PSYCHOLOGICAL ASPECTS OF PREGNANCY AMONGST WOMEN WITH INSULIN-DEPENDENT DIABETES MELLITUS

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Submitted in partial fulfilment of the Degree of Doctor of Philosophy,
University College London Medical School

London
1997
ACKNOWLEDGEMENTS

Just as an academic thesis has a set structure, so too does the acknowledgements section. I must therefore begin with my supervisor, Stan Newman. Finishing the project has been a long haul and I am delighted that we have both seen it through to the end. I am particularly grateful to him for insisting on the non-pregnant control group; he was right.

Not surprisingly in a study that has looked at the psychological effects of an endocrine disorder during pregnancy, numerous people, from a variety of different disciplines, have provided me with assistance. I would like to thank the staff at the departments of diabetic medicine and the departments of obstetrics at Kings College, North Middlesex, University College, Whipps Cross and the Whittington hospitals. Dr Marjorie Doddridge, consultant diabetologist at Kings College Hospital deserves a special mention for her extraordinary kindness and attention to detail.

Afra Cambridge helped me enormously with the administration of the project across the five different hospitals, as well as providing general morale boosting and support. Barbara Nettleton did a marvellous job word-processing the tables, and transforming a scruffy manuscript into a presentable thesis. Colin Symons advised me on setting up the SPSS program, and Aviva Petrie gave me invaluable advice on statistical issues. Discussion with Sandra Elliott helped me clarify issues at two key stages of the project. Cathy Mooney and Diana Hawdon from the School of Life Sciences at the University of North London carried out the nutritional analyses of the dietary data.

I am enormously grateful to the British Diabetic Association for the award of a research grant.

Finally, most students battling through a Ph.D could use a guardian angel. I was lucky enough to have three wise men. I would like to express my debt of gratitude to Steven Briggs, Andrew Franklin and Michael Rutter. Each of them, in their own way, helped me to get to the end of the project. But Andrew Franklin bore the hardest brunt, as he had to live with me from the project’s conception right the way through to the final delivery.
CHAPTER 3 MEDICAL AND PSYCHOLOGICAL ASPECTS OF PREGNANCY COMPLICATED BY IDDM

3.1 INTRODUCTION ................................................................. 68

3.2 INCIDENCE OF PREGNANCY COMPLICATED BY DIABETES MELLITUS ......................................................... 68

3.3 MATERNAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM ................................. 68

3.3.1 Hypoglycaemia ................................................................. 68

3.3.2 Diabetic ketoacidosis ......................................................... 69

3.3.3 Retinopathy ........................................................................ 69

3.3.4 Nephropathy ....................................................................... 69

3.3.5 Neuropathy ......................................................................... 70

3.3.6 Diabetic heart disease ......................................................... 70

3.3.7 Pregnancy induced hypertension ........................................ 70

3.3.8 Maternal mortality ............................................................. 70

3.4 FOETAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM ................................. 71

3.4.1 Spontaneous abortion ........................................................ 71

3.4.2 Congenital malformations .................................................. 71

3.4.3 Macrosomia ........................................................................ 71

3.4.4 Intra-uterine growth retardation ......................................... 72

3.5 PERINATAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM ................................. 72

3.5.1 Prematurity and method of delivery .................................. 72

3.5.2 Caesarean section ............................................................. 72

3.5.3 Perinatal mortality ............................................................. 73

3.5.4 Respiratory distress syndrome .......................................... 73

3.5.5 Hypoglycaemia in the infant .............................................. 73

3.6 MEDICAL MANAGEMENT OF WOMEN WITH IDDM DURING PREGNANCY ................................................................. 74

3.6.1 Preconception management ................................................. 74

3.6.2 Insulin regimen during pregnancy ...................................... 74

3.6.3 Diet .................................................................................... 74
3.6.4 Self-monitoring of blood glucose ........................................................ 75

3.7 PSYCHOLOGICAL ASPECTS OF PREGNANCY

3.7.1 Adherence to the diabetic self-care regimen during pregnancy ........................................................ 75

3.7.2 Emotional adjustment during pregnancy in patients with IDDM ........................................................ 79

3.8 Rationale of current study ................................................................. 81

3.8.1 The assessment of regimen adherence during pregnancy ............. 81

3.8.2 The assessment of emotional adjustment during pregnancy ........ 82

CHAPTER 4 METHODS ................................................................. 84

4.1 DESIGN OF STUDY ................................................................. 84

4.2 RECRUITMENT OF THE SAMPLE ........................................ 84

4.2.1 Recruitment of the pregnant diabetic (P/D) group ....................... 84

4.2.1.1 Response rate ................................................................. 86

4.2.2 Recruitment of the pregnant non-diabetic (P/N-D) group ............. 87

4.2.2.1 Matching the P/N-D group to the P/D group ......................... 87

4.2.2.1.1 Matching of gestational age ........................................ 87

4.2.2.1.2 Matching of maternal age .......................................... 87

4.2.2.1.3 Matching of social class ........................................... 87

4.2.2.1.4 Matching of ethnic origin ......................................... 88

4.2.2.1.5 Matching of marital status ........................................ 88

4.2.2.1.6 Matching the number of living children ....................... 88

4.2.2.2 Response rate ................................................................. 88

4.2.3 Recruitment of the non-pregnant diabetic (N-P/D) group .......... 88

4.2.3.1 Response rate ................................................................. 90

4.3 PROCEDURE ................................................................. 92

4.4 DESCRIPTION OF THE QUESTIONNAIRES ................................ 93

4.4.1 Questionnaires completed by all three groups ......................... 95

4.4.1.1 Demographic background (Appendix B4) ........................... 95

4.4.1.2 Depressed mood (Appendix B5) ....................................... 95

4.4.1.3 Previous episodes of emotional problems (Appendix B6) .... 97

4.4.1.4 State anxiety (Appendix B7) ........................................... 97

4.4.1.5 Satisfaction with social support (Appendix B8) .................... 97

4.4.2 Questionnaires completed by the two pregnant groups .......... 97

4.4.2.1 Medical aspects of pregnancy (Appendix B9) ...................... 97
4.4.2.2 Psychological attachment to the foetus (Appendix B10) .... 98
4.4.2.3 Prenatal self-evaluation questionnaire (Appendix B11)...... 98
  4.4.2.3.1 Health anxieties about the baby/labour
                      (subscale I) ................................................................. 98
  4.4.2.3.2 Identification with the motherhood role
                      (subscale III) ............................................................... 98
  4.4.2.3.3 Satisfaction with relationship with partner
during pregnancy (subscale VI) ........................................... 99
4.4.2.4 Feelings about being pregnant (Appendix B11) ............... 99
4.4.2.5 Foetal health locus of control (Appendix B12) ................ 100
4.4.2.6 Body image (Appendix B13) .......................................... 100
4.4.2.7 Satisfaction with antenatal care (Appendix B14) ............. 100
4.4.3 Questionnaires completed by the two diabetic groups .......... 101
  4.4.3.1 Knowledge about diabetes (Appendix B15) .................... 101
  4.4.3.2 Emotional adjustment to diabetes (Appendix B16) ........... 101
  4.4.3.3 Family support for diabetes (Appendix B17) .................. 101
  4.4.3.4 Perceived control of diabetes (Appendix B18) ............... 102
  4.4.3.5 Diabetes self-efficacy (Appendix B19) ......................... 102
  4.4.3.6 Satisfaction with diabetic care (Appendix B20) .............. 103
  4.4.3.7 Health Belief Model (Appendix B21) .............................. 103
    4.4.3.7.1 Cues to action (Appendix B21a) ............................... 104
    4.4.3.7.2 General health motivation (Appendix B21a) .......... 105
    4.4.3.7.3 Perceived barriers (Appendix B21b) ..................... 105
    4.4.3.7.4 Perceived benefits (Appendix B21b) .................... 106
    4.4.3.7.5 Perceived seriousness (Appendix B21c) ............. 107
    4.4.3.7.6 Perceived susceptibility (Appendix B21d) .......... 108
  4.4.3.8 Open-ended items about motivation for
        regimen adherence (Appendix B22) .............................. 108
4.4.4 Questionnaires completed by the pregnant diabetic
group only .............................................................................. 108
  4.4.4.1 Health beliefs about diabetic pregnancy
                      (Appendix B23a,b&c) ........................................... 108
  4.4.4.2 Knowledge about diabetic pregnancy (Appendix B24) ....... 109
4.5 THE ASSESSMENT OF REGIMEN ADHERENCE AND
       SELF CARE BEHAVIOUR ......................................................... 110
  4.5.1 Blood glucose testing .................................................. 110
    4.5.1.1 Self-monitoring of blood glucose testing .............. 110
4.5.1.2 Self-report of blood glucose testing (Appendix C3) ............ 110
4.5.1.3 Subject's representation of the prescribed blood
    glucose testing regimen (Appendix C4) ............................. 111
4.5.1.4 Adherence to the blood glucose testing regimen .......... 111

4.5.2 Insulin injections ................................................................. 111
4.5.2.1 Self-monitoring of insulin injections (Appendix C5) ......... 111
4.5.2.2 Self-report of insulin injections (Appendix C3) ............ 112
4.5.2.3 Subject's representation of the prescribed insulin
    regimen (Appendix C6) ....................................................... 112
4.5.2.4 Adherence to the insulin testing regimen ................. 112
    4.5.2.4.1 Using the information from the
        self-monitoring records ......................................... 112
    4.5.2.4.2 Using the information from the
        self-report questionnaire (Appendix C3) ............ 112

4.5.3 Dietary behaviour ............................................................... 113
4.5.3.1 Self-monitoring of diet .................................................. 113
4.5.3.2 Self-report of dietary behaviour (Appendix C3) .......... 114
4.5.3.3 Subject's representation of the prescribed diet
    (Appendix C9) ................................................................. 114
4.5.3.4 Adherence to the diet .................................................... 114
4.5.3.5 Self-Care prior to pregnancy (Appendix C10) ............ 114

4.6 THE MEASUREMENT OF GLYCAEMIC CONTROL ................. 114

4.7 STATISTICAL PROCEDURES ................................................. 115

CHAPTER 5 INTRODUCTION TO RESULTS ........................................ 117

5.1 COMPARISONS INVOLVING ALL THREE GROUPS ..................... 117
    5.1.1 Drop out from the study ................................................. 117
    5.1.2 Demographic characteristics ........................................ 119
        5.1.2.1 Age ........................................................................ 120
        5.1.2.2 Parity .................................................................... 120
        5.1.2.3 Social class ......................................................... 121
        5.1.2.4 Marital status ...................................................... 121
        5.1.2.5 Employment status ............................................ 122
    5.1.3 Physical well-being and medical treatment ..................... 122
        5.1.3.1 Illnesses other than diabetes ................................. 122
    5.1.4 Satisfaction with social support ...................................... 124
    5.1.5 State anxiety .............................................................. 124
# 5.2 Comparisons Involving the Two Pregnant Groups

## 5.2.1 Obstetric History
- Previous miscarriages
- Previous terminations of pregnancy
- Planning of pregnancy
- Conception
- Weeks pregnant when first contacted the doctor
- Weeks pregnant at time of interview

## 5.2.2 Physical Problems Related to Pregnancy

## 5.2.3 Antenatal Treatment
- Preconception counselling
- Ultrasound scans
- Amniocentesis
- Hospitalization during pregnancy
- Satisfaction with antenatal treatment and continuity of care

## 5.2.4 Factors Related to Emotional Adjustment During Pregnancy

## 5.2.5 Outcome of Pregnancy

# 5.3 Comparisons Involving the Two Diabetic Groups

## 5.3.1 Medical Aspects of Diabetes
- Disease duration
- Diabetic complications
- Glycaemic control
- Satisfaction with diabetic treatment and continuity of care

## 5.3.2 Health Beliefs About Diabetes and Its Treatment
- Perceived severity and perceived susceptibility to particular medical problems

## 5.3.3 Diabetes Specific Psychosocial Factors
- Knowledge about diabetes
- Diabetic related stress
- Family support for diabetes
- Perceived control of diabetes

# 5.4 Factors Specific to Pregnancy Complicated by Diabetes

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9
CHAPTER 6  ADHERENCE TO THE BLOOD GLUCOSE TESTING REGIMEN

6.1  INTRODUCTION

6.2  COMPARISON OF REGIMEN PRESCRIPTIONS

6.2.1  Comparison of number of weekly recommended blood glucose tests

6.2.2  Failure to recall blood glucose testing recommendations

6.3  MEASURING BLOOD GLUCOSE TESTING SELF-CARE AND REGIMEN ADHERENCE

6.3.1  Difficulties with measuring regimen adherence

6.3.2  Intercorrelations between the self-care and adherence measures

6.4  COMPARING LEVELS OF BLOOD GLUCOSE TESTING

6.4.1  Comparison of number of weekly blood glucose tests carried out

6.4.2  Comparison of self-report measure of frequency of blood glucose testing

6.4.3  Adherence to the blood glucose testing regimen

6.5  COMPARING THE FREQUENCY WITH WHICH BLOOD GLUCOSE TEST RESULTS WERE WRITTEN DOWN

6.6  SUMMARY OF COMPARISONS

6.7  IDENTIFYING FACTORS ASSOCIATED WITH LEVELS OF BLOOD GLUCOSE TESTING

6.7.1  Demographic and obstetric factors

6.7.2  Psychosocial factors

6.7.2.1  Attributions of control

6.7.2.2  Emotional adjustment

6.7.2.3  Adjustment to pregnancy

6.7.2.4  Satisfaction with social support

6.7.3  Health belief model

6.7.3.1  Health beliefs as predictors in the pregnant diabetic group

6.7.3.2  Health beliefs as predictors in the non-pregnant diabetic group

6.8  OPEN-ENDED RESPONSES ABOUT REASONS UNDERLYING FOR REGIMEN ADHERENCE

6.8.1  Open-ended responses in the P/D group

6.8.2  Open-ended responses in the N-P/D group
CHAPTER 7  ADHERENCE TO THE INSULIN INJECTION AND
DIETARY REGIMEN ........................................................................................................... 175
7.1 INTRODUCTION ........................................................................................................... 175
7.2 COMPARING INSULIN PRESCRIPTIONS ..................................................................... 175
7.2.1 Recall of regimen prescriptions ........................................................................ 175
7.2.2 Comparison of number and type of recommended weekly injections ............... 175
7.3 ADHERENCE TO THE INSULIN REGIMEN ............................................................. 176
7.4 COMPARING THE DIETARY PRESCRIPTIONS ........................................................... 177
7.4.1 Proportion advised to follow a particular diet .................................................. 177
7.4.2 Source of dietary recommendations ................................................................... 178
7.4.3 Proportion recommended to follow dietary principles ....................................... 179
7.5 ADHERENCE TO DIETARY PRINCIPLES .................................................................. 180
7.6 ABSOLUTE LEVELS OF DIETARY SELF-CARE FROM THE DIETARY DIARIES .......................................................... 183
7.6.1 Proportion of usable diaries .............................................................................. 183
7.6.2 Comparison of intake of nutritional components between the two groups .......... 183
7.6.2.1 Carbohydrate intake ...................................................................................... 185
7.6.2.2 Sugar intake .................................................................................................. 185
7.6.2.3 Fibre intake .................................................................................................. 186
7.6.2.4 Fat intake ...................................................................................................... 186
7.6.2.5 Protein intake ............................................................................................... 186
7.6.2.6 Alcohol intake .............................................................................................. 187

CHAPTER 8  ANTENATAL ATTACHMENT AND FEELINGS ABOUT THE PREGNANCY .................................................................................................................. 189
8.1 DIFFERENTIATING BETWEEN ANTENATAL ATTACHMENT AND FEELINGS ABOUT THE PREGNANCY .......................................................... 189
8.2 COMPARING ANTENATAL ATTACHMENT ................................................................ 189
8.3 IDENTIFICATION OF FACTORS ASSOCIATED WITH ANTENATAL ATTACHMENT .......................................................... 190
8.3.1 Demographic factors .......................................................................................... 190
8.3.2 Obstetric factors .................................................................................................. 192
8.3.3 Psychosocial factors ............................................................................................ 194
8.3.4 Physical aspects of pregnancy ........................................................................... 196
8.3.5 Stepwise multiple regression analysis .................................................................. 195
8.4 COMPARING FEELINGS ABOUT THE PREGNANCY ................................................. 197
8.5 IDENTIFICATION OF FACTORS ASSOCIATED WITH FEELINGS ABOUT THE PREGNANCY ................................................................. 198
  8.5.1 Demographic factors .................................................................................. 198
  8.5.2 Obstetric factors ....................................................................................... 200
  8.5.3 Psychosocial factors .................................................................................. 200
  8.5.4 Physical aspects of pregnancy .................................................................. 204
  8.5.5 Stepwise multiple regression analysis ....................................................... 205

CHAPTER 9 PREVIOUS EMOTIONAL HISTORY AND DEPRESSED MOOD .......... 207
  9.1 COMPARISON OF PREVIOUS EMOTIONAL HISTORY .................................. 207
    9.1.1 Distinguishing between previous postnatal and previous non-postnatal emotional problems ................................................................. 207
    9.1.2 Combining postnatal and non-postnatal data ......................................... 207
      9.1.2.1 The role of marital status .................................................................. 208
      9.1.2.2 The role of childlessness .................................................................. 209
  9.2 COMPARISON OF LEVELS OF DEPRESSED MOOD ................................... 209
    9.2.1 Total BDI scores .................................................................................... 210
    9.2.2 Somatic items from the BDI .................................................................... 210
    9.2.3 Cognitive-affective items from the BDI .................................................. 211
  9.3 THE IDENTIFICATION OF POSSIBLE CASES OF CLINICAL DEPRESSION IN THE THREE GROUPS ................................................................. 211
    9.3.1 Comparing group mean scores to cut-off points .................................... 211
    9.3.2 Frequencies of subjects experiencing different levels of depression .......... 212
  9.4 IDENTIFICATION OF FACTORS ASSOCIATED WITH DEPRESSED MOOD .............................................................................................................. 212
    9.4.1 Demographic factors .............................................................................. 212
    9.4.2 Obstetric factors ..................................................................................... 214
    9.4.3 Physical well-being ................................................................................ 216
    9.4.4 The effect of vulnerability factors ............................................................ 218
      9.4.4.1 Factors applying to all three groups .................................................. 219
      9.4.4.1.1 Previous episodes of emotional problems .................................... 219
      9.4.4.1.2 Satisfaction with social support ....................................................... 223
      9.4.4.2 Factors applying to the 2 pregnant groups ........................................ 225
      9.4.4.2.1 Quality of the marital relationship during pregnancy ....................... 225
9.4.4.2 Health anxieties about labour/the baby ............... 225
9.4.4.2.3 Confidence in one's ability to look after
the baby ............................................................... 225
9.4.4.2.4 Emotional attachment to the foetus ............... 225
9.4.4.2.5 Body image during pregnancy ....................... 226
9.4.4.3 Factors applying to the 2 diabetic groups ............... 226
9.4.4.3.1 Diabetic related stress ........................................ 226
9.4.4.3.2 Perceived susceptibility to diabetic problems .... 226
9.4.4.3.3 Levels of self-care and adherence to the
self-care regimen ................................................. 226
9.4.5 Stepwise multiple regression analyses ...................... 227
9.4.5.1 All three groups .................................................. 227
9.4.5.2 The two pregnant groups ...................................... 228
9.4.5.3 The two diabetic groups ....................................... 229

CHAPTER 10 DISCUSSION ................................................................. 230
10.1 LIMITATIONS OF THE STUDY .................................................... 230
10.2 THE IMPACT OF THE STUDY ON WOMEN WITH
DIABETES ........................................................................... 234
10.2.1 Medical aspects of diabetes ....................................... 234
10.2.2 Health beliefs about diabetes ..................................... 235
10.2.3 Diabetes specific indices of adjustment ....................... 237
10.2.4 The blood glucose testing regimen ........................... 240
10.2.4.1 Levels of blood glucose testing .............................. 240
10.2.4.2 Identifying predictors of blood glucose testing .......... 242
10.2.4.2.1 Psychosocial factors ....................................... 242
10.2.4.2.2 The utility of the Health Belief Model ............... 243
10.2.5 The Dietary Regimen .................................................. 251
10.2.5.1 Dietary Advice ..................................................... 251
10.2.5.2 Dietary Behaviour ................................................ 251
10.2.6 The insulin regimen ................................................ 254
10.3 THE IMPACT OF DIABETES ON PREGNANCY ....................... 254
10.3.1 Medical aspects and antenatal treatment .................... 254
10.3.1.1 Previous obstetric history ..................................... 254
10.3.1.2 Planning of Pregnancy and Pre-conception care ..... 255
10.3.1.4 Antenatal treatment ............................................ 256
10.3.1.4 Hospitalization during pregnancy ....................... 256
10.3.1.5 Physical well-being ......................................................... 257

10.3.2 Adjustment to the medical aspects of pregnancy ....................... 257

10.3.3 Adjustment to the motherhood role .............................................. 260

10.4 THE IMPACT OF PREGNANCY AND DIABETES ON ANXIETY .............. 266

10.5 THE IMPACT OF PREGNANCY AND DIABETES ON DEPRESSED MOOD ........................................................................................................... 267

10.5.1 Previous emotional history ............................................................... 268

10.5.2 Comparison of levels of depressed mood between the
three groups ...................................................................................... 268

10.5.3 Identifying psychosocial predictors of depressed mood ............... 272

10.5.3.1 Previous emotional history and social support .................. 272

10.5.3.2 Pregnancy related predictors of depressed mood .............. 275

10.5.3.3 Diabetes specific predictors of depressed mood .............. 278

10.6 CONCLUSIONS ............................................................................................. 281

10.7 SUGGESTIONS FOR FUTURE RESEARCH .............................................. 283

REFERENCES ........................................................................................................................ 287

APPENDICES

Appendix A Calculation to determine sample size .................................................... 307
Appendix B1 Diabetes in pregnancy project - patient information sheet .................. 308
Appendix B2 Consent form ....................................................................................... 309
Appendix B3 Preamble ............................................................................................. 310
Appendix B4 Demographic background .................................................................. 311
Appendix B5 Beck depression inventory .................................................................. 313
Appendix B6 Previous emotional history ................................................................. 316
Appendix B7 State anxiety ......................................................................................... 318
Appendix B8 Satisfaction with social support ............................................................ 319
Appendix B9 Medical aspects of pregnancy ............................................................. 321
Appendix B10 Psychological attachment to the foetus ............................................ 235
Appendix B11 Prenatal self-evaluation questionnaire .............................................. 330
Appendix B12 Foetal health locus of control ............................................................ 335
Appendix B13 Body image ....................................................................................... 337
Appendix B14 Satisfaction with antenatal care ......................................................... 338
Appendix B15 Knowledge about diabetes ................................................................. 340
Appendix B16 Adjustment to diabetes ...................................................................... 342
Appendix B17 Family support for diabetes ............................................................. 345
Appendix B18 Perceived control of diabetes ............................................................ 347
Appendix B19 Diabetes self-efficacy ................................................................. 352
Appendix B20 Satisfaction with diabetic care ..................................................... 354
Appendix B21a Health belief model - cues to action and general health motivation 356
Appendix B21b Health belief model - perceived barriers and perceived benefits 357
Appendix B21c Health belief model - perceived seriousness ............................... 360
Appendix B21d Health belief model - perceived susceptibility ............................ 362
Appendix B22 Open ended items ..................................................................... 263
Appendix B23a Health beliefs about diabetic pregnancy
- perceived benefits and barriers ................................................................. 364
Appendix B23b Health beliefs about diabetic pregnancy
- perceived severity .................................................................................... 365
Appendix B23c Health beliefs about diabetic pregnancy
- perceived susceptibility ............................................................................ 366
Appendix B24 Knowledge about diabetic pregnancy ......................................... 367
Appendix C1 Written instructions for self-monitoring ....................................... 368
Appendix C2 Self-monitoring of blood glucose testing form ............................... 369
Appendix C3 Regimen self-report questionnaire ............................................... 370
Appendix C4 Subject’s representation of prescribed blood glucose testing regimen 372
Appendix C5 Self-monitoring of insulin injections form ..................................... 374
Appendix C6 Subject’s representation of prescribed insulin injections ............... 375
Appendix C7 Instructions for self-monitoring diet .......................................... 379
Appendix C8 Dietary diary ............................................................................... 381
Appendix C9 Subject’s representation of prescribed diet .................................... 383
Appendix C10 Regimen self-report questionnaire on behaviour prior to pregnancy 386
LIST OF TABLES

Table 1.1  Recommended classification of Diabetes Mellitus. (WHO, 1980; 1985) .......... 22
Table 3.1  Summary of studies of adherence to the diabetic self-care regimen during pregnancy .................................................................................................................... 78
Table 3.2  Summary of studies of emotional adjustment of pregnant IDDM patients ........ 80
Table 4.1  Response rate in each of the 3 groups .......................................................... 90
Table 4.2  Comparison of demographic characteristics of responders and non-responders within the P/N-D group ................................................................. 92
Table 4.3  Questionnaires used in the study .................................................................. 95
Table 5.1  Comparison of demographic characteristics between those P/D women who completed the week of self-monitoring and those P/D women who did not ................................................................. 118
Table 5.2  Comparison of mean ages (in years) between the three groups ................. 120
Table 5.3  Demographic characteristics of subjects in each of the three groups ............ 121
Table 5.4  Frequencies of subjects who had experienced illnesses other than diabetes (all three groups) .................................................................................................................. 123
Table 5.5  Comparison between the three groups of satisfaction with social support and state anxiety ................................................................. 124
Table 5.6  Frequencies of subjects in the two pregnant groups who had experienced different previous obstetric events ................................................................. 126
Table 5.7  Comparison between the two pregnant groups of mean weeks pregnant when first contacted the doctor, and mean weeks pregnant at the time of interview ................................................................. 128
Table 5.8  Frequencies of subjects in the two pregnant groups who had experienced nausea and tiredness ................................................................. 129
Table 5.9  Frequencies of subjects in the P/D group who checked glycaemic control prior to pregnancy, divided according to the planning of pregnancy and according to parity .................................................................................................................. 131
Table 5.10 Frequencies of subjects in the two pregnant groups who had experienced hospitalisation, a first ultrasound scan, a second ultrasound scan and amniocentesis screening .................................................................................................................. 131
Table 5.11 Comparison between the two pregnant groups of satisfaction with antenatal treatment and continuity of antenatal treatment ................................................................. 133
Table 5.12 Comparison between the two pregnant groups of pregnancy related psychosocial variables .................................................................................................................. 134
Table 5.13 Comparison between the two diabetic groups of mean disease duration ........ 135
Table 5.14 Frequencies of subjects in the two diabetic groups who had experienced complications of diabetes .................................................................................................................. 136
Table 5.15 Comparison of mean preprandial blood glucose test results (in mmol/L) between the two diabetic groups .................................................................................................................. 137
Table 5.16 Comparison between the two diabetic groups of satisfaction with diabetic treatment ................................................................. 137
Table 5.17 Comparison between the two diabetic groups on the components of the Health Beliefs Model ...................................................... 139
Table 5.18 Comparison between the two diabetic groups of perceived severity to specific diabetic problems and perceived susceptibility to specific diabetic problems ................................................................. 141
Table 5.19 Comparison between the two diabetic groups of family support for diabetes (positive and negative subscales), diabetes related stress and knowledge about diabetes ................................................................. 142
Table 5.20 Comparison between the two diabetic groups of perceived control of diabetes scales ............................................................................................................ 143
Table 5.21 Comparison between the two diabetic groups of effects of treatment in 4 hypothetical situations and effects of medical control (ie the doctor) in 4 hypothetical situations .............................................................................................. 144
Table 5.22 Difference between the perceived benefits of the regimen and the perceived barriers to adherence during pregnancy (P/D group only) .................... 147
Table 6.1 Frequencies of subjects recalling their blood glucose test recommendations in the two diabetic groups .......................................................... 153
Table 6.2 Intercorrelations between the self-care and adherence measures of blood glucose testing ............................................................................................................ 154
Table 6.3 Comparison between the 2 diabetic groups of the self-report measure of blood glucose testing frequency ................................................................. 157
Table 6.4 Comparison of the self-report measure of blood glucose testing during pregnancy with the retrospective self-report measure of blood glucose testing prior to pregnancy (P/D group only) .................................................................................. 158
Table 6.5 Comparison between the 2 diabetic groups of the self-report frequency of writing down blood glucose test results ................................................................. 159
Table 6.6 Comparison of the self-report measure of blood glucose testing during pregnancy with the retrospective self-report of blood glucose testing prior to pregnancy (P/D group only) .................................................................................. 160
Table 6.7 Relationship between demographic/obstetric factors and blood glucose testing (P/D and N-P/D groups) ................................................................. 162
Table 6.8 Relationship between psychosocial variables and blood glucose testing (P/D and N-P/D groups) ................................................................. 165
Table 6.9 Relationship between health belief model variables and blood glucose testing (P/D and N-P/D groups) ................................................................. 168
Table 6.10 Relationship between perceived severity to specific diabetic complications and adherence to the blood glucose testing regimen (P/D group) ................................................................. 169
Table 6.11 Relationship between pregnancy specific health belief model variables and blood glucose testing (P/D group) ................................................................. 170
Table 7.1 Frequencies of subjects who had been prescribed a particular diet (P/D and N-P/D groups) ................................................................. 177
Table 7.2 Frequencies of being prescribed a particular diet and receiving dietary advice during pregnancy (P/D group) .......................................................... 179
Table 7.3 Frequencies of subjects who had been advised to adhere to different dietary principle ......................................................................................... 180
Table 7.4 Frequencies of self-reported adherence to each of the 4 dietary principles amongst those subjects who had been advised about that particular principle ......................................................................................... 181
Table 7.5 Self-reported adherence to the 4 dietary principles prior to pregnancy, compared to adherence during pregnancy (P/D group only) ................................... 182
Table 7.6 Comparison of intake of nutritional components between the 2 diabetic groups. Data from 4-day dietary diaries, analysed by comp-EAT programme ............................................................................................................. 184
Table 7.7 Comparison between the 2 diabetic groups of number of daily high sugar snacks taken between meals ................................................................................. 185
Table 8.1 Intercorrelation between antenatal attachment and feelings about the pregnancy (P/D and N-P/D groups) ........................................................................... 189
Table 8.2 Relationship between demographic factors and antenatal attachment (P/D group and P/N-D groups) .................................................................................. 191
Table 8.3 Relationship between obstetric factors and antenatal attachment (P/D and P/N-D groups) ................................................................................................. 193
Table 8.4 Relationship between antenatal attachment and psychosocial variables (P/D and P/N-D groups) ................................................................................. 194
Table 8.5 Relationship between antenatal attachment and physical aspects of pregnancy (P/D group and P/N-D group) ...................................................................... 196
Table 8.6 Stepwise Multiple Regression Analysis predicting antenatal attachment (both pregnant groups) .................................................................................. 197
Table 8.7 Comparison of feelings about the pregnancy between the 2 pregnant groups ..................................................................................................................... 197
Table 8.8 Relationship between demographic factors and feelings about the pregnancy (P/D and P/N-D groups) .......................................................................... 199
Table 8.9 Relationship between obstetric factors and feelings about the pregnancy (P/D and P/N-D groups) ................................................................................. 201
Table 8.10 Relationship between feelings about the pregnancy and psychosocial variables (P/D and P/N-D groups) ........................................................................ 202
Table 8.11 Relationship between feelings about the pregnancy and physical aspects of pregnancy (P/D and P/N-D groups) ...................................................................... 205
Table 8.12 Stepwise Multiple Regression Analysis predicting feelings about the pregnancy (both pregnant groups) ........................................................................ 206
Table 9.1 Frequencies of previous episodes of emotional problems, both within and outside the postnatal period (all 3 groups) ................................................................. 207
Table 9.2 Frequencies of previous episodes of emotional problems at any time (all 3 groups) .......................................................... 208
Table 9.3 Frequencies of previous episodes of emotional problems at any time (P/D and N-P/D groups) .......................................................... 209
Table 9.4 Comparison of group mean scores on the total Beck Depression Inventory and on the 2 subscales (all 3 groups) 210
Table 9.5 Frequencies of subjects experiencing different levels of depression, based on the cut-off points described by Shaw et al (1985), and applied to the 9 cognitive-affective items 212
Table 9.6 Relationship between demographic factors and depressed mood (all 3 groups) .......................................................... 213
Table 9.7 Relationship between obstetric factors and depressed mood (P/D group and P/N-D group) .......................................................... 215
Table 9.8 Relationship between physical well-being and depressed mood (all 3 groups) .......................................................... 217
Table 9.9 Potential vulnerability factors for predicting depressed mood .......................................................... 219
Table 9.10 Relationship between previous emotional history and depressed mood (all 3 groups) .......................................................... 220
Table 9.11 Relationship between previous emotional history and suggested diagnosis of current depression (all 3 groups) .......................................................... 222
Table 9.12 Relationship between depressed mood and psychosocial risk factors (all groups) .......................................................... 224
Table 9.13 Stepwise Multiple Regression predicting depressed mood (all 3 groups) .......................................................... 227
Table 9.14 Stepwise Multiple Regression predicting depressed mood (both pregnant groups) .......................................................... 228
Table 9.15 Stepwise multiple regression analysis predicting depressed mood (both diabetic groups) .......................................................... 229
Table 10.1 Summary of predictor variables that were significantly correlated with the adherence measure and the self-care measure of blood glucose testing, P/D and N-P/D groups .......................................................... 243
LIST OF FIGURES

Figure 4.1 Design of Study ........................................................................................................ 84
Figure 5.1 Drop out from different stages of the Study ........................................................... 118
Figure 5.2 Responses to question 3 on ‘Medical aspects of Pregnancy’ questionnaire, 
P/D group only (n=34) .............................................................................................. 130
Figure 5.3 Responses to questions on the benefits of the regimen during pregnancy .......... 146
Figure 5.4 Responses to questions about perceived susceptibility to and perceived severity of diabetic related pregnancy complications (P/D group only) .............. 148
Figure 6.1 Comparison of recommended number of weekly blood glucose tests 
between the 2 diabetic groups .................................................................................. 152
Figure 6.2 Comparison of weekly blood glucose tests carried out between the 2 
diabetic groups ........................................................................................................... 156
Figure 6.3 Proportion of recommended weekly blood glucose tests carried out by 
subjects in the P/D group (n=24) .............................................................................. 158
Figure 6.4 Responses to question “What would you say are the major factors that motivate you to follow your regimen at the moment?” P/D group (37 women responded) ............................................................................................................. 172
Figure 6.5 Responses to question “Before you were pregnant or trying to conceive the current pregnancy, what were the major factors that motivated you to follow your regime then?” P/D group (37 women responded) .............. 172
Figure 6.6 Responses to question “In what ways has your diabetes changed during your pregnancy?” P/D group (37 women responded) ................................................................. 173
Figure 6.7 Responses to question “What would you say are the major factors that motivate you to follow your regimen at the moment?” N-P/D group (23 women responded) .................. 174
Figure 7.1 Comparison of recommended number of weekly insulin injections 
between the 2 diabetic groups .................................................................................. 176
Figure 7.2 Comparison of percentage of recommended weekly insulin injections 
carried out between the 2 diabetic groups ............................................................... 177
Figure 7.3 Sources of dietary advice ......................................................................................... 178
Figure 7.4 Comparison of mean daily alcohol intake between the 2 diabetic groups 
(data taken from the 4 day dietary diaries) ............................................................. 187
ABSTRACT

This study investigated emotional adjustment and regimen adherence of pregnant women with insulin-dependent diabetes mellitus (IDDM). 40 pregnant women with IDDM (P/D group), 35 pregnant non-diabetic women (P/N-D group) and 25 non-pregnant women who had IDDM (N-P/D group) were interviewed in their homes. Both of the diabetic groups self-monitored their regimen adherence in the week following the interview. All P/D and P/N-D interviews took place in the second trimester of pregnancy. Pregnancy was associated with significant shifts in blood glucose testing behaviour but only minor shifts in dietary behaviour. The two diabetic groups also differed in the factors that predicted blood glucose testing. Health beliefs and attitudes to the disease did not alter dramatically during pregnancy. The 2 pregnant groups did not differ in terms of physical symptoms of pregnancy or in rates of hospitalization. The P/D group did not report higher levels of health anxieties and they were optimistic about the prognosis for the pregnancy. No group differences were found in psychological attachment to the foetus. Within both pregnant groups attachment to the foetus was found to be unrelated to feelings about the state of pregnancy. The three groups did not differ in current levels of depressed mood but the N-P/D group had experienced a significantly higher rate of previous emotional problems. The generally favourable psychological adjustment of the P/D women was attributed to changes in the medical management of diabetic pregnancy and the improved prognosis for both mother and baby. The suggestion is also made that that the P/D women may have differed in their tolerance of physical symptoms of pregnancy. The limitations of the current study and suggestions for future research are discussed.
CHAPTER 1
MEDICAL AND PSYCHOLOGICAL ASPECTS
OF INSULIN-DEPENDENT DIABETES MELLITUS

1.1 INTRODUCTION

The aim of this thesis is to examine the psychological adjustment during pregnancy of a group of women with insulin-dependent diabetes mellitus (IDDM). Two different aspects of their adjustment are examined: firstly, the question of how the women manage the demands of the diabetic self-care regimen during pregnancy, and secondly, the question of how they cope with the emotional demands of pregnancy complicated by diabetes. In this chapter, a description of diabetes mellitus and the treatment regimen is provided. In addition, the literature on psychosocial correlates of regimen adherence and psychological adjustment to diabetes are critically reviewed. Chapter 2 provides a critical review of the literature on psychological aspects of pregnancy concentrating on emotional adjustment during pregnancy. Chapter 3 reviews the existing literature on the combination of the diabetic and pregnancy fields, namely psychological studies of diabetic pregnancy, and builds on these existing findings, together with the main findings from the literature reviewed in chapters 1 and 2, to provide a rationale for the investigations carried out in this study.

1.2 CLASSIFICATION, PREVALENCE AND INCIDENCE OF DIABETES MELLITUS

1.2.1 Classification of diabetes

Diabetes Mellitus (DM) is a disorder of multiple aetiology characterized by hyperglycaemia, glycosuria and a wide spectrum of clinical and pathological manifestations (Tang Fui and Keen, 1988). The currently recommended classification of DM proposed by the Expert Committee of the Whole Health Organization (WHO, 1980; 1985) is given in Table 1.1.

| Table 1.1 Recommended classification of Diabetes Mellitus, (WHO, 1980; 1985) |
|------------------|------------------|------------------|------------------|
| 1 | Diabetes Mellitus (DM) | 2 | Gestational Diabetes |
| | A | Insulin Dependent Diabetes Mellitus (IDDM) - Type 1 | | |
| | B | Non-insulin Dependent Diabetes Mellitus (NIDDM) - Type 2 | | |
| | C | Malnutrition Related Diabetes Mellitus (MRDM) | | |
| | D | DM associated with certain syndromes and conditions such as pancreatic disease and endocrine disorders | | |
| 3 | Impaired Glucose Tolerance | | |
Patients with IDDM usually have a relatively abrupt onset of the disease and are invariably dependent on injected insulin to preserve life (Jarrett, 1986). The onset is usually in childhood, adolescence and young adult life, although it may occasionally occur later in life (Marble and Freemason, 1985). In IDDM the insulin deficiency is due to pancreatic beta cell malfunctioning resulting in partial or total failure of insulin synthesis and/or secretion (Drury, 1986).

In contrast to IDDM, patients with NIDDM often have an insidious onset of the disease with few or no classical symptoms of diabetes such as thirst or frequent urination (Marble and Freemason, 1985). NIDDM patients are not dependent upon injected insulin for survival, although insulin may be required for the correction of persistent or symptomatic high blood sugars, i.e. hyperglycaemia, (Jarrett, 1986). However, in many cases of NIDDM, dietary modification alone is adequate treatment (Drury, 1986). Although the vast majority of patients develop the disease after the age of 45, it can occur in adolescence or young adult life (Williams and Pickup, 1990). About 60-90% of NIDDM subjects are obese and constitute a subtype of NIDDM; in these patients hyperglycaemia is improved by weight loss.

Although the vast majority of cases of diabetes will be either IDDM or NIDDM, diabetes mellitus can also be associated with certain conditions and syndromes such as pancreatic disease and endocrine disorders. Malnutrition related diabetes mellitus (MRDM) is prevalent in tropical countries, and occurs in cases of gross malnutrition. (Tang Fui and Keen, 1981).

A diagnosis of gestational diabetes is restricted to pregnant women in whom the onset or diagnosis of diabetes occurs during pregnancy. Women known to be diabetic who then become pregnant are not included in this category. Finally, the diagnosis of impaired glucose tolerance is suggested for those patients in whom the fasting plasma glucose level is lower than that required for the diagnosis of diabetes, but in whom during an oral glucose tolerance test, the value lies between the normal and diabetic values.

1.2.2 Incidence and prevalence of Diabetes Mellitus

Patterson et al (1983) reported an annual rate of incidence of IDDM of 13.8 per 100,000 Scottish children aged 0-18 years. There is also evidence that the incidence of IDDM is increasing, (Metcalfe and Baum, 1991). Estimates of prevalence of IDDM vary widely. Since prevalence rises steeply with age, differences in the age structure of study populations often make interpretations difficult, thus estimates of incidence are considered more reliable (Gamble, 1988).

A 1986 study using the WHO criteria estimated the prevalence of known diabetes (both IDDM and NIDDM) as 3.4% of the USA population, amongst those aged 20-74 years (Harris et al, 1986). NIDDM constitutes the most frequent form of the disease; even in areas where IDDM is common such as northern Europe and the USA, NIDDM accounts for at least 85% of all patients.
with diabetes (Harris and Zimmett (1992)). However, estimating prevalence on known (ie previously diagnosed) cases significantly underestimates the extent of NIDDM in the population (Harris et al 1986).

Data on the prevalence of gestational diabetes are scarce. Furthermore, such estimates will vary widely, according to the screening methods that are adopted (O'Sullivan, 1980). In a screening study which measured blood glucose levels one hour after oral ingestion of 50g of glucose, O'Sullivan (1980) reported a prevalence of gestational diabetes of 2.3% in a group of unselected pregnancies.

1.3 MEDICAL ASPECTS OF DIABETES MELLITUS

1.3.1 Hypoglycaemia

Hypoglycaemia has been defined as a decrease in the plasma glucose concentration to a level sufficient to produce symptoms, with attenuation of symptoms upon restoration of a normal glucose concentration. (Widom and Simonson, 1994). Amongst patients with IDDM a particular blood glucose level at which hypoglycaemic symptoms occur cannot be specified, due to wide individual differences in the precise level at which patients become symptomatic. The clinical syndrome associated with hypoglycaemia develops as the nervous system becomes glucose deficient, ie neuroglycopenia develops. Mild neuroglycopenia produces subtle intellectual and psychomotor impairment; severe neuroglycopenia causes confusion, disturbed behaviour, fits and ultimately unconsciousness (Williams and Pickup, 1992). Most patients will experience some symptoms of mild hypoglycaemia during the course of a year (Widom and Simonson, 1994), but the rate of more severe episodes of hypoglycaemia is much lower. The available evidence suggests that about 30% of patients will experience a hypoglycaemic coma at least once in their lifetime, about 10% of patients will suffer a coma in any one year, and 3% are incapacitated by frequent and severe episodes (Williams and Pickup, 1992).

An important aspect of the prevention of hypoglycaemia is that patients should carry an emergency supply of sugar or glucose at all times. In addition care needs to be taken about having regular snacks throughout the day, and also before vigorous exercise, Watkins (1993).

1.3.2 Hyperglycaemia and Ketoacidosis

Severe hyperglycaemia is caused by a deficiency of insulin and can result in the metabolic derangement associated with diabetic ketoacidosis (DKA). The exact prevalence of DKA is unknown, but in a community study in Minnesota, the rate of DKA was estimated to be 13.4 episodes per 1000 patients per year, in patients under 30 years of age. (Johnson et al, 1980). Admissions for DKA reach a peak in the adolescent years (Dornan, 1990). DKA is a serious
potential complication of diabetes, and between 6-10% of episodes of DKA can prove fatal (Alberti and Hockaday, 1977; Clements and Vourganti, 1978). Common precipitating causes of DKA are infection, management errors and new undiagnosed cases of diabetes, (Williams and Pickup, 1992).

1.3.3 Micro and macrovascular complications of diabetes

Complications associated with diabetes are often severe and debilitating and may affect the heart and vascular system, the eyes, kidneys and nerves (Lloyd and Orchard, 1992). The Epidemiology of Diabetes Complications Study (EDC), examined a group of patients who had had diabetes for at least 25 years and demonstrated that one or more of the diabetic complications will affect virtually all those with IDDM at some point in time (Orchard et al, 1990).

The EDC reported a relatively low prevalence of cardiovascular disease (ie a history of myocardial infarction, angina or stroke), with 10% of males and 16% of females classified as having this disease after 30 years. However, if previous deaths from CVD are taken into account, by 35 years duration some 18% of both men and women currently have (or have died from) CVD. The EDC also reported an association between CVD and renal disease, although in the EDC study over half of the IDDM cases with CVD did not have renal disease.

Retinopathy is the most common of all diabetic complications (Lloyd and Orchard, 1992). The EDC and the Wisconsin Epidemiological Study of Diabetic Retinopathy (Klein et al, 1992) reported that by 20 years duration virtually all patients with IDDM develop some retinopathy. However, panretinal laser techniques have now significantly reduced the risk of severe visual loss from diabetic retinopathy. As diabetic retinopathy is often asymptomatic in the treatable early stages, detection of early changes through regular eye examinations is an essential part of the treatment programme for patients with IDDM.

The EDC reported that overt nephropathy showed an increase in prevalence with duration, with little disease evident until 10-14 years duration. The cumulative incidence then increases and reaches a plateau after a disease duration of about 25 years. In all, between 25-30% of patients with IDDM will develop nephropathy, (Watkins et al, 1990). In the past, the majority of patients whose nephropathy had reached the stage of persistent proteinuria then went on to develop end stage renal failure (Knowlewski et al, 1985). However, with recent more effective antihypertensive treatments, the 10 year survival rate after onset of persistent proteinuria has now risen to about 80%, (Mathiesen et al, 1989).

Clinical evidence of neuropathy may not be evident during the early years of diabetes, but investigators have found a higher prevalence of sub-clinical neuropathy (eg changes in motor
nerve conduction velocity) in teenagers with IDDM, (Young et al, 1983). In an older population, the EDC reported an incidence of neuropathy of 18% amongst a group of patients aged 18-29 years.

1.4 THE RELATIONSHIP BETWEEN GLYCAEMIC CONTROL AND DIABETIC COMPLICATIONS

Although numerous studies have addressed this question, (eg Peterson et al, 1984; Strowig and Raskin, 1992), more definitive answers have now become available from the Diabetes Control and Complications Study, (DCCT). The DCCT was set up in 1984 and aimed to investigate whether intensive therapy would prevent the development and/or progression of diabetic complications in IDDM subjects. There were 1,441 subjects from 29 centres and they were randomly assigned to conventional therapy (CT) or intensive therapy (IT). The IT group aimed for long-term normoglycaemia with at least four home blood glucose assessments per day, at least three insulin injections per day or use of the insulin pump, and monthly diabetes clinic visits with telephone contact in between. The conventional treatment group in comparison had one or two insulin injections per day, daily self-monitoring of urine or blood, and three monthly clinic visits.

One notable feature of the DCCT was that there was a 99% completeness of follow-up, probably attributable to the fact that patients in both groups received free medical treatment, which in the context of the American health system, obviously proved to be an overwhelming incentive to remain with the study.

In the DCCT, as in most recent studies, glycosylated haemoglobin was used as the index of glycaemic control. This index provides a measure of average blood glucose control during the preceding 4 to 6 week period. Amongst non-diabetic subjects values of glycosylated haemoglobin are in the range of 4-6 % (Tattersall and Gale, 1990) but if the blood glucose level is high as in poorly controlled diabetes, the percentage of haemoglobin that becomes glycosylated is much higher, in the range of 10-20% (Drury, 1986).

The DCCT study reported a significant difference between the CT and IT groups in terms of mean glycosylated haemoglobin levels (7.0% in the IT group compared to 8.7% in the CT group), although it is interesting to note that even the IT group did not attain normoglycaemia. In terms of the reduction in risks of complications (ie comparing the CT group to the IT group), in patients with minimal retinopathy and nephropathy, intensive therapy reduced the risk of retinopathic progression by nearly 60%. A similar effect was found in patients without retinopathy and nephropathy at the start of the study. In addition, IT significantly reduced the prevalence of neuropathy.
Although the results of this major long-term study have conclusively demonstrated that improved glycaemic control can prevent and retard diabetic complications, the DCCT also reported that there was a three-fold increase in episodes of severe hypoglycaemia in the IT group compared to the CT group, where severe hypoglycaemia was defined as 'episodes requiring external assistance'. However, Ward (1994) has pointed out that even though the increase in hypoglycaemia was significant, the incidence of 0.5 episodes per 100 patients per year in the IT group still represented a relatively low rate.

1.5 DESCRIPTION OF THE DIABETES SELF-CARE REGIMEN AMONGST PATIENTS WITH IDDM

The diabetic self-care regimen comprises a number of different aspects such as taking insulin, modifying one's diet and monitoring blood sugar levels. Moreover, these different aspects are inter-related in that deviations from the regimen in one area (eg eating later than usual) will have implications for the other regimen areas (eg it might require the timing of the injection to be altered, or an additional blood glucose test to be performed). As Dunn (1987) has stressed, the demands of the regimen may necessitate a lifestyle change for some patients.

1.5.1 Insulin regimen

The aim of insulin treatment is to prevent ketoacidosis, alleviate symptoms, and achieve good metabolic control, whilst avoiding unacceptable and dangerous episodes of hypoglycaemia (Watkins et al, 1990). Most patients with IDDM are managed with twice-daily or three times daily injection schedules, although an increasing number of patients are on four dose schedules in which short acting insulin is given before each meal and a longer acting preparation is given at bedtime. These three meal schedules are frequently given with a 'pen device' which delivers the dose from a cartridge, and obviates against the need for spare syringes and needles to be carried around. The advantage of this type of regimen is that it gives patients greater flexibility in the timing and composition of their meals.

The injection can be sited in any part of the body where there is sufficient flesh, but patients are advised to vary the injection site from day to day, in order to avoid developing fatty lumps at the site of the injection.

1.5.2 Diet

The dietary recommendations given by the British Diabetic Association (BDA, 1992), are for a diet that is high in carbohydrate (50-55% of the dietary energy intake), has reduced fat content (30-35% of dietary energy intake, with only 10% being derived from saturated fats) and reduced protein content (10-15% of dietary energy intake). These recommendations are very similar to
the current nutritional recommendations for the general UK population (DHSS, 1984) and of the WHO in Europe (James et al, 1988). The basis of the recommendations is for a fibre-rich, high-carbohydrate, low-fat intake diet, with nutrients specified as a proportion of total energy intake. In some European countries such as Norway, eating habits of the whole population now closely approach these recommendations, but changes have not been marked in the UK (WHO, 1990). Although these recommendations were written for the general IDDM population, the BDA report concludes that they are also suitable for IDDM patients during pregnancy.

Patients also need to eat at relatively regular intervals throughout the day. More flexible regimens for insulin administration, particularly regimens using pen-injectors, allow more frequent injection of smaller doses of insulin and this type of regimen is best matched by more frequent ingestion of smaller amounts of food.

1.5.3 Blood glucose testing

Watkins et al (1990) suggest that for most patients, an average of a single daily blood glucose measurement is sufficient, but this needs to be done at different times of day in order to build up an overall pattern of daily fluctuations. Watkins et al go on to suggest that multiple daily blood glucose tests should be reserved for limited periods such as pregnancy, illness or when the insulin regime has recently been change.

Although regular self-monitoring of blood glucose is now an essential component of the regimen for patients with IDDM, Tattersall and Gale (1990) have pointed out that to maximize the effectiveness of self-monitoring of blood glucose, patients not only have to carry out the tests, but also have to be able to alter insulin doses and/or dietary intake in the light of the blood glucose test results. Mazze et al (1985) have indicated that many patients have difficulties using blood glucose test results to modify other aspects of their self-care regimen, particularly adjustments to insulin dosage.

1.5.4 Exercise

In the United States, patients are frequently given quite precise instructions as to the amount of physical exercise that they should take. For example, in Glasgow et al’s (1987) study of regimen adherence, just under half of the patients could describe how much physical exercise they had been recommended to have. In this country, beyond the general advice that it is beneficial for patients to take regular exercise (eg Williams and Pickup, 1992), precise details of exercise prescriptions are not routinely provided.
1.6 PSYCHOLOGICAL ASPECTS OF DIABETES MELLITUS

1.6.1 Introduction

The role of psychological factors in diabetes has long been recognized. In the 17th century Thomas Willis (1679) stated that he believed the disease was the result of 'prolonged sorrow', whilst two centuries later, Maudsley (1899) commented on the importance of anxiety as a correlate of diabetes onset. Nevertheless, until the advent of insulin in the 1920s, the study of psychological factors remained minimal, particularly in the area of insulin-dependent diabetes. As Treuting (1962) pointed out, the patient with diabetes in the pre-insulin era had but a few years to live. Everything was done to make the patient's life comfortable during this time, but psychological concerns were necessarily minimized in view of physical realities.

After insulin was discovered in 1922, insulin-deficient patients could anticipate a reasonable life-expectancy, and interest in psychological aspects of the disease increased. Johnson (1980) categorized research in this area into 3 related issues: the influence of psychosocial factors on the onset of diabetes; the influence of psychosocial factors on the course of the disease, and the influence of diabetes on the psychological adjustment of the patient. The second question, (the influence of psychosocial factors on the course of the disease) can in turn be sub-divided into two different research topics. Firstly, the question of the direct link between psychological factors and metabolic control, eg studies on the relationship between stress and metabolic control. Secondly, studies of the indirect link between psychological factors and metabolic control, eg studies that consider the role of regimen adherence in determining metabolic control and attempt to identify factors that predict regimen adherence.

A review of all three of these questions is beyond the scope of this thesis. Thus the first of Johnson’s questions (ie the question of onset) is not considered, beyond mentioning that recent studies suggested that stress as assessed by the frequency of major negative life events, possibly in conjunction with reduced social support, may play a role in the aetiology of diabetes, amongst genetically susceptible individuals (Robinson et al, 1989, Therlund et al, 1995). In addition, the question of the neurophysiological effects of stress on glycaemic control is also not considered, beyond mentioning that recent studies have suggested that chronic psychosocial stress is associated with worse glycaemic control among those who do not cope effectively with stress (eg Peyrot and McMurray, 1992) and that social support may buffer the deleterious effects of stress on glycaemic control (Griffith et al, 1990).

The literature reviewed below therefore concentrates on the two issues that are central to this thesis, namely the psychosocial adjustment of patients with diabetes, and the identification of factors that predict adherence to the diabetic self-care regimen.
1.6.2 Adherence to the diabetic self-care regimen

1.6.2.1 Differentiating regimen compliance and regimen adherence

Haynes (1979) defines compliance as “the extent to which a person’s behaviour (in terms of taking medications, following diets or executing lifestyle changes), coincides with medical or health advice”. Moreover, according to Haynes, the term ‘adherence’ may be used interchangeably with ‘compliance’. Conversely, Meichenbaum and Turk (1987) distinguish between adherence and compliance. They argue that ‘compliance’ refers to the extent to which patients are obedient and passively follow the instructions and prescriptions of the health care providers, in contrast to ‘adherence’ which implies a more active, voluntary, collaborative involvement of the patient.

Whilst not questioning Meichenbaum and Turk’s argument that it is vital to foster active patient participation in formulating the regimen, it is important to realize that Meichenbaum and Turk’s definitions of these two terms are not consistently applied in the literature. For example, Webb et al (1982) describe how patients were “encouraged to acquire sufficient knowledge of food composition and skill in selecting food to suit their personal preferences and to achieve the recommended dietary goals”. Despite the clients’ active involvement, the authors use the term ‘dietary compliance’ not ‘dietary adherence’. In this thesis, for the sake of consistency the term regimen adherence will be used, but it is recognized that many authors referring to regimen compliance have been referring to an identical construct.

1.6.2.2 Differentiating regimen adherence from levels of self-care

Glasgow et al (1985) have described the crucial distinction between regimen adherence and levels of self-care. He has pointed out that regimen adherence involves a comparison of the actual behaviour that the patient has been performing with the regimen that the patient has been advised to carry out. For example, in the context of blood glucose testing, adherence to the blood glucose testing regimen involves comparing the actual number of blood glucose tests carried out in a given period, with the number of tests that the patient has been advised to do over the same period. In contrast, the level of self-care, is simply the measure of actual behaviour, eg in the context of blood glucose testing, the actual number of blood glucose tests carried out.

In the context of diabetes where patients can have very different regimen prescriptions, this distinction is important. So, for example, if one patient has been advised to carry out 7 blood glucose tests per week, and another has been advised to carry out 48, and they both carry out 14, this actually represents a very different response to medical advice on the part of these two patients. Yet if the actual level of self-care (ie the number of blood tests carried out) is used as the measure, this differential response to medical advice will not be assessed, and the patients
will actually be recorded as having an identical score. If in turn a particular psychosocial variable (eg health beliefs about the seriousness of the disease) is then correlated with the self-care measure, it is not surprising if no clear pattern emerges because the measure of behaviour (the number of blood tests per week) does not reflect the fact that one of the patients has carried out more tests than advised and one has carried out significantly less.

Given that regimen prescriptions can vary so widely between patients, it may be more useful to assess adherence rather than levels of self-care in the context of patients with diabetes. However, there are also particular reasons why the assessment of adherence to the diabetic regimen is particularly difficult. As Glasgow (1991) has argued, for some aspects of the diabetic self-care regimen (eg exercise) prescriptions may never have been given, or if they have been given, they may be extremely non-specific. In addition, patients with diabetes may be encouraged to play a very active role in managing their disease (eg by adjusting their insulin dose) and in these cases, there may be no set prescription against which the patient’s behaviour can be assessed; the actual prescription varies and is subject to patient modification and definition.

There is no simple solution to this problem because if patients, for whatever reason, do not have an actual regimen prescription, then measures of adherence cannot be computed. However, at the very least, it is essential to be clear about whether one has a measure of adherence or a measure of self-care, and to be aware of the implications of this distinction and the impact that it may have on the collected data (Glasgow et al, 1985).

There is also an additional issue as to whether to use the patient’s description of the regimen prescription or the prescription as described by the health care provider as the basis against which actual self-care behaviour is compared. Although the subject’s representation of the appropriate prescription may not be identical to that provided by the health care provider. Page et al, (1981) and Leventhal et al, (1984) have argued that the subject’s own report of their regimen prescription provides a better representation of the goals that people are trying to achieve. Therefore Leventhal et al, (1984) suggested that it is the patient’s representation of their regimen that should be used in the calculation of patient adherence.

1.6.2.3 The Measurement of regimen adherence

1.6.2.3.1 Using the health care provider to assess regimen adherence

Caron and Roth (1968) studied the ability of physicians to identify the non-adherent patient. The physicians were asked to assess patient adherence with antacid regimens, and it was found that they could not estimate how adherent their patients had been to the drug regimen at any better than a chance level. Gordis (1979) therefore concluded that physicians’ estimates of patient adherence are of very limited value.
1.6.2.3.2 Self-monitoring and self-report

The most frequently employed measure used to assess adherence is self-report, e.g., asking the patient directly whether they performed the prescribed behaviour. An alternative form of self-report is when the patients are asked to record concurrently the frequency with which a particular behaviour is performed on a self-monitoring form.

One particular problem with the use of self-monitoring procedures is that the actual act of self-monitoring may serve as a cue to alter behaviour (Meichenbaum and Turk, 1987; Schlundt, 1988). This could mean that for the duration of a study when patients are being asked to fill out self-monitoring forms, rates of adherence were unusually high. More generally, researchers have indicated that the potential reliability of both self-monitoring and self-report data can be compromised by the tendency of patients to under-report incidences of non-adherence (Dunbar and Stunkard, 1979). In order to minimize this effect, Christensen (1983) has emphasized the importance of asking for self-report data in a non-judgemental manner.

In the context of adherence to the blood testing component of the regimen, some indication of the potential unreliability of self-monitoring data has become available since the advent of glucometers which have a memory capacity. These glucometers allowed a recording to be made of results from each blood glucose test that the patient had made, without the patient’s knowledge. The results stored in the memory of the glucometer could then be compared with the self-monitoring results recorded in the patient’s log book.

In 1984 Mazze et al reported on 19 IDDM patients attending a clinic in the Bronx in New York who had used a glucometer modified with a memory capacity for 2 weeks. These meters were identical in appearance to standard glucometers and patients were not aware of the memory capacity. Two thirds of the subjects had recorded values that obscured hyper or hypoglycaemia, whilst the major source of error was omitting high-glucose results and substituting lower values. In a later study, Langer and Mazze (1986) studied a group of 34 pregnant diabetic women (of whom 13 had IDDM) and reported comparable results in that two thirds of the patients reported values that were significantly lower and less variable than those recorded in the memory of the glucometer. Mazze et al (1985) also reported data on another 20 IDDM clinic patients (none of whom were currently pregnant) who were aware of the memory capacity of the glucometers. In this trial, a much higher degree of reliability was recorded.

Taken together, the findings of these three studies would suggest that unless patients know that the research team can independently assess the reliability of their log books, estimates based on self-monitoring will significantly underestimate the extent of non-adherence. However, data from subsequent studies have suggested that the extent of the unreliability of the patient data recorded in the initial memory glucometer studies may not in fact be typical. Thus Moses et al
(1986) reported that amongst a group of 18 patients attending a private clinic in Australia, only 0.2% of the results were altered. Similarly, Gonder-Frederick et al (1988) in a study of 30 adults with IDDM reported that only 6 values were altered in 967 log-book entries whilst Hoskins et al (1988) reported that the log books of gestational diabetic women were significantly more unreliable than those of patients with NIDDM.

Two explanations have been put forward in the literature to account for these discrepant results. Hoskins et al (1988) suggested that the results of the gestational diabetic women were particularly unreliable as they had been told that if their average blood glucose results were not below a certain critical value, than insulin treatment would be instituted, and that this may in turn have served as a reason for omitting high results, or altering them to lower ones, in order to avoid starting on insulin. It is not possible to know if this same factor (ie gestational diabetic patients who were currently being treated by diet alone, and who wanted to avoid being placed on insulin) contributed to the high level of unreliability observed in Langer and Mazze’s (1986) study of pregnant women as the number of diet treated gestational women is not specified.

The second explanation for the different results observed in these various studies is that it may be due to how demanding the required self-monitoring schedule is. Thus, Gonder-Frederick et al (1988) suggest that the difference between their results and those of Mazze et al reported above may be due to the fact that in the Gonder-Frederick et al study, patients were on their usual blood glucose testing schedule whilst they were carrying out the self-monitoring, whereas in the Mazze et al studies, patients were being required to test their blood extremely frequently (at least 7 times a day in Langer and Mazze (1986) and moreover this high frequency was a relatively new pattern for the patients. If this explanation is correct, it would still mean that data from pregnant IDDM patients might be prone to unreliability, as patients are placed on particularly demanding self-monitoring schedules during pregnancy.

The Langer and Mazze (1986) study only had 13 pregnant patients with IDDM and no other studies comparing self-monitoring data with those stored in the memory of a glucometer amongst pregnant IDDM women have been reported. Thus it is not yet possible to quantify the extent to which the high frequency of recommended blood glucose testing amongst pregnant IDDM patients may result, as Gonder-Frederick et al have suggested, in unreliable data.

In general, those authors who have addressed these methodological issues underlying the measurement of regimen adherence have concluded that there are no easy solutions (Ary et al, 1986; Glasgow et al, 1985; Glasgow, 1991). However, there is consensus concerning the need to use multiple and diverse methods of measurement as each type of measurement strategy has its strengths and limitations (Wilson et al, 1986; Glasgow et al, 1987).
1.6.2.4 Levels of adherence to the diabetic self-care regimen

Studies that have examined levels of self-care and/or adherence to the diabetic regimen have used an enormous diversity of different measures. For example, in terms of dietary adherence, Schlundt (1988) asked subjects to report on episodes of over-eating and under-eating, with the subjects themselves generating their own definitions whilst Maclean (1991) carried out a series of open-ended interviews and assessed dietary behaviour using her own criteria. Webb et al (1982) compared the results of a 4 day self-monitored food diary to the recommended intake and expressed the scores as the sums of squares of differences between the logarithms of the actual and recommended amounts whilst McCulloch et al (1983) calculated the co-efficient of daily variation in carbohydrate intake.

There has been similar variability in terms of the assessment of blood glucose testing behaviour. Mulhauser et al (1983) examined patient logbooks to assess the frequency with which blood glucose tests were carried out, Schlenk and Hart (1984) asked subjects to use a 5 point scale to rate the different aspects of their blood glucose testing behaviour and then expressed this score as a percentage of the maximum possible score. These methods can be compared to Mazze et al (1985) and Gonder-Frederick et al (1988) who used the memory capacity of the glucometers to assess how many daily blood glucose tests subjects had performed.

Given this diversity of indices, it is difficult to compare the results of different studies. However, two important general findings do emerge. Firstly, adherence to many aspects of the self-care regimen is relatively low. For example McCulloch et al (1983) reported that the co-efficient of variation in carbohydrate intake which provides an index of day to day consistency in carbohydrate intake was approximately 50%, whilst ideally, patients should have little or no daily variation. Similarly Schlundt (1988) reported that on over a quarter of all occasions, subjects ate either too much or too little, whilst Maclean (1991) identified 35% of her subjects as showing little or no attempt to follow the recommended dietary pattern.

The second consistent finding is that there is a ‘hierarchy’ of regimen adherence, with a higher level of adherence to ‘medical’ aspects of the regimen (especially insulin injections, and to a lesser extent blood glucose tests) than to diet or to exercise. For example, Glasgow et al (1987) reported that 98% of subjects never missed an insulin injection and subjects carried out about 70% of the prescribed number of blood glucose tests, but they rated their dietary adherence as poor/moderate. Similarly, Ary et al (1986) found that subjects adhered 78% of the time to carrying out their insulin injections on time, but rated their adherence to the exercise regimen as only 31%. In particular, a consistent finding is that long-term adherence to dietary recommendations tends to be poor (McCulloch et al 1983; Chrisentsen et al 1983; Webb et al 1982; Schlundt 1988; Maclean, 1991).
1.6.2.5 Correlation between adherence to different aspects of the regimen

A further complexity in the assessment of regimen adherence amongst patients with diabetes is the fact that adherence to one aspect of the regimen is not highly correlated to adherence to other aspects. This lack of correlation between different aspects of the regimen is a consistent finding, and has been demonstrated amongst adolescent samples (Schafer et al, 1983), adult IDDM samples (Glasgow et al, 1987; Ary et al, 1986) and NIDDM samples (Wilson et al, 1986).

Some studies have produced global assessments of regimen compliance that add together scores from all the different regimen areas (Kaplan et al, 1985; Bloomgarden et al, 1987). However, the finding that regimen adherence to one area is frequently unrelated to adherence to other areas points to the necessity of assessing each aspect of the regimen separately.

1.6.2.6 Link between adherence and glycaemic control

In 1984 Suzanne Bennet Johnson pointed out that although patients were asked to adhere to the recommended treatment in order to ensure their good health, there were in fact very few studies which had directly assessed the relationship between regimen adherence and metabolic control. Since that time, studies addressing this issue have been reported, but the overall picture that emerged is far from straightforward. Davis et al (1987) demonstrated that the type and duration of diabetes can moderate the extent to which good adherence translates into improved metabolic control. However, even amongst studies that took disease type and duration into account, a significant relationship between adherence and glycosylated haemoglobin has been observed in some studies (eg Delahanty and Halford, 1993), but not in others (eg Glasgow et al, 1987; Johnson et al 1990; Hampson et al, 1990).

In these later studies that have failed to obtain a straightforward relationship between adherence and metabolic control, the authors have not rejected the notion that these two factors are in some way related, arguing that such a conclusion would be inconsistent with clinical experience. Instead, they have argued that adherence should be seen as one of a variety of factors influencing glycaemic control (Glasgow et al, 1987; Hampson et al, 1990).

Other studies have indicated that glycaemic control is in fact influenced by a huge array of other factors such as illness and levels of physical activity (Lipman et al, 1972), responsiveness of fat cells to insulin (Lonroth et al, 1983) and obesity (Sulway, 1980). In addition, Hampson et al, (1990) argued that the appropriateness of the medical regimen, stress and temporal factors such as adherence and metabolic indices not being measured over the same time period, could also account for the lack of correlation between adherence and glycosylated haemoglobin.
The overall conclusion is not that adherence is irrelevant for the metabolic control of the patients, but rather, that the relationship between the two is highly complex, such that it is not necessarily true for each individual patient that stricter adherence to the regimen will necessarily result in lowered glycosylated haemoglobin.

1.6.2.7 Factors associated with regimen adherence

1.6.2.7.1 Demographic factors

Although individual research studies have found significant correlations between a particular demographic factor and a particular index of adherence eg (McCaul et al, 1987 reported that men and those who had diabetes for longer had poorer dietary adherence) in general demographic factors are poor predictors of adherence. Thus Rosenstock (1985) in a comprehensive review of adherence commented ‘there is no consistent relationship between compliance with medical regimens and respectively age, sex, education, income, personality type, intelligence or general knowledge about health and illness’.

1.6.2.7.2 Social learning theory based explanations of adherence

Social learning theory (Bandura, 1977) provides an example of an SCM ie a model that attempts to describe important cognitions and their relationship to the regulation of behaviour (Connor and Norman, 1996).

Models derived from the social learning theory emphasize the reciprocal interaction between personal (particularly cognitive) factors and environmental variables in determining behaviour. Of particular significance to the explanation of regimen adherence, the theory emphasizes the potential for learning, and therefore focuses on variables that have the potential to change, (McCaul et al, 1987). The theory is based on notions of behavioural specificity; predicting a particular behaviour depends upon measuring the psychological and environmental influences that are specific to that behaviour.

Glasgow and his colleagues have carried out a series of investigations applying variables derived from social learning theory to the prediction of regimen adherence. (Glasgow and McCaul, 1982; Glasgow et al 1986; Glasgow et al, 1989; Glasgow and Toobert, 1988; McCaul et al, 1987; Schafer et al, 1983; Schafer et al, 1986; Wilson et al, 1986). Throughout these series of investigations, attempts have been made to incorporate the notion of behavioural specificity. So, for example, Schafer et al, (1983) in their analysis of psychosocial factors related to regimen adherence assessed cognitive and environmental factors that were specific to each component of the self-care regimen.

Two cognitive variables derived from social learning theory, namely self-efficacy beliefs and locus of control attributions, have been examined, to see if they are able to explain differences in
levels of adherence between patients with diabetes. In addition, patients' regimen skills and problem solving skills have also been examined within a social learning theory framework. In terms of environmental factors, a number of studies have assessed the impact of social support on adherence. Each of these components will be considered in turn.

**Self-efficacy beliefs**

Self-efficacy has been defined as perceived confidence in one's ability to undertake a particular action (Bandura, 1989). On the basis of a review of a number of different SCMs, Norman and Connor (1996) concluded that the self-efficacy construct was a key predictor of health behaviour. Only one study, McCaul et al (1987) has examined the role of self-efficacy beliefs as a predictor of regimen adherence amongst IDDM adults. This study also analyzed the role of other potential predictors of adherence, but it was only self-efficacy beliefs that predicted adherence to each of the four regimen areas considered in this study. It is therefore clear that the self-efficacy construct is an important variable in terms of predicting diabetic related behaviours.

**Locus of Control**

The early health locus of control scale developed by Wallston et al (1976) examined the extent to which subjects felt that illness and the maintenance of health was under their own (internal) control, or was controlled by external forces. The Multidimensional Health Locus of Control scale (Wallston et al, 1978) was a further development providing measures on three unipolar dimensions labelled 'internal', 'chance' and 'powerful others'. In this way, on the later multidimensional scale external expectancies were subdivided to specify whether outcomes were believed to be controllable by 'powerful others' such as the doctor, or essentially uncontrollable and due to chance.

Findings on the link between locus of control attributions and adherence have been inconsistent. Becker and Rosenstock (1984) concluded that there was in fact no consistent relationship between the two categories and Alogna (1980) and Lowery and DuCette 1976) also failed to establish significant relationships between locus of control attributions and behaviour. In contrast, Schlenk and Hart (1984) found that those IDDM patients who had stronger 'powerful others' attributions or stronger 'internal' attributions of control reported higher levels of regimen adherence.

In the current study, as Brewin and Bradley (1982) have demonstrated the greater predictive utility of having locus of control scales that are tailor made for a particular population, Bradley et al's (1984) diabetes specific locus of control scale was used to assess patients' beliefs about control of their diabetes.
Regimen skills and problem solving skills

The social learning framework also highlights the importance of both the skills to carry out the regimen tasks (e.g., correctly mixing and injecting insulin; operating glucose monitors, etc.) and problem-solving skills which Glasgow (1991) has defined as 'the patients ability to adapt creatively to and overcome the many challenges and barriers to compliance'.

It is important to note that regimen related skills rather than general knowledge about diabetes are held to be important within the social learning framework and in fact, many studies have demonstrated that knowledge about diabetes per se, is not a significant predictor of regimen adherence (Muhlhauser et al, 1983; McCaul et al 1987). In terms of the role of regimen related skills as a predictor of adherence, having the necessary skills is viewed as a necessary but by no means sufficient condition for adherence to the self-care regimen (Glasgow, 1991), and thus studies have failed to report a significant relationship between adequate performance of the necessary self-care skills in a testing situation, and regimen adherence (McCaul et al, 1987).

Evidence on the role of problem-solving skills as a predictor of adherence is more equivocal. Toobert and Glasgow (1991) carried out an open ended problem solving interview with NIDDM patients and then coded and rated the taped responses to the interview. Responses to the interview were found to predict levels of dietary and exercise self-care. However, McCaul et al (1987) in a study of IDDM patients failed to find any significant relationships between a structured questionnaire measure of problem-solving skills and adherence to the different aspects of the regimen amongst the adult patients, although interestingly problem-solving skills were found to be significant predictors amongst adolescents.

It is unclear whether the difference between the McCaul et al (1987) and Toobert and Glasgow (1991) studies is due to differences in disease type (IDDM v NIDDM) or to the actual measure of problem-solving ability used (structured questionnaire v open-ended interview). However, as it would not be possible within the context of this study to use an open-ended interview procedure given the number of other factors that were examined, the role of problem-solving ability as a predictor of adherence was not actually assessed.

Social Support

Social support has been conceptualized as a component of the social learning theory model of adherence. (Schafer et al, 1983; Glagow et al, 1989). A number of authors have stressed the need for measures that specifically assess the ways in which families support or fail to support regimen adherence (Schafer et al, 1986; Johnson, 1980) as global measures of support may obscure the precise ways in which family or friends can support or disrupt regimen adherence.
Studies on the relationship between social support and regimen adherence have produced inconsistent results. Schafer et al (1986) reported that negative social support for diabetes was associated with blood glucose testing adherence at one of the interview assessments that they carried out, whilst McCaul et al (1987) did not report a significant correlation between either positive or negative social support for diabetes and blood glucose testing. The low internal consistency reported for the negative support scale (see Schafer et al, 1986) may, in part, account for this discrepant pattern of results.

1.6.2.7.3 The health belief model

The health belief model (HBM) is another example of an SCM. It was originally formulated to explain why people would or would not undertake preventative health actions (Rosenstock, 1974). The HBM has received greater research attention and been applied to a broader range of health behaviours than other SCMs such as health locus of control theory (Wallston et al, 1978) or self-efficacy theory (Bandura, 1991).

The four dimensions of the HBM are perceived susceptibility to the different aspects of the illness; perceived severity of the different aspects of the illness, perceived benefits of medical treatment and perceived barriers associated with the medical treatment. As Rosenstock (1974) has noted “the combined levels of susceptibility and severity provided the energy or force to act and the perception of benefits, minus barriers, provided a preferred path of action”.

In addition to the four main dimensions, the model is predicated on the premise that ‘health’ is a highly valued concern or goal for most individuals (Janz and Becker, 1984). Thus the model includes an assessment of the patient’s general health motivation. Finally, the model assumes that ‘cues to action’ that trigger the appropriate health behaviour also have to be considered.

Initial applications of the model were attempts to explain why people would or would not undertake preventative health actions and it has been applied to the prediction of numerous preventative behaviours such as screening for cervical cancer, breast self-examination, and attendance for vaccinations. Subsequently, the model has been applied to the prediction of adherence to prescribed therapies. In addition to the studies described below that have applied the model to adherence to the diabetic regimen, it has also been used to predict adherence to other medical regimens such as those used in the treatment of hypertension and renal disease.

In terms of the prediction of long-term health related behaviours, Janz and Becker (1984) acknowledge that behaviours such as cigarette smoking and tooth brushing may have a substantial habitual component, thus by-passing any on-going cognitively mediated decision process. Sutton (1994) has elaborated on this observation and proposed that a distinction should
be made between habits and routines. According to Sutton, although routines are a sequence of behaviours which are repeated on a regular basis, unlike habits they need to be supported by regular reminders and therefore they require some conscious thought in order to be maintained. This argument therefore suggests that behaviours such as the components of the diabetic self-care regimen which are routines carried out every day, are likely to be cognitively mediated to some extent.

In terms of adherence to the diabetic self-care regimen, it is also likely that the impact of habit is significantly reduced during pregnancy. In Chapter 3 below, the enormous changes in the diabetic self-care regimen associated with pregnancy are described. These changes include a large increase in the daily insulin dosage and the recommendation to greatly increase the number of daily blood glucose tests. Given the extent of these changes in the regimen, and furthermore, that these changes would be discussed at each antenatal clinic visit, it is unlikely that the women in the current study would be behaving as they always behaved, without giving any conscious thought to the changes in the prescribed regimen.

A number of studies have attempted to use the HBM to predict adherence to different aspects of the diabetic regimen (Brownlee-Duffeck et al, 1987; Harris and Linn, 1985; Cerkoney and Hart 1980; Alogna 1980). In a key paper, Davis et al (1987) demonstrated that spurious results on relationships between health beliefs and outcome variables can be obtained when heterogeneous populations of patients with diabetes are grouped together. As an example of this problem they cited the fact that in their study when the results from IDDM and NIDDM patients were analysed together, a counter-intuitive finding was obtained in that patients with more positive beliefs about the benefits of adherence had significantly poorer blood glucose control. However, when a further analysis was carried out and each disease type was analyzed separately, this finding disappeared. They therefore concluded that any analysis of the relationship between psychosocial factors and outcome variables with diabetic patients must take disease type into account.

Many of the research studies on the role of health beliefs were carried out before Davis et al’s (1987) paper and they frequently failed to differentiate between the two disease types (eg Cerkoney and Hart, 1980; Harris et al, 1987). Even studies that were carried out post-1987 have sometimes failed to differentiate between IDDM and NIDDM patients (eg Schatz, 1988).

Surprisingly, only 4 studies on the relationship between health beliefs and regimen adherence have purely comprised adult (or adult and adolescent) IDDM patients. Taken together, these 4 studies provide support for the utility of some of the HBM constructs in predicting regimen adherence. Thus Brownlee-Duffeck et al (1987) reported a significant correlation between perceived benefits of the regimen and regimen adherence, whilst Glasgow et al (1986) in a combined adult and adolescent sample obtained significant correlations between perceived
barriers to adherence and adherence to glucose testing, exercise, diet and insulin injections. This study also compared the role of regimen specific barriers with a total barriers score, and found that regimen specific barriers were better predictors of adherence than the overall total barriers score.

In a later study McCaul et al (1987) examined the role of ‘outcome expectancies’ which consisted of beliefs about both the benefits and barriers of different regimen areas and found that these beliefs were significantly related to adherence to the insulin regimen and to diet, but not to blood glucose testing. This finding demonstrates the important point that different psychosocial predictors may be correlated with different aspects of the self-care regimen. Finally, Webb et al (1982) documented changes in health beliefs that occurred after a diabetes education programme. Webb et al (1982) found that after the programme patients rated themselves as more susceptible to the complications of diabetes, and saw the dietary regimen as having fewer barriers and being more beneficial. Various indices of dietary adherence also improved after the education programme, but unfortunately, the authors provided no information on the relationship between changes in the health beliefs and changes in behaviour.

The two studies (Brownlee-Duffeck et al (1987) and Webb et al, (1982) that assessed the role of perceived severity failed to find a significant effect of this category of beliefs and only the former paper analysed the effect of ‘cues to action’ and again, failed to find a significant effect. Only one paper, Schlenk and Hart (1984) has examined the role of general health motivation on adherence and also failed to obtain any significant relationship, probably, as the authors note, due to the fact that over 80% of patients reported valuing their health highly, and thus there was insufficient variability of scores to obtain significant correlations between health motivation and adherence.

Although as discussed above, significant correlations have been observed between the constructs identified within the HBM and diabetic adherence, there are still some important limitations to the model. Firstly, there is a problem with construct definition. Jetter et al (1981) pointed out that studies have resulted in a plethora of different questionnaires all purportedly measuring the same health beliefs. As a result, the conceptual content of a given health belief category can vary markedly between the different studies. For example, ‘cues to action’ is variously defined as ‘the subjects ability to detect reactions (ie hypos) in themselves’(Brownlee-Duffeck et al, 1987); ‘the intensity of symptoms that would lead the patient to seek medical intervention’ (Harris and Linn, 1985); and ‘subjects intention to comply’(Cerkoney and Hart, 1980). Given the conceptual inconsistency between the studies, it can be difficult to review the studies that have been carried out to date and conclude that certain of the health beliefs have more explanatory ability than others.
A second limitation with the early formulations of the HBM is that it omits key constructs. As discussed above, Norman and Connor (1996) concluded that the self-efficacy construct was a key predictor of health behaviour. Early formulations of the HBM (Rosenstock, 1974) did not include the construct. Subsequently, Rosenstock argued for its inclusion into the model (Rosenstock, 1985) as he pointed out that patients may well believe in the benefits of a particular aspect of the regimen, but may still not comply with it if they believe that the regimen is too difficult for them to follow. Within the diabetic domain, McCaul et al (1987) reported that self-efficacy beliefs were consistent predictors of adherence to the diabetic self-care regimen, again emphasizing the importance of including the construct into any predictive model of regimen adherence.

A third limitation of the HBM is that it is lacking in a clear description of how the different components fit together. Although the model focuses on the relationship between a threat perception component (consisting of perceived severity and perceived susceptibility) and a behavioural evaluation component (consisting of perceived benefits and perceived barriers), the precise way in which these different components should be operationalized, or how they interact, has not been described, (Sheeran and Abrahams, 1996). As a result, the model has usually been operationalized as a series of separate independent constructs.

If one examines the studies that have applied the model to diabetic adherence, with the exception of McCaul et al (1987) that used a combined benefits/barriers measure, all of the other studies separately analyzed the effects of each of the components. Furthermore, McCaul et al (1987) did not operationalize the full model as in their study they did not include an assessment of the other components of the HBM. Thus the explanatory power of the model as a whole when applied to the diabetic regimen has not yet been addressed, due to the difficulties of fitting together the different components of the model.

A fourth limitation of the HBM is that it provides a static conceptualization of health behaviour, implying that a decision once made has no impact on future health behaviours. Subsequently, a number of authors (eg Schwarzer, 1992; Weinstein, 1988) have suggested that health decisions are made in stages with a pre-contemplation stage, then a motivation stage, through to the initiation of behaviour and finally a maintenance stage. As Norman and Connor (1996) have argued, not only are these stage models dynamic, in comparison to the static HBM, but built into the stage models is the recognition that different cognitions will be significant at different stages.

Norman and Connor (1996) also suggest that some of the components outlined in the HBM (eg perceived susceptibility and perceived severity) may be more important at the stages when the individual starts to deliberate over performing a health behaviour, rather than being important at the later planning and action stages. In turn, this may explain why perceived severity and perceived susceptibility have tended to be relatively weak predictors of health behaviours. None of the studies which have applied the HBM to the diabetic sphere have attempted to modify the
original model in order to adopt a dynamic stage approach. As such it is likely that they have failed to conceptualize adequately the relationship between cognitions and the performance of diabetic self-care behaviours.

The final point that needs to be considered in relation to the HBM is that of effect size. Harrison et al (1992) carried out a meta-analysis of studies that had applied the HBM to the prediction of health behaviour. These authors found that whilst the separate components of the model were all significantly correlated with behaviour they only accounted for between 0.5% to 4% of the variance in behaviour scores. This indicates that the effect of these components, although statistically significant, was actually very small. Harrison et al also pointed out that there was considerable heterogeneity in the observed effect sizes between different studies, suggesting that they way in which the HBM has been operationalized across different studies has influenced the results.

It is clear from the above discussion that the HBM has a number of key limitations. However, it is still utilized in the current study. The reasons for this are as follows. Firstly, it is the most commonly used model within the diabetic sphere (although it has never been used to predict adherence to the regimen during pregnancy). If an alternative model had been used it would have been more difficult to compare the results obtained with the non-pregnant diabetic group with the wider literature. In turn, it would have been difficult to assess the extent to which the results obtained with the non-pregnant diabetic group were congruent with other earlier studies, ie assess the extent to which this group provided a valid control group in the study.

The second reason that the HBM was employed relates to the comparative predictive powers of the different alternative models. Norman and Connor (1996) in a discussion on this question, argued that the different SCMs tended to perform to a similar level, suggesting that there may be little to choose between them.

Finally, despite the limitations of the HBM it must be recognized that the model has consistently led to the identification of relevant beliefs that correlate significantly with the performance of health behaviours (Sheeran and Abrahams, 1996). For these reasons, the model was employed in the current study. However, as described in the Methods Chapter (Chapter 4), attempts were made in the operationalization of the model to overcome some of the more glaring problems associated with the use of the model. Furthermore, key constructs derived from social learning Theory such as diabetes specific locus of control and diabetes specific self-efficacy beliefs were also assessed, in order to analyze their contribution to the prediction of regimen adherence.
1.6.2.7.4 Personal models of diabetes

It is clear that there is considerable overlap between the health belief model and social learning theory accounts of regimen adherence. In very broad terms, both of these SCMs are based on an expectancy-value approach to motivation in which it is asserted that individuals are motivated to maximize gains and minimize losses. More specifically, social learning theory variables of health locus of control and social support are closely related to aspects of the health belief model (Schlenk and Hart, 1984). For example, health locus of control can be conceptualized as an internal cue to action whilst social support can be conceptualized as an example of an external cue to action.

However, these SCMs have not been without their critics. As an alternative to a SCM approach, Leventhal et al (1992) have developed a self-regulatory model (SRM) as a framework for analyzing adherence behaviours. A basic tenet of the SRM is that health related behaviours are influenced by the patients' own representations of the illness. Furthermore, Leventhal et al suggest that the HBM or models derived from social learning theory are too prescribed to represent how patients conceptualize illness. They suggest that open-ended questioning should be used in order to allow the researcher to elicit patients' personal models of their disease. According to these authors, personal models of illness refer to patients' cognitive representations of their disease and include such things as beliefs and emotions about the cause, symptoms, course, treatment and consequences of their disease (Leventhal and Nerenz, 1985).

As Horne (in press) has argued, another major difference between the SRM approach and the HBM is that the SRM provides a dynamic model. According to the SRM the selection of a particular behavioural strategy is determined by the nature of the patient's representation of the illness. Following the behaviour there is an appraisal stage in which the patient evaluates the efficacy of the chosen behaviour. If the patient appraises a particular strategy to be ineffective then this might result in the selection of an alternative behavioural response, or even in a change in the cognitive representation of the illness. This dynamic model can be contrasted with the static conceptualization provided by the HBM.

Hampson et al, (1990) have attempted to identify the treatment and illness representations of patients with diabetes. Using a comprehensive interview covering a wide range of beliefs about diabetes with many open-ended as well as closed responses, a personal model of diabetes interview schedule was developed for NIDDM patients (Hampson et al, 1990). Following factor analysis, four aspects of the personal model of diabetes emerged: cause, symptoms, treatment and seriousness of the disease. In this way the illness representations of the patients with diabetes were elicited.
Responses to the categories emerging from the personal model were then correlated with levels of self-care. Hampson et al reported that believing in the importance of treatment and believing in the seriousness of one's diabetes were predictive of high levels of dietary self-care and believing in the importance of treatment was predictive of more frequent exercise and blood glucose testing.

It is clear from the above findings that these results were congruent with earlier research on the HBM in that the categories that emerged as significant from the personal model research (namely perceived benefits of treatment and perceived seriousness of the condition) are two of the variables contained in the HBM (Rosenstock, 1974, Becker, 1974).

The potential advantage of using personal model formulations of patients' beliefs about their disease is that they are less constrained than the HBM or social learning theory. But at the end of the elaborate procedure undertaken by Hampson et al, it was striking that the final results were also congruent with findings obtained using the HBM. As there is also a consistent body of research evidence reviewed above demonstrating the relevance of HBM variables to regimen adherence amongst patients with diabetes, in the current study cognitions about disease were examined within a HBM framework.

However, a number of insights derived from the SRM framework have informed the current study. firstly, the SRM framework stresses the importance of understanding in a detailed way, the particular conceptualization that the patient has of his or her illness. It is also recognized that patients' representations are not synonymous with the standard medical view of the disease and its treatment, (Horne, in press). Within the current study, although the complex personal model of diabetes interview schedule (see above) was not used, open-ended pilot interviews with patients with diabetes were carried out in order to elicit a range of different diabetic related cognitions. These interviews are described in detail in Chapter 4. Items derived from these interviews were then included in the health belief scales used in the current study.

A second insight derived from the SCM concerns the need for construct specificity. Horne (in press) has shown that within a complex regimen such as the diabetic self-care regimen, patients may hold different beliefs about different aspects of the regimen, and adherence to each component of the regimen is best predicted by the particular set of beliefs that apply to that regimen component. A corollary of this that was rigorously followed in the current study is the need to anchor questions about patients' beliefs to the specific details of the disease, rather than asking questions of a general nature. Given the complexity of diabetes as a disease - the different symptoms, long term complications associated with it and the complexity of the treatment regimen - it is clearly vital to ask very specific questions. So for example, patients may believe that blood glucose testing is important in managing day to day glycaemic control, but that it will not determine whether or not they develop long term complications. Simply asking 'how
beneficial is carrying out blood glucose testing' without assessing in what particular ways the
behaviour is or is not perceived to be beneficial, could result in significant patterns between
beliefs and regimen adherence being obscured. It is not surprising therefore that Skyler (1981),
Johnson (1984) and Glasgow and his colleagues have argued for the over-riding need to have
psychological measures that assess the specific detailed patterns of beliefs and behaviour of
patients with diabetes. This principle was carefully followed in the construction of the health
belief items used in the current study.

As discussed above, the SRM approach, in contrast to the HBM provides a dynamic
conceptualization of regimen adherence. Analyzing the dynamic relationship between cognitions
and regimen adherence would have required the collection of longitudinal data, and this was
beyond the scope of the current study. It is recognized, however, that the static nature of the
HBM is an important limitation of the model and that as such, it cannot provide a full description
of the complex ways in which cognitions relate to regimen behaviour.

1.6.3 Emotional adjustment amongst patients with diabetes

1.6.3.1 Introduction

Early notions of adjustment amongst patients with diabetes were heavily influenced by
psychoanalytic theories, particularly the notion that specific unconscious conflicts result in
specific psychosomatic disease, (Alexander, 1950). Typical examples of such psychosomatic
formulations of adjustment to diabetes are Menninger’s (1935) notion of the diabetic personality
characterized by diminished alertness, apathy, hypochondriac concerns, and especially
vulnerability to depression. Similarly, Dunbar et al (1936) listed immaturity, passivity,
masochism, sexual identity conflicts and oral dependency as features of the diabetic personality.

In 1981, Dunn and Turtle produced a masterly overview of all the empirical studies, and reviews
published since 1935. These authors highlighted key methodological problems that have
blighted the research literature, namely bias in selecting the diabetic group and bias in selecting
an appropriate control group. Dunn and Turtle pointed out that interpretation of the
characteristics of the diabetic personality depend substantially on the nature of the normative
sample chosen and that a control group that does not properly represent the population from
which the diabetic sample is selected in all respects other than the presence of diabetes will
invariably lead to misinterpretation.

Dunn and Turtle concluded that given the absence of adequate controls, there is still no evidence
of a characteristic personality that distinguishes diabetic patients from any other chronically ill
group or from the normal population. They go on to argue that although a number of studies
have reported increased rates of depression that this depression does not differentiate between
diabetes and any other chronic illness, and thus it does not constitute the basis of a separate 'diabetic personality'.

1.6.3.2 Rates of depression amongst patients with diabetes

Since the early reports of a consistent relationship between diabetes and depression there have been a number of large-scale investigations using well validated measures of depression reported in the literature. With a few exceptions, later studies have replicated the finding of an increased incidence of depression amongst patients with diabetes. So, for example, Lustman et al (1986) in a study of 114 adult IDDM and NIDDM patients reported that in terms of lifetime prevalence, major depressive episodes and generalized anxiety disorder were extremely common, occurring at rates approximately 6 to 7 times those observed in populations surveys using the same diagnostic criteria. Similarly, Popkin et al (1988) reported that the lifetime prevalence of major depression was significantly higher in their study of 75 adult patients with IDDM than the rate observed amongst first-degree relatives or in the general population. Both Lustman et al (1986) and Popkin et al (1988) used samples derived from attenders at outpatient clinics and therefore the representativeness of their findings could be questioned. More recently, to overcome the problem of only sampling outpatient attenders, Mayou et al (1991) sampled patients from a defined geographical area, regardless of whether or not they were currently attending the clinic. This study also reported increased rates of depression and anxiety amongst young adults with IDDM.

In contrast, Robinson et al’s (1988) study found no increase in the prevalence of depression amongst their diabetic sample. Robinson et al (1988) interviewed a random sample of 160 diabetic patients (IDDM and NIDDM) using the Present State Examination (PSE), a standardized, clinical intensive psychiatric interview (Wing et al, 1974). As this study reported a relatively high response rate (81%), bias in sampling is unlikely to have exerted a significant effect. However, Gavard et al (1993) have suggested that the strict diagnostic criteria of the PSE may have accounted for the pattern of results, arguing that with this instrument, only severe cases of depression would be likely to be detected.

Two other studies (Mazze et al, 1984 and Roy et al, 1994) have used self-report inventories of depressed mood, rather than the standardized diagnostic interview schedules of depression described above. These measures do not yield a discrete diagnosis of depression, instead they are constructed to measure the extent of depressive symptoms expressed as a single continuous dimension that includes normal emotional functioning (Gotlib and Cane, 1989). Although different scores on these inventories may be taken as indicators of different levels of depression, firm diagnoses of the presence of depression cannot be made on the basis of inventory scores alone. (Gotlib and Cane, 1989).
Roy et al (1994) compared a group of IDDM adults attending an outpatient clinic with a non-diabetic control group on their scores on the Beck Depression Inventory (BDI), (Beck et al, 1961). The diabetic patients were found to have significantly higher scores on the inventory, than the non-diabetic control group. Clearly this finding using a self-report inventory ties in with the studies described above that used diagnostic interview schedules. In contrast, Mazze et al (1984) reported that adult subjects with IDDM did not differ from population mean scores on the Zung Self-Rating Depression Scale (Zung, 1965). However, Mazze et al sought volunteers by placing an advertisement in local and regional newspapers. It is possible that this form of subject recruitment will tend to reduce the levels of depressed mood observed in the sample as patients who are currently depressed may be less likely to put themselves forward for inclusion in the study.

Two studies have also addressed the question of the course of depression amongst patients with diabetes. Lustman et al (1988), in a follow up to their earlier study (Lustman et al, 1986) reinterviewed 28 diabetic adults (both IDDM and NIDDM) 5 years after an index evaluation at which they had all received a diagnosis of major depression. This group was compared to a comparison group of 20 adult patients who were not depressed at the time of the earlier index evaluation. At follow-up 79% of the 28 diabetic patients who had all been diagnosed with a major depression at the index evaluation reported an affective disorder during the 5 year follow up period. In contrast, the likelihood of symptomatic affective disorder was only 10% over the same follow-up period in the comparison group. Lustman et al (1988) therefore suggested that diabetic patients with depression may experience a chronic course of psychiatric distress that is possibly more malevolent than that reported amongst the medically well, with a particularly high relapse rate.

Recently, Wells et al (1993) reported results that conflicted with Lustman et al (1988) as they found that the course of depression did not differ between patients with diabetes and non-diabetics. However, Wells et al included both IDDM and NIDDM patients in their sample, and it is therefore possible that these sample differences accounted for the different pattern of results observed between the two studies.

1.6.3.3 Factors associated with depression amongst patients with diabetes

1.6.3.3.1 Glycaemic control

Lustman et al (1986) found a significant difference in glycosylated haemoglobin between those who had had a recent psychiatric illness and those who had never experienced a psychiatric illness. Analysis of the effects of specific psychiatric categories on metabolic control indicated that the relationship between poor control and psychiatric illness was largely due to the specific effects of depression on glycaemic control. Mayou et al (1991) have also reported significantly
poorer glycaemic control amongst those subjects who were defined as a case according to the PSE.

Comparable results were also reported by Mazze et al (1984). In this study depressed mood scores on the self-report inventory were significantly correlated to glycosylated haemoglobin scores; higher levels of depressed mood were associated with poorer glycaemic control. Furthermore, Mazze et al also reported that changes in glycaemic control over a 36 week period were consistently correlated with changes in depressed mood scores. In contrast, Jacobson et al (1990) using the Symptom Checklist-90, (Derogatis et al, 1973), found no difference in checklist scores between poorly and well controlled IDDM patients. However, the authors expressed some surprise at this finding. They went on to suggest that the difference between their result and the findings of Lustman et al (1986) could be due to the fact that their clinic drawn sample may have contained inadequate numbers of patients with clinically meaningful psychiatric problems, and thus the study may have lacked the statistical power to detect the relationship between emotional functioning and glycaemic control.

1.6.3.3.2 Diabetic complications

A number of authors have examined whether the observed increase in depression amongst patients with diabetes is reactive to deteriorating physical health, and thus have investigated the relationship between diabetic complications and psychiatric status. The available evidence strongly suggests that the observed increase in the prevalence of depression amongst patients with diabetes is unrelated to the presence of complications. For example, Robinson et al (1988) found that the proportion of patients with complications did not differ significantly between those who were currently depressed and those who were not currently depressed, whilst Popkin et al (1988) reported that lifetime and six-month prevalences of major depression were unrelated to the presence of diabetic complications.

Lustman et al (1986) demonstrated the important finding that psychiatrically ill patients reported more symptoms of diabetes and more distress associated with these symptoms than did patients who had never been psychiatrically ill. Furthermore in their study, the overall report of diabetes symptoms was unrelated to glycosylated haemoglobin levels, and was influenced primarily by the recent presence of psychiatric disorder. Taken together these studies suggest that although the presence of complications does not itself cause the increased rate of depression observed amongst patients with diabetes, the distress associated with diabetic symptoms is increased in those patients with psychiatric problems.
1.6.3.3 Biological Factors

There are many commonalities in the biological expression of both depression and diabetes. For example, Lustman et al (1983) found that hormonal arousal, similar to that observed in psychiatric patients with severe anxiety may be induced by sustained elevated plasma glucose levels, a condition which diabetic patients in poor control may have experienced. Dysregulation of hypothalamic-pituitary-adrenocortical activity has been observed in both diabetes and depression (Cameron et al, 1984) and a surplus of insulin antagonists such as cortisol are present during severe depression, (Wright et al, 1978).

Lustman et al (1988) have argued that this evidence of an association between biological factors and depression amongst patients with diabetes does not rule out a role of social and environmental pressures. The precise role of different variables has not yet been delineated amongst patients with diabetes, however it may be that biological factors such as hyperglycaemia induced nervous system arousal, may make a diabetic individual more susceptible to the effects of environmental stress.

1.6.3.3.4 Demographic Factors and Type of diabetes

IDDM and NIDDM patients have not been found to differ significantly in the prevalence of depression (Lustman et al, 1986; Robinson et al, 1988). Results on the role of unemployment are equivocal; Friis and Nanjundappa (1986) reported that the prevalence of depression was higher amongst unemployed diabetics than those who were in employment, but Robinson et al (1988) did not find such an association. Both Popkin et al (1988) and Robinson et al (1988) found that the presence of depression was unrelated to the sex of the patient, or to the duration of their diabetes.

1.6.3.3.5 Regimen adherence

None of the studies using standardized interview schedules to diagnose depression have assessed the role of regimen adherence. However, two studies using self-report indices of depressed mood have considered the role of this factor. In a study of NIDDM adults, Wilson et al (1986) reported that depressed mood (assessed by the BDI) was significantly negatively related to various aspects of regimen adherence, although it was a poorer predictor of adherence than the health belief variables considered in the study. McCaul et al (1987) reported a different pattern of results amongst IDDM patients; using the Automatic Thoughts Questionnaire (Hollon and Kendall, 1980) as the index of depressed mood, higher depressed mood scores did not significantly predict adherence amongst adult IDDM patients. It is unclear whether the difference between the these two studies reflects a different relationship between adherence and depressed mood in NIDDM
1.6.4 Diabetes specific emotional adjustment

At the end of Dunn and Turtle's seminal review on the psychological functioning of patients with diabetes, the authors concluded: "We need to know how different individuals react to the tyrannies of diabetes, explore the psychological demands of diabetes rather than its general psychological consequences, and explore alternative models, for adequate adjustment and good diabetic control, which are adaptable to the personality of the individual".

Building on this conclusion about the need to understand how different individuals cope with the specific demands posed by diabetes, Dunn and his colleagues developed a psychometric instrument, (the ATT39) which aimed to measure emotional adjustment to diabetes. A factor analysis based on the responses of 170 subjects identified 6 subscales of the ATT39: perceived levels of diabetes related stress; adaptation to diabetes; guilt associated with the disease; alienation associated with the disease; illness conviction and tolerance for ambiguities inherent in diabetes. On the basis of a number of separate investigations using the ATT39, Dunn (1988) identified different patterns of emotional adjustment. For example, he found that diabetes related guilt was a major problem during the early years of diabetes for all patients, and it reappeared many years later with the onset of diabetic complications. Amongst patients with IDDM, the intervening period was often characterized by stable adjustment to the disease. A further important result of research using the ATT39 was the finding that different patterns of adjustment were associated with different types of diabetes.

Subsequent work by Welch et al (1992) has questioned the 6 factor structure of the ATT39, and concluded that only 1 factor, namely diabetic related stress was replicated. However, even though this calls into the question the details of the conclusions that Dunn et al reached using the 6 factors of the ATT39, the basic point of Dunn et al's approach remains, namely the need to look at the specific ways in which living with diabetes imposes a stress on patients, rather than looking for the effect of diabetes on broad personality traits.

Very recently two additional instruments have been developed that attempt to assess the emotional impact of diabetes. The Questionnaire on Stress in Diabetic Patients (Duran et al, 1995) was designed to assess psychological stress associated with the daily living problems of diabetics. The Problem Areas in Diabetes Survey (Polonsky et al, 1995) was designed to assess psychosocial adjustment specific to diabetes. Both of these measures were published after the data collection stage of the current study, and therefore could not be used. However, their development reflects the growing awareness of the need for measures that assess the specific ways in which diabetes impacts on emotional adjustment.
CHAPTER 2

PSYCHOLOGICAL ASPECTS OF PREGNANCY

2.1 INTRODUCTION

The aim of this chapter is to provide a critical review of the literature on psychological aspects of pregnancy. In the previous chapter key topics within the overall literature on psychological aspects of diabetes were selected. Similarly, in this chapter it would not be possible to review the literature on all the different aspects of psychological functioning during pregnancy. Instead, this chapter begins with a brief description of early work on pregnancy derived from psychoanalytic theory, as a number of researchers have drawn on this work to make suggestions about the functioning of diabetic patients during pregnancy. The chapter then concentrates on two issues: depression in pregnancy and attachment to the foetus. These areas were selected as suggestions have previously been made in the literature, that these are two key areas in which diabetic women during pregnancy might differ from non-diabetic women.

2.2 EARLY STUDIES OF PSYCHOLOGICAL ADJUSTMENT DURING PREGNANCY

Deutch (1943) conceptualized pregnancy as a dream-like period which fulfilled a woman’s deepest yearnings, but this view was then superseded by that of psychoanalysts such as Bibring (1959) and Caplan (1960) who theorized that pregnancy was a developmental crisis. According to Caplan, three psychological tasks must be completed in order for the woman to resolve the crisis successfully. Firstly, the woman must accept the pregnancy and acknowledge its existence; secondly an attachment to the foetus needs to be made; and finally, an adaptation to an appropriate relationship with the baby after delivery has to occur.

A corollary of this crisis model is the prediction that preventative psychotherapy would diminish the adjustment problems that pregnant women might face. Yet the results of Shereshefsky and Yarrow’s (1974) research which involved giving preventative psychotherapy to a group of primiparous married middle class women necessitated a refinement of the crisis model. Shereshefsky and Yarrow concluded that their data did not support the notion that pregnancy was a crisis that required extraordinary resources, but that it was a crisis in the sense of being a transitional phase or a turning point for the couples involved in the study.

In parallel to the psychoanalytic perspective, family sociologists have also theorized that pregnancy is a time of major upheaval. LeMaster (1957) viewed the family as a small social system in its own right and argued that the addition of a new member could therefore be as disruptive to the system as the loss of a member. Although LeMaster provided some empirical support for his theory, later researchers have criticized his interview techniques and rejected the idea that a proportion as high as 83% of first-time couples could be experiencing severe crises.
Elliott (1984) has pointed out that although the psychoanalytic and sociological approaches to the study of pregnancy operated separately, they actually evolved similarly in that in both fields initial theoretical "crisis" models gave way to "transitional" models following a period of empirical research. Thus Zajicek (1981) argued that for any individual woman, pregnancy, just as any other period of major life change, can be a traumatic crisis, but that for many women it is actually a period of transition resulting in maturation; the particular outcome depending upon the "orientation and the psychological stage of the individuals involved".

2.3 DEPRESSION IN PREGNANCY

2.3.1 Introduction

The issue of whether pregnancy is associated with an increased risk of depression has received considerable attention. There can however be difficulties comparing the results of different studies due to the fact that they frequently consist of very small samples of different demographic compositions assessed with different indices of depression at different stages of pregnancy. Therefore, as Whiffen (1992) has argued in a recent comprehensive review, it is premature to make firm conclusions about the prevalence of depression during pregnancy. However, sufficient research has been undertaken to draw some tentative conclusions on a number of key issues such as whether pregnancy is a time when women are at an increased risk of experiencing depression, or depressed mood, the relationship between pregnancy and postnatal depression, and some probable risk factors for depression during pregnancy.

2.3.2 Rates of depression in pregnancy

On the basis of studies that have used diagnostic interviews with standardized criteria such as the Research Diagnostic Criteria, DSM-III, the PSE and ICD 9 classifications, the evidence suggests that pregnancy is not associated with an increased risk of major depressive episodes. For example, O'Hara et al (1990) compared a group of childbearing women to a matched group of non-childbearing women; the latter group was constructed by asking each childbearing women to nominate an acquaintance of similar age, class and parity who was not currently pregnant. O'Hara et al reported that using RDC criteria there were no differences in the rate of major or minor depression between the childbearing and non-childbearing groups during pregnancy, and the childbearing group had a prevalence of major depression of 5%. Murray and Cox (1990) also using RDC criteria reported an almost identical rate of major depression to that observed by O'Hara et al (1990), ie a 6% prevalence of major depression whilst Cutrona (1983) reported a point prevalence of 3.5% of major depression during the 3rd trimester on the basis of DSM-III criteria.
Although these studies point to the conclusion that pregnancy is not associated with an increased risk of major depressive disorders, other studies have suggested a higher prevalence of psychopathology. For example, Zajicek and Wolkind (1978) in a study of 105 primips in an inner-city working class area of London reported that 14% of the women showed signs of emotional difficulties, using a screening interview based on Rutter (1976). In this study 14% of the sample were found to have an emotional disorder of sufficient severity that it significantly impaired the daily lives of the women. Obviously this classification system is not strictly comparable to the stricter diagnostic systems that were used in the studies above, but the fact that 14% of the women experienced both symptoms and impairment of functioning does suggest a higher degree of pathology in this sample than those described above. However Zajicek and Wolkind also asked retrospectively about emotional difficulties that the women were experiencing prior to pregnancy and found a significant effect of pre-pregnancy emotional functioning on emotional well-being during pregnancy; 81% of the women who reported emotional difficulties prior to pregnancy were experiencing difficulties during pregnancy, whilst only 10% of the women who had not experienced pre-pregnancy difficulties experienced emotional problems during pregnancy. It therefore seems likely that the high degree of emotional distress observed in this study was not a function of pregnancy per se, but rather related to the high degree of pre-pregnancy problems occurring in this disadvantaged group of women.

Another study that reported a higher incidence of depression was that of Kumar and Robson (1984) who reported an increased incidence of new cases of depression in the first trimester of pregnancy of 10%. Given that these were new cases of depression the argument that the observed rate was the product of high pre-pregnancy rates cannot be sustained. However, although the authors did not use RDC criteria to classify the cases, they subsequently re-analyzed the structured interview results using RDC criteria and concluded that 73% of the cases were minor rather than major depression, and they also reported that the majority of these early depressions had remitted before the second trimester. Furthermore, in a recent study Murray and Cox (1990) have questioned the clinical significance of the RDC minor depression category during pregnancy, suggesting that many patients might meet the criteria during pregnancy without being significantly impaired. Therefore, the results of Zajicek and Wolkind (1978) or Kumar and Robson (1984) do not contradict the conclusion drawn from the diagnostic studies above that pregnancy is not associated with an increased rate of major depression.

In contrast to this conclusion that the prevalence of major depressive episodes does not increase during pregnancy, the available evidence does suggest that women may experience a greatly increased degree of mild depressive symptomatology during pregnancy. Using a cut-off score of 10 or above on the BDI as a classification of mild depression, Gotlib et al (1989) reported that 21.5% of the sample reported depressed mood during the 2nd trimester, and 24.8% during the third trimester. Strikingly similar figures were reported by Cutrona (1983) who used a cut-off
point of 9 and above on the BDI and found that 24.7% of her sample of primips reported symptoms of mild depression and Raskin et al (1990) who reported that 26% of the women showed signs of depressed mood on the basis of the CES-D self-report scale.

A number of authors have examined the question of the relative contribution of somatic versus cognitive-affective changes, to increased scores on self-report inventories during pregnancy. Huffman et al (1990) reported that although total scores on the BDI, and the somatic subscale increased significantly during pregnancy, a comparable change did not occur with the cognitive-affective items. O'Hara et al (1990) in the study discussed above that incorporated the matched comparison group of non-childbearing women found that the childbearing women had greatly elevated scores on the BDI from the second trimester through to the early puerperium, and that this increase was largely due to changes in the somatic subscale of the BDI. O'Hara et al concluded that although the risk of major depressive episodes was not increased during pregnancy, there was evidence of increased psychological distress in a significant minority of women, and that a major element, although not the entirety of this distress was directly related to many of the physical changes associated with pregnancy and childbirth.

Against this overall picture of increased depressive symptomatology during pregnancy, particularly associated with the physical changes during the period, it is necessary to stress, as Elliott (1984) has argued, that pregnancy is not a great 'leveller' of emotional experience. Elliott criticized the tendency to assume that psychologically pregnancy affects all women similarly, leading to generalizations such as Pitt's (1978) statement that "pregnant women tend to be moody, whimsical and to worry a lot". Her longitudinal study of 128 women demonstrated the extent of individual differences as on all indices studied, and on all measurement occasions, there was a wide range of scores.

2.3.3 Changes in depressed mood over the course of pregnancy

A number of authors have investigated changes in mood state over the course of pregnancy. Firm conclusions are difficult to make as different findings have emerged from these studies, but there is sufficient consistency to draw some tentative conclusions. Elliott et al (1983) reported that symptoms of depressed mood did not change over the course of pregnancy. Earlier work by Lubin et al (1975) and Condon (1987) similarly found consistency of emotional functioning over the three trimesters whilst Gotlib et al (1989) found similar point prevalence rates of RDC major and minor depression in the 2nd and 3rd trimester.

Other authors have suggested that depressive symptomatology increases over the course of pregnancy. A consistent, and understandable finding is that somatic symptoms and tiredness increase over the period. Thus Elliott et al (1983) found that somatic scores from the CCEI (Crown and Crisp, 1979) increased, as did ratings of discomfort. Similarly, O'Hara (1990) found
that the somatic items from the Beck Depression Inventory showed a large increase from the 2nd trimester through to the early puerperium, and indeed the most pronounced difference between the childbearing and non-childbearing subjects over the whole study was in the late pregnancy and early puerperium measures of somatic symptoms. What is less clear is whether non-somatic aspects of depression also increase during pregnancy. Pritchard (1994) on the basis of the Hospital Anxiety and Depression Scale (Zigmond and Snaith, 1983) found that the rates of cases and possible cases increased between 20 and 30 weeks gestation. As the HADS excludes all somatic symptoms of depression, this observed increase cannot be due to somatic symptoms increasing over pregnancy. However, Pritchard did not say whether the increase over this time period was statistically significant or not, and he also mentioned that there was considerable overlap between the two time periods, ie the majority of depressed patients were experiencing prolonged difficulties and had been depressed on both occasions.

Kumar and Robson (1984) reported a different pattern of results, with the highest incidence of affective disorder occurring in the first trimester with many of these depressions remitting by the end of the 2nd trimester. However, not only does this result not accord with other studies, there is also some suggestion based on the comparison of rates of postnatal depression observed in those subjects who were interviewed throughout pregnancy with those who were only interviewed postnatally, that taking part in the series of interviews throughout pregnancy may have had a therapeutic effect. Clearly, if the diagnostic interviews were themselves therapeutic, this could account for the decline in affective disorder observed over the course of pregnancy.

2.3.4 Changes in emotional functioning from pregnancy to the puerperium

Other researchers have looked at changes in emotional functioning from pregnancy to the postpartum period. Embedded within this issue are two separate but related questions: Firstly, are there changes in the frequency with which depression and/or depressed mood occurs over the period and secondly, what are the patterns of association over the period. It is of course theoretically possible, for example, for the rate of depression to stay constant over the period, but for different individuals to experience the disorder during pregnancy as opposed to postpartum. Conversely, the rate could alter after birth, but the majority of postnatal cases might still be made up of women who had experienced problems during pregnancy. It is therefore essential to consider these questions as two separate issues.

Despite the fact that postnatal depression has received quite considerable attention in the non-academic press whereas pregnancy depression is rarely discussed, the available evidence suggests that with respect to levels of depressed mood women may report less distress a month or so after delivery than during pregnancy. Some studies have found that levels of depressed mood during the first few weeks after birth remain at the pregnancy level (eg Fink and Windt, 1984; O'Hara et al 1990), but a large number of studies have indicated that by 5-6 weeks postpartum,
levels are significantly lower than those observed during the second or third trimester (e.g., Steer et al., 1990; Fink & Windt, 1984; O'Hara et al., 1990).

Changes in the rate of major or minor depression prepartum to postpartum have been investigated by O'Hara (1986) who reported that the rate increased from 9% prepartum to 12% postpartum, but he did not say whether this difference was statistically significant. Similarly, Kumar and Robson (1984) noted a high incidence of disorder 12 weeks postnatally, but also did not say whether this rate was higher than that observed in the 1st trimester. Only one study has included a non-childbearing control group that was also interviewed over a comparable time period, and these researchers reported that there was no increase in the rate of major depression over the period within either of the two groups, nor did the two groups differ from each other at either of the assessments (O'Hara et al., 1990). However, Whiffen (1992) has demonstrated that studies such as O'Hara et al., 1990 that interviewed less than 200 pregnant patients, lack the statistical power to detect changes in prevalence pre-to-post-partum, and therefore firm conclusions on this issue cannot be made yet.

In terms of the link between pregnancy and postnatal depression, many, but not all of the studies to date, suggest that the two are related and that a significant proportion of postnatal problems may have actually started during pregnancy. For example, Buesching et al. (1986); Ballinger (1982); and Green (1990) all reported a significant association between antenatal and postnatal emotional well-being. In terms of diagnostic criteria, Gotlib et al. (1989) found that only half of the cases of postpartum depression were new onset and the remaining women had been depressed during pregnancy and similar findings were reported in a later study by the same researchers (Gotlib et al., 1991). Whiffen (1992) in a meta-analysis of previous studies concluded that the available evidence suggests that 23-40% of the cases of postpartum depression should be classified as continuing episodes rather than new cases as they actually had their onset during pregnancy.

Although these studies therefore point to a continuity model whereby a significant proportion of postnatal distress is seen as arising prior to birth, other studies have not supported this conclusion. Thus Kumar and Robson (1984) concluded that subjects mainly suffered either from antenatal or postnatal depression, not both. However, even in this study, 18% of the subjects who had been depressed at any time during pregnancy were found among the cases at 3 months postpartum. Also, as discussed above, there was some suggestion with this study that the diagnostic interviews may have had a therapeutic effect, which may also have lowered the observed correlation between pre and postnatal depression. The study by Cox et al. (1982) which also failed to find a significant relationship between postnatal depression and early pregnancy ratings of anxiety symptoms is also often taken as evidence against the continuity model. However, more postnatally depressed women had reported themselves as "always been a worrier", so even in this study there was some evidence of continuity. Finally, Elliott (1984) has
suggested that predominantly middle class samples such as that studied in Kumar and Robson (1984) and Cox et al (1982) are less likely to exhibit continuity over the time period, in contrast to working class samples (eg Watson et al, 1984) where the groups of cases are more likely to contain significant numbers of women who are cases by virtue of environmental stressors which would remain constant from pregnancy through to the postnatal period.

Whilst a growing number of studies therefore support the idea of a considerable degree of overlap between pregnancy and postnatal emotional functioning, it is also important to reiterate Elliott's (1984) conclusions about the variability in patterns of change in emotional functioning observed pre to postnatally; a finding later replicated by Dimitrovsky et al (1987). It is certainly not the case that all women who experience depressed mood during pregnancy go on to experience similar symptoms postnatally, or that those who are emotionally well during pregnancy will necessarily avoid postnatal emotional problems. However, the available evidence reviewed above does suggest that notions of 'postnatal depression' need to be broadened, and that there is an important degree of continuity in emotional functioning across the birth divide.

2.3.5 Factors associated with depression in pregnancy

Although more research has been carried out on postnatal than pregnancy depression, a large number of studies have still attempted to identify factors associated with depression and depressed mood during pregnancy. Often though, conclusions must remain very tentative due to the methodological limitations discussed above. In the section below three types of factors are considered; demographic, obstetric and psychosocial.

2.3.5.1 Demographic factors

The evidence on two demographic factors, maternal age and parity, is inconclusive. Zuckerman et al (1989) found that older mothers reported more depressive symptoms during pregnancy. In contrast using RDC criteria found that depressed pregnant women were younger than non-depressed pregnant women. The position on the effects of parity is also unclear. O'Hara (1986) and Gotlib et al (1989) both using RDC criteria reported that depressed pregnant women had more children than non-depressed pregnant women, whilst Elliott et al (1983) and Murai and Murai (1975) found no effect of parity on self-report indices of depressed mood.

The evidence on two other variables, social class and marital status is somewhat more consistent. Many, although not all, of the studies that have investigated the role of social class have found that it is a significant factor. So, for example, Gotlib et al (1989, 1991), found that depressed pregnant women were less well-educated than non-depressed pregnant women whilst Zuckerman et al (1989) and Pritchard (1994) both found an association between social class and the number of depressive symptoms that the women reported, with women in the lowest social class reporting
the greatest number of symptoms. Against this conclusion that social class is a risk factor during pregnancy, Kumar and Robson (1984) and O'Hara (1986) both failed to find any association between class and emotional well-being during pregnancy. In the case of Kumar and Robson's study, the social homogeneity of the sample may have minimized the effect of social class, and O'Hara's sample sizes were so small (only 6 cases of major depression during pregnancy), that all conclusions must be regarded as extremely tentative.

The other demographic factor that may have an effect in pregnancy is whether the woman is single, or alternatively is married/living as married with a partner. Greene et al (1991), Zuckerman et al (1989) and Pritchard (1994) have all found that depressive symptomatology during pregnancy is greater amongst single women, than those who have a partner.

2.3.5.2 Obstetric factors

Very little systematic work has been carried out on the effect of previous infertility on emotional functioning during pregnancy. Bernstein et al (1988) reported that 32 women who had previously experienced fertility problems had higher scores on the Hopkins symptom checklist during pregnancy, compared to a matched never infertile group, but given the small sample size it is not possible to reach a firm conclusion. In contrast, Kumar and Robson (1984) found that there was no association between depression during pregnancy and difficulty conceiving the current pregnancy, although there was a significant association between depression during pregnancy and having previously experienced a therapeutic abortion. There have been no reports of later studies that have supported or failed to confirm this finding on the effect of previous therapeutic abortions on depression during pregnancy.

The evidence on the effect of previous miscarriage is similarly inconsistent; Zuckerman et al (1989) in a large sample of 1014 predominantly deprived women from an inner-city American hospital found that previous miscarriages were associated with increased depressive symptomatology, whilst Kumar and Robson (1984) in a predominantly middle-class sample found that previous miscarriage was not a risk factor for the diagnosis of depression during pregnancy.

More recently, Stratham and Green (1994) examined the effects of miscarriage, previous terminations, and stillbirths on feelings early in a subsequent pregnancy. Although the authors concentrated on anxiety during pregnancy, the methodological points that emerged from this study make it relevant to the discussion of depression. In Stratham and Green's study 1356 women from all social backgrounds completed postal questionnaires during pregnancy and a number of important findings emerged. Firstly, Stratham and Green found a very interesting effect of the ordering of these different birth events. With regard to worry about miscarriage and the possibility of something being wrong with the baby, a successful pregnancy was only found
to be protective if it had occurred since the earlier miscarriage; those women who had had a successful pregnancy and then had a miscarriage did not differ in terms of anxiety levels from those women who had had miscarriages but no successful pregnancies. Secondly, the authors also reported that the effect of previous abortions and miscarriages may be interactive. A previous termination of pregnancy had no overall effect on worries, but amongst women who had experienced an abortion as well as miscarriage a significant increase in worries about miscarriage was noted. This study therefore points to the complexity of the effects of different obstetric experiences on emotional functioning during pregnancy. Given that the particular ordering of events and the interaction between different events may be significant, it makes it clearer why consistent patterns often fail to emerge from previous smaller studies that have been unable to analyze these more complex patterns.

In terms of the effect of the mother’s health during pregnancy, Mercer and Ferketich (1988) interviewed 153 high risk women who were hospitalized during their pregnancy and compared them to a low risk pregnant sample. The authors found that the high risk women had higher scores on the CES-D self-report index of depressed mood. However, it must be stressed that these women were at extremely high risk of serious pregnancy complications. An additional interesting finding that emerged from this study was that the high risk women reported receiving more social support than the low risk women. This highlights the importance of adopting a broad perspective when analyzing the impact of a given situation and looking for some of the potentially beneficial factors that may buffer the impact of an adverse situation.

Whilst women who are hospitalized for severe complications during pregnancy may report higher levels of depressed mood, the available evidence suggests that less critical potential problems during pregnancy do not have a large impact on emotional functioning. Thus Zuckerman et al (1989) found that depressive symptoms were not related to health problems such as hypertension or Venereal Disease during pregnancy. Similarly, Kumar and Robson (1984) found no evidence of increased prevalence of depression amongst those women who had a ‘chronic illness’ (unfortunately, the precise details of the illnesses in the study were not specified).

In contrast, Zajicek and Wolkind found that women who were more emotionally distressed during pregnancy rated their health as more of a problem. However, this type of rating is not identical to objective ratings of medical severity that a medical practitioner might provide. As discussed in Chapter 1, this distinction is particularly apparent in the context of the relationship between health problems and depression in diabetes; many studies have found no relationship between the existence of complications and depression, but Lustman et al (1986) found that the extent to which patients find symptoms of diabetes distressing was in fact related to whether they were depressed or not. So, in the context of Zajicek and Wolkind’s findings it must be realized that a relationship between self-rated severity of health problems and emotional distress may not
necessarily be reactive, but may instead be the result of the fact that those who are distressed during pregnancy, rate the somatic changes associated with pregnancy as more problematic. A similar argument also applies to Kumar and Robson's (1984) finding of an association between health anxieties about the foetus and depression during pregnancy; it was not possible to conclude whether the women worried more about the health of the baby because they were depressed, or alternatively whether they were depressed because of their health anxieties.

2.3.5.3 Psychosocial factors

Other researchers have investigated the effect of a range of psychosocial stressors (eg lack of social support, poor marital relationship etc) that have been found to be related to depression in the general, non-pregnant population. The overwhelming conclusion to emerge from a review of these studies is that those factors that have been found to be associated with depression and depressed mood in the general population, are also related to these states amongst pregnant women. Thus all those studies that have investigated the relationship between social support and depressed mood in pregnancy found a significant association; (eg Norbeck and Tilden, 1983; Mercer and Ferketich, 1988; Zuckerman et al, 1989 and Thorpe et al, 1992). Similarly, O’Hara (1986) using RDC criteria found that women who were diagnosed as depressed during pregnancy reported receiving less social support than non-depressed pregnant women.

Within this general pattern, the differential effect of different types of emotional support remains less clear. Zuckerman et al (1989) Mercer and Ferketich (1988) and Norbeck and Tilden (1983) all reported that emotional support was the critical factor in predicting levels of depressed mood whilst O’Hara (1986) found that it was instrumental support that differentiated between depressed and non-depressed pregnant women. Clearly interpreting this pattern of results is complicated by the fact that O’Hara (1986) used diagnostic criteria whilst the other studies used self-report symptom inventories.

The second consistent finding in the literature is that a less than satisfactory marital relationship is also a critical factor. All the studies that have investigated this factor have found it to be significantly associated with levels of depressed mood during pregnancy; ( eg Elliott et al, 1983; Kumar and Robson, 1984; Tietjen and Bradley, 1985; Dimitrovsky et al, 1987; Anderson et al, 1994 ). Similarly, O’Hara (1986) found that the quality of the marital relationship was significantly poorer amongst those women who were diagnosed as suffering from depression during pregnancy.

The third psychosocial factor that has consistently been found to be associated with depression and depressed mood in pregnancy is a previous history of emotional problems. Four out of five studies that have investigated this factor found that it had a significant effect; (ie Zajicek and Wolkind, 1978; Elliott et al, 1983; Kumar and Robson, 1984; Buesching et al, 1986). Only O’Hara
(1986) found no association between previous psychiatric history and the diagnosis of depression in pregnancy, but this study was based on 9 patients who were diagnosed using RDC criteria with major or minor depression, and therefore the small sample size involved may have precluded the relationship being observed in this study.

In general then, there is consistent evidence that those factors that have been found to be associated with depression and depressed mood in non-pregnant women also exert a significant effect during pregnancy. But there are also some other factors that are specific to pregnancy, that might be associated with an increased risk of emotional problems. For example, doubts about having the baby or one’s ability to cope after the birth, worries about the bodily changes occurring during pregnancy and fears about the pain of labour.

In terms of doubts about having the baby, it is important to realize, as Elliott (1984) has pointed out, that this is not synonymous with the planning of pregnancy as even a definitely unplanned pregnancy can turn out to be a highly welcome event. However, a number of studies have consistently shown an association between doubts about being pregnant at this time and emotional well-being. For example, Kumar and Robson (1984) found an association between depression and having given serious consideration to terminating the current pregnancy whilst Condon (1987) reported that a lack of emotional attachment to the foetus was associated with emotional problems during pregnancy. Similarly, Zuckerman et al (1989) found an association between depressed mood and feeling unhappy about the pregnancy and Green (1990) found that a woman’s initial reaction to finding that she was pregnant was a significant predictor of mood state during pregnancy.

Another aspect of adjustment to pregnancy is a woman’s feelings about her ability to cope with the new baby. A consistent finding is that those women who have the most frequent doubts about their ability to handle the demands of motherhood have higher levels of depressed mood during pregnancy (eg Elliott et al 1983; Affonso et al 1991; Anderson et al 1994). Not only is there an association between worries about dealing with the baby and mood state during pregnancy, but worries about the pain of labour are also significant. So for example, Green (1990) and Anderson et al (1994) both found that women who were more concerned about the pain of labour were more dysphoric during pregnancy. Finally, those women who felt more concerned about the body changes occurring during pregnancy were also found to experience more emotional distress (Zajicek and Wolkind 1978) and higher levels of depressed mood (Anderson et al 1994).

Of course throughout this whole section it must be stressed that these various observed significant associations do not provide evidence on causal mechanisms. It is impossible to deduce from the studies carried out to date whether for example, worries about one’s ability to cope with the baby significantly increase levels of depressed mood, or alternatively whether such
worries are in fact caused by the low mood state as part of the negative cognitive processing that is a feature of depression (Beck, 1991). The same point can be made for most of the psychosocial stressors discussed above, with the obvious exception of previous psychiatric history. However, the available evidence does clearly suggest that the general set of psychosocial factors operative outside of pregnancy are associated with depression and depressed mood in pregnancy, and in addition, there is a set of specific factors linked to women's concerns about the process of pregnancy, delivery and mothering that are also associated with an increased risk of emotional distress. The lack of large scale controlled longitudinal studies makes it impossible to reach more detailed conclusions, and Whiffen's (1992) position still holds that we do not yet have a definitive picture of causal processes underlying depression in pregnancy or of whether the mechanisms differ from those operating post-natally.

2.4 PSYCHOLOGICAL ATTACHMENT TO THE FOETUS

2.4.1 Introduction

The notion that during pregnancy a woman develops some form of emotional attachment to her unborn child was first put forward by Helena Deutsch in the 1940s (Deutsch 1943). This notion was similar to the work of Bibring (1959) who conceptualized one of the psychological tasks of pregnancy as an investment of libido in the foetus. Further evidence of this emotional attachment to the foetus was provided by Kennell in his observations of the mourning and grief experienced by women who had been bereaved by stillbirth (Kennell et al 1970).

Building on these early observations, a number of authors from the 1970s onwards attempted empirical investigations of maternal foetal attachment. Leifer (1977) interviewed 19 primiparous women during each trimester of pregnancy, and again at 3 days, 2 months and 7 months postpartum. The attachment behaviour Leifer described included talking to the foetus, reprimanding it for moving too much and calling the foetus by a pet name, but her precise method for assessing attachment was not specified. Cranley (1981) interviewed 30 women during the third trimester of their pregnancies and again on the third postpartum day. Using the Maternal Foetal Attachment Scale (MFAS) which she developed for the study, Cranley concluded that 78% of the women engaged in behaviours or expressed attitudes indicative of affiliation to and interaction with their unborn child.

However, as Condon (1985) has pointed out, the investigation of the maternal foetal relationship is particularly difficult, given that the object of attachment is a "curious mixture of fantasy and reality". More specifically, he argued that Cranley's MFAS confounds feelings about 'being pregnant' with feelings about the developing foetus. On the basis of factor analysis of responses to 36 questionnaire items, Condon (1985) demonstrated that women discriminate between their emotional reactions to the foetus versus their reactions to 'being pregnant'. Not only was there a
low intercorrelation between these two factors, but time changes over the course of pregnancy indicated that particularly in the third trimester, a profound attachment to the foetus may coexist with a significant disenchantment with 'being pregnant'.

An additional difficulty with the MFAS pointed out by Condon (1985) is the fact that some of the items (eg 'I picture myself feeding the baby') contribute little to an assessment of attachment unless the affect associated with the fantasy is also assessed. Similarly, Muller (1993) argued that the MFAS has an undue emphasis on maternal behaviours, rather than on emotional attachment to the foetus. Furthermore, Mercer (1993) has suggested that there may be cultural differences in the extent to which women interact with the foetus (eg the extent to which they talk to the unborn baby) and that these cultural norms also have the potential to confound MFAS scores.

Of those studies that have used psychometric instruments to assess antenatal attachment, only Stainton (1985), Muller (1993) and the studies by Condon and his team, have used scales other than the MFAS. Condon (1985) in a study in which 54 first-time expectant couples were interviewed throughout pregnancy using an attachment scale developed for the study, reported that 10-15% of couples show little evidence of attachment to the foetus, even by late pregnancy. In a later retrospective study (Condon and Dunn, 1988) in which couples were asked 5 days postpartum about feelings during pregnancy, 25% of women acknowledged the presence of some negative feelings toward the unborn child and 12% reported a lack of emotional closeness or affection. Thus these studies clearly suggest that a significant minority of women have failed to develop strong emotional attachments to the foetus during pregnancy.

2.4.2 The relationship between prenatal and postnatal attachment

A key question that stems from the finding that a significant minority of women fail to develop strong emotional attachments during pregnancy is the issue of the relationship between antenatal and postnatal attachment. Although Cranley (1981) found no association between MFAS scores and postnatal attachment as assessed by the Broussard Neonatal Perception Inventory (Broussard and Hartner, 1970) administered at 3 days postpartum, other authors have suggested that there is a significant association between antenatal and postnatal attachment. Thus Leifer (1977) reported a significant association between attachment to the foetus during pregnancy and maternal feelings toward the infant postpartum. Similarly Condon and Dunn (1988) found that the attitudes and feelings toward the unborn child that developed during pregnancy significantly influenced the early postnatal feelings about the baby (assessed within the first 5 days postpartum).
2.4.3 Factors associated with antenatal attachment

Given that the available evidence therefore suggests that feelings about the foetus during pregnancy may be predictive of postnatal attachment to the baby, particularly in the early puerperium, it is important to consider what factors have been found to predict antenatal attachment.

2.4.3.1 Demographic factors

Condon and Esuvaranathan (1990) using Condon's attachment scale and Mercer (1993) using the MFAS suggested that antenatal attachment scores may be higher amongst primips than multips and Condon suggested that women may feel that their first pregnancy is somehow 'special', in comparison to subsequent ones. In contrast, Muller (1993) and Cranley (1981) also using the MFAS found no effect of parity. Unravelling the possible effects of parity is complicated by the fact that maternal age may also influence attachment, and obviously age and parity tend to be confounded in most study samples. Muller (1993) found that attachment was inversely related to age, ie younger women were more attached to their baby, but she did not separate out the effects of age from those of parity so interpreting this finding is difficult. Only Berryman and Windridge (1993) have reported analyzing the effect of age separately amongst multips and primips. These authors found that amongst multips, there was no effect of age on attachment, but amongst primips, older women reported significantly lower attachment scores. This difference was explained in terms of older primiparous women delaying becoming attached to the foetus until the results of amniocentesis were known.

Evidence on the effect of gestational age on attachment is unequivocal; all the authors that have addressed this question have found that antenatal attachment scores increase during the course of pregnancy (Grace, 1989; Wu and Eichmann, 1988; Condon, 1985; Heidrich and Cranley, 1989; Reading and Cox, 1984; Muller, 1993 ). Grace (1989) also reported an interaction between parity and gestational age with multips showing less increase across the three trimesters than primips.

2.4.3.2 Quality of relationship with the partner

A second consistent finding is the association between antenatal attachment and the quality of the relationship with the woman's partner. With the exception of Muller (1993) who failed to find that marital satisfaction was related to antenatal attachment, all of the other authors who have investigated this question have reported that attachment to the foetus is reduced amongst those women who report a poor relationship with their partner (Condon, 1985; Cranley, 1984; Mercer et al, 1988; Weaver and Cranley, 1983).
2.4.3.3 Obstetric factors

A number of authors have investigated whether the process of attachment to the developing foetus is compromised in women experiencing high-risk pregnancies where the foetus may not survive. Although it has been suggested that women may protect themselves from the pain of losing the foetus by being less emotionally attached to the foetus, the available evidence does not suggest that women experiencing high-risk pregnancies actually withdraw from emotional involvement in this way. Thus Kemp and Page (1987) found no differences in the MFAS scores of 32 non-hospitalized high-risk pregnant women and 53 women experiencing uncomplicated pregnancies. Similarly, Curry (1987) and Mercer et al (1988) found no differences in MFAS scores between hospitalized high-risk and non-hospitalized normal samples.

Curry (1987) also compared her hospitalized group to normative values obtained with low-risk samples using Lederman's Acceptance of Pregnancy scale, (Lederman, 1984) and found that the hospitalized group reported significantly lower scores. However, two of the three lowest scores on this scale were both items that could be interpreted as pertaining to physical aspects of pregnancy ('It is hard for me to get used to the changes brought about by pregnancy' and 'This has been an easy pregnancy so far'). Thus the lower scores of the hospitalized women on the Acceptance of Pregnancy Scale may simply reflect their accurate perception that they were having more physically demanding pregnancies, rather than any underlying differences in attachment to the baby.

Studies have also considered the impact of physical symptoms of pregnancy on the development of antenatal attachment. Lerum and LoBiondo-Wood (1989) reported that the severity of physical symptoms, the frequency of physical symptoms or the combination of these scores were not related to antenatal attachment. Thus these studies suggest that having a pregnancy that is at a greater medical risk, or experiencing more serious symptoms of pregnancy does not impair a woman’s capacity to become emotionally attached to her foetus.

Other researchers investigated whether obstetric procedures such as ultrasound influenced the process of antenatal attachment, as it had the potential to allow women to see the developing foetus, and might therefore increase bonding. Although in early studies women described the effect of ultrasound as positive and as increasing their feelings towards the baby (eg Fletcher and Evans, 1983), later empirical work failed to substantiate the idea that ultrasound had a significant effect on attachment towards the foetus (Reading et al, 1984; Heidrich and Cranley, 1989). Kemp and Page (1987) who studied high and low risk women in their third trimester also found that no differences in antenatal attachment scores accompanied ultrasound.

In contrast to these results indicating no effect of ultrasound on attachment, studies that have investigated the effect of amniocentesis on attachment suggest that women who have
amniocentesis have lower attachment scores before the procedure, but one month after the amniocentesis the attachment scores were not significantly different from those of other women who have not had the procedure (Heidrich and Cranley, 1989). Thus it seems that these results support Silvestre and Fresco's (1980) contention that women may withhold involvement in the baby until after the results of the amniocentesis are known, but once a favourable result has been obtained, no long term damaging effects of the procedure on attachment occur.
CHAPTER 3
MEDICAL AND PSYCHOLOGICAL ASPECTS OF PREGNANCY
COMPLICATED BY IDDM

3.1 INTRODUCTION

In this chapter the medical aspects of pregnancy complicated by IDDM are described in order to outline the risks facing the women, and the day to day demands of the regimen that the women experience during pregnancy. The small number of studies that have addressed the issue of psychological aspects of pregnancy in women with IDDM are then critically reviewed. Finally, drawing both on the existing studies of psychological aspects of diabetic pregnancy, and also on the studies reviewed in the first two chapters, the rationale is given for the investigations carried out in the current study.

3.2 INCIDENCE OF PREGNANCY COMPLICATED BY DIABETES MELLITUS

The majority of cases of pregnancy complicated by diabetes mellitus are cases of gestational diabetes. Whilst gestational diabetes occurs in approximately 5% of all pregnancies (Goldberg et al, 1986), pregestational diabetes (both IDDM and NIDDM) complicates an estimated 0.2% of all pregnancies (York et al, 1995). Similarly, Connell et al (1985) in an epidemiological study of all births in Washington State during a 2 year period, obtained an incidence of pregestational diabetes of 0.21%. Connell et al further estimated that one-quarter of all the pre-gestational cases were NIDDM, rather than IDDM, and therefore concluded that pregnancy complicated by IDDM occurred in 0.16% of all pregnancies in the population under study during the 2 year period.

3.3 MATERNAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM

3.3.1 Hypoglycaemia

Hypoglycaemia is common in the first half of pregnancy, especially in the first trimester, due to the combination of physiological adaptations to pregnancy, any attempts to maintain excellent glycaemic control and the nausea of early pregnancy (Drury, 1986). Drury (1989) undertook a prospective study of hypoglycaemic episodes in 189 pregnant insulin-treated patients. There were 230 episodes of significant hypoglycaemia (defined as episodes in which the patient had to be assisted by a third party). However, in this series the rate of perinatal loss was not higher amongst those who had experienced a significant episode of hypoglycaemia, nor was there any evidence of any permanent ill effects on the mother.
3.3.2 Diabetic ketoacidosis

Diabetic ketoacidosis during pregnancy can be lethal to the foetus. However, nowadays cases of foetal death due to hyperglycaemic ketoacidosis are rare, although it has been reported in association with continuous subcutaneous infusion of insulin (Gillmer, 1985).

3.3.3 Retinopathy

According to the Wisconsin Epidemiologic Study a woman with IDDM for 15 years or more has a 63-82% chance of retinopathy of any type and a 18-20% chance of having proliferative retinopathy (Klein et al, 1984). Thus many young diabetic women contemplating pregnancy will have retinopathy.

Moloney and Drury (1982) found that the background retinopathy that developed during pregnancy regressed to pre-pregnancy levels post-partum, and that the cases of neovascularization that occurred also improved, but not to post-partum levels. More recently, Hare (1994) concluded that with improvements in glycaemic control irreversible retinopathic changes rarely develop during pregnancy.

A number of studies have demonstrated though that when tight metabolic control is suddenly instituted in diabetics with early retinopathy, a worsening of retinopathy may be provoked (Canny et al, 1985; Dahl-Jorgensen et al, 1985). Given that many diabetics on becoming pregnant are transferred to intensive insulin regimes such as multiple daily injections, the consequent sudden improvement in control may contribute to advancing retinopathy. Available evidence has confirmed that during pregnancy there is a greater deterioration of retinopathy in those with poor control and higher blood glucose levels before institution of intensive therapy, who then experience rapid marked improvement of glycaemic control (Moloney and Drury, 1982; Dibble et al, 1982). Thus the meticulous metabolic control required during pregnancy should be achieved gradually, in order to avoid possible deleterious effects on retinopathy (Parfitt et al, 1991).

3.3.4 Nephropathy

Kitzmiller et al (1981) followed up a group of women with diabetic nephropathy who attained 24 weeks of pregnancy. The results of this study suggested that pregnancy did not cause permanent renal dysfunction or accelerate diabetic nephropathy in most patients. No effect of nephropathy on the rate of spontaneous abortion was observed, but caesarean section and neonatal morbidity, particularly due to respiratory distress syndrome was more common in diabetic mothers who had experienced kidney problems. However, as discussed in chapter 1, nephropathy is relatively
infrequent in women of childbearing age. For example, Lowy et al (1986) in the UK Diabetic Pregnancy survey found that only 3% of the women had evidence of nephropathy at their first antenatal visit.

3.3.5 Neuropathy

Although there have been few studies on the effects of pregnancy on the development or progression of diabetic neuropathy, Nylund et al (1985) indicated that in patients with minimal or no neuropathy, diabetic pregnancy with good metabolic control is not associated with the onset or deterioration of neuropathy. In patients with severe symptomatic autonomic neuropathy pregnancy is contraindicated (Macleod et al, 1990), but again this condition is also uncommon in women of childbearing age.

3.3.6 Diabetic heart disease

About 0.5% of diabetics under the age of 40 years have clinical manifestations of ischaemic heart disease (Chahal and Hawkins, 1989). The prognosis for mother and foetus have been reported to be poor, and diabetic women with evidence of ischaemic heart disease are often advised against pregnancy (Reece et al, 1986).

3.3.7 Pregnancy induced hypertension

Although a number of studies have indicated that the rate of pregnancy induced hypertension is increased in diabetic pregnancies, there is evidence that the rate is decreasing (Cousins, 1987). This study also reported that established diabetics with diabetic complications are more at risk of developing hypertension during pregnancy.

3.3.8 Maternal mortality

Cousins (1987) reported a maternal mortality rate of 115 per 1000 000, a rate 10 times greater than that occurring in the non-diabetic pregnant population. More recent data though suggest that maternal mortality in diabetes is now no greater than in the general obstetric population (Chahal and Hawkins, 1989).
3.4 FOETAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM

3.4.1 Spontaneous abortion

Poorly controlled diabetes during the first trimester, as assessed by elevated levels of glycosylated haemoglobin, has been found to be associated with a significantly higher incidence of spontaneous abortion (Miodovnik et al, 1985). Hare (1994) concluded that when glycaemic control is good, rates of spontaneous abortion are similar to those observed amongst non-diabetic women, but the rates rise when first trimester glycosylated haemoglobin levels are high.

3.4.2 Congenital Malformations

Drury (1989) in a series of 1066 viable infants born over the period 1951 to 1987 reported that the malformation rate in infants of diabetic mothers is two to three times greater than that in the general population. Anomalies observed include major cardiac defects and neural tube defects. Presently, these major anomalies represent the leading cause of death among the infants of diabetic mothers (Moley et al, 1988; Hawthorne et al, 1994). Other non-fatal malformations identified in infants of diabetic mothers include spina bifida, renal anomalies, chromosomal disorders and lung complications (Moley et al, 1988).

In Drury's series, the occurrence of malformations was significantly correlated with maternal levels of HbA1 in the first trimester, and a similar finding was reported by Apeland et al (1992). However, Drury (1989) pointed out that the relationship between malformations and poor control is not a simple one and that some mothers in bad control had normal infants, and vice versa. Fuhrmann et al (1983), Goldman et al, (1986) and Willhoite et al (1993) have shown that intensive glucose monitoring begun prior to conception in insulin-dependent diabetic mothers drastically reduces the anomaly rate to those observed in the non-diabetic population.

3.4.3 Macrosomia

Macrosomia specifically refers to the excessive growth of insulin-sensitive tissues such as muscle, liver and fat in the foetus. Nielsen and Hosrup (1993) reported a series of 276 consecutive pregnancies among 186 women with diabetes mellitus, over a 10 year period. Diabetic offspring were significantly heavier than the reference population, regardless of duration of diabetes, presence of diabetic complications or gestational age. Foetal macrosomia can also be associated with polyhydramnios (excess amniotic fluid) which can cause respiratory difficulties for the foetus or premature labour (Kitzmiller, 1983).
Although the link between poor metabolic control during the latter part of pregnancy and the development of macrosomia has been well established (Drury, 1989), Roberts and Baker (1987) have suggested that metabolic control during the first trimester may also influence baby size. The main obstetric problem to be overcome with macrosomic babies is how to achieve a safe delivery without harm to either the mother or to the baby.

3.4.4 Intra-uterine growth retardation

Lowy et al (1986) reported that 8 per cent of the babies born to mothers with established diabetes had birth weights less than the 10th centile and that low birth weight was associated with longer duration of diabetes and the presence of vascular complications, nephropathy or other risk factors such as smoking. Lowy et al (1986) reported that small for dates premature babies were particularly at risk of neonatal death.

3.5 PERINATAL MEDICAL PROBLEMS ASSOCIATED WITH PREGNANCY COMPLICATED BY IDDM

3.5.1 Prematurity and method of delivery

Some studies have reported that rates of prematurity remain high amongst patients with IDDM, (eg Hanson and Persson 1993; Crombach et al, 1990), whilst others reported that the rate approximates that observed in the non-diabetic population (Persson and Hanson, 1993). Prematurity is more common when the mother's diabetes is complicated by nephropathy (Hare, 1994) or by hypertension and neuropathy (Lassman-Vague and Thiers, 1990).

3.5.2 Caesarean Section

There is an increased frequency of caesarean section in diabetic compared with non diabetic pregnancies. For example in the United Kingdom prospective study of diabetic pregnancies, 43% of patients had an elective caesarean section. Similarly, Hanson and Persson (1993) reported a rate of 45.2% and these authors pointed out that this rate was four times that occurring amongst pregnant non-diabetic women.

The high rate of caesarean section is linked to the prevalence of interventionist policies. Bryce et al (1991) carried out a survey of the management of diabetic pregnancy in the UK and reported that less than half of the centres allowed woman with IDDM to progress to term. However, Lowy (1991) has argued that 'across the board' policies on the route and timing of the delivery are not acceptable and each case should be assessed according to the dual criteria of diabetic control and foetal well-being. Lowy has suggested that elective caesarean section would be indicated if the health of the foetus appeared to be compromised, or if the baby was macrosomic.
and therefore vaginal delivery would be hazardous. Interestingly, using this approach, Drury (1986) reduced the elective caesarean rate to 19% in his series in Dublin, without any adverse effects on perinatal mortality.

3.5.3 Perinatal mortality

One of the most marked improvements in the medical management of women with IDDM during pregnancy has been the enormous decrease in perinatal mortality observed in this population. For example, Crombach et al (1990) reported that over the period 1971-1980 the perinatal mortality rate was 20.9%, but this fell to 2.9% over the period 1981-1988 when a regime of tight glycaemic control was instituted. Similarly Roberts and Pattison (1990) in a sample from New Zealand reported that perinatal mortality had fallen from 15.2% to 2% amongst pregnant women with IDDM. A number of centres have now reported perinatal mortality rates of less than 2% (eg Sachon et al, 1994; Peck et al 1991). Hanssen (1992) reported that in the best Scandinavian centres, the rate matches that observed in the non-diabetic population. Those studies that have reported higher rates have all confirmed the association between increased perinatal mortality and poor glycaemic control (eg Hanson and Persson 1993; Miranda et al 1994). In terms of causes, a number of studies have demonstrated that foetal abnormality is the major reason for the increase in perinatal mortality observed amongst women with IDDM (Hawthorne et al 1994; Somville 1990).

3.5.4 Respiratory distress syndrome

Foetal lung maturity has been shown to be related to diabetic control and Mimouni et al (1987) reported that amongst well controlled diabetic mothers, the incidence of respiratory distress did not differ from that observed in matched controls. Hare (1994) concluded that with improved techniques of foetal surveillance and assessment of foetal pulmonary maturity, foetal respiratory distress has practically been eliminated as a cause of neonatal death.

3.5.5 Hypoglycaemia in the infant

Neonatal hypoglycaemia is relatively common, especially in macrosomic infants (Drury, 1986). Strict metabolic control in the mother and later delivery diminish the frequency and severity of neonatal hypoglycaemia (Drury, 1986; Brudenell and Doddridge, 1989).
3.6 MEDICAL MANAGEMENT OF WOMEN WITH IDDM DURING PREGNANCY

3.6.1 Preconception Management

The evidence reviewed above on the incidence of congenital malformations associated with diabetes in pregnancy highlighted the need for optimum glycaemic control to be present from conception onwards, rather than at some point during the middle or end of the first trimester. In order to obtain this goal, preconception counselling has been advocated for diabetic patients contemplating a pregnancy (Steel et al, 1982).

The clinic aims to provide an overall assessment of the woman's physical well-being, with particular emphasis on detection of diabetic complications. The clinic also aims to counsel women on the importance of good diabetic control and provide an outline of what the management of her diabetes during pregnancy is likely to be (Chahal and Hawkins, 1989). If the patient is unfamiliar with self-monitoring of blood glucose, she will be instructed in its use.

Given the consensus that preconception management of blood sugar levels is needed in order to reduce the rate of congenital malformations, it is extremely disturbing to note that in Bryce et al's recent survey of the management of diabetic pregnancy in the UK, only 12% of the clinics offered preconception counselling (Bryce et al, 1991). Moreover, this figure may significantly overestimate the extent of provision as nearly a half of the health districts surveyed failed to return the questionnaire, and it is likely that provision will be less extensive in those districts that failed to respond to the survey.

3.6.2 Insulin Regimen during pregnancy

During pregnancy insulin requirements can increase to as much as three times the pre-pregnancy dosage, but fall rapidly immediately following delivery to pre-pregnancy levels (Lowy, 1991). Most women are managed with mixtures of short and intermediate acting insulins given 2-4 times daily (Lowy, 1991). A single injection of long or intermediate acting insulin administered at bedtime, with three intermittent short-acting injections given before meals and administered with an insulin 'pen', is a frequently used regimen during pregnancy. Women may also be advised to alter their insulin dosage or administer an extra injection in response to high blood glucose test results, (Watkins, 1993).

3.6.3 Diet

The extent to which additional calories need to be consumed during pregnancy is controversial, but there is consensus that the pre-pregnancy spacing of food throughout the day needs to be continued, ie three meals and snacks in between (Hare, 1994). Dietary recommendations for
IDDM patients compiled by the British Diabetic Association were described in chapter 1. These recommendations are also suitable for IDDM patients during pregnancy, and therefore the overall breakdown of the diet in terms of the percentage of calorific intake to be obtained from different sources remains identical to that discussed in chapter 1.

3.6.4 Self-monitoring of blood glucose

Because the objective of the self-care regimen during pregnancy is to prevent hyperglycaemia, self-monitoring of blood glucose is the most important measurement of diabetes control during pregnancy (McCoy and Oswald, 1983). The actual pattern of blood glucose testing advised during pregnancy is variable. Some women are advised to test their blood before and after each meal, and before bed (ie 7 tests) every day of the week, whilst others may be advised to do the same number of daily tests, but on other than a daily basis, for example every other day. Other common regimens include testing four times a day (before every meal, and before bed). Women are also asked to perform blood glucose tests when feeling symptomatic for hyperglycaemia or hypoglycaemia, and to write down the values of all blood tests, (McCoy and Oswald, 1983).

3.7 PSYCHOLOGICAL ASPECTS OF PREGNANCY COMPLICATED BY IDDM

In chapter 1 the literature on regimen adherence and emotional adjustment of patients with IDDM was critically reviewed. In this section studies that have examined these issues amongst pregnant IDDM samples are discussed.

3.7.1 Adherence to the diabetic self-care regimen during pregnancy

Surprisingly, given the large number of studies that have addressed the issue of adherence amongst patients with diabetes, only 6 studies have attempted to assess levels of adherence to the self-care regimen amongst pregnant insulin-dependent patients. Two studies, (Hoskins et al, 1988 and Ruggiero et al, 1990), addressed the issue of adherence amongst patients with gestational diabetes, but did not include any patients with IDDM. A summary of these studies is presented in Table 3.1.

From Table 3.1 it can be seen that only 1 study (Ruggiero et al 1993) have analyzed the results separately for IDDM and NIDDM women. Given the fact that pregnancy complicated by IDDM occurs in approximately 0.2% of all pregnancies, it is not surprising that studies have attempted to increase the number of available subjects by including both IDDM and NIDDM subjects. But in Chapter 1, it was argued on the basis of the findings of Davis et al (1987) that spurious results can be obtained when the results of IDDM and NIDDM patients are analyzed together. Table 3.1 also indicates that sample sizes in these studies were extremely small; Anderson et al (1990) only
included 8 women and with the exception of Ruggiero et al (1993) all of the studies listed in Table 3.1 had less than 30 pregnant women with IDDM.

As discussed in Chapter 1 in the section on measuring regimen adherence, Langer and Mazze (1986) in a study using memory glucometers found a low level of accuracy of self-reported data amongst pregnant diabetic women. Langer and Mazze also reported that accuracy did not differ between pregestational and gestational diabetic women. However, Hoskins et al (1988) in a later memory glucometer study found that the problem of accuracy was particularly acute amongst gestational diabetic women and suggested that these women were falsifying their results in order to avoid being put on insulin. In Chapter 1, the argument was made that as Langer and Mazze only had 13 women with pregestational diabetes in their sample and as they also did not mention how many of the gestational diabetic women were treated by diet alone, the significance of their finding that pregestational and gestational diabetic women did not differ in their accuracy is impossible to interpret. Therefore, Langer and Mazze’s study does not permit conclusions to be drawn about the accuracy of self-report data, or the frequency of blood glucose testing amongst pregnant women with pregestational diabetes.

Barglow et al (1981) investigated the association between psychiatric risk factors and compliance in a sample of patients with gestational diabetes, IDDM and NIDDM. This group of authors concluded that psychiatric risk status was associated with non-compliance. However, there are a number of major problems with this study such as the failure to differentiate different types of diabetes, an unvalidated measure of psychiatric risk status, and the fact that non-compliance was assessed post-natally by ratings made by the diabetologist. To recap on a finding discussed in Chapter 1, Caron and Roth (1968) demonstrated that physicians’ estimates were a very unreliable measure of regimen adherence.

Spirito et al (1990) reported that dietary adherence, as assessed by a self-report questionnaire, did not differ between gestational diabetic and what they termed ‘overt’ (i.e. IDDM and NIDDM) patients, and furthermore that dietary adherence was not related to demographic or locus of control variables. Both of these findings are in accordance with other studies of regimen predictors amongst non-pregnant diabetic patients reviewed in Chapter 1. In a later study, Spirito et al (1993) reported that knowledge about diabetes was related to dietary adherence and to insulin administration amongst pregnant women with diabetes. This finding is somewhat surprising, given that the general thrust of the literature in non-pregnant patients with diabetes has tended to demonstrate that knowledge is not a significant predictor of regimen adherence. However, it would certainly be premature to reach any firm conclusions on the basis of this study as very small numbers of pregestational diabetic patients were involved, and also because results from IDDM and NIDDM patients were combined together. Similarly, although Anderson et al
(1990) reported few significant shifts in dietary behaviour amongst pregnant diabetic women, this conclusion must be regarded with some caution as their sample only consisted of 8 women.

To date the most comprehensive study of regimen adherence amongst pregnant patients with IDDM is that of Ruggiero et al (1993). Sample sizes were larger than those used in earlier studies and for some of the analyses the results of IDDM and NIDDM patients were differentiated. As with the studies of non-pregnant diabetic patients described in Chapter 1, Ruggiero et al (1993) reported a hierarchy of adherence; although levels of adherence were generally high across all aspects of the regimen, levels were highest to blood glucose testing and insulin administration and lowest to dietary adherence. This study also reported that dietary adherence was associated with social support and with stress, although in this section of the study results from IDDM and NIDDM patients were combined together, and should therefore be treated with caution.
Table 3.1 Summary of studies of adherence to the diabetic self-care regimen during pregnancy

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Measurement of adherence/compliance</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barglow et al (1981)</td>
<td>100 women - sample included GD, IDDM and NIDDM but did not classify them by disease type.</td>
<td>Retrospective postnatal assessment by diabetologist.</td>
<td>Poor adherence associated with psychiatric risk factors.</td>
</tr>
<tr>
<td>Langer &amp; Mazze (1986)</td>
<td>GD = 21 IDDM = 13 NIDDM = 13 (non-pregnant)</td>
<td>Compared logbook entries with records stored in memory glucometer.</td>
<td>i) Poor accuracy of logbook data. ii) No difference in accuracy between GD v IDDM and NIDDM</td>
</tr>
<tr>
<td>Anderson et al (1990)</td>
<td>GD = 2 IDDM = 6 8 pregnant non-diabetic women</td>
<td>Seven days food diary</td>
<td>i) No differences between 2 groups in % energy delivered from fat or from carbohydrate. ii) Pregnant women consumed less simple sugar. iii) Diabetic women failed to meet BDA guidelines.</td>
</tr>
</tbody>
</table>
3.7.2 Emotional Adjustment during Pregnancy in Patients with IDDM

A number of authors have made suggestions in the literature as to how women with IDDM cope during pregnancy, often drawing heavily on psychoanalytic models of pregnancy. For example, Hare (1983) refers to Bibring’s (1959) model to suggest that pregnancy is a time of upheaval, and then goes on to say that given that diabetic patients have justifiable worries about the effect of pregnancy on their own health and the health of the baby, pregnancy is a period of greater emotional upheaval amongst diabetic women. In a later paper, Hare (1989) predicts that attachment to the foetus may be impaired amongst women with diabetes if she fear for the wellbeing of her developing baby.

In a similar vein, Furlong-Lind and Beck-Black (1989) discuss the special difficulties that pregnant diabetic women may encounter in coping with the three psychological tasks that Bibring described. Accepting the pregnancy as part of oneself may be more difficult for women who have negative views about themselves, particularly early in pregnancy when the foetus is not clearly differentiated from the mother. The second task, that of renegotiating the relationship with the spouse, may be especially difficult for the pregnant diabetic and her partner, as it may involve the woman confronting the issue of maternal disability. The authors finally suggest that the third of Bibring’s tasks, namely the need for the pregnant woman to re-examine her relationship with her own mother may be especially difficult for the pregnant diabetic since often that relationship is plagued by unresolved guilt and dependency issues stemming back to the family’s early reaction to the diagnosis of diabetes.

Other suggestions about how women with diabetes cope during pregnancy include the suggestion that those who have serious complications of diabetes (e.g., nephropathy or proliferative retinopathy) may be very ambiguous about the pregnancy and that those who manage to meet the requirements for improved glycaemic control during pregnancy have might raised self-esteem (Hare, 1989).

It must be realized that these suggestions, although plausible enough, are really no more than conjectures. As Johnson (1984) has pointed out in terms of the psychological adjustment of (non-pregnant) diabetic patients, much of the literature is descriptive containing sensible suggestions as to how diabetic patients might feel about their condition, but the suggestions are infrequently put to an empirical test. In fact there have only been 4 actual reports of empirical investigations in the literature. (See Table 3.2).
### Table 3.2 Summary of studies of emotional adjustment of pregnant IDDM patients

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Measurement of emotional adjustment</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barglow et al (1984)</td>
<td>IDDM = 69 NIDDM = 63</td>
<td>Stress scale developed for the study</td>
<td>IDDM lower stress score.</td>
</tr>
<tr>
<td>Spirito et al (1993)</td>
<td>IDDM } NIDDM} = 43 (not differentiated) Non-diabetic pregnant = 68</td>
<td>Profile of Mood States (bi-polar form)</td>
<td>i) Diabetic women significantly more anxious.</td>
</tr>
</tbody>
</table>

The first study was that of Barglow et al (1981) who reported that on the basis of psychiatric interviews, two thirds of their population of pregnant diabetic patients (both IDDM and NIDDM) showed significant psychopathology, with 33% of the sample exhibiting evidence of clinically significant depression and a further 25% of the sample reporting anxiety reactions. However, a non-standardized interview was used in this study, and furthermore no control group was included, which makes an interpretation of these findings impossible.

Barglow et al (1981) also attempted to identify and quantify the role of a range of psychosocial risk factors in predicting psychopathology in this population. According to these authors, the most important risk factors were adolescent pregnancy, history of previous psychiatric treatment, having IDDM or NIDDM as opposed to gestational diabetes, marital problems, single motherhood and concurrent medical illness other than diabetes. What is striking about this list is with the exception of diabetic classification and concurrent medical illness, all the other risk factors refer to factors that have been found to be predictive of emotional distress during pregnancy in the wider non-diabetic population (see chapter 2). Furthermore, a later discussant
on this paper questioned whether diabetic classification was actually a risk factor, saying that it could be a spurious finding resulting from the concentration of other risk factors in different diabetic categories. (D’Angelo, 1981). The only conclusion that can therefore be drawn from Barglow et al’s (1981) paper is that without a control group, it is impossible to know whether the prevalence of psychopathology is significantly increased amongst pregnant women with IDDM.

More recently, there have been two other studies that have assessed emotional functioning in women with IDDM during pregnancy (Spirito et al, 1990; Spirito et al, 1992). Spirito et al (1990) found that women with overt diabetes (ie both IDDM and NIDDM) had higher levels of depressed mood than a non-diabetic pregnant control group, but they did not report if this was statistically significant. In the later study Spirito et al (1992) found that women with overt diabetes did not differ in terms of depressed mood from a non-diabetic pregnant control group and that mean depressed mood scores were not in the clinically significant range for either group. The authors also reported that the pregnant diabetic women were more significantly more anxious than the control group, but again, mean anxiety scores were also in the clinically normal range. However, the findings on anxiety in this study must be treated with caution. Spirito et al (1992) used the Profile of Mood States (POMS) (Lorr and McNair, 1982) but Gotlib and Cane (1989) have pointed out that the anxiety scale of this instrument actually measures physical or muscular-skeletal tension rather than anxiety or nervousness. In addition, a study by Shroeder-Zwelling and Hock (1986) found no difference in anxiety levels, between a group of diabetic women (both IDDM and GD) and a non-diabetic pregnant control group.

Taken together, it can be seen that these previous studies have failed to differentiate between IDDM and NIDDM patients, and in addition, have not included a diabetic non-pregnant control group. As a result, the question as to whether pregnancy increases the risk of emotional problems in women with IDDM must remain open.

3.8 RATIONALE OF CURRENT STUDY

3.8.1 The assessment of regimen adherence during pregnancy

Although Ruggiero et al’s (1993) study is an improvement on earlier work on adherence amongst pregnant diabetic patients in that IDDM and NIDDM patients were differentiated for at least some of the study, and over 30 IDDM patients were included, it still could not be said to provide a full analysis of regimen adherence amongst pregnant IDDM patients. Firstly, no control group of non-pregnant diabetic women was included in the study so it was not possible to address the question of whether levels of adherence amongst pregnant IDDM patients. Secondly, the methodological issues raised by Glasgow and colleagues and described in detail in chapter 1, had not been incorporated into this work. Specifically, the issue of the difference between levels of self-care and adherence was not addressed, and Ruggiero et al also relied on

Ruggiero et al (1993) investigated the relationship between two predictors (social support and stress) and regimen adherence and found that both of these were significantly associated with dietary adherence. However, the study does not provide a comprehensive identification of predictors of adherence. Firstly, the results from IDDM and NIDDM patients were combined together. Secondly, only predictors of dietary adherence were identified, yet Schafer et al (1983) has demonstrated that different psychosocial predictors are associated with different aspects of the self-care regimen. Ruggiero et al (1993) also only analyzed the role of stress and social support. No attempt was made to draw on the extensive literature on regimen adherence in non-pregnant diabetic patients that has clearly indicated that health belief variables are significant predictors of regimen adherence.

Finally, other studies have made suggestions about possible correlates of non-adherence amongst pregnant diabetic patients. Thus Bali (1983) suggested that if the baby is not desired, this can lead to problems of adherence whilst Hare (1983) suggested that non-adherence can be associated with financial worries (in particular cutting down on clinic attendance because of the cost of appointments) and also if the patients become too discouraged by labile diabetes during pregnancy. Yet none of these suggestions have ever been followed up by any empirical studies.

The current study therefore aimed to address the question of adherence to the self-care regimen during pregnancy in a sample of IDDM women. Not only was careful consideration given to the measurement of regimen adherence, along the lines suggested by Glasgow et al, but also, a full range of predictors derived from the literature on factors predicting adherence in non-pregnant patients were explored. Furthermore, for the first time, suggestions about regimen adherence during pregnancy that have been raised in the literature but have never been empirically investigated were put to the test.

3.8.2 The assessment of emotional adjustment during pregnancy.

In the discussion of Barglow et al’s research on emotional adjustment during pregnancy in women with IDDM, the over-riding need for a control group became apparent. More specifically, as Sweeny (1981) argued, in a comment to Barglow et al’s 1981 paper, there was actually a need for two control groups; one diabetic non-pregnant group and one pregnant non-diabetic group. Only in this way can the emotional impact of pregnancy complicated by IDDM be assessed. This study is the first to include both of the relevant control groups, in addition to the pregnant diabetic group.
Barglow et al (1984) also reported that gestational diabetes was a higher risk factor for psychological disorder during pregnancy than either IDDM or NIDDM and Shroeder-Hock and Zwelling (1986) have also reported that women with gestational diabetes show significantly higher anxiety levels than women with IDDM. In this study therefore, no women with gestational diabetes were included in the sample.

In terms of the investigations on emotional functioning carried out in this study, what distinguishes it from earlier work is not merely that it has included all three relevant group, but the fact that this study has also attempted to look beyond the mood state variables such as depressed mood to investigate a broader range of factors that have been found to be important in the diabetic non-pregnant literature and the pregnancy literature. For example, in studies on the emotional impact of diabetes, researchers are beginning to appreciate the importance at looking specifically at how patients adjust to the demands of the disease, rather than analyzing general mood state variables (See chapter 1). This study however represents the first attempt to analyze these issues amongst a pregnant diabetic sample.

The two recent studies on pregnant women with IDDM reviewed above both included a non-diabetic pregnant control group, but they only assessed a very narrow range of pregnancy related variables (Spirito et al 1990; 1992). This study therefore represents the first attempt to look beyond mood state variables and include other aspects of emotional functioning in pregnancy such as attachment to the foetus and specific anxieties about the well-being of the baby. In this way, a number of hypotheses that have been discussed in the literature were put to an empirical test.

This study also excluded women with gestational diabetes from the sample. Both Barglow et al (1984) and Shroeder-Zwelling and Hock (1986) have suggested that the psychological adjustment of women with gestational diabetes may differ from those with IDDM. Clearly therefore it would be problematic to include both types of diabetes in one group and compare their psychological adjustment to that of a non-diabetic control group. The decision was therefore made to include only women with IDDM in the current study.

Finally, as discussed above, Barglow et al (1981) attempted to address the question of the link between emotional well-being and adherence in pregnant patients with diabetes, but the study had numerous methodological flaws. Apart from Barglow's early study, no other researchers have looked at the link between emotional functioning and regimen adherence in this population as they have tended to concentrate on the issue of adherence or on emotional well-being, but not on any possible links between the two. As a broad range of emotional state variables were investigated in this study, as well as a comprehensive assessment of regimen adherence, it was possible to investigate systematically, whether different aspects of emotional functioning were significant predictors of adherence to different parts of the self-care regimen.
CHAPTER 4
METHODS

4.1 DESIGN OF STUDY

Figure 4.1 shows the basic design of the study. From this figure it can be seen that there were two stages to the data collection. Firstly women were interviewed at home and secondly they completed self-monitoring questionnaires in the week following the interview. In contrast data from the non-diabetic women were only gathered at one point in time, namely from the home based interview.

Figure 4.1 Design of Study

<table>
<thead>
<tr>
<th>P/D Group</th>
<th>P/N-D Group</th>
<th>N-P/D Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 women recruited by telephone</td>
<td>35 women recruited by telephone</td>
<td>25 women recruited by telephone</td>
</tr>
<tr>
<td>Interviewed at home</td>
<td>Interviewed at home</td>
<td>Interviewed at home</td>
</tr>
<tr>
<td>Self-monitoring of diet, insulin injections and blood glucose tests in week following interview</td>
<td>Self-monitoring of diet, insulin injections and blood glucose tests in week following interview</td>
<td></td>
</tr>
</tbody>
</table>

4.2 RECRUITMENT OF THE SAMPLE

4.2.1 Recruitment of the pregnant diabetic (P/D) group

Consultants from the Departments of Diabetic Medicine in 6 London teaching hospitals were approached by letter, and asked whether IDDM patients attending the Diabetes in Pregnancy clinics at their hospitals could be recruited into the study. Consultants in 5 of the hospitals
agreed, whilst the consultant at one hospital declined as the pregnant patients were already being asked to take part in a number of physiologically based studies. The remaining 5 hospitals were in different health authorities so separate Ethical Committee approval was requested and was duly obtained from each of the authorities. This approval allowed the pregnant diabetic patients and the two control group of patients (ie pregnant non-diabetic and non-pregnant diabetic) to be interviewed.

Dunn and Turtle (1981) have commented on the problem of biased sampling inherent in many studies of psychological aspects of diabetes. Clearly any method of recruitment that relies heavily on 'opting in' (eg putting up a notice in the antenatal clinic or writing to patients and asking them to volunteer) may tend to attract those patients that are coping well with their diabetes and adjusting well to pregnancy. It was therefore essential to adopt an alternative method.

Recruiting the sample by attending the Diabetes in Pregnancy clinics in person was also not a practical option because of the geographical dispersion of the sample and the relative infrequency of cases. In addition, the researcher at all times made it clear to patients that she was not part of the medical team at the Diabetes in Pregnancy Clinic as being seen as part of the team could introduce a bias into the assessment of many factors such as the patients' satisfaction with their medical care, and their adherence to the diabetic regimen. The researcher felt that it would be much harder for patients to accept that she was not part of the medical team, if their initial meeting with her actually took place at the clinic.

In this study patients were recruited into the sample by telephone. The consultants in each of the 5 hospitals sent a referral form to the researcher giving the details of every women with IDDM who was attending the antenatal clinic. As all the interviews took place in the second trimester of pregnancy, the researcher first checked with the antenatal clinic that the woman had not had a spontaneous abortion between the time of referral and the time that they would have entered the second trimester. Then, the researcher telephoned the women, either at home or at work, and asked whether they would be willing to take part in the study. The researcher stressed that she was interested in how women with IDDM were feeling during pregnancy and also said it was important that all women were given an opportunity to talk about how they were managing during this period as only in this way could the needs of women with IDDM be met. The researcher then went on to stress that women were under no obligation to take part in the study, and that their medical treatment at the clinic would not in any way be compromised if they declined to take part.

Although it could be argued that recruiting women by telephoning them at home caught them 'off-guard' the majority of women commented that they actually welcomed an opportunity to talk at length about their diabetes and how it had effected their pregnancy. Thus even if they had
been hesitant about taking part in the first place, their attitude to the researcher during the interview did not indicate that they felt that they had been forced into agreeing to take part.

Three referrals were obtained from non-caucasian P/D women. Given this small number it would not have been possible to analyze the impact of ethnic origin on any of the psychological variables considered in the study. The decision was therefore made to exclude these women from the study, and to restrict the sample to caucasian women.

In terms of deciding on an appropriate sample size, it was noted that the study by Ruggiero et al (1993) had 39 patients in their pregnant diabetic group and reported significant differences in psychological variables such as the Foetal Health Locus of Control scale between the pregnant diabetic and pregnant non-diabetic women. This finding therefore provided preliminary evidence that a sample size of 40 would provide sufficient statistical power to detect significant differences between the groups in the current study.

Carrying out calculations on the sample size necessary to detect significant differences between groups is complicated by the fact that for many of the attitude or health belief scales it is difficult to assign a meaningful effect size. In contrast, with a scale such as the Beck Depression Inventory (Beck et al, 1961), scores falling in different ranges have been taken as indicators of different levels of depression severity, (see Shaw et al, 1985). Using these cut-off points, it is therefore possible to determine a clinically meaningful effect size.

Shaw et al (1985) described BDI scores falling in the 10-15 range as being indicative of mild depression. Huffman et al (1990) reported that the mean score for the pregnant women was 7.04 (SD=2.69). Therefore with an effect size of 4 points on the BDI, scores would be shifting from the mean to within the mildly depressed range. Using these figures, and an effect size of 4 points difference in the BDI, it was calculated that a sample size of 20 in each group would be able to detect a significant difference, with a power of 95% and a significance level set at 0.05 (See Appendix A for the calculation). This calculation therefore confirmed that the sample size of 40 would have sufficient statistical power.

4.2.1.1 Response rate

Using this method of recruitment 44 women were approached and 40 agreed to take part. This response rate of 90% compares very favourably with the response rates in the range of 70-80% often reported in psychological studies of patients with diabetes (eg Bradley et al 1984; Glasgow and Toobert 1988, Meadows et al, 1987). Obviously one limitation of telephone recruitment is that patients who are not on the telephone cannot be contacted by this method. However, only 3 of the patients who were referred by the consultants gave no home or work telephone contact.
number. The researcher did in fact write to all 3 of these patients enclosing a stamp addressed envelope but none of them replied to the letter. As this only involved 3 patients though, it is unlikely that it introduced a significant bias into the sample.

4.2.2 Recruitment of the pregnant non-diabetic (P/N-D) group

A pregnant non-diabetic control group was recruited using an identical recruitment procedure, ie the women were telephoned at home or at work and asked to take part in the study. The researcher explained to the non-diabetic women that the primary purpose of the study was to find out how women with IDDM were managing during pregnancy, but that in order to be able to reach any firm conclusions it was also necessary to interview a group of women who were pregnant but who did not have diabetes. The P/N-D group was drawn from the same 5 referring hospitals.

4.2.2.1 Matching the P/N-D group to the P/D group

The P/N-D control group was matched to the P/D group on a number of demographic criteria. The information that was necessary to identify potential non-diabetic matches was all available on the booking in form, completed by the midwife when the woman attends her first appointment at the antenatal clinic. The researcher was given access to the booking in forms, and used the information that they contained to identify potential matches.

4.2.2.1.1 Matching of gestational age.

Various aspects of psychological adjustment during pregnancy, (eg psychological attachment to the foetus) change throughout the course of pregnancy (see Chapter 2). To avoid differences in gestational age confounding the results, all pregnant women in the study were interviewed in the second trimester of pregnancy.

4.2.2.1.2 Matching of maternal age

Women in the P/D group were matched to a P/N-D woman such that all of the P/D women were within four years of age from the matched P/N-D woman.

4.2.2.1.3 Matching of social class

Women were classified by social class using the Standard Occupational Classification (HMSO, 1990) in conjunction with the Registrar General's Classification. The 6 categories of the classification system (ie I, II, III non-manual, III manual, IV and V) were merged into 3 social class groups; (I combined with II; III non-manual combined with III manual; IV combined with
V). Women in the P/D group were matched to a P/N-D woman according to this 3 group classification.

4.2.2.1.4 Matching of ethnic origin

All of the women in the P/D group were Caucasian, thus the P/N-D control group also only consisted of Caucasian women.

4.2.2.1.5 Matching of marital status

Women in the P/D group were matched to P/N-D women according to marital status, with women who were living as married, and women who were married being classified in the same group.

4.2.2.1.6 Matching the number of living children

Women in the P/D group were matched to P/N-D women according to the number of living children they had. It should be noted that the two groups were not matched for previous obstetric history (ie number of spontaneous and therapeutic abortions, stillbirths or perinatal deaths). The reason that the two groups were not matched for previous obstetric history was the practical difficulty of identifying women who were of the same age, ethnic origin, marital status, occupational status and who also shared the same previous obstetric history. However, information about previous obstetric history was available to the researcher and thus its effects could be analyzed using statistical methods.

4.2.2.2 Response rate

The response rate amongst the non-diabetic pregnant control group women was also very high. Only 2 out of the 37 women who were approached refused to take part in the interview. This gives a response rate of 94.6%.

4.2.3 Recruitment of the non-pregnant diabetic (N-P/D) group

Ideally a non-pregnant IDDM group would have been recruited that was matched to the target pregnant diabetic group according to the matching criteria discussed above. However, recruiting a matched group in this way was not possible. With the P/N-D control group all of the demographic data needed for the matching were available on the booking-in form that was routinely filled in as part of each woman's antenatal care. Moreover, the antenatal notes were up-to-date as the women were currently attending the hospital during pregnancy.
The situation with the N-P/D control group was markedly different. Firstly, the notes were often extremely out-of-date and secondly very often they did not contain all of the necessary demographic data needed for matching. This meant that either the researcher had to telephone the woman at home and try to obtain the demographic details over the telephone or write to them and ask them to fill in a demographic questionnaire. The latter could have introduced a bias into the data as there might have been a tendency for it to be the women that were coping well with their diabetes to respond to such a request. The former strategy was tried, but proved impossible as it involved telephoning patients at home and asking them personal questions such as whether they currently had a partner. The decision was therefore made to interview a non-matched non-pregnant diabetic group, and to attempt to control statistically for any differences in the key demographic criteria between the pregnant and the non-pregnant diabetic groups.

As women with IDDM are advised to optimise their glycaemic control prior to contemplating a pregnancy (Steel et al, 1982) it was obviously important to exclude women who were currently trying to conceive. The researcher therefore asked the women about this issue over the telephone before she included them in the sample.

The 5 hospitals provided a list of women of childbearing age who had attended the diabetes clinic in the last two years. Women were randomly selected from this list and approached in the same way as the other two groups, ie they were telephoned at home, the purpose of the study was explained to them, and they were asked if they would be willing to take part. Although women in the N-P/D group were not matched to the women in the P/D group on demographic criteria, they were recruited from the same 5 hospital populations. Subjects for the two pregnant groups were recruited into the study in tandem; as a P/D woman was recruited into the study, so a P/N-D woman was identified and recruited into the appropriate control group. Referrals for the two pregnant groups came from 5 different hospitals, and for each potential subject the researcher had to check with the antenatal clinic that the subject had not miscarried, before she approached them by telephone. Furthermore, each pregnant woman had to be seen during the 2nd trimester of pregnancy, so there was a time constraint on the time from first referral to setting the interview date. In order to ease the management of the data collection stage, the decision was made to recruit the N-P/D women after the interviews with the two pregnant groups had been obtained.

Obtaining the target sample sizes with the 2 pregnant groups took longer than initially anticipated, as the organizational difficulties inherent in recruiting across 5 different hospitals had not been adequately appreciated at the beginning of the study. As it was not possible to start on the data analysis of the study as a whole until all three groups of women had been interviewed, it was decided that the sample size of the N-P/D group would be reduced, in order to finish the data collection stage of the study, and start on the data analysis. However, the power calculations described in Section 4.21, and Appendix A, indicated that a sample size of 20 would be sufficient to detect a significant difference on the Beck Depression Inventory.
Furthermore, other studies within the diabetic literature have used sample sizes of 25, and detected significant differences on measures of self-care behaviour (eg McCulloch et al, 1983, who investigated the effect of different teaching techniques on diabetic self-care) and also in diabetic related health beliefs and attributions (eg Peyrot and McMurray, 1985, who investigated differences in health beliefs and attributions between diabetic subjects in good and poor control). Thus a sample size of 25 is likely to have sufficient statistical power to detect differences on comparable scales in the current study.

4.2.3.1 **Response rate**

The response rate in the N-P/D group was lower than that observed in the other two groups. 32 women who were not current attempting to conceive were approached, with 25 agreeing to take part in the study (78% response rate). Of the 7 women who declined to take part, 4 had no children, and felt that the study was not of relevance to them whilst 3 of the women who declined did have children, but said that they were too busy to take part.

Table 4.1 compares the response rate of the 3 different groups in the study. Due to the small number of women in each group who refused to take part, cell sizes were too small to permit a Chi-squared test of association to be carried out across the three groups. However 2 separate analyses were carried out using a Fisher’s Exact test; one comparing the 2 pregnant groups and a second analysis comparing the 2 diabetic groups. These analyses indicated that there was no significant difference in response rate between the two pregnant groups or between the 2 diabetic groups in this study.

Table 4.1 **Response rate in each of the 3 groups**

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agreed to take part</td>
<td>40</td>
<td>25</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>Refused to take part</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Fisher’s Exact
P/D v N-P/D = 0.19
Fisher’s Exact
P/D v P/N-D = 0.68
The 5 referring hospitals sent details of the P/D women to the researcher, who as explained in section 4.21 above, telephoned the women and asked them to take part in the study. Demographic details about the women who agreed to take part in the study became available from the interview itself. Demographic details of the 4 women who refused to take part were not available, as the information could not be obtained from the interviews, and the medical records of these women were not examined at the hospital.

Demographic details of the 7 non-responders in the N-P/D group were also not available. As described in section 4.23 above, the N-P/D women were selected from lists of women attending the diabetes clinics in the 5 hospitals. Demographic details of these women were not provided to the researcher before she contacted the women, and if they declined to take part, their medical records were not examined in the hospital.

The response rate did not differ significantly between the 3 groups in the study (see Table 4.1) but it is possible that within the P/D group or within the N-P/D group that the responders could have differed significantly from the non-responders on demographic criteria. This could not be investigated in the current study because demographic details of the non-responders in the two diabetic groups were not available. The possible impact of a demographic skewing of the non-responders, on the results obtained in this study, is discussed in the final chapter.

In contrast to the two diabetic groups, demographic details of the 2 P/N-D women who declined to take part were available and are shown in Table 4.2. The reason that this information was available for the P/N-D group was that these women were matched to P/D women on demographic criteria before they were telephoned at home, and thus even if they declined to take part in the study, their demographic details were still known to the researcher. Only 2 P/N-D women declined to take part, and Table 4.2 indicates that these 2 were not significantly different from the responders in terms of the number of children or in terms of marital status. Inspection of their mean ages does not indicate that they differed from the mean age of the responders but tests of statistical significance could not be carried out.
Table 4.2  Comparison of demographic characteristics of responders and non-responders within the P/N-D group

<table>
<thead>
<tr>
<th></th>
<th>Responders</th>
<th>Non-Responders</th>
<th>Fisher's Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>N(^o) of children</td>
<td>0</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>&gt;1</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td>Social Class</td>
<td>I</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>II</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>III</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Living with partner</td>
<td>34</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Not living with partner</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Age</td>
<td>x = 31.64</td>
<td>x = 29.45</td>
<td>Numbers too small to permit analysis</td>
</tr>
<tr>
<td></td>
<td>SD = 4.14</td>
<td>SD = 1.34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 35</td>
<td>n = 2</td>
<td></td>
</tr>
</tbody>
</table>

4.3 PROCEDURE

The procedure described in this section applied to all three groups. Following on from the telephone call the researcher wrote to each woman thanking her for agreeing to take part in the interview, enclosing an information sheet about the project and also giving her a phone number where she could be contacted if the interview time needed to be altered. Although women could then have telephoned or written a letter stating that they had changed their mind and no longer wished to take part in the study, in fact none opted out from the study at this point.

All of the interviews took place in the women’s homes. A standard procedure was used. After thanking the woman for agreeing to take part in the study, the researcher gave a very general explanation about the purpose of the study, namely that it was to find out how women with IDDM were managing during pregnancy. The researcher went on to explain that she was not part of the medical team at the hospital, and that everything that was said at the interview was confidential and would not be repeated to the medical team. After checking that the women did not have any queries, the consent form was read out to the woman and fully explained, before the researcher asked each woman to sign it. (See Appendix B2).

Before the women in the two pregnant groups began answering any of the questions a ‘Preamble’ was read to them (see Appendix B3), which stressed that they should answer the questions in terms of how they felt currently, rather than how they might have felt before they were pregnant.
or trying to conceive a baby. After this preamble, the first questionnaire that women in all 3 groups were asked to fill in was a questionnaire that assessed various relevant demographic factors. The researcher began with this questionnaire as it was straightforward and helped the patients to feel comfortable talking without asking any searching or personal questions. After this questionnaire, the order of presentation was randomized to avoid any order effects on the data.

The interview lasted from one and a half to two and a half hours long, and consisted of the women completing paper and pencil questionnaires. Women were given the choice of either reading the questionnaires and answering them silently, or having the questions read to them by the researcher. Tape recordings of the interviews were not made, although any relevant additional comments that the women made were written down during the interview.

If a woman became tired during the course of the interview, or if the patience of a younger child was overstretched, the researcher left the remaining questionnaires behind with a stamp-addressed envelope and asked the women to fill them out within the week and return them to her.

Women in the both of the diabetic groups were also left a set of self-monitoring forms plus accompanying explanatory sheets and a stamp-addressed envelope. The researcher also made sure that she had fully explained the self-monitoring forms to each patient before the end of the interview in addition to supplying them with a telephone number at which she could be contacted should they have any difficulties with the forms.

All women were written to after the interview and thanked for their participation. The letter to patients in the two diabetic groups also reminded them about completing and returning the self-monitoring forms. If the forms were not received within three weeks, the woman was telephoned at home and reminded on up to two occasions. It was however considered unethical to remind the patients again after a second telephone call.

Although the women were not interviewed again postnatally, the researcher obtained information from the hospitals about the outcome of the pregnancy, for the women in the 2 pregnant groups.

4.4 DESCRIPTION OF THE QUESTIONNAIRES

Table 4.3 lists all the questionnaires used in this study (with the exception of questionnaires used to assess regimen adherence which are described later in this chapter). From Table 4.3 it can be seen that the questionnaires were divided into four categories; those completed by all of the three groups, those completed by the two pregnant groups, those completed by the two diabetic groups and finally those completed by the P/D group only. A complete set of all the questionnaires used in this study is contained in Appendix B.
Many of the questionnaires used in the study have been validated for British samples (e.g., Beck Depression Inventory; State Anxiety; Body Image; Perceived Control of Diabetes). However, other scales included in the study have not been used before on British samples, e.g., Foetal Health Locus of Control Scale and the Psychological Attachment to the Foetus Scale. Clearly, the high reliability coefficients reported for American or Australian validated scales may not necessarily apply when these scales are used with different samples, as for example, language differences may result in particular items having different meanings in different English speaking countries. However, validated alternative British scales were not available for these particular variables. Furthermore, although it would have been possible to construct new scales, the small sample size of the current study would have made validation of the scales difficult. In addition, constructing new scales for the study would also have meant that it was difficult to compare the results of the current study with the results from the existing scales, many of which had been quite extensively used in America or Australia. For this reason it was decided to use scales even if they had not been validated for use in the United Kingdom. However, discrepancies in scores between those obtained in the current study and those obtained with earlier American or Australian studies are discussed in the final chapter, and the possible effects of language and other cultural differences on the scales are considered.
Table 4.3 Questionnaires used in the study

<table>
<thead>
<tr>
<th>Questionnaires completed by all three groups</th>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic background</td>
<td>B4</td>
</tr>
<tr>
<td>Beck Depression Inventory (Beck et al, 1961)</td>
<td>B5</td>
</tr>
<tr>
<td>Previous Emotional History (Leverton &amp; Elliott, 1989)</td>
<td>B6</td>
</tr>
<tr>
<td>State Anxiety (Spielberger et al, 1970)</td>
<td>B7</td>
</tr>
<tr>
<td>Satisfaction with Social Support (Sarason et al, 1987)</td>
<td>B8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaires completed by the two pregnant groups</th>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Aspects of Pregnancy</td>
<td>B9</td>
</tr>
<tr>
<td>Psychological Attachment to the Foetus (Condon, 1993)</td>
<td>B10</td>
</tr>
<tr>
<td>Prenatal Self-Evaluation Questionnaire (Lederman, 1984)</td>
<td>B11</td>
</tr>
<tr>
<td>Feelings about being Pregnant (Lederman, 1984)</td>
<td>B11</td>
</tr>
<tr>
<td>Foetal Health Locus of Control (Labs and Wurtele, 1986)</td>
<td>B12</td>
</tr>
<tr>
<td>Body image (Kumar et al, 1984)</td>
<td>B13</td>
</tr>
<tr>
<td>Satisfaction with Antenatal Care (McCaul et al, 1987)</td>
<td>B14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaires completed by the two diabetic groups</th>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge about Diabetes (Dunn et al, 1984)</td>
<td>B15</td>
</tr>
<tr>
<td>Emotional Adjustment to Diabetes (Dunn et al, 1986)</td>
<td>B16</td>
</tr>
<tr>
<td>Family Support for Diabetes (Schafer et al, 1986)</td>
<td>B17</td>
</tr>
<tr>
<td>Perceived Control of Diabetes (Bradley et al, 1984)</td>
<td>B18</td>
</tr>
<tr>
<td>Diabetes Self-Efficacy (McCaul et al, 1987)</td>
<td>B19</td>
</tr>
<tr>
<td>Satisfaction with Diabetic Care (McCaul et al, 1987)</td>
<td>B20</td>
</tr>
<tr>
<td>Health Beliefs about Diabetes</td>
<td>B21</td>
</tr>
<tr>
<td>Open-ended items about regimen adherence</td>
<td>B22</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Questionnaires completed by the pregnant diabetic group only</th>
<th>Appendix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Beliefs about Diabetic Pregnancy</td>
<td>B23</td>
</tr>
<tr>
<td>Knowledge about Diabetic Pregnancy</td>
<td>B24</td>
</tr>
</tbody>
</table>

4.4.1 Questionnaires completed by all three groups

4.4.1.1 Demographic background (Appendix B4)

The questions on basic demographic factors were taken from Green et al's (1988) postal questionnaire study of 800 women during the and after pregnancy. However, in addition to the basic demographic questions, the diabetic group were also asked a number of questions about diabetes such as the disease duration and whether any family member had diabetes.

4.4.1.2 Depressed mood (Appendix B5)

The Beck Depression Inventory, BDI (Beck et al, 1961) is a 21 item questionnaire derived from clinical observations of depressed psychiatric patients and widely used to assess depressed mood. A number of items in the questionnaire refer to somatic correlates of depressed mood (e.g., tiredness, sleep difficulties, changes in libido). As changes in some of these somatic indices may be normative during pregnancy, there is the potential for elevating overall BDI scores during...
pregnancy. Huffman et al (1990) addressed this issue in a comparative study of three groups of women (pregnant women with low psychiatric risk, non-pregnant women with low psychiatric risk and pregnant women with high psychiatric risk) and concluded that the cognitive-affective items (i.e., items 1-9) were the most sensitive to assessing depressed mood during pregnancy. These authors also reported on the internal homogeneity of the cognitive-affective clusters and found high Cronbach alpha scores for the cognitive-affective cluster (0.71) for both the pregnancy assessment and the post-partum assessment, which confirms a substantial concentration of common items.

Clearly the use of the BDI in patients with diabetes also introduces the possibility of confounding symptoms of diabetes with aspects of depression (e.g., fatigue). However, using Huffman et al.'s cognitive-affective cluster all items that could have caused confounding between diabetes symptomatology and aspects of depression have been removed. This conclusion is reinforced by Cavanaugh et al.'s (1983) findings that the cognitive-affective items were able to discriminate depression amongst medically ill patients. Lustman et al. (1992) have also demonstrated that the cognitive-affective items are able to discriminate between depressed and non-depressed patients with diabetes.

In this study the BDI was therefore used to calculate three different scores. Firstly, the total BDI score was calculated. This enables the results obtained with the three groups in the study, to be compared to other studies that have used the total BDI score. Second, the total of the 9 cognitive-affective items recommended by Huffman et al. (1990) was calculated, and thirdly, the total score on the 7 somatic items were calculated, i.e., items 15-21.

The Beck Depression Inventory does not permit a firm diagnosis of clinical depression as it is not a diagnostic tool. However, scores falling in different ranges have been taken as indicators of different levels of depression severity. Shaw et al. (1985) have therefore classified scores less than or equal to 9 as not depressed, scores in the range of 10-15 as indicating mild depression, scores in the range of 16-23 as indicating moderate depression and scores greater than or equal to 24 as indicating severe depression.

Huffman et al. (1990) did not describe cut-off points for the 9 items suggested for use during pregnancy and no subsequent studies have addressed this point. However, as in the total inventory each item is given an equal weight, scores from the 9 cognitive-affective items can be converted to mean item scores, and these can then be multiplied by 21, to make them comparable to scores obtained across all 21 items. These converted score can then be compared to the cut-off points used with the whole 21 item inventory.
4.4.1.3 Previous episodes of emotional problems (Appendix B6)

Women in all three groups were asked whether they had previously experienced any emotional problems during the postnatal period (defined as within three months of giving birth), or outside this period. The wording of the questions were taken from Leverton and Elliott's (1989) questionnaire on vulnerability to postnatal depression. The whole questionnaire was not used as it also included a small number of items on the marital relationship, and general social support which were examined more fully in other questionnaires used in this study.

4.4.1.4 State anxiety (Appendix B7)

Reading (1983) has discussed the importance of distinguishing between state and trait anxiety, in the context of pregnancy research. According to Reading, state anxiety is more likely to influence the course and outcome of the pregnancy, rather than the enduring personality dispositions assessed by trait anxiety measures. Therefore in this study, state anxiety was assessed using the Spielberger Anxiety Inventory (Spielberger et al, 1970). In addition to the state anxiety measure, specific anxieties about pregnancy and labour were also assessed in the two pregnant groups using the relevant subscale from Lederman's (1984) prenatal self-evaluation questionnaire described below.

4.4.1.5 Satisfaction with social support (Appendix B8)

Sarason et al's (1987) abbreviated 6 item measure of satisfaction with social support was used in this study. Women indicated how satisfied they were on a 6 point Likert scale ranging from 'very dissatisfied' to 'very satisfied'. This 6 item scale has high internal reliability (0.93) and Sarason et al (1987) concluded that the 6 item scale serves as a reliable substitute for the longer original 27 item scale (Sarason et al, 1983). Given the length of the full interview in this study, it was clearly preferable to use the 6 item rather than the longer original questionnaire.

4.4.2 Questionnaires completed by the two pregnant groups

4.4.2.1 Medical aspects of pregnancy (Appendix B9)

This 18 item questionnaire written for the study examined women's physical well-being and aspects of the medical care that they received during pregnancy. In terms of the medical care that the women received during pregnancy, questions were asked about routine medical procedures such as ultrasound, and also more specialized procedures such as amniocentesis that some women may have experienced.
4.4.2.2 Psychological attachment to the foetus (Appendix B10)

As discussed in chapter 2, scales that have attempted to assess attachment to the foetus frequently confound feelings about the state of pregnancy with feelings about the unborn child. In this study Condon’s (1993) 19 item foetal attachment scale was used. This questionnaire was developed following an item analysis with a sample of 112 women. The Cronbach alpha coefficient was 0.82, and the factor structure which emerged suggested that the questionnaire provided a measure of antenatal attachment uncontaminated by attitudes towards the pregnancy state per se (Condon 1993).

4.4.2.3 Prenatal self-evaluation questionnaire (Appendix B11)

Lederman’s (1984) questionnaire contains 79 statements, each with four response categories. Three out of the seven subscales contained in the questionnaire were used in the current study: Health anxieties about the baby/self; Identification with motherhood role; Relationship with partner. Based on a validity study of 119 primips and multips, the scales were found to be relatively independent and Lederman concluded that separate measures were justified for each of these subscales. Each of the subscales analysed in the current study will be considered in turn.

4.4.2.3.1 Health anxieties about the baby/labour (subscale I)

This scale focused on anxieties about the health of the baby, and labour. It consisted of 10 items and had a Cronbach alpha coefficient of 0.83.

4.4.2.3.2 Identification with the motherhood role (Subscale III)

This scale focuses on the extent to which a woman looks forward to assuming the motherhood role, and anticipates that she will find caring for the baby satisfying. There were 15 items in this subscale and it had a Cronbach alpha coefficient of 0.79.

A subset of 4 items from this scale were used to assess the slightly narrower issue of the woman’s confidence in her ability to be a good mother to the baby. These items were as follows:

I have doubts about being a good mother
It will be difficult for me to give enough attention to the baby
I am worried that my baby may not like me
I believe I can be a good mother
4.4.2.3 Satisfaction with relationship with partner during pregnancy (subscale VI)

This scale assesses the quality of the relationship with the partner. The scale has 10 items and a Cronbach alpha coefficient of 0.82.

4.4.2.4 Feelings about being pregnant (Appendix B11)

Although Condon raised the important conceptual distinction between attachment and feelings about the pregnancy in his 1985 paper, he did not provide a scale which measured feelings about the pregnancy, uncontaminated by notions of antenatal attachment.

Lederman's (1984) 79 item prenatal self-evaluation questionnaire has an 14 item acceptance of pregnancy subscale. According to the authors this subscale attempted to assess women's response specifically to the pregnancy, rather than to the baby. However, in the detailed account of the subscale, the author goes on to say that evaluating acceptance of pregnancy involves evaluating the extent to which the woman 'consciously planned and wanted the pregnancy' as well as the extent to which the woman 'was ambivalent and experienced conflict about the pregnancy near term'. It is clear from these detailed comments, that included in this subscale description are notions of antenatal attachment.

As a result, the acceptance of pregnancy subscale as a whole cannot be taken as an index of feelings about being pregnant because a number of the items pertain to the foetus rather than to feelings about the state of pregnancy per se. For example, items such as 'I wish I wasn't having the baby now'; and 'I am happy about this pregnancy' will both be influenced by the woman's feelings about the foetus.

In order to construct an index of feelings about the state of pregnancy, 5 items that clearly related to the pregnancy, rather than to feelings about the foetus were selected from the 14 item subscale. These 5 items were as follows:

I can tolerate the discomforts that I've had during pregnancy
It's hard for me to get used to the changes brought about by pregnancy
I have enjoyed this pregnancy
This has been an easy pregnancy so far
I find many things about pregnancy disagreeable.
4.4.2.5 Foetal health locus of control (Appendix B12)

Labs and Wurtele (1986) suggested that investigating a mother’s locus of control beliefs specific to the health of her baby may be more pertinent to predicting how pregnant women will adhere to pregnancy health recommendations than examining a woman’s own locus of control beliefs. They therefore developed an 18 item foetal health locus of control scale with three distinct factors: an internal dimension measuring a woman’s belief that she is directly responsible for the health of her unborn child, and two external dimensions assessing beliefs that health professionals (powerful others) and chance factors (chance) determine the health of the foetus. Cronbach alpha co-efficients for each subscale were 0.99 (internal), 0.76 (powerful others) and 0.83 (chance) indicating high internal consistencies for the three subscales.

4.4.2.6 Body image (Appendix B13)

The scale assessing body image during pregnancy was one of the subscales in Kumar et al’s (1984) Maternal Adjustment and Maternal Attitudes questionnaire. The body image subscale consisted of 12 items. In their validation of the questionnaire Kumar et al reported adequate test-retest reliability (0.89) and split-half reliability (0.72) of the body image subscale.

4.4.2.7 Satisfaction with antenatal care (Appendix B14)

In order to be able to compare women’s satisfaction with their diabetic care with their satisfaction with their antenatal care, the researcher adapted McCaul et al’s (1987) questionnaire on satisfaction with diabetic care, to cover satisfaction with the antenatal provision. Item 1 from the questionnaire (Your doctor’s ability to adapt your regimen to keep your diabetes controlled during this pregnancy) was omitted, as the obstetricians were not responsible for keeping the patient’s diabetes under control during pregnancy. Item 2 from the original questionnaire (Your doctor’s knowledge about diabetes) was altered to ‘Your doctor’s knowledge about pregnancy’. Item 3 on the questionnaire (Your doctor’s knowledge about diabetic pregnancy), which as explained above, was added in by the researcher. Women in the P/N-D control group were asked the same set of questions, with the exception of item 3 which specifically referred to pregnancy complicated by diabetes.

Two questions written for the study were attached to the questionnaire, and addressed the issue of continuity of antenatal care. Scores from these questions were not added to the antenatal satisfaction scale, but were totalled as a separate score. (See Appendix B14).
4.4.3 Questionnaires completed by the two diabetic groups

4.4.3.1 Knowledge about diabetes (Appendix B15)

The Diabetes Knowledge Assessment (DKN) scales (Dunn et al, 1984), provide a rapid and reliable knowledge assessment in patients with diabetes. Three equivalent parallel forms of the DKN scales (ie scales A B and C) were developed to allow the measurement of the effects of an educational intervention without contamination from recall of earlier answers. These three scales each had Cronbach alpha coefficients above 0.82 and correlated 0.90 with each other. However, as in this study patients were interviewed once the issue of subject recall was not critical. As a result, form A from the DKN battery was used.

4.4.3.2 Emotional Adjustment to Diabetes (Appendix B16)

The ATT39 developed by Dunn et al (1986) contains 39 Likert scale items measuring emotional adjustment to diabetes. A factor analysis based on the responses of 170 subjects identified 6 subscales of the ATT39: perceived levels of diabetes related stress; adaptation to diabetes; guilt associated with the disease; alienation associated with the disease; illness conviction and tolerance for ambiguities inherent in diabetes. However, a subsequent study (Welch et al, 1992) found that only factor 1 (ie diabetic related stress) from Dunn’s original factor structure was replicated. Therefore, in this study only factor 1 was calculated, and the other aspects of emotional adjustment included in Dunn’s original factorization were not considered.

4.4.3.3 Family support for diabetes (Appendix B17)

In an analysis of the relationship between family interactions and regimen adherence, a number of authors have pointed to the need for measures that specifically assess the ways in which families can support or fail to support regimen adherence (Schafer et al, 1986; Johnson, 1980). Only one specific measure of family support for regimen adherence exists, The Diabetes Family Behaviour Checklist (DFBC), Schafer et al, 1986. This scale contains 9 positive (supportive) and 7 negative (non-supportive) items. In the scale 4 items address each regimen area: insulin injection, diet, glucose testing and exercise. As patients did not have prescriptions about the amount of exercise they should be taking or see exercise as part of their self-care regimen, the questions about exercise were not scored in this study.

A validity study of the DFBC was carried out with 54 adults with IDDM (Schafer et al, 1986). This study reported a Cronbach’s alpha score of 0.73 for the positive score, but only 0.43 for the negative score. In the light of this low reliability score for the negative items, some caution is needed in interpreting analyses using this score.
4.4.3.4 Perceived control of diabetes (Appendix B18)

Bradley et al (1984) developed a specific scale to measure perceived control of diabetes mellitus in patients with IDDM. This scale, was based on Wallston et al's Multidimensional Locus of Control Scale (Wallston et al, 1978). The format of the perceived control over diabetes questionnaire was based on that of the attributional style questionnaire (Peterson et al, 1982). In Bradley et al's questionnaire, perceived control over 6 hypothetical situations about diabetes were assessed. Three of these situations represented positive outcomes (eg being in a period of good glycaemic control) whilst three of these situations represented negative outcomes (eg weight gain). For each of these 6 hypothetical events patients were asked to imagine that they had recently experienced that particular event, and to write down its single most likely cause. They then rated this cause on seven separate 7 point scales which were labelled internality, treatment, externality, chance, personal control, medical control and foreseeability. Bradley et al then calculated 14 subscale scores by separately calculating scores of the 7 subscales when the diabetic outcome was positive and again when the diabetic outcome was negative.

The perceived control scales were adapted in 3 ways in this study. Firstly, 2 of the hypothetical situations (weight gain and restoring good control after a period of poor control) were not appropriate for the P/D group as they confounded the effects of pregnancy with the effects of changes in diabetic control. So, only 4 of the 6 hypothetical situations were assessed in this study. Secondly, it became evident early on in the study that patients had considerable difficulty in understanding the question on foreseeability in each of the 4 situations, so this question was omitted. Finally, given the number of variables examined in this study, it was considered inappropriate to calculate 14 separate perceived control subscales. Therefore each of the 6 subscales used in the study were averaged across the positive and negative outcomes.

4.4.3.5 Diabetes self-efficacy (Appendix B19)

Self-efficacy can be defined as the beliefs that people hold about their personal capability to perform certain activities (Bandura, 1989). McCaul et al’s (1987) self-efficacy for diabetic regimen adherence scale was used. The original version contains 24 items, but the 3 items on exercise were omitted. The remaining 21 item self-efficacy scale assessed subjects’ confidence in their abilities to perform a graded series of regimen behaviours (eg test blood glucose levels once a week, once a day, twice a day etc) in each of the 3 following regimen areas; glucose testing, insulin injections and diet. The scale was provided after personal correspondence with the author, and information on reliability was not given. However, as McCaul et al (1987) found that self-efficacy was the only variable that significantly predicted adherence to each of the regimen areas, the questionnaire was included in the study, even though initially the psychometric properties of the questionnaire were unknown. Cronbach alpha co-efficients calculated from the diabetic patients in the current study were 0.89 for the questionnaire as a
whole, 0.84 for the diet subscale, 0.91 for the blood glucose testing subscale and 0.20 for the insulin subscale. These results indicated that the questionnaire as a whole, and the blood glucose testing and dietary subscales had acceptable levels of internal consistency, but that the internal consistency of the insulin subscale was unacceptably low.

4.4.3.6 Satisfaction with diabetic care (Appendix B20)

McCaul et al's (1987) questionnaire on satisfaction with diabetic care was used. However, one additional item (item 3) was added to the questionnaire. In McCaul et al's original questionnaire, patients were asked how satisfied they were with their doctor's knowledge of diabetes. The additional item, (item 3), specifically asked about how satisfied patients were with their doctor's knowledge about diabetic pregnancy. This instrument was also provided by the author, and no information on its psychometric properties was available.

Three questions written for the study were attached to the questionnaire, and addressed the issue of continuity of diabetic care. Scores from these questions were not added to the satisfaction with diabetic care scale, but were totalled as a separate score. (See Appendix B20).

4.4.3.7 Health belief model (Appendix B21)

Skyler (1981) has described the need for a health belief instrument specific to diabetes, so that for example, the susceptibility questions cover the different microvascular complications associated with diabetes and the barriers questions look at barriers associated with the different aspects of the diabetic regimen.

Although numerous diabetic health belief scales have been developed, none of them were entirely appropriate for this study. For example, Alogna (1980), Cerkoney and Hart (1980), Given et al (1983) and Harris et al (1987) all included a large number of questions that were not relevant to a younger IDDM sample. Brownlee-Duffeck et al's (1987) questionnaire was based on an IDDM sample but there were a number of problems with this instrument such as confounding the measures of knowledge with those of health beliefs and the lack of sensitivity in the wording of certain questions, whilst Bradley et al's (1984) scale did not include all the components of the health belief model.

In Chapter 1, the importance of eliciting patients' representation of the illness and the treatment was discussed. Within the context of diabetes it was also realized that the beliefs that predicted one aspect of the diabetic regimen may differ from beliefs that predicted other aspects (Schafer, et al 1983). Therefore not only was it necessary to attempt to elicit diabetic patients' representations of their illness and the treatment regimen, but it was also important that
cognitions were specific to each component of the regimen, rather than trying to elicit general cognitions about the regimen as a whole.

In order to include items that assessed relevant patient cognitions, a number of pilot interviews were carried out by the researcher. First, 2 diabetic consultants and 2 experienced diabetic liaison nurses were interviewed. These interviews were taped and they provided the researcher with detailed information about how the treatment regimen was adapted during pregnancy, and about medical problems and adherence difficulties that the women may experience during pregnancy. On the basis of these interviews the researcher had an understanding, from a medical point of view, about the specific nature of the regimen that the women were prescribed during pregnancy, and also about potential difficulties that some women may face with the regimen.

It was recognized however that patients may hold beliefs about treatment which may differ from the medical point of view (Horne, in press), and it was therefore essential that patients’ beliefs, as well as those of the medical profession were elicited. Interviews were therefore carried out with 10 diabetic women. None of these women were currently pregnant, but 6 of them had children, and had therefore experienced pregnancy complicated by diabetes. During these taped interviews the women were asked in considerable detail how they managed each component of the regimen. For each aspect of the regimen they were asked about any difficulties they experienced, about how adherent they felt that they were, and for the reasons that lay behind the particular level of adherence that they managed to achieve. Women who had children were asked how they had managed each component during pregnancy, how their adherence had altered during pregnancy, and for the reasons for any shifts in regimen behaviour.

In this study no existing health beliefs questionnaire was used in its entirety, because, as described above, each of the existing questionnaires had limitations. Instead, the interviews with the diabetic women were taped and the transcriptions were used to generate items that were added to the most pertinent questions from each of the existing questionnaires. Ideally it would have been useful to pilot the new questionnaire that resulted from this process. However, numbers of pregnant patients with IDDM were so small that the researcher wanted to be able to include all of the referrals in the actual study, so the health belief questionnaire was not piloted.

In order to see how the final set of health belief questions were derived, each component of the health belief model will be considered in turn.

4.4.3.7.1 Cues to action (Appendix B21a)

Becker and Rosentock (1984) have distinguished between internal cues to action (e.g., the perception of symptoms) and external cues to action (e.g., interpersonal interactions). Questions that addressed the role of internal symptoms in prompting adherence to different aspects of the regimen were specifically written for this study:
'How often do you use symptoms (how you are feeling) as signals that you should carry out a blood glucose test.'

In terms of the role of external cues to action, Brownlee-Duffeck et al (1987) did include one item on external cues in their health belief questionnaire, and in this study, this one question on diet, was then replicated to ask separately about each of the regimen areas under study:

'How often do family members/close friends give you reminders that help you to stay on your diet/ do your injections on time/carry out a blood glucose test.'

Cronbach alpha co-efficients calculated from the diabetic patients in the current study were 0.61 for the questionnaire as a whole, 0.14 for the diet subscale, 0.09 for the blood glucose testing subscale and 0.11 for the insulin subscale. These results indicated that the questionnaire as a whole, and all 3 of the component subscales failed to attain adequate internal consistency.

4.4.3.7.2 General health motivation (Appendix B21a).

The question on general health motivation was taken from Harris et al's (1987) questionnaire, although the wording was slightly altered to make it more acceptable to British readers:

'Some people are quite concerned about the chances of becoming ill whilst others are not. How much do you worry about whether you will become ill.'

As there was only 1 item assessing general health motivation, it was not possible to calculate a Cronbach alpha score for General Health Motivation.

4.4.3.7.3 Perceived barriers (Appendix B21b)

According to the Health Belief Model, negative aspects of a particular health action may act as impediments to adhering to the prescribed regimen. In terms of adherence to the diabetic self-care regimen, potential barriers include the fact that specific aspects of the regimen may be time-consuming, inconvenient, painful and unpleasant.

Harris et al's (1987) questionnaire included 4 items on barriers to adherence. However, the preliminary interviews with the diabetic patients indicated that were a number of additional potential barriers associated with each aspect of the regimen. Therefore this study included the specific barriers identified by the patients with diabetes in the perceived barriers questionnaire. These items were as follows:
'It hurts when I prick my finger in order to do a blood glucose test.'

'Carrying out the recommended number of daily blood glucose tests interferes with my life.'

'Sticking to the recommended diet interferes with my life.'

'Sticking to the recommended diet means I am still hungry at the end of a meal.'

'Sticking to the recommended timing of my insulin injections interferes with my life.'

'I tend to run my blood sugar high in order to avoid having a hypo.'

'It hurts when I do my insulin injections.'

'Having to cook meals for my partner/family makes sticking to the recommended diet difficult.'

'My domestic responsibilities mean that it is difficult for me to find time to do the recommended number of blood glucose tests.'

'Because I go out to work, it is difficult for me to find time to do the recommended number of blood glucose tests.'

Cronbach alpha co-efficients calculated from the diabetic patients in the current study were 0.42 for the barriers items as a whole, 0.56 for the diet subscale, 0.71 for the blood glucose testing subscale and 0.18 for the insulin subscale. These results indicated that only the blood glucose testing subscale had acceptable internal consistency.

4.4.3.7.4 Perceived benefits (Appendix B21b)

All of the existing questionnaires on health beliefs about diabetes have asked general questions about the benefits of different aspects of the diabetic self-care regimen eg Harris et al asked “How much do you think medical treatment will reduce your chances of developing diabetic complications". However, as Schafer et al (1983) demonstrated that different psychosocial variables predict adherence to different regimen components, it is therefore possible that adherence to one aspect of the regimen, such as regular blood glucose testing, is related to a specific benefit such as allowing the woman to feel in control of her diabetes, whilst, adherence to another aspect such as dietary adherence is related to feeling that it will stave off future diabetic complications. If a patient believes that a particular aspect of the regimen is very important in some respects, but useless in others, simply asking a general question about the potential benefits of that aspect of the regimen may obscure important relationships. In this study therefore, questions were asked about how each aspect of the regimen related to a variety of different possible benefits. So, for example, in terms of adherence to the dietary regimen patients were asked separately whether it could reduce the risk of /hypo/ of experiencing hyperglycaemia/ of developing long term complications. Only by looking at specific benefits of
each regimen component, can an adequate understanding of the role of perceived benefits in predicting adherence be obtained.

In addition, specific beliefs about benefits of the regimen that emerged from the patient interviews were also included in the questionnaire. These beliefs were as follows:

'As long as I am feeling OK, it doesn't matter if I don't test my blood glucose level each day.'
'By paying attention to how my body feels I can get a reasonable estimate of my blood glucose level.'

In the final questionnaire used in this study, the questions on perceived benefits and perceived barriers were jumbled up, and then grouped together in one section.

Cronbach alpha co-efficients calculated from the diabetic patients in the current study were 0.80 for the benefits items as a whole, 0.73 for the diet subscale, 0.72 for the blood glucose testing subscale and 0.73 for the insulin subscale. These results indicated that the questionnaire as a whole, and all three of the component subscales had acceptable levels of internal consistency.

4.4.3.7.5 Perceived seriousness (Appendix B21c)

The questions on perceived severity used in this study were taken from Harris et al's (1987) questionnaire, although a number of adaptations were made. Firstly, patients were not asked to rate the severity of numbness/tingling, or of shin spots, as these were not seen to be relevant to this young IDDM population. Furthermore, Harris et al's questions on amputation and shortened life expectancy were omitted, because one of the diabetic consultants felt that they were too distressing to ask during pregnancy. Finally, the actual wording of the questions were altered; whereas Harris et al attempted to assess perceived severity by asking how much a particular medical problem would interfere with everyday activities, in this study, patients were asked directly about the perceived severity of the problem.

In addition to the medical problems that Harris et al included in their questionnaire, in this study patients were also asked to rate the severity of a number of other medical problems, that the pilot group had indicated were particularly significant during pregnancy. These additional medical problems were hypos at night; hypos during the day; being unable to anticipate hypos and periods of high blood sugar levels.
The Cronbach alpha co-efficient calculated from the diabetic patients in the current study was 0.60 for the perceived severity scale, indicating an unsatisfactory level of internal consistency.

4.4.3.7.6 Perceived susceptibility (Appendix B21d)

As with the items on perceived seriousness, the items in this section were broadly taken from Harris et al.’s questionnaire. Again, items on shortened life expectancy and amputation were omitted on request from one of the diabetologists. Items on numbness, poor circulation and shin spots were also omitted whilst items on difficulty anticipating hypos, day time hypos, night time hypos, and high blood sugar levels, were added to this section, as the pilot interviews with the patients described above indicated that they were of particular importance during pregnancy.

The Cronbach alpha co-efficient calculated from the diabetic patients in the current study was 0.78 for the perceived susceptibility scale, indicating a satisfactory level of internal consistency.

4.4.3.8 Open-ended items about motivation for regimen adherence (Appendix B22)

In order to give women an opportunity to discuss at greater length how they were coping with the diabetic self-care regimen, a number of open-ended items were constructed for this study. These questions asked women to comment on the factors that currently motivated them to follow the regimen. In addition, the P/D group were also asked about the factors that had motivated them to follow the regimen prior to pregnancy and about how their diabetes had changed during their pregnancy.

4.4.4 Questionnaires completed by the pregnant diabetic group only

4.4.4.1 Health beliefs about diabetic pregnancy (Appendix B23a,b&c)

If one is considering the role of health beliefs in patients with diabetes during pregnancy one has to consider both health beliefs about diabetes (eg beliefs about perceived severity of microvascular complications) and also beliefs about the interaction between diabetes and pregnancy (eg severity of different pregnancy complications that could arise in pregnant patients with diabetes). In order to be able to compare the health beliefs about diabetes between the P/D and the N-P/D patients, two separate health belief questionnaires were used. The first one as described above examined health beliefs about diabetes in general, and was therefore applicable to both diabetic groups in the study. The second health belief questionnaire specifically tackled the question of health beliefs about diabetes during pregnancy and was only completed by the pregnant diabetic group.
In this study the key issues to include in the questionnaire were obtained from the pilot interviews with the 10 female IDDM patients, plus interviews with the consultant diabetologists and the diabetic liaison nurses. Using this information and an identical format to that used in the Diabetes Health Belief Model Questionnaire, a 26 item questionnaire was constructed. The interviews with the consultant diabetologists were used to identify the possible serious outcomes that could occur in patients with diabetes. Obviously, as discussed in chapter 1, a higher rate of perinatal mortality is one of the possible complications of pregnancy complicated by diabetes when glycaemic control is poor. However, the diabetologists felt that it was potentially too distressing to raise this issue in an interview, and therefore questions about perinatal mortality were not included in the questionnaire.

Items on the pregnancy specific barriers and benefits subscales were derived from the interviews with the 6 diabetic women who had experienced pregnancy complicated by diabetes.

Cronbach alpha co-efficients calculated from the pregnant diabetic patients in the current study were 0.77 for the perceived benefits of the regimen during pregnancy, 0.64 for the benefits of the blood glucose testing during pregnancy subscale, 0.23 for the perceived barriers to the whole regimen during pregnancy, and 0.54 for perceived barriers to blood glucose testing during pregnancy. The perceived severity of diabetes during pregnancy had an internal consistency score of 0.68 and the perceived susceptibility to pregnancy related diabetic complications had a score of 0.76.

These results indicated that of the pregnancy specific health belief scales, only the perceived benefits of the regimen as a whole, and perceived susceptibility to diabetic problems had adequate internal consistency.

4.4.4.2 Knowledge about diabetic pregnancy (Appendix B24)

In addition to assessing the woman's knowledge about diabetes in general, an assessment was also made of her knowledge about diabetic pregnancy. Although a screening measure to assess knowledge of diabetes in pregnancy has recently been developed (Spirito et al, 1990), given the length of the interview schedule it was decided that rather than using the 14 questions on Spirito et al's questionnaire, three key questions on diabetes and pregnancy would be added onto the end of the DKN instrument. These 3 items were developed after discussion with a diabetologist and a diabetic liaison sister with special responsibility for the diabetes in pregnancy clinic, and represented the key points that women with IDDM needed to understand during pregnancy. (See DKN questionnaire in Appendix B).
4.5 THE ASSESSMENT OF REGIMEN ADHERENCE AND SELF-CARE BEHAVIOUR

In chapter 1 the crucial distinction between adherence and actual levels of self-care was discussed and it was also mentioned that although patient reports of the prescribed regimen may not always match actual prescriptions (Page et al, 1981), they probably better represent the goals that people try to achieve. Thus Leventhal et al (1984) suggested that the subject's own representation of the prescription rather than the doctor's provides the appropriate standard against which actual levels of self-care should be compared.

In this study therefore, following Leventhal et al (1984) and Glasgow and his team's work on the measurement of regimen adherence, (see Glasgow et al, 1987; McCaul et al 1987; Glasgow 1991) an assessment was made of both absolute levels of behaviour (referred to as 'self-care behaviour') and also of the woman's representation of the prescribed regimen. In this way, by comparing the absolute scores with the prescribed regimen, it was possible to calculate regimen adherence scores, for each of the areas of the regimen. The questionnaires, self-monitoring forms and patient information sheets used to assess regimen behaviour are included in Appendix C. The assessment of each of the three regimen areas included in this study will be described in turn.

4.5.1 Blood glucose testing

4.5.1.1 Self-monitoring of blood glucose testing

Women were asked to write down the time of every blood test, the time of the meal prior to the blood test, and the results of each test, for the period of a week. The written instructions made it clear that they should not change what they normally did during this week of self-monitoring. (See Appendix C1). It was explained verbally to the women that the purpose of the study was to be a 'fly on the wall' in order to get an impression of how many blood glucose tests women managed to do on a day to day basis throughout a week. To use the terminology suggested by Glasgow et al (1987), data from the self-monitoring forms provide a measure of blood glucose testing self-care behaviour. (See Appendix C2 for the self-monitoring form).

4.5.1.2 Self-report of blood glucose testing (Appendix C3)

Using Glasgow et al's (1987) regimen self-report questionnaire, women were asked how often they had actually tested their blood sugar during the last seven days using the following response categories:

'every day/most days/some days/none of the days/I never test blood glucose levels.'
In addition, they were also asked how many of these blood test results they had actually recorded in their notebook.

Women in the P/D group were also asked how frequently they had performed these behaviours before they were pregnant or trying to conceive the current pregnancy.

These self-report questions provide an alternative assessment of self-care behaviour and thus allowed an assessment of the reliability of the self-monitoring forms to be made.

4.5.1.3 Subject's representation of the prescribed blood glucose testing regimen (Appendix C4)

The questions on how many blood glucose tests women believed that they had been asked to do were taken from the Regimen Characteristics Questionnaire (Glasgow et al, 1987). Women were asked both how frequently they had been instructed to do blood glucose tests, and also what times of the day they had been asked to do them.

4.5.1.4 Adherence to the blood glucose testing regimen

By comparing the actual number of blood tests performed over the week (obtained from the self-monitoring forms), to the number they said they had been prescribed (from the Regimen Characteristics questionnaire) an index of adherence to the prescribed number of blood glucose tests was obtained.

4.5.2 Insulin injections

4.5.2.1 Self-monitoring of insulin injections (Appendix C5)

Measurements of the number and timing of the insulin injections were obtained from the self-monitoring of insulin injections carried out for seven days following the interview. On these forms women were asked to write down the time of every insulin injection and the dosage and type of insulin taken, for the period of a week. As explained above, the instructions made it clear that women should not change what they were normally doing for the week of self-monitoring. Data from the self-monitoring forms provided a measure of insulin self-care behaviour.
4.5.2.2 Self-report of insulin injections (Appendix C3)

Glasgow et al’s (1987) regimen self-report questionnaire asked about the insulin injections that subjects had carried out over the last 7 days. There were two questions about the insulin regimen, one asking about timing, and one asking about the measurement of the insulin.

Women in the P/D group were also asked an additional set of questions about how they had carried out their insulin injections before they were pregnant or trying to conceive the current pregnancy.

4.5.2.3 Subject’s representation of the prescribed insulin regimen (Appendix C6)

Glasgow et al’s (1987) Regimen Characteristics questionnaire contained a number of questions on the prescribed insulin regimen. Subjects were asked about the content of each injection they were supposed to be doing, and at what times of day they were supposed to carry them out.

4.5.2.4 Adherence to the insulin testing regimen

Adherence to the insulin injection recommendations was assessed in two ways:

4.5.2.4.1 Using the information from the self-monitoring records.

By comparing the number and timing of insulin injections performed over the week (obtained from the self-monitoring records) to the number and time that subjects had been recommended to carry out the injections (from the Regimen Characteristics questionnaire) indices of adherence to the timing and number of insulin injections could be calculated.

4.5.2.4.2 Using the information from the self-report questionnaire. (Appendix C3)

An alternative assessment of adherence to the insulin regimen was obtained from the regimen self-report questionnaire. With regard to blood glucose testing the self-report questionnaire asked about the frequency with which blood glucose testing was performed and thus provided a measure of actual levels of self-care rather than of adherence. In contrast, with regard to the insulin regimen, the self-report questionnaire asked ‘Over the last 7 days how many of your insulin injections have you taken when you were supposed to’. Given that implicit in this wording is a comparison of actual behaviour with the prescribed regimen, the answers to this question should be regarded as a self-report assessment of adherence.
4.5.3 Dietary behaviour

4.5.3.1 Self-monitoring of diet

Women were asked to record in their dietary diaries everything that they had eaten during a four day period. Two of the days had to be weekdays, and two were at the weekend. The format of the diaries and the accompanying dietary instructions were taken from the UK Prospective Diabetes Survey (UKPDS, 1983). As in the UKPDS, women were not asked to weigh their food portions as this was felt to be too intrusive, but they were asked to estimate quantities in terms of household measures (ie teaspoons, tablespoons, etc) and to give detailed information on brand names where this was relevant. In addition, the researcher always explained the dietary instructions to each patient, rather than leaving them to read and interpret the sheet without a specific explanation and also gave them a sample dietary diary which had previously been filled in, to show them the ideal level of detail that was required. (See Appendix C7 for the Dietary Instructions and Appendix C8 for the format of the dietary diaries).

A trained dietitian entered the data from the dietary diaries into the COMP-EAT computer programme, produced by Lifeline Nutritional Services, London. The analysis of food composition performed by this programme was based on McCance and Widdowson's food (1991) food tables. The COMP-EAT programme was then used to calculate 9 dietary indices:

(i) The percentage of energy derived from carbohydrates
(ii) The percentage of energy derived from sugar
(iii) The percentage of energy derived from all fat sources
(iv) The percentage of energy derived from saturated fatty acids
(v) The percentage of energy derived from mono-unsaturated fatty acids
(vi) The percentage of energy derived from polyunsaturated fatty acids
(vii) The percentage of energy derived from protein
(viii) The daily intake of dietary fibre (in grammes)
(ix) The daily intake of alcohol (in grammes, which translates to units of alcohol).

These dietary indices were used because they correspond to the categories used by the British Diabetic Association in their recent dietary guidelines (BDA, 1992). Furthermore, with the exception of alcohol intake, the guidelines stressed that the same dietary recommendations applied both during and outside of pregnancy. The 1992 recommendations did not consider the question of alcohol intake during pregnancy for patients with diabetes, but general health recommendations for the wider pregnant population advise total abstention or very low levels of alcohol during pregnancy, (Department of Health, 1995).
4.5.3.2 Self-report of dietary behaviour (Appendix C3)

Using Glasgow et al's (1987) regimen self-report questionnaire, women were asked how often they had adhered to the basic dietary principles during the previous week. In addition, women in the P/D group were asked how frequently they had adhered to these principles before they became pregnant or were trying to conceive the current pregnancy.

4.5.3.3 Subject's representation of the prescribed diet (Appendix C9)

Glasgow et al's (1987) Regimen Characteristics questionnaire was used to examine the women's representation of the prescribed diet. In addition to asking whether women had been prescribed a specific diet, this questionnaire also asked whether women had been advised to stick to 5 broad dietary principles. These principles were spreading out intake or carbohydrate foods over the day, limiting fatty intake, limiting sweet things, having a moderate protein intake and eating sufficient fibre.

4.5.3.4 Adherence to the diet

The regimen self-report questionnaire (see Appendix C3) provided a self-report assessment of adherence to the basic dietary principles. In theory it would be also be possible to calculate more detailed dietary adherence indices using the 4 day dietary diaries. However, current dietary advice for patients with diabetes has moved away from rigid calorific prescriptions or food exchange prescriptions to encouraging patients to adhere to these broad dietary principles (BDA guidelines, 1992). Given that many patients are not given firm dietary prescriptions, it is not feasible to compare intake data from the diaries with actual prescriptions in order to obtain indices of adherence to calorific or food exchange prescriptions.

4.5.3.5 Self-Care prior to pregnancy (Appendix C10)

Using the wording from Glasgow et al's (1987) Regimen self-report questionnaire, subjects in the P/D group were also asked about their blood glucose testing, insulin taking and dietary behaviour prior to pregnancy.

4.6 THE MEASUREMENT OF GLYCAEMIC CONTROL

All of the patients in the current study who self-monitored their blood glucose levels used glucometers rather than blood glucose testing strips. Data were taken from the blood glucose testing self-monitoring forms, and the average pre-prandial blood glucose level for the week of testing was calculated.
4.7 STATISTICAL PROCEDURES

Analyses were conducted using the SPSS for Windows (Version 6.0) statistical package. If a particular index did not use interval scaling, or if samples sizes were less than 10 in one particular category, non-parametric analyses were used. Furthermore, if in a particular series of analyses (eg analyses exploring the relationship between different demographic factors and depressed mood), sample sizes in one analysis necessitated the use of a non-parametric test, all the related analyses were also carried out using non-parametric methods of analysis. However, Siegal and Castellan (1988) have argued that the loss of power-efficiency involved with using a non-parametric test instead of the related parametric test is actually very low, so this is unlikely to have had a major impact on the pattern of results obtained.

In terms of the non-parametric tests, the Mann-Whitney U test was used to compare medians between 2 independent samples, the Wilcoxon Signed Rank test was used to compare medians between 2 related samples and the Kruskall-Wallis test was used to compare medians between 3 independent samples. When the relationship between 2 variables was investigated, and at least one of the variables did not have interval scaling, Spearman’s Rank Correlation coefficient was calculated.

For qualitative variables, the Chi-square test was used to compare proportions. When the number of subjects in a 2 x 2 contingency table was less than 20, and therefore the expected frequency in at least one of the cells would be less than 5, Fisher’s Exact test was applied. The Yates continuity correction was applied in a 2 x 2 contingency table if the number of subjects was greater than 20, but less than 100.

For quantitative variables t-tests were used to compare means between 2 groups. The 2 sample t-test was used to compare means between 2 independent groups and the paired t-test was used to compare means between 2 related groups. One way Analysis of Variance and Analysis of Covariance were used to compare means between the 3 groups. For these parametric tests, data were shown to be approximately normal by use of normal plots. Homoscedasticity was verified by Levene’s test.

When the linear relationship between 2 quantitative variables was investigated Pearson’s Product-Moment correlation coefficient was calculated. Approximate normality of the variables was verified by use of normal plots. The linear relationship between 1 dependent variable and a number of independent variables was investigated by use of Stepwise Multiple Regression analysis. The underlying assumptions of the model were investigated, namely linearity between the dependent variable and each of the independent variables; normality and constant variance of the residuals. Following Campbell and Machin (1993), lack of linearity was regarded as the most
serious breach of the assumptions. This assumption was not breached in the multiple regression analyses included in the study.

Mean item scores were calculated on all of the scales, rather than total scores across each questionnaire. There were two reasons for this. Firstly, because of the length of the total interview, patients sometimes missed out one item on a given questionnaire. In order to avoid losing all of the data for that patient on that questionnaire, mean item scores were used, as in this instance, total questionnaire scores would be misleading. The second reason that mean item scores were used was that the health belief questionnaires were not standardized, and consisted of different numbers of questions on each of the component scales. In this situation, interpreting a total score would be difficult. By using a mean item score, the score that was obtained could be compared to the 5 point rating scale, and this helped with the process of interpretation.
CHAPTER 5
INTRODUCTION TO RESULTS

The purpose of this chapter is to compare the three groups on demographic and medical variables. In addition, the groups are also compared on relevant predictor variables that may be related to emotional adjustment during pregnancy and/or to regimen adherence.

5.1 COMPARISONS INVOLVING ALL THREE GROUPS

In this section demographic, medical and predictor variables that are applicable to all three groups are considered.

5.1.1 Drop out from the study

Figure 5.1 shows the number of patients in each of the three groups who completed both stages of the assessments. It can be seen that there was drop-out from the P/D group at two stages. Firstly, five patients terminated the interview before they had finished it. In two cases this was due to tiredness and in three due to the presence of younger children making it hard to continue. The remainder of the interview schedule plus the self-monitoring forms were left with these 5 patients, and they were asked to complete them, and return them to the researcher using the stamp addressed envelope. None of the five patients returned the envelopes and thus these patients contributed an incomplete set of questionnaires to the study. In Chapter 4, it was explained that the order of questionnaires was randomized to avoid order effects on the data. As a result, the 5 women differed in the particular questionnaires that they left uncompleted. In turn, this meant that in the P/D group, the number of women completing each questionnaire did not remain constant for each questionnaire.

The second point at which drop-out occurred amongst the P/D group was the failure of seven women who had completed all of the questionnaires at the interview, to return the self-monitoring forms. When these women were telephoned 2 weeks after the interview and reminded about the self-monitoring forms, two said that on reflection they would not be able to find the time to complete the self-monitoring, whilst three others said that they would be able to do so, but even after a second telephone reminder, failed to send in the completed forms. It was considered unethical to remind the women again after a second telephone call. Three other women said that the forms had been sent to the hospital, but they were never received. One of these women offered to redo the self-monitoring forms, and thus in total seven women failed to produce self-monitoring data, although all other data were available for these patients.
Figure 5.1 shows that self-monitoring data was therefore available for 28 women in the P/D group and not available for 12 women. Demographic characteristics of those P/D women for whom self-monitoring data were available were compared to the demographic characteristics of those P/D women for whom self-monitoring data were not available (See Table 5.1). These analyses indicate that within the P/D group those who provided self-monitoring data did not differ from those who did not provide self-monitoring data in terms of age, parity or marital status. However, Table 5.1 indicates that the proportion of P/D women who did not provide self-monitoring data was higher amongst women in social class III. Sample sizes were too small though to test the statistical significance of the association between failure to provide self-monitoring data and social class.

It can be seen from Fig 5.1 that no women in the N-P/D group terminated during the course of the interview. However, two women in the N-P/D group failed to complete the weekly self-monitoring forms. As with the P/D group, these women were telephoned two weeks after the interview and reminded about the forms; both promised to complete them, but even after a second telephone reminder, failed to do so. Obviously as only 2 N-P/D women failed to provide self-monitoring data, the demographic characteristics of responders could not be compared to that of non-responders.
Table 5.1  Comparison of demographic characteristics between those P/D women who completed the week of self-monitoring and those P/D women who did not

<table>
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<th>Marital Status</th>
<th>Completed self-monitoring</th>
<th>Did not complete self-monitoring</th>
<th>Fisher's Exact p = 0.07</th>
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</thead>
<tbody>
<tr>
<td>Living with partner</td>
<td>27</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Not living with partner</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of children</th>
<th>Completed self-monitoring</th>
<th>Did not complete self-monitoring</th>
<th>$\chi^2_{corrected} = 1.07$ df = 1 p = 0.30</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>12</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>$\geq 1$</td>
<td>16</td>
<td>4</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social Class</th>
<th>Completed self-monitoring</th>
<th>Did not complete self-monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>II</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>III</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Completed self-monitoring</th>
<th>Did not complete self-monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>x</td>
<td>31.72</td>
<td>28.33</td>
</tr>
<tr>
<td>SD</td>
<td>4.68</td>
<td>6.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difference in mean</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>95% CI for difference</td>
<td></td>
</tr>
<tr>
<td>t</td>
<td>-1.92</td>
</tr>
<tr>
<td>p</td>
<td>0.06</td>
</tr>
</tbody>
</table>

The two diabetic groups were compared to see if they differed significantly in the proportion of women who provided the self-monitoring data. These analyses indicated that there was no significant difference between the two diabetic groups, ($\chi^2$-squared (corrected)=3.2, df=2, p=0.07).

5.1.2 Demographic characteristics

In the section below the demographic characteristics of the three groups are compared. In the analyses described in this section, the full (ie n=40) P/D group is compared to the other two control groups. However, as explained above, 5 patients in the P/D group did not complete the full set of questionnaires at the interview. All the demographic comparisons were therefore repeated comparing the 35 P/D patients who completed the whole interview, with the other two control groups. The demographic comparisons between the full (ie n=40) P/D group and the other 2 control groups showed the same pattern of results as the comparisons between the reduced (ie n=35) P/D group and the other 2 control groups. Therefore only the results with the full P/D group are described in this section.
5.1.2.1 Age

Table 5.2 shows the means and standard deviations of the age of women in the three groups. From this table it can be seen that there was no significant difference in mean age between the three groups.

Table 5.2 Comparison of mean ages (in years) between the three groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>40</td>
<td>25</td>
<td>35</td>
<td>F = 0.94</td>
</tr>
<tr>
<td>x</td>
<td>30.70</td>
<td>32.50</td>
<td>31.64</td>
<td>df = 2.97</td>
</tr>
<tr>
<td>SD</td>
<td>5.30</td>
<td>6.15</td>
<td>4.14</td>
<td>p = 0.40</td>
</tr>
<tr>
<td>95% CI</td>
<td>(29.01, 32.40)</td>
<td>(29.94, 35.01)</td>
<td>(30.22, 33.07)</td>
<td></td>
</tr>
</tbody>
</table>

5.1.2.2 Parity

Table 5.3 gives the distribution of women in each of the three groups according to the number of living children that they have. In the design of the study, the two pregnant groups were matched for the number of living children, but the non-pregnant group was not matched on this criterion. From Table 5.3 it can be seen that no women in either of the two pregnant groups currently had three children. As a result, 3 of the 12 cells had expected frequencies less than 5, and therefore a Chi-Square test of association could not be carried out on these data. However, inspection of the percentages indicates that the percentage of women with one child only was much lower amongst the N-P/D group than in the other two groups. Furthermore, it was only amongst the N-P/D group that any women had three children.

In this study following Condon and Eswaranathan (1990) parity was defined as 'the number of times a women has given birth'. Using this definition 'primips' are women who are about to give birth for the first time, 'multips' have had at least one childbirth, and 'nullips' are women who are not currently pregnant and who have never given birth in the past. As none of the women in any of the three groups had previously experienced a stillbirth or a neonatal death, in this study the multips all had at least one living child. It can be seen from Table 5.3 that the proportion of multips and primips (or nullips in the case of the non-pregnant group) did not differ significantly between the three groups.
Table 5.3 Demographic characteristics of subjects in each of the three groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
<th>( \chi^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 } a</td>
<td>20 } a</td>
<td>13 } a</td>
<td>18 } a</td>
<td>( \chi^2 ) corrected a v b = 0.03</td>
</tr>
<tr>
<td>1 } b</td>
<td>11 } b</td>
<td>4 } b</td>
<td>9 } b</td>
<td>df = 2</td>
</tr>
<tr>
<td>2 } b</td>
<td>9 } b</td>
<td>6 } b</td>
<td>8 } b</td>
<td>p = 0.99</td>
</tr>
<tr>
<td>3 } b</td>
<td>0 } b</td>
<td>2 } b</td>
<td>0 } b</td>
<td></td>
</tr>
<tr>
<td>Social class</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>15</td>
<td>9</td>
<td>14</td>
<td>( \chi^2 ) corrected = 0.44</td>
</tr>
<tr>
<td>II</td>
<td>17</td>
<td>12</td>
<td>14</td>
<td>df = 2</td>
</tr>
<tr>
<td>III</td>
<td>8</td>
<td>4</td>
<td>7</td>
<td>p = 0.98</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living with partner</td>
<td>36</td>
<td>17</td>
<td>34</td>
<td>Fisher's Exact</td>
</tr>
<tr>
<td>Not living with partner</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>P/D v N-P/D p = 0.03</td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>5</td>
<td>16</td>
<td>( \chi^2 ) corrected = 4.7</td>
</tr>
<tr>
<td>Yes</td>
<td>24</td>
<td>20</td>
<td>18</td>
<td>df = 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p = 0.1</td>
</tr>
</tbody>
</table>

5.1.2.3 Social class

Table 5.3 shows the social class distribution of each of the three groups, using the combined groups of the Registrar-General's classification (see Chapter 4). It can be seen from Table 5.3 that the social class distribution did not differ significantly between the three groups.

5.1.2.4 Marital status

Table 5.3 gives the numbers of women in each group, in each marital status group. A Chi-Square test of association could not be carried out to test the association between group and marital status across all 3 groups due to the low number of patients who did not have a partner in both of the pregnant groups and hence low expected frequencies in these cells. However, using a Fisher's Exact test it was possible to carry out 2 separate comparisons; one comparing the 2 pregnant groups and a second comparing the 2 diabetic groups. The results of these analyses are given in table 5.3 and indicate that marital status did not differ between 2 pregnant groups. In contrast, a significant difference was obtained between the 2 diabetic groups with a significantly higher proportion of women being married/living with a partner amongst the P/D women compared to the N-P/D women.
5.1.2.5 Employment status

Table 5.3 gives the numbers in each group, divided according to whether or not they are currently employed. It can be seen that although the proportion of women who were not currently employed was lower in the N-P/D than in either of the two pregnant groups, this difference was not statistically significant.

5.1.3 Physical well-being and medical treatment

5.1.3.1 Illnesses other than diabetes

Women in all three groups were asked about any illnesses other than diabetes that had occurred in the last six months, and any that were occurring currently. (See Table 5.4). The three groups did not differ significantly in terms of the frequency of illnesses over the previous six months, or in terms of current illnesses.

Table 5.4 also contains a breakdown of the specific illnesses suffered by women in each of the three groups. Amongst diabetic women there were also case of thyroid disease and asthma, which is to be expected, given that it is now recognized that the three conditions represent related autoimmune disorders (Macfarlane, 1991.). It should be noted that Table 5.4 represents a slight under-representation of the extent of asthma in the diabetic sample as it only gives figures on the first illness suffered currently or in the past six months. In the P/D group two women who currently had thyroid disease also had asthma, whilst one woman who had had thyroid disease over the previous six months had also had asthma at that time. These second illnesses were not included in Table 5.4. Cases of hypertension occurred in all three groups with the highest rate being found amongst the N-P/D group, but numbers in all three groups were small.
Table 5.4 Frequencies of subjects who had experienced illnesses other than diabetes. All three groups

<table>
<thead>
<tr>
<th>Experienced illness in the last six months</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
<th>$\chi^2$ corrected a v b =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced illness in the last six months</td>
<td>No</td>
<td>30 = a</td>
<td>18 = a</td>
<td>32 = a</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>9 = b</td>
<td>4 = b</td>
<td>3 = b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Breakdown of b)</td>
<td>(Breakdown of b)</td>
<td>(Breakdown of b)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = thyroid</td>
<td>1 = hypertension</td>
<td>1 = respiratory infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = hypertension</td>
<td>1 = kidney disease</td>
<td>1 = sinus infection</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = asthma</td>
<td>1 = respiratory infection</td>
<td>1 = anaemia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = chicken pox</td>
<td>1 = tonsillitis</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = viral myocarditis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = sciatica</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 = trigger finger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiencing illness currently</td>
<td>No</td>
<td>32 = a</td>
<td>16 = a</td>
<td>32 = a</td>
</tr>
<tr>
<td>Experiencing illness currently</td>
<td>Yes</td>
<td>6 = b</td>
<td>7 = b</td>
<td>3 = b</td>
</tr>
<tr>
<td>(Breakdown of b)</td>
<td>(Breakdown of b)</td>
<td>(Breakdown of b)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 = thyroid</td>
<td>4 = thyroid</td>
<td>1 = hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = hypertension</td>
<td>2 = hypertension</td>
<td>1 = hyperemesis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 = carpal tunnel syndrome</td>
<td>1 = knee injury</td>
<td>1 = heart murmur</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\chi^2$ corrected a v b = 2.26</td>
<td>df = 2</td>
<td>p = 0.32</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\chi^2$ corrected a v b = 4.81</td>
<td>df = 2</td>
<td>p = 0.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.1.4 **Satisfaction with social support**

The three groups were compared using Sarason et al’s (1987) abbreviated six item measure of satisfaction with social support. From Table 5.5 it can be seen that the 3 groups did not differ significantly in terms of this index.

<table>
<thead>
<tr>
<th>Table 5.5</th>
<th>Comparison between the three groups of satisfaction with social support and state anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P/D</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>n = 37</td>
</tr>
<tr>
<td>with social support</td>
<td>x = 5.65</td>
</tr>
<tr>
<td>SD = 0.68</td>
<td>(5.42, 5.87)</td>
</tr>
<tr>
<td>State Anxiety</td>
<td>n = 31</td>
</tr>
<tr>
<td>2</td>
<td>x = 1.85</td>
</tr>
<tr>
<td>SD = 0.53</td>
<td>(1.65, 2.04)</td>
</tr>
<tr>
<td>2</td>
<td>95% CI</td>
</tr>
</tbody>
</table>

1 Satisfaction with social support. Items scored from 1 (very dissatisfied) to 6 (very satisfied). Mean item score is reported.
2 State anxiety. Items scored from 1 (low anxiety) to 4 (high anxiety). Mean item score is reported.

5.1.5 **State anxiety**

The three groups were also compared on levels of State Anxiety using Spielberger’s (1970) inventory. Table 5.5 indicates that levels of State Anxiety did not differ significantly between the three groups.

5.2 **COMPARISONS INVOLVING THE TWO PREGNANT GROUPS**

In this section, the two pregnant groups are compared on obstetric factors as well as on pregnancy related variables that have previously been found to be related to emotional adjustment during pregnancy

5.2.1 **Obstetric history**

5.2.1.1 **Previous miscarriages**

Data on previous obstetric history (eg previous miscarriages and terminations of pregnancy) were not obtained for the N-P/D group. With the P/N-D group all the medical records were made available, and therefore data on all the patients in the sample were obtained. Unfortunately, with
the P/D group, three of the hospitals were unable to locate all of the relevant records, and thus the information on previous obstetric history could not be obtained for six women.

Table 5.6 shows the number of previous miscarriages that women in the two pregnant groups have previously experienced. In order to see if the two groups differ on miscarriage rate, it was necessary to combine the four miscarriage categories in Table 5.6 (ie 0, 1, 2 and 3 previous miscarriages) into two categories (no previous miscarriages and at least one previous miscarriage). Using these combined categories, there was no difference in miscarriage rate between the two pregnant groups. Obviously, the use of combined categories could obscure any differences in recurrent miscarriage rate between the two pregnant groups. Although this question cannot be analyzed using a test of statistical significance, Table 5.6 does not suggest that the rate of recurrent miscarriage differed between the two groups.
Table 5.6 Frequencies of subjects in the two pregnant groups who had experienced different previous obstetric events

<table>
<thead>
<tr>
<th>Number of previous events</th>
<th>P/D</th>
<th>P/N-D</th>
<th>( \chi^2 ) corrected a v b = ( df = 1 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of miscarriages</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>23</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>Number of previous terminations of pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>27</td>
<td>a</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>b</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned the current pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Planned alone</td>
<td>1</td>
<td>a</td>
<td>7 { a } 9 { a } 11 { b } ( \chi^2 ) corrected a v b = 0.00 ( df = 1 ) ( p = 0.96 )</td>
</tr>
<tr>
<td>Not planned</td>
<td>1</td>
<td>a</td>
<td>8 { a } 10 { b } 13 { b } ( \chi^2 ) corrected a v b = 0.90 ( df = 1 ) ( p = 0.34 )</td>
</tr>
<tr>
<td>Jointly planned</td>
<td>11</td>
<td>b</td>
<td>11 { b } 11 { b } 10 { b } 13 { b } ( \chi^2 ) corrected a v b = 0.00 ( df = 1 ) ( p = 0.96 )</td>
</tr>
<tr>
<td>Difficulty in conceiving current pregnancy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>a</td>
<td>30 { a } ( \chi^2 ) corrected = 0.20 ( df = 1 ) ( p = 0.65 )</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>b</td>
<td>5 { b } ( \chi^2 ) corrected = 0.20 ( df = 1 ) ( p = 0.65 )</td>
</tr>
</tbody>
</table>
5.2.1.2 Previous terminations of pregnancy

Table 5.6 shows the number of previous terminations of pregnancy that women in the two pregnant groups have previously experienced. As with data on previous miscarriages described above, in order to see if the two groups differ on rates of previous termination, it was necessary to combine the four termination categories in Table 5.6 into two categories; no previous termination and at least one previous termination. Using these combined categories, there was no difference in termination rate between the two pregnant groups. Obviously, as with the miscarriage data, the use of combined categories could obscure any differences in the rate of repeated terminations between the two pregnant groups. Although this question cannot be analyzed using a test of statistical significance, Table 5.6 does not suggest that the rate of repeated termination differed between the two pregnant groups.

5.2.1.3 Planning of pregnancy

Women in both of the two pregnant groups were asked whether the current pregnancy had been jointly planned with a partner, planned by themselves alone without consulting their partner, or had not been planned. In both of the pregnant groups one patient had planned the pregnancy alone without talking about it to their partner. In order to perform a Chi-Square test to examine whether the rate of planning differed between the two pregnant groups these patients had to be omitted from the analysis as otherwise the expected frequency in these two categories would be too low. When the planning of pregnancy was restricted to two categories (i.e. jointly planned v unplanned) the difference between the two groups was not statistically significant. (See Table 5.6).

Additional analyses considered whether there was a relationship between parity and the planning of pregnancy. Within each of the two groups, parity was unrelated to the planning of pregnancy, i.e. there was no tendency for primips or multips to differ on the frequency with which the pregnancy was planned or not.

5.2.1.4 Conception

Women were also asked whether they had been trying to conceive the current baby for more than one year. From Table 5.6 it can be seen that using this definition of difficulty in conception, there was no significant difference between the two pregnant groups.

5.2.1.5 Weeks pregnant when first contacted the doctor

Women in both of the pregnant groups were asked how many weeks pregnant they had been when they first contacted a doctor (which could be a GP, the antenatal clinic or the diabetologist).
Table 5.7 indicates that there was no difference in the stage of pregnancy at which women in the two pregnant groups first contacted a member of the medical profession. It can also be seen from this table that the mean stage at which women contacted a doctor was extremely early in both of the two pregnant groups, namely 6.48 weeks pregnant in the diabetic group and 7 weeks pregnant in the non-diabetic group.

Table 5.7 Comparison between the two pregnant groups of mean weeks pregnant when first contacted the doctor, and mean weeks pregnant at the time of interview

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>P/N-D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean weeks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>pregnant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>when first</td>
<td>n =</td>
<td>39</td>
<td>28</td>
<td>0.52</td>
<td>(-.77, 1.79)</td>
<td>0.80</td>
</tr>
<tr>
<td><strong>contacted</strong></td>
<td>x =</td>
<td>6.49</td>
<td>7.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>doctor</strong></td>
<td>SD</td>
<td>2.44</td>
<td>2.80</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean weeks</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>pregnant at</strong></td>
<td>n =</td>
<td>40</td>
<td>35</td>
<td>1.79</td>
<td>(-.56, 4.14)</td>
<td>1.52</td>
</tr>
<tr>
<td><strong>time of</strong></td>
<td>x =</td>
<td>25.33</td>
<td>27.11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>interview</strong></td>
<td>SD</td>
<td>4.49</td>
<td>5.74</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.2.1.6 Weeks pregnant at time of interview

Table 5.7 gives the means and standard deviations of how many weeks pregnant the women were at the time of interview. It can be seen that the groups did not differ significantly in terms of this variable.

5.2.2 Physical problems related to pregnancy

Two aspects of the women's physical health related to pregnancy were assessed. Firstly, they were asked about nausea both during the first 12 weeks of pregnancy and currently, and secondly, they were asked about tiredness during these same two time periods. The results of these analyses are shown in Table 5.8. During the first 12 weeks of pregnancy there was no difference between the two pregnant groups in self-reported levels of tiredness or of nausea.

In terms of current levels of tiredness and nausea the four frequency categories (ie all of the time; most of the time; some of the time; never) had to be merged into two categories, in order to be able to carry out a Chi-Square test. Table 5.8 indicates that the two pregnant groups did not differ significantly in terms of current levels of tiredness or in terms of current levels of nausea.
Table 5.8 Frequencies of subjects in the two pregnant groups who had experienced nausea and tiredness

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>P/N-D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>(\chi^2\text{corrected} = 0.68)</td>
</tr>
<tr>
<td>Nausea</td>
<td></td>
<td></td>
<td>df = 3</td>
</tr>
<tr>
<td>All of the time</td>
<td>5</td>
<td>5</td>
<td>p = 0.88</td>
</tr>
<tr>
<td>Most of the time</td>
<td>6</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Some of the time</td>
<td>15</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>12</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Current nausea</td>
<td></td>
<td></td>
<td>Fisher's Exact a v b</td>
</tr>
<tr>
<td>All of the time</td>
<td>0 (\text{a})</td>
<td>1 (\text{a})</td>
<td>p = 0.28</td>
</tr>
<tr>
<td>Most of the time</td>
<td>1 (\text{a})</td>
<td>2 (\text{a})</td>
<td></td>
</tr>
<tr>
<td>Some of the time</td>
<td>10 (\text{b})</td>
<td>6 (\text{b})</td>
<td>df = 1</td>
</tr>
<tr>
<td>Never</td>
<td>27 (\text{b})</td>
<td>26 (\text{b})</td>
<td>p = 0.50</td>
</tr>
<tr>
<td>Tiredness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All of the time</td>
<td>10 (\text{a})</td>
<td>7 (\text{a})</td>
<td>(\chi^2\text{corrected a v b} = 0.45)</td>
</tr>
<tr>
<td>Most of the time</td>
<td>11 (\text{a})</td>
<td>16 (\text{a})</td>
<td>df = 1</td>
</tr>
<tr>
<td>Some of the time</td>
<td>15 (\text{b})</td>
<td>8 (\text{b})</td>
<td>p = 0.50</td>
</tr>
<tr>
<td>Never</td>
<td>2 (\text{b})</td>
<td>4 (\text{b})</td>
<td></td>
</tr>
<tr>
<td>Current tiredness</td>
<td></td>
<td></td>
<td>(\chi^2\text{corrected a v b} = 0.00)</td>
</tr>
<tr>
<td>All of the time</td>
<td>5 (\text{a})</td>
<td>4 (\text{a})</td>
<td>df = 1</td>
</tr>
<tr>
<td>Most of the time</td>
<td>9 (\text{a})</td>
<td>9 (\text{a})</td>
<td>p = 1.0</td>
</tr>
<tr>
<td>Some of the time</td>
<td>20 (\text{b})</td>
<td>20 (\text{b})</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>4 (\text{b})</td>
<td>2 (\text{b})</td>
<td></td>
</tr>
</tbody>
</table>

5.2.3 Antenatal treatment

5.2.3.1 Preconception counselling

Women in the P/D group were asked whether they had received any pre-conception counselling. Responses to this question are displayed in figure 5.2. From this figure it can be seen that 13 of the 34 women who responded to this question reported talking to their doctor about wanting to conceive a baby, and only abandoning contraception once the doctor had confirmed that their blood glucose levels were satisfactory. An additional 2 women reported talking to the doctor about wanting to conceive, but abandoning contraception prior to confirming blood glucose levels with their doctor, whilst 3 women said that they always knew what their own blood sugar levels were like from regular testing. One women who had had considerable fertility problems reported that she had been ‘always trying for a baby’, and thus for her it was not a simple matter of checking blood glucose levels for a short period of time prior to stopping using contraception. The remaining 15 women in the sample reported that they had not sought any medical advice prior to the time when they stopped using contraception.
These data were then re-coded into two categories: checked blood glucose levels prior to conception, and did not check blood glucose levels prior to conception. The group that checked prior to conception consisted of those 13 women who had talked to their doctor and only abandoned contraception when their blood glucose levels were satisfactory, plus the 3 women who reported regularly checking their own blood glucose levels. The group that did not check their blood glucose levels prior to conception consisted of the 15 women who reported that they had not sought medical advice prior to conception. The 2 women who reported that they had talked to their doctor, but stopped using contraception before they had been advised to do so were omitted, because it was not known if they had in fact checked their own blood sugar profiles prior to the decision to stop using contraception. In addition, the woman who had reported that she was always trying for a baby was also omitted, as it was not known if she also checked her blood glucose levels prior to conception.

Additional analyses were then carried out to investigate whether parity or the planning of pregnancy was related to whether the women checked their blood glucose levels prior to conception. Table 5.9 shows that there was no association between parity and whether or not the women checked their blood glucose levels prior to conception. In contrast, there was a marked effect of whether or not the pregnancy was planned. Table 5.9 shows that of the 18 women who reported having planned their pregnancy, 13 of them (ie over 70%) checked their blood glucose levels prior to conception. However, of the 15 women who did not plan their pregnancy, only 3 women knew what their blood sugar levels were like at the time of conception, and 12 did not.

At first sight, of course, it seems contradictory to say that 3 women who did not plan their pregnancy also knew what their blood sugar levels were like pre-conception, but this seeming anomaly is resolved when it becomes clear that the 3 women in the unplanned group who knew what their blood sugar levels were pre-conception, were the 3 women who reported knowing from regularly testing their own blood, as opposed to special pre-conception counselling.
Table 5.9 Frequencies of subjects in the P/D group who checked glycaemic control prior to pregnancy, divided according to the planning of pregnancy and according to parity

<table>
<thead>
<tr>
<th>P/D</th>
<th>Checked glycaemic control prior to conception</th>
<th>( \chi^2 \text{corrected} = 7.0 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>12</td>
<td>df = 1, p &lt; 0.001</td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parity</th>
<th>Yes</th>
<th>No</th>
<th>( \chi^2 \text{corrected} = 0.29 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>9</td>
<td>8</td>
<td>df = 1, p = 0.59</td>
</tr>
<tr>
<td>( \geq 1 )</td>
<td>6</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

5.2.3.2 Ultrasound scans

Women in both pregnant groups were asked whether they had yet been given an ultrasound scan as part of their antenatal treatment. (See Table 5.10). Rates of first ultrasound scanning during pregnancy do not differ between the two groups. However, a greater proportion of women in the diabetic group had a second ultrasound scan and this difference was statistically significant.

Table 5.10 Frequencies of subjects in the two pregnant groups who had experienced hospitalisation, a first ultrasound scan, a second ultrasound scan and amniocentesis screening

<table>
<thead>
<tr>
<th>P/D</th>
<th>P/N-D</th>
<th>( \chi^2 \text{corrected} = 0.55 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>8</td>
<td>df = 1, p = 0.46</td>
</tr>
<tr>
<td>No</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Of those hospitalised once, hospitalised again</th>
<th>P/D</th>
<th>P/N-D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>3</td>
<td>0</td>
<td>p = 0.49</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Had first ultrasound scan</th>
<th>P/D</th>
<th>P/N-D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>38</td>
<td>31</td>
<td>p = 0.26</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Had second ultrasound scan</th>
<th>P/D</th>
<th>P/N-D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>35</td>
<td>18</td>
<td>( \chi^2 \text{corrected} = 15.51 )</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
<td>16</td>
<td>df = 1, p &lt; 0.001</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Had amniocentesis screening</th>
<th>P/D</th>
<th>P/N-D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>5</td>
<td>3</td>
<td>p = 0.42</td>
</tr>
<tr>
<td>No</td>
<td>33</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>
5.2.3.3 **Amniocentesis**

The women were asked whether they had already had, or were intending to have an amniocentesis test performed. Table 5.10 indicates that the proportion of women in both groups opting to have this procedure carried out was relatively small and there was no significant difference between the 2 pregnant groups. Women were also asked to given their reasons for having this procedure: with both the diabetic and non-diabetic patients, the reason given was their age and the associated risk of having a baby with Down’s syndrome.

5.2.3.4 **Hospitalization during pregnancy**

Hospitalization rates were available for the two pregnant groups. Table 5.10 shows a comparison of rates of first hospitalization during pregnancy; subsequent hospitalizations are not reported in Table 5.10. From Table 5.10 it can be seen that although 8 out of 39 (= 20.51%) of the P/D women reported being hospitalized at least once during pregnancy, compared to 4 out of 35 (= 11.43%) of the P/N-D women, this difference did not reach statistical significance.

Whilst none of the four P/N-D women who were hospitalized had any subsequent hospitalizations, three of the eight P/D women who were hospitalized once had a second period in hospital and one out of these eight women had a third stay. However, rates of recurrent hospitalization were not found to differ significantly between the 2 groups.

5.2.3.5 **Satisfaction with antenatal treatment and continuity of care**

Table 5.11 indicates that using the Satisfaction with Antenatal questionnaire as an index, the P/D women had significantly higher levels of satisfaction with the antenatal treatment than women in the P/N-D group.

A significant difference was also obtained between the two pregnant groups on continuity of antenatal care, with the P/D women receiving significantly greater continuity of medical care for their antenatal treatment than women in the P/N-D group. (See Table 5.11).

As the two groups were found to differ significantly in terms of both of these variables, an additional analysis was carried out comparing the two groups on levels of antenatal satisfaction, whilst controlling for continuity of obstetric care. This analysis found no significant difference between the two groups (F=3.30, df=59.1, p=0.07) indicating that it was the difference in
continuity of care between the two pregnant groups that contributed to the higher levels of treatment satisfaction observed amongst the P/D women.

Table 5.11 Comparison between the two pregnant groups of satisfaction with antenatal treatment and continuity of antenatal treatment

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>P/N-D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with antenatal treatment¹</td>
<td>n = 35</td>
<td>35</td>
<td>0.44</td>
<td>(.03, .85)</td>
<td>2.14</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>x = 4.05</td>
<td>3.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD = 0.71</td>
<td>1.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity of antenatal treatment²</td>
<td>n = 35</td>
<td>29</td>
<td>-0.83</td>
<td>(-1.45, -.21)</td>
<td>-2.67</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>x = 2.93</td>
<td>3.76</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD = 1.15</td>
<td>1.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1  Satisfaction with antenatal treatment. Items scored from 1 (low satisfaction) to 5 (high satisfaction). Mean item score is reported.
2  Continuity of antenatal treatment. Items scored from 1 (high continuity) to 5 (low continuity). Mean item score is reported.

5.2.4 Factors related to emotional adjustment during pregnancy

The two pregnant groups were compared on 7 factors that the literature review has indicated may be related to emotional adjustment in pregnancy.

It can be seen from table 5.12 that the two pregnant groups did not differ significantly in terms of satisfaction with the marital relationship during pregnancy, identification with the motherhood role, confidence in their mothering ability, health anxieties about the baby, attachment to the foetus or in their body image during pregnancy. In addition, the two pregnant groups did not differ significantly in two out of the foetal health locus of control subscales, namely the internality and chance subscales. In contrast, a significant difference was obtained between the two groups on the powerful others subscale. The direction of this difference indicated that the P/D group were more likely than the P/N-D group to believe that the health of their unborn baby is a function of powerful others, ie of members of the health care professions.
Table 5.1.2  Comparison between the two pregnant groups of pregnancy related psychosocial variables

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>P/N-D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with the marital relationship during pregnancy¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 32</td>
<td>x = 1.71</td>
<td>SD = 0.23</td>
<td>35</td>
<td>1.64</td>
<td>0.89</td>
<td>0.06</td>
</tr>
<tr>
<td>Identification with the motherhood role²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>x = 1.67</td>
<td>SD = 0.41</td>
<td>35</td>
<td>1.72</td>
<td>0.63</td>
<td>-0.05</td>
</tr>
<tr>
<td>Confidence in one's mothering ability³</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>x = 1.45</td>
<td>SD = 0.47</td>
<td>39</td>
<td>1.33</td>
<td>0.35</td>
<td>0.01</td>
</tr>
<tr>
<td>Health anxiety about the baby/labour⁴</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>x = 2.20</td>
<td>SD = 0.58</td>
<td>35</td>
<td>2.02</td>
<td>0.59</td>
<td>0.18</td>
</tr>
<tr>
<td>Attachment to the foetus⁵</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>x = 2.05</td>
<td>SD = 0.41</td>
<td>35</td>
<td>1.94</td>
<td>0.59</td>
<td>0.11</td>
</tr>
<tr>
<td>Body image⁶</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 35</td>
<td>x = 2.56</td>
<td>SD = 0.41</td>
<td>33</td>
<td>2.59</td>
<td>0.46</td>
<td>-0.04</td>
</tr>
<tr>
<td>Foetal health locus of control - powerful others⁷</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 35</td>
<td>x = 1.88</td>
<td>SD = 0.46</td>
<td>35</td>
<td>1.60</td>
<td>0.50</td>
<td>0.28</td>
</tr>
<tr>
<td>Foetal health locus of control - chance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 35</td>
<td>x = 1.91</td>
<td>SD = 0.64</td>
<td>35</td>
<td>2.02</td>
<td>0.68</td>
<td>-0.11</td>
</tr>
<tr>
<td>Foetal health locus of control - internal</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 35</td>
<td>x = 2.88</td>
<td>SD = 0.48</td>
<td>35</td>
<td>2.88</td>
<td>0.40</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Notes - Table 5.12

1 Satisfaction with marital relationship during pregnancy. Items scored from 1 (high satisfaction) to 4 (low satisfaction). Mean item score is reported.
2 Identification with marital relationship during pregnancy. Items scored from 1 (high identification to 4 (low identification). Mean item score is reported.
3 Confidence in one’s mothering ability. Items scored from 1 (high confidence) to 4 (low confidence). Mean item score is reported.
4 Health anxieties about baby/labour. Items scored from 1 (low anxiety), to 4 (high anxiety). Mean item score is reported.
5 Attachment to the foetus. Items scored from 1 (very positive) to 5 (very negative). Mean item score is reported.
6 Body image. Items scored from 1 (very negative) to 4 (very positive). Mean item score is reported.
7 Foetal health locus of control. For each subscale items are scored from 1 (low chance, internality, powerful others) to 5 (high chance, internality, powerful others). Mean item score is reported.
5.2.5 Outcome of pregnancy

Hospital records of women in both of the pregnant groups were obtained in order to examine the outcome of pregnancy.

The infant of one of the women in the P/D group died due to an incident of ketoacidosis at 36 weeks gestation. All of the other infants of women in the P/D group and of the women in the P/N-D group survived.

In terms of morbidity, none of the infants in the P/D group and none of the infants in the P/N-D group were diagnosed as suffering from a congenital malformation, or from intra-uterine growth retardation.

5.3 COMPARISONS INVOLVING THE TWO DIABETIC GROUPS

This section shows the results of comparisons between the two diabetic groups on a number of diabetes related variables. These diabetic related variables were chosen as previous research has indicated that they may be related to regimen adherence and/or to emotional adjustment amongst women with diabetes.

5.3.1 Medical aspects of diabetes

5.3.1.1 Disease duration

Table 5.13 shows the means and standard deviations of the disease duration (in years) for both of the diabetic groups. It is apparent from Table 5.13 that there was no significant difference between the two groups.

Table 5.13 Comparison between the two diabetic groups of mean disease duration

<table>
<thead>
<tr>
<th>Disease duration (in years)</th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>n = 40</td>
<td>x = 13.34</td>
<td>SD = 8.54</td>
<td>24</td>
<td>-2.62</td>
<td>(-7.01, 1.78)</td>
<td>-1.19</td>
</tr>
</tbody>
</table>
5.3.1.2 Diabetic complications

Table 5.14 shows the proportion of each diabetic group that had ever experienced a range of medical problems associated with diabetes. From this table it can be seen that the two diabetic groups did not differ in the frequency with which they had experienced diabetic complications such as kidney disease and eye disease. Only 1 woman in the P/D group and 2 in N-P/D group had experienced any problems with kidney disease, and the numbers who had experienced eye problems though greater than those who had experienced kidney disease were also small. Furthermore there were also no differences between the two groups in terms of problems with hypo or hyperglycaemia; the majority of women in groups reported that they had on occasion experienced difficulties in glycaemic control.

Table 5.14 Frequencies of subjects in the two diabetic groups who had experienced complications of diabetes

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney disease</td>
<td>Yes</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>36</td>
<td>21</td>
</tr>
<tr>
<td>Eye problems</td>
<td>Yes</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>34</td>
<td>18</td>
</tr>
<tr>
<td>Unable to anticipate</td>
<td>Yes</td>
<td>27</td>
<td>13</td>
</tr>
<tr>
<td>hypos</td>
<td>No</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(\chi^2_{\text{corrected}} = 1.07)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>df = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>p = 0.30</td>
</tr>
<tr>
<td>Daytime hypos</td>
<td>Yes</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(\chi^2_{\text{corrected}} = 0.14)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>df = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>p = 0.70</td>
</tr>
<tr>
<td>Night-time hypos</td>
<td>Yes</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(\chi^2_{\text{corrected}} = 0.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>df = 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>p = 1.0</td>
</tr>
<tr>
<td>Hyper-glycaemia</td>
<td>Yes</td>
<td>29</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7</td>
<td>4</td>
</tr>
</tbody>
</table>

5.3.1.3 Glycaemic control

Table 5.15 gives the mean preprandial blood glucose test results for women in the two diabetic groups. These results were obtained from the self-monitoring of blood sugars that the women carried out in the week following the interview. It can be seen from Table 5.15 that preprandial blood sugars were significantly lower amongst the P/D women than the N-P/D women.
Table 5.15  **Comparison of mean preprandial blood glucose test results (in mmol/l) between the two diabetic groups**

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-prandial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blood glucose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>results (mmol/l)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>27</td>
<td>15</td>
<td>1.60</td>
<td>(.04, 3.15)</td>
<td>2.15</td>
<td>0.04</td>
</tr>
<tr>
<td>x</td>
<td>5.42</td>
<td>7.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1.49</td>
<td>2.66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5.3.1.4 **Satisfaction with diabetic treatment and continuity of care**

Table 5.16 indicates that the two diabetic groups did not differ in terms of their satisfaction with diabetic care or in terms of the continuity of care that they received.

Table 5.16  **Comparison between the two diabetic groups of satisfaction with diabetic treatment**

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with diabetic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treatment¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>37</td>
<td>22</td>
<td>0.28</td>
<td>(-.15, .70)</td>
<td>1.35</td>
<td>0.19</td>
</tr>
<tr>
<td>x</td>
<td>4.46</td>
<td>4.18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.43</td>
<td>0.89</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of diabetic</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>treatment²</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n</td>
<td>38</td>
<td>25</td>
<td>0.24</td>
<td>(-.28, .76)</td>
<td>0.92</td>
<td>0.36</td>
</tr>
<tr>
<td>x</td>
<td>2.40</td>
<td>2.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>0.92</td>
<td>1.15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Satisfaction with diabetic treatment. Items scored from 1 (low satisfaction) to 5 (high satisfaction). Mean item score is reported.

² Continuity of diabetic treatment. Items scored from 1 (high continuity) to 5 (low continuity). Mean item score is reported.

5.3.2 **Health beliefs about diabetes and its treatment**

Table 5.17 gives the results of comparisons between the two diabetic groups on the different components of the Health Belief Model. In terms of the different components of the Health Belief Model analyzed in Table 5.17 total scores for perceived benefits of the regimen, perceived barriers to adherence and cues to action were computed. In addition, benefits, barriers and cues scores were also computed for the 3 individual areas of the regimen (i.e., diet, insulin injections and blood glucose testing).
The other components of the health belief model that were considered were perceived severity of possible medical problems associated with diabetes, perceived susceptibility to these different medical problems and general health motivation. Finally self-efficacy beliefs about regimen adherence were also considered.

From Table 5.17 it can be seen that the two diabetic groups did not in fact differ significantly in terms of any components of the health belief.
Table 5.17 Comparison between the two diabetic groups on the components of the Health Belief Model

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cues - whole regimen</strong></td>
<td>n=38</td>
<td>x=3.69</td>
<td>SD=0.62</td>
<td>38</td>
<td>25</td>
<td>-0.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cues - diet</strong></td>
<td>n=38</td>
<td>x=3.28</td>
<td>SD=0.86</td>
<td>38</td>
<td>25</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cues - insulin</strong></td>
<td>n=38</td>
<td>x=4.24</td>
<td>SD=0.74</td>
<td>38</td>
<td>25</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cues - BGT</strong></td>
<td>n=38</td>
<td>x=3.60</td>
<td>SD=0.68</td>
<td>38</td>
<td>25</td>
<td>-0.05</td>
</tr>
<tr>
<td><strong>Perceived severity</strong></td>
<td>n=37</td>
<td>x=1.85</td>
<td>SD=0.61</td>
<td>37</td>
<td>23</td>
<td>0.17</td>
</tr>
<tr>
<td><strong>Perceived susceptibility</strong></td>
<td>n=36</td>
<td>x=3.17</td>
<td>SD=0.72</td>
<td>36</td>
<td>23</td>
<td>-0.12</td>
</tr>
<tr>
<td><strong>Perceived barriers - whole regimen</strong></td>
<td>n=38</td>
<td>x=3.58</td>
<td>SD=0.43</td>
<td>38</td>
<td>25</td>
<td>-0.23</td>
</tr>
<tr>
<td><strong>Perceived barriers - diet</strong></td>
<td>n=38</td>
<td>x=3.77</td>
<td>SD=0.55</td>
<td>38</td>
<td>25</td>
<td>-0.29</td>
</tr>
<tr>
<td><strong>Perceived barriers - insulin</strong></td>
<td>n=38</td>
<td>x=3.58</td>
<td>SD=0.68</td>
<td>38</td>
<td>25</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Perceived barriers - BGT</strong></td>
<td>n=38</td>
<td>x=3.44</td>
<td>SD=0.62</td>
<td>38</td>
<td>25</td>
<td>0.22</td>
</tr>
<tr>
<td><strong>Perceived benefits - whole regimen</strong></td>
<td>n=38</td>
<td>x=2.26</td>
<td>SD=0.55</td>
<td>38</td>
<td>25</td>
<td>-0.08</td>
</tr>
<tr>
<td><strong>Perceived benefits - diet</strong></td>
<td>n=38</td>
<td>x=1.91</td>
<td>SD=0.61</td>
<td>38</td>
<td>25</td>
<td>-0.22</td>
</tr>
<tr>
<td><strong>Perceived benefits - insulin</strong></td>
<td>n=38</td>
<td>x=2.35</td>
<td>SD=0.68</td>
<td>38</td>
<td>25</td>
<td>-0.08</td>
</tr>
<tr>
<td><strong>Perceived benefits - BGT</strong></td>
<td>n=38</td>
<td>x=2.39</td>
<td>SD=0.68</td>
<td>38</td>
<td>25</td>
<td>-0.14</td>
</tr>
<tr>
<td><strong>Self-efficacy - whole regimen</strong></td>
<td>n=39</td>
<td>x=7.64</td>
<td>SD=0.62</td>
<td>39</td>
<td>23</td>
<td>0.18</td>
</tr>
<tr>
<td><strong>Self-efficacy - diet</strong></td>
<td>n=39</td>
<td>x=7.28</td>
<td>SD=0.62</td>
<td>39</td>
<td>23</td>
<td>0.19</td>
</tr>
<tr>
<td><strong>Self-efficacy - insulin</strong></td>
<td>n=39</td>
<td>x=7.95</td>
<td>SD=0.19</td>
<td>39</td>
<td>23</td>
<td>0.13</td>
</tr>
<tr>
<td><strong>Self-efficacy - BGT</strong></td>
<td>n=39</td>
<td>x=7.68</td>
<td>SD=0.75</td>
<td>39</td>
<td>23</td>
<td>0.24</td>
</tr>
<tr>
<td><strong>General Health Motivation</strong></td>
<td>n=38</td>
<td>median=2</td>
<td>mean rank=29.43</td>
<td>38</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>mean=2</td>
<td>range=1-5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Notes - Table 5.17
1  Cues to action. Items scored from 1 (high cues) to 5 (low cues). Mean item score is reported.
2  Perceived severity. Items scored from 1 (high severity) to 5 (low severity). Mean item score is reported.
3  Perceived susceptibility. Items scored from 1 (high susceptibility) to 5 (low susceptibility). Mean item score is reported.
4  Perceived barriers. Items scored from 1 (high barriers) to 5 (low barriers). Mean item score is reported.
5  Perceived benefits. Items scored from 1 (high benefits) to 5 (low benefits). Mean item score is reported.
6  Self efficacy. Items scored from 1 (low self efficacy) to 8 (high self efficacy). Mean item score is reported.
7  General health motivation. One item only, scored from 1 (never concerned) to 5 (always concerned). Median item score is reported.

5.3.2.1 Perceived severity and perceived susceptibility to particular medical problems

Although Table 5.17 demonstrated that the two diabetic groups did not differ in terms of beliefs about their susceptibility to diabetic problems, or the severity of those problems, the scores given in Table 15.17 referred to overall scores about susceptibility and severity. It is possible though, that the two groups may differ in their beliefs about individual potential medical problems, as some problems may become more acute during pregnancy, or have more significant implications for foetal health (see chapter 3). Table 5.18 addresses this question and gives the results of analyses in which perceived severity to individual medical problems are compared between the two groups. As the analyses reported in Table 5.18 were based on answers to individual questions rather than total scores, non-parametric analyses have been used.

Table 5.18 indicates that the P/D group rated diabetic kidney problems as significantly less serious than women in the N-P/D group. The two diabetic groups did not differ in terms of their beliefs about the perceived severity of other possible complications of diabetes.

Table 5.18 also indicates that the P/D group rated themselves as significantly more susceptible to night time hypoglycaemia. The two groups did not differ in terms of their beliefs about perceived susceptibility to other possible complications of diabetes.
Table 5.18  Comparison between the two diabetic groups of perceived severity to specific diabetic problems and perceived susceptibility to specific diabetic problems

<table>
<thead>
<tr>
<th>Perceived severity¹</th>
<th>P/D</th>
<th>N-P/D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37</td>
<td>23</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>32.68</td>
<td>27.00</td>
<td>W = 621.0, p = 0.16</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 3</td>
<td>1 - 3</td>
<td></td>
</tr>
<tr>
<td>Kidney problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37</td>
<td>23</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>33.47</td>
<td>25.72</td>
<td>W = 591.5, p = 0.04</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 3</td>
<td>1 - 3</td>
<td></td>
</tr>
<tr>
<td>Difficulty</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>anticipating hypo-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37</td>
<td>23</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>29.76</td>
<td>31.70</td>
<td>W = 729.0, p = 0.65</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 4</td>
<td>1 - 4</td>
<td></td>
</tr>
<tr>
<td>Daytime hypo-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37</td>
<td>23</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>30.31</td>
<td>30.80</td>
<td>W = 708.5, p = 0.91</td>
</tr>
<tr>
<td>range =</td>
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<td>1 - 4</td>
<td></td>
</tr>
<tr>
<td>Night-time</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>hypo-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 37</td>
<td>22</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>31.16</td>
<td>28.05</td>
<td>W = 617.0, p = 0.46</td>
</tr>
<tr>
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<td>1 - 2</td>
<td></td>
</tr>
<tr>
<td>Hyper-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>23</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>32.11</td>
<td>26.70</td>
<td>W = 614.0, p = 0.21</td>
</tr>
<tr>
<td>range =</td>
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<td></td>
</tr>
</tbody>
</table>

Perceived susceptibility²

<table>
<thead>
<tr>
<th>Perceived susceptibility²</th>
<th>P/D</th>
<th>N-P/D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>23</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>31.39</td>
<td>27.83</td>
<td>W = 640.0, p = 0.40</td>
</tr>
<tr>
<td>range =</td>
<td>2 - 5</td>
<td>2 - 4</td>
<td></td>
</tr>
<tr>
<td>Kidney problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>23</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>30.26</td>
<td>29.59</td>
<td>W = 404.5, p = 0.87</td>
</tr>
<tr>
<td>range =</td>
<td>2 - 5</td>
<td>2 - 4</td>
<td></td>
</tr>
<tr>
<td>Difficulty anticipating</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>hypo-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>22</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>2</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>28.04</td>
<td>31.89</td>
<td>W = 701.5, p = 0.37</td>
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<tr>
<td>range =</td>
<td>1 - 5</td>
<td>1 - 5</td>
<td></td>
</tr>
<tr>
<td>Daytime hypo-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>22</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>29.51</td>
<td>30.76</td>
<td>W = 707.5, p = 0.77</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 5</td>
<td>1 - 5</td>
<td></td>
</tr>
<tr>
<td>Night-time hypo-glycaemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 36</td>
<td>23</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>3</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>26.10</td>
<td>36.11</td>
<td>W = 830.5, p = 0.02</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 5</td>
<td>2 - 5</td>
<td></td>
</tr>
<tr>
<td>Hyper-glycaemia</td>
<td></td>
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</tr>
<tr>
<td>n = 36</td>
<td>23</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>median=</td>
<td>3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>mean rank =</td>
<td>29.75</td>
<td>30.39</td>
<td>W = 699.0, p = 0.88</td>
</tr>
<tr>
<td>range =</td>
<td>1 - 5</td>
<td>2 - 5</td>
<td></td>
</tr>
</tbody>
</table>

¹ Perceived severity to each potential problem rated from 1 (high severity) to 5 (low severity). Median score for the item is reported.

² Perceived susceptibility of each potential problem rated from 1 (high susceptibility) to 5 (low susceptibility). Median score for the item is reported.

141
5.3.3 Diabetes specific psychosocial factors

In this section, the two diabetic groups are compared on a variety of other diabetes related variables. The variables in question were chosen because the review of the literature (see chapters 1 and 3) indicated that these factors may be related to regimen adherence and/or to emotional well-being in patients with IDDM.

5.3.3.1 Knowledge about diabetes

From Table 5.19 it can be seen that the two pregnant groups did not differ in terms of knowledge about diabetes. Furthermore, knowledge scores (as assessed by Dunn’s DKN scale) were extremely high, with mean scores amongst non-pregnant patients being 10.8 and amongst pregnant patients being 10.6, out of a maximum possible score of 11.

Table 5.19 Comparison between the two diabetic groups of family support for diabetes (positive and negative subscales), diabetes related stress and knowledge about diabetes

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family support for diabetes - positive behaviour¹</td>
<td>n = 34</td>
<td>x = 2.68</td>
<td>SD = 0.76</td>
<td>24</td>
<td>x = 2.73</td>
<td>SD = 0.66</td>
</tr>
<tr>
<td>Family support for diabetes - negative behaviour²</td>
<td>n = 34</td>
<td>x = 2.15</td>
<td>SD = 0.76</td>
<td>24</td>
<td>x = 2.17</td>
<td>SD = 0.64</td>
</tr>
<tr>
<td>Diabetes related stress³</td>
<td>n = 35</td>
<td>x = 2.63</td>
<td>SD = 0.41</td>
<td>25</td>
<td>x = 2.78</td>
<td>SD = 0.60</td>
</tr>
<tr>
<td>Knowledge about diabetes⁴</td>
<td>n = 38</td>
<td>x = 10.58</td>
<td>SD = 0.92</td>
<td>24</td>
<td>x = 10.79</td>
<td>SD = 1.47</td>
</tr>
</tbody>
</table>

1 Family support for diabetes, positive scale. Items scored from 1 (low positive behaviour) to 5 (high positive behaviour). Mean item score is reported.
2 Family support for diabetes, negative scale. Items scored from 1 (low negative behaviour) to 5 (high negative behaviour). Mean item score is reported.
3 Diabetes related stress. Items scored from 1 (low stress) to 5 (high stress). Mean item score is reported.
4 Knowledge about diabetes. Mean score out of a possible maximum score of 11.
5.3.3.2 Diabetic related stress

Factor 1 of Dunn's ATT39 instrument was used to assess feelings of stress associated with diabetes. From Table 5.19 it can be seen that the two diabetic groups did not differ in terms of this factor.

5.3.3.3 Family support for diabetes

The extent of family support for diabetes was also assessed in the two diabetic groups. Table 5.19 shows that the two groups did not differ in terms of either positive or negative family interactions about diabetes.

5.3.3.4 Perceived control of diabetes

The two diabetic groups were compared on attributions concerning the perceived control of diabetes, using the scales developed by Bradley et al (1984). From Table 5.20 it can be seen that the 2 groups did not differ in terms of 4 of the 6 perceived control subscales, namely internality, externality, chance or personal control. In contrast, there was a significant difference between the two groups in the remaining 2 subscales, namely medical control (ie the doctor) and treatment. The direction of these significant differences indicated that the P/D group attributed more importance to the effects of medical control and to treatment than the N-P/D group.

Table 5.20 Comparison between the two diabetic groups of perceived control of diabetes scales

<table>
<thead>
<tr>
<th>Perceived control subscales</th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 4.92</td>
<td>5.18</td>
<td>-0.26 (-.64, .11)</td>
<td>1.41</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>SD = 0.74</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 2.49</td>
<td>1.73</td>
<td>-0.76 (.03, 1.49)</td>
<td>2.08</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>SD = 1.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externality</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 1.82</td>
<td>2.13</td>
<td>-0.31 (-1.04, .43)</td>
<td>-0.83</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>SD = 1.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 1.49</td>
<td>1.09</td>
<td>0.40 (-.35, 1.15)</td>
<td>1.06</td>
<td>0.29</td>
<td></td>
</tr>
<tr>
<td>SD = 1.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 4.45</td>
<td>4.52</td>
<td>-0.07 (-.73, .59)</td>
<td>-0.22</td>
<td>0.83</td>
<td></td>
</tr>
<tr>
<td>SD = 1.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Control</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 38</td>
<td>x = 1.79</td>
<td>1.09</td>
<td>0.69 (.01, 1.37)</td>
<td>2.04</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>SD = 1.42</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 With each of these 6 separate subscales items are scored from 0 (not at all due to that factor) to 6 (totally due to that factor). Mean item score per subscale is reported.
The perceived control subscales were derived by asking the women to rate the importance of the 6 factors in 4 different diabetic related situations. As the analyses reported in Table 5.20 indicated that the P/D group gave more weight to the effects of medical control and to treatment, additional analyses were carried out to see if this effect held in all of the 4 situations, or only in some. These additional analyses indicated that it was only in respect of finding high sugar levels after carrying out blood tests that the P/D women rated the effect of the doctor and the effect of treatment as having a more significant effect than the N-P/D group. (See Table 5.21).

Table 5.21  Comparison between the two diabetic groups of effects of treatment in 4 hypothetical situations and effects of medical control (ie the doctor) in 4 hypothetical situations

<table>
<thead>
<tr>
<th>Treatment ( ^1 )</th>
<th>P/D</th>
<th>N-P/D</th>
<th>( W )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypoglycaemia</strong></td>
<td>n = 36</td>
<td>21</td>
<td>W = 620.5, ( p = 0.81 )</td>
<td></td>
</tr>
<tr>
<td>median = 28.68</td>
<td>mean rank = 0 - 4</td>
<td>29.55</td>
<td>0 - 4</td>
<td></td>
</tr>
<tr>
<td><strong>Being in good diabetic control</strong></td>
<td>n = 35</td>
<td>23</td>
<td>W = 608.5, ( p = 0.17 )</td>
<td></td>
</tr>
<tr>
<td>median = 31.50</td>
<td>mean rank = 0 - 6</td>
<td>26.46</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td><strong>Hypoglycaemia</strong></td>
<td>n = 35</td>
<td>23</td>
<td>W = 538.0, ( p = 0.02 )</td>
<td></td>
</tr>
<tr>
<td>median = 33.51</td>
<td>mean rank = 0 - 6</td>
<td>23.39</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td><strong>Avoiding complications</strong></td>
<td>n = 36</td>
<td>23</td>
<td>W = 685.0, ( p = 0.94 )</td>
<td></td>
</tr>
<tr>
<td>median = 30.14</td>
<td>mean rank = 0 - 6</td>
<td>29.78</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td><strong>Medical Control</strong> ( ^2 )</td>
<td>n = 37</td>
<td>23</td>
<td>W = 722.0, ( p = 0.69 )</td>
<td></td>
</tr>
<tr>
<td><strong>Hypoglycaemia</strong></td>
<td>n = 37</td>
<td>23</td>
<td>W = 722.0, ( p = 0.69 )</td>
<td></td>
</tr>
<tr>
<td>median = 29.95</td>
<td>mean rank = 0 - 4</td>
<td>21.39</td>
<td>0 - 4</td>
<td></td>
</tr>
<tr>
<td><strong>Being in good diabetic control</strong></td>
<td>n = 35</td>
<td>23</td>
<td>W = 623.0, ( p = 0.33 )</td>
<td></td>
</tr>
<tr>
<td>median = 31.09</td>
<td>mean rank = 0 - 5</td>
<td>27.09</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td><strong>Hypoglycaemia</strong></td>
<td>n = 35</td>
<td>23</td>
<td>W = 556.5, ( p = 0.04 )</td>
<td></td>
</tr>
<tr>
<td>median = 32.99</td>
<td>mean rank = 0 - 6</td>
<td>24.20</td>
<td>0 - 6</td>
<td></td>
</tr>
<tr>
<td><strong>Avoiding complications</strong></td>
<td>n = 37</td>
<td>23</td>
<td>W = 642.5, ( p = 0.36 )</td>
<td></td>
</tr>
<tr>
<td>median = 32.09</td>
<td>mean rank = 0 - 6</td>
<td>27.93</td>
<td>0 - 6</td>
<td></td>
</tr>
</tbody>
</table>

1 Treatment subscale. For each hypothetical situation the single item is scored from 0 (not due to treatment) to 6 (totally due to treatment). Median item score is reported.

2 Medical control subscale. For each hypothetical situation the single item is scored from 0 (not due to doctor) to 6 (totally due to doctor). Median score is reported.
5.4 FACTORS SPECIFIC TO PREGNANCY COMPLICATED BY DIABETES

In the final section of this chapter, the health beliefs that the P/D women had about pregnancy complicated by diabetes were explored. The content of the questionnaire used in this section reflected the basic health belief model categories, i.e. benefits; barriers, susceptibility and severity. This questionnaire was only completed by the P/D women.

Figure 5.3 graphically displays answers to the perceived benefits and barriers section of the questionnaire, divided according to regimen area. It is clear that only a small minority had doubts about the efficacy of the treatment. So, for example, no women disagreed with the statement that ‘sticking to the diet can help me to have a healthy baby’ whilst only 5% of the women disagreed with a comparable statement as to whether carrying out blood glucose tests would help them to have a healthy baby. Similarly, only 5% of the women disagreed with the statement that carrying out regular blood glucose testing would help them to feel in control of the pregnancy, whilst 10% disagreed with the statement that sticking to the diet would help them to feel in control.
Figure 5.3 Responses to questions on the benefits of the regimen during pregnancy

“Sticking to the recommended diet helps me to feel in control of this pregnancy”

- Disagree (n=4)
- Uncertain (n=2)
- Agree (n=23)
- Strongly agree (n=8)

“Sticking to the recommended diet can help me to have a healthy baby”

- Agree (n=15)
- Strongly agree (n=19)
- Uncertain (n=3)

“Carrying out the recommended number of blood glucose tests helps me to feel in control of this pregnancy”

- Agree (n=21)
- Disagree (n=1)
- Strongly agree (n=13)
- Uncertain (n=1)

“Carrying out the recommended number of blood glucose tests can help me to have a healthy baby”

- Agree (n=21)
- Disagree (n=2)
- Strongly agree (n=12)
- Uncertain (n=1)

“Sticking to the recommended timing of my injections helps me to feel in control of this pregnancy”

- Agree (n=14)
- Disagree (n=5)
- Strongly agree (n=12)
- Uncertain (n=6)

“Sticking to the recommended timing of my injections can help me to have a healthy baby”

- Agree (n=14)
- Disagree (n=2)
- Strongly agree (n=10)
- Uncertain (n=1)

In terms of potential pregnancy related barriers to the treatment regimen, the women were asked to assess the extent to which tiredness interfered with carrying out the regimen prescription.
Again, only a minority of women thought that this was a problem with 6% of women feeling that they did not have enough energy to stick to the diet and 11% of the women feeling that energy levels might limit regular blood glucose testing.

Taken together these findings demonstrate that the majority of the women believed the regimen to be beneficial and these beliefs about potential benefits were not outweighed by beliefs about significant barriers preventing adherence. This pattern of results was confirmed by the finding that beliefs about the perceived benefits of the regimen during pregnancy significantly outweighed beliefs about the perceived barriers to regimen adherence during pregnancy. (See Table 5.22).

Table 5.22  

<table>
<thead>
<tr>
<th>Perceived benefits of the regimen for the pregnancy</th>
<th>Perceived barriers to adherence during pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>x</td>
<td>2.27</td>
</tr>
<tr>
<td>SD</td>
<td>0.53</td>
</tr>
<tr>
<td>No of pairs</td>
<td>35</td>
</tr>
<tr>
<td>Mean Difference (Be-Ba)</td>
<td>-1.71</td>
</tr>
<tr>
<td>95% CI for mean difference</td>
<td>(1.38, 2.05)</td>
</tr>
<tr>
<td>t</td>
<td>10.42</td>
</tr>
<tr>
<td>p</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

1 Perceived benefits of regimen for the pregnancy. Items scored from 1 (high benefits) to 5 (low benefits). Mean item score is reported.

2 Perceived barriers to adherence during pregnancy. Items scored from 1 (high barriers) to 5 (low barriers). Mean item score is reported.

Analyses of the questions concerning perceived severity of and susceptibility to complications of pregnancy related to diabetes also suggested that the majority of the women were optimistic about their condition. Figure 5.4 graphically displays answers from the perceived susceptibility and severity sections of the questionnaire. From this figure it can be seen that none of the women thought it 'very likely' that they would have a baby with a birth defect, and only 1 woman thought that it was 'likely'. Similarly, in terms of having a heavy baby, none of the women thought that it was 'very likely' and only 6 women thought that it was 'likely'. A larger proportion of the women (20%) thought it 'likely' or 'very likely' that they would deliver the baby by caesarean section.
Figure 5.4 Responses to questions about perceived susceptibility to and perceived severity of diabetic related pregnancy complications (P/D group only)

"It is likely that I would have a premature baby"

- Strongly disagree (n=3)
- Agree (n=4)
- Disagree (n=17)
- Uncertain (n=11)

"Having a premature baby would be very serious"

- Strongly disagree (n=1)
- Agree (n=9)
- Disagree (n=9)
- Uncertain (n=14)

One patient strongly agreed/agreed with both statements

"It is likely that I will have a baby born with a birth defect"

- Strongly disagree (n=3)
- Agree (n=1)
- Disagree (n=2)
- Uncertain (n=10)

"Having a baby born with a birth defect would be very serious"

- Uncertain (n=3)
- Disagree (n=1)
- Strongly agree (n=13)
- Agree (n=16)

One patient strongly agreed/agreed with both statements

"It is likely that I will have a very heavy baby"

- Strongly disagree (n=1)
- Agree (n=6)
- Disagree (n=16)
- Uncertain (n=12)

"Having a very heavy baby would be very serious"

- Disagree (n=6)
- Agree (n=14)
- Uncertain (n=13)

Three patients strongly agreed/agreed with both statements
Figure 5.4 (continued)

"It is likely that I would have a very small baby"

- Strongly disagree (n=4)
- Agree (n=3)
- Uncertain (n=8)
- Disagree (n=20)

One patient strongly agreed/agreed with both statements

"Having a baby that was born very small would be very serious"

- Disagree (n=5)
- Agree (n=13)
- Uncertain (n=15)

"It is likely that I would have to have a caesarean"

- Strongly disagree (n=2)
- Strongly agree (n=6)
- Agree (n=3)
- Uncertain (n=11)

Two patients strongly agreed/agreed with both statements

"Having to have a caesarean would be very serious"

- Strongly disagree (n=6)
- Agree (n=8)
- Uncertain (n=3)

In terms of the perceived severity of these different complications whilst 72.5% of the women felt that having a baby with a birth defect would be serious, only 35% of the women thought that it would be serious to have a heavy baby whilst 20% of the women thought that needing a C section would be serious.

It is also important to combine the severity and susceptibility ratings to find out whether those women who believed a particular complication was serious also believed that it was likely to happen to them. Figure 5.4 shows that the majority of the women felt that having a baby with a birth defect would be serious, but, as mentioned above, only 1 of the women felt that this was likely to happen to her. 6 of the women felt that they were likely to have a heavy baby, but of these, only 3 rated this possible complication as serious. Similarly, whilst 9 of the women felt
that it was likely they would have to have a C section, only 2 of these women thought that this form of delivery was serious. Taken together therefore, these findings suggest that very few women in the sample felt susceptible to diabetic related complications that they rated to be serious.
CHAPTER 6
ADHERENCE TO THE BLOOD GLUCOSE TESTING REGIMEN

6.1 INTRODUCTION

This chapter addresses two related questions. Firstly, what is the impact of pregnancy on the frequency with which blood glucose testing is carried out? Secondly, within each of the two diabetic group, what factors are associated with observed levels of blood glucose testing?

As described in the Chapter 4, in this study there were two measures of actual levels of self-care and one measure of regimen adherence. The two self-care measures were (a) the retrospective measure from the regimen self-report questionnaire, and (b) the number of weekly blood tests calculated from the week of self-monitoring that the women carried out in the week following the interview. The adherence measure was the proportion of blood glucose tests carried out during the week and involved expressing the number of blood tests carried out each week as a proportion of the number of tests that they had been advised to do by their doctor or nurse.

6.2 COMPARISON OF REGIMEN PRESCRIPTIONS

Before the two diabetic groups are compared on any of the indices of self-care or adherence, it is important to have an understanding of any differences between the two groups in their actual regimen prescriptions. The Regimen Characteristics questionnaire, adapted from Glasgow et al (1987) was used to obtain data on the women's conceptualization of their own prescribed regimen.

6.2.1 Comparison of number of weekly recommended blood glucose tests

Figure 6.1 illustrates the number of weekly recommended blood tests in the two diabetic groups. From this figure it is apparent that the P/D group reported that they had been recommended to carry out significantly more blood tests per week, than the N-P/D group. Figure 6.1 illustrates that there was also considerable variation within each of the two groups on the number of recommended weekly blood tests. Within the P/D group the recommended number ranged from 9 per week to 49, whilst within the N-P/D group, the recommended number ranged from 7 to 28. The reasons for this within group variation are likely to be due to a combination of factors such as the lability of the woman's diabetes, the doctor/nurse's opinion on how many blood glucose tests the woman could cope with, and different strategies adopted by the different hospitals from which the women were recruited. It was however beyond the scope of this study to analyse these
different factors and thus identify why the recommendations within each of the groups showed this large variation.

Figure 6.1 Comparison of recommended number of weekly blood glucose tests between the 2 diabetic groups

6.2.2 Failure to recall blood glucose testing recommendations

Table 6.1 illustrates that within both of the groups, but particularly within the N-P/D group, a number of women did not know how many blood glucose tests per week they had been recommended to carry out. Thus 3 women in the P/D group and 11 in the N-P/D group could not recall their specific blood glucose testing recommendations. This difference was statistically significant indicating that a larger proportion of N-P/D than P/D women did not know how many blood glucose tests they had been recommended to carry out each week.

In this study data were not available from the health care staff on what blood glucose testing schedule they had advised the women to carry out. It was therefore not possible to differentiate those women who had been given specific recommendations and had forgotten them, from those who had never been given specific guidelines. However, the results clearly demonstrate that for whatever reason, just under a half of the women in the N-P/D group did not have a clear picture of how frequently they should be carrying out blood glucose testing each week.
Table 6.1 Frequencies of subjects recalling their blood glucose test recommendations in the two diabetic groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>( \chi^2 ) corrected = 10.77</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recalled blood glucose test prescription</td>
<td>yes</td>
<td>33</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>3</td>
<td>11</td>
</tr>
</tbody>
</table>

6.3 MEASURING BLOOD GLUCOSE TESTING SELF-CARE AND REGIMEN ADHERENCE

6.3.1 Difficulties with measuring regimen adherence

The results described in the section above on the details of the prescribed regimen have implications for the analysis of the adherence data in this study. Given that 11 out of the 25 women in the N-P/D group did not know how many blood glucose tests they had been advised to do each week, it would be misleading to calculate the proportion of recommended blood glucose tests per week for this group. Therefore, for the N-P/D group, a measure of regimen adherence could not be calculated, and instead only the two self-care measures described in the methods chapter were calculated for this group.

6.3.2 Intercorrelations between the self-care and adherence measures

Table 6.2 gives the intercorrelations of the self-care and adherence measures separately for each of the two diabetic groups. A non-parametric correlation co-efficient was used with the self-report measure, as the measure consisted of one question using an ordinal scale. With the P/D group the two self-care measures (ie the number of blood tests per week, and the index from the self-report questionnaire) were significantly correlated with each other. The direction of this significant correlation (ie negative) was as predicted because with the self-report questionnaire more frequent blood glucose testing obtained a low score, but with the self-monitoring index, more frequent blood glucose testing resulted in a higher score.
Table 6.2  Intercorrelations between the self-care and adherence measures of blood glucose testing

P/D Group

<table>
<thead>
<tr>
<th></th>
<th>P/D Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of recommended</td>
<td><em>r</em> = 0.29</td>
</tr>
<tr>
<td>weekly blood tests</td>
<td><em>n</em> = 24</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.18</td>
</tr>
<tr>
<td>Self-report measure</td>
<td><em>r_s</em> = -0.40</td>
</tr>
<tr>
<td></td>
<td><em>n</em> = 27</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.04</td>
</tr>
<tr>
<td>Number of blood tests per week</td>
<td><em>r_s</em> = 0.06</td>
</tr>
<tr>
<td></td>
<td><em>n</em> = 24</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.78</td>
</tr>
</tbody>
</table>

N-P/D Group

<table>
<thead>
<tr>
<th></th>
<th>N-P/D Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of recommended</td>
<td><em>r</em> = 0.04</td>
</tr>
<tr>
<td>weekly blood tests</td>
<td><em>n</em> = 10</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.90</td>
</tr>
<tr>
<td>Self-report measure</td>
<td><em>r_s</em> = -0.17</td>
</tr>
<tr>
<td></td>
<td><em>n</em> = 20</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.48</td>
</tr>
<tr>
<td>Number of blood tests per week</td>
<td><em>r_s</em> = 0.14</td>
</tr>
<tr>
<td></td>
<td><em>n</em> = 9</td>
</tr>
<tr>
<td></td>
<td><em>p</em> = 0.72</td>
</tr>
</tbody>
</table>

Notes for Table 6.2

1 The self-report measure was derived from the retrospective questionnaire that assessed blood glucose testing during the previous week using a 5 point scale from 1 (I test my blood everyday) to 5 (I do not test my blood). As this scale did not permit parametric analyses, *r_s* was used with this index. Both 1 and 2 are self-care measures as defined in Chapter 4.

2 Number of weekly blood glucose tests was obtained from the self-monitoring forms.

3 Proportion of recommended weekly blood glucose tests was obtained by expressing the number of weekly blood glucose tests as a proportion of the recommended number of blood glucose tests.

In contrast to the significant correlation between the two self-care measures, the adherence measure (the proportion of recommended weekly blood tests) was not significantly correlated with either of the two self-care measures. This lack of correlation between the self-care and adherence measures is not surprising, given the considerable variation in the recommended number of blood glucose tests within each of the groups. If, for example, within the P/D group, a woman who had been recommended to carry out 9 blood glucose tests a week and a patient who had been recommended to carry out 49 tests both carried out 28 tests per week, it would represent a very different response to medical advice on the part of the two patients and would result in divergent scores on the proportion of recommended tests index. Yet when the actual number of
blood tests per week as opposed to the proportion of recommended blood tests is used as the index, both of these patients would have identical scores, (ie 9 blood tests per week). This example clarifies the conceptual difference between the self-care and regimen adherence measures and demonstrates that with a regimen where prescriptions may differ greatly between different patients, measuring self-care behaviour cannot provide an accurate assessment of the extent to which medical recommendations are being followed.

A slightly different pattern of inter-correlations was obtained within the N-P/D group. As with the P/D group, Table 6.2 illustrates that neither of the self-care measures were related to the proportion of recommended blood tests carried out each week. However, unlike the P/D group, in the N-P/D group, the two self-care measures were not significantly correlated with each other. In the situation where a number of women were testing frequently, but not on every day of the week, the correlation between the self-monitoring and the self-report measure would be reduced. The reason for this is that with the self-report measure a lower rating is given to testing 'most days' than 'every day', yet if patients were carrying out four tests every other day, this could still result in a relatively high score on the self-monitoring index (the number of weekly blood tests carried out). Within the P/D group 7 of the women who recalled their blood glucose testing had been advised to test on most but not all days of the week. Therefore the fact that the two self-care measures were not significantly correlated in the N-P/D does not necessarily suggest any unreliability of the measures.

6.4 COMPARING LEVELS OF BLOOD GLUCOSE TESTING

6.4.1 Comparison of number of weekly blood glucose tests carried out

Figure 6.2 shows the number of weekly blood glucose tests carried out by women in the two diabetic groups in the study. No women in either of the two groups recorded carrying out no blood glucose tests during the week of self-monitoring. However, Figure 6.2 indicates that the groups did differ in terms of how many weekly blood glucose tests they carried out. The mean number of weekly tests in the pregnant group was 26.2 (SD=7.3) whilst the mean number of weekly tests in the non-pregnant diabetic group was 14.4 (SD=6.9). This difference between the two diabetic groups in the number of weekly blood glucose tests was found to be statistically significant. The results displayed in Figure 6.2 clearly suggest a higher frequency of blood glucose testing amongst the P/D women.
6.4.2 Comparison of self-report measure of frequency of blood glucose testing

Responses to the question about blood glucose testing on the self-report questionnaire were also examined to see if they also indicated a higher level of blood glucose testing during pregnancy. In contrast, to the self-monitoring data which was only completed by a sub-set of the full sample, responses were available for 38 out of the 40 women in the P/D group, and for 24 out of the 25 women in the P/N-D group.

As discussed above, if women were on a schedule where they tested frequently on most but not every day, the scale used in the self-report questionnaire could be misleading as testing every day is given a higher rating than testing most days, without taking into account how many tests are carried out each day. In order to overcome this problem responses from the self-report questionnaire were grouped into two categories: carries out blood glucose testing all/most of the days of the week, and carries out blood glucose testing some of the days of the week/nome of the days/I do not test my blood. Table 6.3 shows the distribution of the two groups divided according to these categories.
Table 6.3  Comparison between the 2 diabetic groups of the self-report measure of blood glucose testing frequency

<table>
<thead>
<tr>
<th>Self-report question</th>
<th>P/D</th>
<th>N-P/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>In an average week how frequently you would test your blood sugar level?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>all days</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>most days</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>some days</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>none of the days</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>I do not test my blood</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

From Table 6.3 it can be seen that 37 out of 38 (=97.4%) of the P/D women reported carrying out blood glucose testing on all or most of the days in an average week, whilst 17 out of 24 (=70%) of the N-P/D women reported carrying out blood glucose testing on all or most of the days of an average week. Table 6.3 indicated that the difference between the two groups in the frequency of blood glucose testing was statistically significant. Therefore the results from the self-care questionnaire which was based on almost all of the women in both groups also indicate that the frequency of blood glucose testing was higher in the P/D group.

Women in the P/D group were also asked how frequently they had carried out blood glucose tests prior to the time that they were pregnant with, or trying to conceive the current pregnancy. The answers to this question are shown in Table 6.4. From this table it can be seen that 20 out of 32 (= 62.5%) reported carrying out blood glucose tests on all or most days prior to the current pregnancy, whereas, as mentioned above, 97.4% of the women reported carrying out blood glucose tests on all or most days during the current pregnancy. This difference in the self-report frequency of blood glucose testing during pregnancy as compared to prior to pregnancy was statistically significant.
Table 6.4  Comparison of the self-report measure of blood glucose testing during pregnancy with the retrospective self-report measure of blood glucose testing prior to pregnancy. P/D group only

<table>
<thead>
<tr>
<th>Self-report question</th>
<th>During Pregnancy</th>
<th>Prior to Pregnancy</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In an average week how frequently would you test your blood sugar level?</td>
<td>all days n = 32</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td></td>
<td>most days n = 5</td>
<td>4</td>
<td>Wilcoxon</td>
</tr>
<tr>
<td></td>
<td>some days n = 1</td>
<td>10</td>
<td>Z = -2.80</td>
</tr>
<tr>
<td></td>
<td>none of the days n = 0</td>
<td>2</td>
<td>p = &lt; 0.01</td>
</tr>
<tr>
<td></td>
<td>I do not test my blood n = 0</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

6.4.3 Adherence to the blood glucose testing regimen

Data were available on the adherence measure, i.e., the proportion of recommended weekly blood glucose tests for 24 women in the P/D group. The results obtained with these 24 women are displayed in Figure 6.3. From this figure it can be seen that only 4 of the 24 women for whom data were available, were carrying out less than 75% of the recommended number of blood glucose tests. Figure 6.3 also indicates that 4 of the women in this group were carrying out more than the recommended weekly total of blood glucose tests each week.

Figure 6.3  Proportion of recommended weekly blood glucose tests carried out by subjects in the P/D group (n=24)
6.5 COMPARING THE FREQUENCY WITH WHICH BLOOD GLUCOSE TEST RESULTS WERE WRITTEN DOWN

In the self-report questionnaire, women were also asked about the frequency with which they wrote down the results of their blood glucose tests. This is a small but important part of the blood glucose testing regimen because if results are not written down it becomes harder to discern patterns in blood glucose fluctuations, and in turn to alter food intake and/or insulin dosage, in order to stabilize glycaemic control.

Table 6.5 shows the frequency with which women in each of the two diabetic groups recorded the results of the blood glucose tests. From Table 6.5 it can be seen that in the P/D group 78.4% of the women reported writing down all of their blood glucose test results, 16.2% reported writing down most of the results, 5.4% reported writing down some of the results and no women reported writing down none of the test results. In contrast amongst the N-P/D women only 45.8% reported writing down all of their tests and 8.3% reported writing down most of the tests, whilst 12.5% reported writing down some of the tests and 33.3% reported writing down none of the test results. This difference between the two diabetic groups was statistically significant.

Table 6.5 Comparison between the 2 diabetic groups of the self-report frequency of writing down blood glucose test results

<table>
<thead>
<tr>
<th>Self-report question</th>
<th>P/D</th>
<th>N-P/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>In an average week how many of your blood test results would you write down?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>all days</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>most days</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>some days</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>none of the days</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>I do not test my blood</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>median</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Women in the P/D group were also asked how frequently they had written down the results of the blood glucose tests prior to the time that they were pregnant with, or trying to conceive the current pregnancy. (See Table 6.6). From this table it can be seen that 18 out of 32 (= 56.3%)
reported writing down all or most of the blood glucose test results prior to the current pregnancy, whereas, as mentioned above, 94.6% of the women reported writing down all or most of the results during the current pregnancy. This difference in the self-report frequency of writing down the blood test results during pregnancy as compared to prior to pregnancy was statistically significant.

Table 6.6  Comparison of the self-report measure of blood glucose testing during pregnancy with the retrospective self-report of blood glucose testing prior to pregnancy. P/D group only

<table>
<thead>
<tr>
<th>Self-report question</th>
<th>During Pregnancy</th>
<th>Prior to Pregnancy</th>
<th>P/D group only</th>
</tr>
</thead>
<tbody>
<tr>
<td>In an average week how many of your blood tests would you write down?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>all of them n = 29</td>
<td></td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>most of them n = 6</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>some of them n = 2</td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>none of them n = 0</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>I do not test my blood n = 0</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>median</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

6.6 SUMMARY OF COMPARISONS

The analyses reported above suggest that women in the P/D group when compared to women in the N-P/D group, were recommended to carry out blood glucose testing more frequently, recalled their regimen prescriptions more frequently, and wrote down the results of the blood glucose tests more frequently. Amongst the P/D women, comparison of the self-report frequency of blood glucose testing and the self-report frequency of writing down blood glucose test results during pregnancy compared to prior to pregnancy, also indicated that the behaviour of the women shifted during pregnancy. In terms of the assessment of regimen adherence, the results on the proportion of recommended weekly blood tests carried out by the P/D group suggest a very high level of adherence to the blood glucose testing recommendations, with a small minority of women actually testing their blood glucose more frequently than was recommended by their doctor or nurse.
6.7 IDENTIFYING FACTORS ASSOCIATED WITH LEVELS OF BLOOD GLUCOSE TESTING

Data from the self-report questionnaire were not used in the analyses identifying factors associated with levels of blood glucose testing. The five point scale of the self-report questionnaire (ranging from ‘every day’ to ‘never’) was taken from Glasgow et al’s (1987) study where it was used for between group comparisons. However, in Glasgow et al’s study, when predictors of blood glucose testing were identified a different measure of blood glucose testing was used, namely the number of blood glucose tests carried out during the week of self-monitoring and a similar strategy was used in this study.

As discussed above, the recommended number of weekly blood glucose tests varies widely (eg in the P/D group from 9 to 49) and the self-report questionnaire rating scale which has ‘every day’ as its highest category would be unable to discriminate between the different levels of blood glucose testing occurring in this study. Therefore the self-report questionnaire measure was not used in the analyses which attempted to identify factors associated with different levels of blood glucose testing. Instead in the P/D group the number of blood tests per week and the proportion of weekly recommended blood tests were used as the relevant indices and in the N-P/D group the number of blood tests per week was used as the index.

6.7.1 Demographic and obstetric factors

In this section the association between demographic/obstetric factors and blood glucose testing is examined separately for each group. Data on the obstetric variables (eg previous terminations of pregnancy) were not available for the N-P/D group. In addition, it was not possible to examine the role of marital status in the P/D group because only 1 woman without a partner completed the week of blood glucose testing.

Table 6.7 indicates that amongst the P/D women there was no significant relationship between either of the two blood glucose testing variables and age, parity, disease duration, social class, or whether the woman is currently employed or not. In terms of the role of obstetric variables, in the P/D group there was no significant relationship between either of the two blood glucose testing variables and the number of weeks pregnant, previous miscarriage or previous terminations.
Table 6.7 Relationship between demographic/obstetric factors and blood glucose testing. P/D and N-P/D groups

<table>
<thead>
<tr>
<th></th>
<th><strong>P/D GROUP</strong></th>
<th></th>
<th></th>
<th><strong>N-P/D GROUP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Tests per Week</td>
<td>Proportion of Weekly Blood Tests</td>
<td>Blood Tests per Week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
<td>Range</td>
<td>n</td>
</tr>
<tr>
<td><strong>Social Class</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>12</td>
<td>28</td>
<td>20-49</td>
<td>11</td>
</tr>
<tr>
<td>II</td>
<td>12</td>
<td>27</td>
<td>9-35</td>
<td>10</td>
</tr>
<tr>
<td>III</td>
<td>3</td>
<td>20</td>
<td>13-28</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Currently Employed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19</td>
<td>27</td>
<td>13-49</td>
<td>17</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>28</td>
<td>9-36</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Living with Partner</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>26</td>
<td>Numbers too small to permit analysis</td>
<td>23</td>
<td>Numbers too small to permit analysis</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>Numbers too small to permit analysis</td>
<td>1</td>
<td>Numbers too small to permit analysis</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of Living Children</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>12</td>
<td>27</td>
<td>9-31</td>
<td>9</td>
</tr>
<tr>
<td>≥1</td>
<td>15</td>
<td>27</td>
<td>20-49</td>
<td>15</td>
</tr>
</tbody>
</table>
Table 6.7 (continued)

<table>
<thead>
<tr>
<th></th>
<th>P/D GROUP</th>
<th></th>
<th>N-P/D GROUP</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Tests per Week</td>
<td>Proportion of Weekly Blood Tests</td>
<td>Blood Tests per Week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
<td>Range</td>
<td>n</td>
</tr>
<tr>
<td>Previous Termination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5</td>
<td>28</td>
<td>25-35</td>
<td>W = 73.5</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>27</td>
<td>9-49</td>
<td>p = 0.31</td>
</tr>
<tr>
<td>Previous Miscarriage</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>27</td>
<td>9-35</td>
<td>W = 105.5</td>
</tr>
<tr>
<td>No</td>
<td>15</td>
<td>28</td>
<td>13-49</td>
<td>p = 0.67</td>
</tr>
<tr>
<td>Age</td>
<td>r = 0.36</td>
<td>n = 27</td>
<td>p = 0.06</td>
<td>r = -0.03</td>
</tr>
<tr>
<td>Disease duration</td>
<td>r = 0.20</td>
<td>n = 27</td>
<td>p = 0.32</td>
<td>r = -0.30</td>
</tr>
</tbody>
</table>
In the N-P/D group, no significant relationship between any of the demographic variables and the number of blood tests per week was observed. (See Table 6.7).

6.7.2 Psychosocial factors

In this section the relationship between different psychosocial factors and blood glucose testing is examined.

6.7.2.1 Attributions of control

Two measures of attributions of control were used in this study. The Perceived Control of Diabetes scale (Bradley et al 1984) assesses the extent to which patients attribute control over diabetes to themselves, to health care professionals or to chance. The Foetal Health locus of Control scale (Labs and Wurtele 1986) assesses the extent to which patients attribute the well-being of the developing foetus to themselves, to health care professionals or to chance.

Table 6.8 shows the results of bi-variate correlations between the attributions of control variables and the blood glucose testing indices. In the P/D group, neither the perceived control of diabetes variables or the foetal health locus of control variables were significantly associated with the number of blood glucose tests carried out each week, or with the index of regimen adherence.

In the N-P/D, the perceived control of diabetes variables were not significantly associated with the number of blood glucose tests carried out each week. (See Table 6.8).

6.7.2.2 Emotional adjustment

Table 6.8 shows the results of bi-variate correlations between two indices of emotional adjustment (depressed mood and state anxiety) and blood glucose testing. In the P/D group, neither of these variables were significantly associated with the number of blood glucose tests carried out each week, or with the index of regimen adherence. Similarly, amongst the N-P/D women depressed mood and state anxiety were not found to be significantly related to the number of blood glucose tests carried out each week.
Table 6.8  Relationship between psychosocial variables and blood glucose testing P/D and N-P/D groups

<table>
<thead>
<tr>
<th>Psychosocial Variable</th>
<th>P/D GROUP</th>
<th>N-P/D GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Tests per Week</td>
<td>Proportion of Recommended Weekly Blood Tests</td>
</tr>
<tr>
<td><strong>Perceived Control of Diabetes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chance</td>
<td>$r = -0.15$</td>
<td>$r = 0.04$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.46$</td>
<td>$p = 0.84$</td>
</tr>
<tr>
<td>Medical control</td>
<td>$r = -0.06$</td>
<td>$r = -0.06$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.30$</td>
<td>$p = 0.80$</td>
</tr>
<tr>
<td>Externality</td>
<td>$r = 0.15$</td>
<td>$r = 0.02$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.46$</td>
<td>$p = 0.94$</td>
</tr>
<tr>
<td>Treatment</td>
<td>$r = -0.22$</td>
<td>$r = -0.05$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.28$</td>
<td>$p = 0.84$</td>
</tr>
<tr>
<td>Personal control</td>
<td>$r = -0.18$</td>
<td>$r = 0.02$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.40$</td>
<td>$p = 0.94$</td>
</tr>
<tr>
<td>Internality</td>
<td>$r = -0.24$</td>
<td>$r = 0.02$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.24$</td>
<td>$p = 0.92$</td>
</tr>
<tr>
<td><strong>Support for Diabetes</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive behaviours</td>
<td>$r = -0.14$</td>
<td>$r = 0.10$</td>
</tr>
<tr>
<td></td>
<td>$n = 25$</td>
<td>$n = 22$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.50$</td>
<td>$p = 0.66$</td>
</tr>
<tr>
<td>Negative behaviours</td>
<td>$r = 0.36$</td>
<td>$r = 0.36$</td>
</tr>
<tr>
<td></td>
<td>$n = 25$</td>
<td>$n = 22$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.08$</td>
<td>$p = 0.10$</td>
</tr>
<tr>
<td>Knowledge about diabetes</td>
<td>$r = -0.08$</td>
<td>$r = 0.06$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.72$</td>
<td>$p = 0.78$</td>
</tr>
<tr>
<td>Treatment satisfaction (diabetes)</td>
<td>$r = 0.02$</td>
<td>$r = 0.06$</td>
</tr>
<tr>
<td></td>
<td>$n = 26$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.92$</td>
<td>$p = 0.78$</td>
</tr>
</tbody>
</table>
Table 6.8 continued

<table>
<thead>
<tr>
<th>Psychosocial Variable</th>
<th>P/D GROUP</th>
<th>N-P/D GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Tests per Week</td>
<td>Proportion of Recommended Weekly Blood Tests</td>
</tr>
<tr>
<td>Foetal Health Locus of Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chance</td>
<td>r = 0.24</td>
<td>r = -0.17</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 23</td>
</tr>
<tr>
<td></td>
<td>p = 0.24</td>
<td>p = 0.42</td>
</tr>
<tr>
<td>Internal</td>
<td>r = -0.24</td>
<td>r = -0.18</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 23</td>
</tr>
<tr>
<td></td>
<td>p = 0.24</td>
<td>p = 0.42</td>
</tr>
<tr>
<td>Powerful others</td>
<td>r = 0.06</td>
<td>r = -0.04</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 23</td>
</tr>
<tr>
<td></td>
<td>p = 0.78</td>
<td>p = 0.84</td>
</tr>
<tr>
<td>Health anxieties about baby/labour</td>
<td>r = -0.12</td>
<td>r = -0.04</td>
</tr>
<tr>
<td></td>
<td>n = 27</td>
<td>n = 23</td>
</tr>
<tr>
<td></td>
<td>p = 0.54</td>
<td>p = 0.88</td>
</tr>
<tr>
<td>Attachment to the foetus</td>
<td>r = 0.30</td>
<td>r = -0.19</td>
</tr>
<tr>
<td></td>
<td>n = 27</td>
<td>n = 24</td>
</tr>
<tr>
<td></td>
<td>p = 0.14</td>
<td>p = 0.36</td>
</tr>
<tr>
<td>Treatment satisfaction (antenatal)</td>
<td>r = 0.02</td>
<td>r = 0.12</td>
</tr>
<tr>
<td></td>
<td>n = 24</td>
<td>n = 21</td>
</tr>
<tr>
<td></td>
<td>p = 0.94</td>
<td>p = 0.60</td>
</tr>
<tr>
<td>Satisfaction with social support</td>
<td>r = -0.23</td>
<td>r = 0.03</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 24</td>
</tr>
<tr>
<td></td>
<td>p = 0.26</td>
<td>p = 0.88</td>
</tr>
<tr>
<td>State anxiety</td>
<td>r = 0.25</td>
<td>r = 0.23</td>
</tr>
<tr>
<td></td>
<td>n = 22</td>
<td>n = 20</td>
</tr>
<tr>
<td></td>
<td>p = 0.28</td>
<td>p = 0.22</td>
</tr>
<tr>
<td>Depressed mood</td>
<td>r = 0.09</td>
<td>r = 0.03</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 24</td>
</tr>
<tr>
<td></td>
<td>p = 0.68</td>
<td>p = 0.88</td>
</tr>
</tbody>
</table>

### 6.7.2.3 Adjustment to pregnancy

Table 6.8 shows the results of bi-variate correlations between two indices of adjustment to pregnancy (health anxieties about the baby/labour and psychological attachment to the foetus) and blood glucose testing. In the P/D group, neither of these variables were significantly
associated with the number of blood glucose tests carried out each week, or with the index of regimen adherence.

6.7.2.4 Social support

Table 6.8 shows the results of bi-variate correlations between three variables that assessed social support (satisfaction with social support, positive family support for diabetes and negative family support for diabetes) and blood glucose testing. From this table it can be seen that in the P/D group, none of these three support variables correlated significantly with either of the blood glucose testing indices. Similarly, amongst the N-P/D women none of the three social support variables were significantly associated with the number of blood glucose tests carried out each week.

6.7.3 Health belief model

6.7.3.1 Health beliefs as predictors in the Pregnant Diabetic group

Table 6.9 shows the bivariate correlations obtained within the P/D group between the different components of the health belief model and the index of self-care (number of blood glucose tests performed each week) and the index of adherence (the proportion of recommended weekly blood glucose tests). From Table 6.9 it can be seen that amongst the P/D women the only variable that was significantly correlated with the number of blood tests was the measure of self-efficacy for performing blood glucose tests. The direction of the significant correlation indicated that those women who expressed greater confidence in their ability to carry out their blood glucose testing regimen carried out a significantly larger number of blood glucose tests each week.

In contrast to the results obtained with the number of blood glucose tests each week, a number of the components of the Health Belief Model were significantly correlated with the adherence measure, ie with the proportion of recommended blood tests carried out. Those women who felt that blood glucose testing was more beneficial to their diabetes carried out a significantly greater proportion of the recommended number of blood glucose tests. It can also be seen from Table 6.9 that those women who rated diabetic complications as more serious carried out a higher proportion of the recommended number of blood glucose tests.
Table 6.9 Relationship between health belief model variables and blood glucose testing. P/D and N-P/D groups

<table>
<thead>
<tr>
<th>Health Belief Model Variable</th>
<th>P/D GROUP</th>
<th>N-P/D GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood Tests per Week</td>
<td>Proportion of Recommended Weekly Blood Tests</td>
</tr>
<tr>
<td>Self efficacy whole regimen</td>
<td>$r = 0.29$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td>Self efficacy BGT</td>
<td>$r = 0.38$</td>
<td>$n = 26$</td>
</tr>
<tr>
<td>General health motivation</td>
<td>$r = 0.08$</td>
<td>$n = 27$</td>
</tr>
<tr>
<td>Cues whole regimen</td>
<td>$r = 0.14$</td>
<td>$n = 25$</td>
</tr>
<tr>
<td>Cues BGT</td>
<td>$r = 0.02$</td>
<td>$n = 27$</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>$r = 0.12$</td>
<td>$n = 26$</td>
</tr>
<tr>
<td>Perceived susceptibility</td>
<td>$r = -0.01$</td>
<td>$n = 24$</td>
</tr>
<tr>
<td>Perceived barriers whole regimen</td>
<td>$r = 0.13$</td>
<td>$n = 27$</td>
</tr>
<tr>
<td>Perceived barriers BGT</td>
<td>$r = 0.22$</td>
<td>$n = 27$</td>
</tr>
<tr>
<td>Perceived benefits whole regimen</td>
<td>$r = 0.09$</td>
<td>$n = 27$</td>
</tr>
<tr>
<td>Perceived benefits BGT</td>
<td>$r = 0.07$</td>
<td>$n = 27$</td>
</tr>
</tbody>
</table>
Additional analyses looked at the relationship between blood glucose testing adherence and perceived severity of specific diabetes related problems (See Table 6.10). From this table it can be seen that those who rated problems with anticipating hypos and daytime hypos as more serious carried out a higher proportion of the recommended number of blood glucose tests.

### Table 6.10  Relationship between perceived severity to specific diabetic complications and adherence to the blood glucose testing regimen. P/D group

<table>
<thead>
<tr>
<th>Perceived Severity</th>
<th>Spearman Correlation Co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney disease</td>
<td>$r_s = -0.15$</td>
</tr>
<tr>
<td></td>
<td>$n = 25$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.24$</td>
</tr>
<tr>
<td>Eye disease</td>
<td>$r_s = -0.32$</td>
</tr>
<tr>
<td></td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.07$</td>
</tr>
<tr>
<td>Difficulty anticipating hypos</td>
<td>$r_s = -0.67$</td>
</tr>
<tr>
<td></td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p &lt; 0.001$</td>
</tr>
<tr>
<td>Daytime hypos</td>
<td>$r_s = -0.50$</td>
</tr>
<tr>
<td></td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p &lt; 0.001$</td>
</tr>
<tr>
<td>Night time hypos</td>
<td>$r_s = -0.27$</td>
</tr>
<tr>
<td></td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.10$</td>
</tr>
<tr>
<td>High blood sugar levels</td>
<td>$r_s = -0.33$</td>
</tr>
<tr>
<td></td>
<td>$n = 24$</td>
</tr>
<tr>
<td></td>
<td>$p = 0.06$</td>
</tr>
</tbody>
</table>

In terms of the pregnancy specific health beliefs, only one significant correlation was obtained and that was between the perceived benefits of the blood glucose regimen for helping with the problems of diabetes in pregnancy, and the proportion of recommended blood tests per week. The direction of this correlation indicated that those women who felt that the regimen was more beneficial to their diabetes during pregnancy carried out a higher proportion of their recommended weekly blood glucose tests. (See Table 6.11).
Table 6.11 Relationship between pregnancy specific Health Belief Model variables and blood glucose testing. P/D group

<table>
<thead>
<tr>
<th>Health Belief Model Variable</th>
<th>Blood Tests per Week</th>
<th>Proportion of Recommended Weekly Blood Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived severity of diabetic related pregnancy complications</td>
<td>r = 0.28</td>
<td>r = -0.15</td>
</tr>
<tr>
<td></td>
<td>n = 23</td>
<td>n = 21</td>
</tr>
<tr>
<td></td>
<td>p = 0.19</td>
<td>p = 0.95</td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic related pregnancy complications</td>
<td>r = 0.16</td>
<td>r = 0.02</td>
</tr>
<tr>
<td></td>
<td>n = 25</td>
<td>n = 23</td>
</tr>
<tr>
<td></td>
<td>p = 0.44</td>
<td>p = 0.92</td>
</tr>
<tr>
<td>Perceived barriers to adherence during pregnancy (whole regimen)</td>
<td>r = 0.17</td>
<td>r = -0.14</td>
</tr>
<tr>
<td></td>
<td>n = 24</td>
<td>n = 22</td>
</tr>
<tr>
<td></td>
<td>p = 0.43</td>
<td>p = 0.53</td>
</tr>
<tr>
<td>Perceived barriers to BGT during pregnancy</td>
<td>r = 0.14</td>
<td>r = -0.14</td>
</tr>
<tr>
<td></td>
<td>n = 24</td>
<td>n = 22</td>
</tr>
<tr>
<td></td>
<td>p = 0.51</td>
<td>p = 0.53</td>
</tr>
<tr>
<td>Perceived benefits (whole regimen) of adherence during pregnancy</td>
<td>r = 0.13</td>
<td>r = -0.29</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 24</td>
</tr>
<tr>
<td></td>
<td>p = 0.96</td>
<td>p = 0.17</td>
</tr>
<tr>
<td>Perceived benefits of BGT adherence during pregnancy</td>
<td>r = -0.08</td>
<td>r = -0.50</td>
</tr>
<tr>
<td></td>
<td>n = 26</td>
<td>n = 22</td>
</tr>
<tr>
<td></td>
<td>p = 0.68</td>
<td>p = 0.02</td>
</tr>
</tbody>
</table>

6.7.3.2 Health beliefs as predictors in the Non-Pregnant diabetic group

Table 6.9 gives the result of the bivariate correlations obtained between the general Health Belief Model categories and the number of blood tests carried out each week amongst the N-P/D women. As with the P/D group, a significant correlation was obtained between self-efficacy and the number of blood tests carried out each week. The direction of this significant correlation indicated that those women who expressed greater confidence in their ability to carry out their blood glucose testing regimen performed a significantly larger number of blood glucose tests each week. Of the remaining 6 categories of the Health Belief Model, significant correlations were obtained with 2 of them; general health motivation and barriers to performing blood glucose tests. The significant correlation between general health motivation and the number of blood glucose tests carried out each week, indicated that those who were more concerned about their health performed more blood tests each week. The significant correlation between barriers to blood glucose testing and the number of blood glucose tests carried out each week indicated that
those who reported more barriers to testing (eg greater pain, more interference with their domestic responsibilities) carried out fewer blood tests each week.

6.8 OPEN-ENDED RESPONSES ABOUT REASONS UNDERLYING REGIMEN ADHERENCE

Women in both groups were given a number of open-ended questions about the reasons underlying regimen adherence. Figures 6.4 - 6.7 graphically display their responses. It should be noted that as women were able to cite more than one factor in each of these questions, the number of responses is greater than the number of women in each group.

6.8.1 Open-ended responses in the P/D group

Figure 6.4 clearly indicates that the major factor that the P/D cited as underlying current patterns of adherence was the desire for a healthy baby. It is interesting to note that while 35 out of the 37 women who responded cited the desire for a healthy baby, only 15 women mentioned their own health as a factor. Even more striking is the fact that only 2 women mentioned avoiding complications as a factor underlying current patterns of adherence. This obviously contrasts with the responses given in Figure 6.5, in which the same group of women were asked about motivation for adherence prior to pregnancy. It is clear from Figure 6.5 that the two major reasons cited were the desire to avoid complications and maintaining one's own health. A few women also cited additional factors such as the desire to avoid weight gain or hypoglycaemia. Women in the P/D group were asked how their diabetes had changed during pregnancy. See Figure 6.6. It is striking that of the 37 women who responded, 20 mentioned that their diabetes was better controlled during pregnancy. A number of responses of the women illustrate this point.
Figure 6.4  Responses to question “What would you say are the major factors that motivate you to follow your regimen at the moment?” P/D group (37 women responded)

Figure 6.5  Responses to question “Before you were pregnant or trying to conceive the current pregnancy, what were the major factors that motivated you to follow your regime?” P/D group (37 women responded)
Responses to question "In what ways has your diabetes changed during your pregnancy?" P/D group (37 women responded)

- Increased hypos (n=5)
- More worrying (n=3)
- Less predictable (n=4)
- Becoming an obsession (n=1)
- Not craving sweets (n=1)
- Insulin has increased (n=10)
- Better controlled (n=20)

"My diabetes is more controlled and I’ve learned to make time for the things to do with my diabetes. I’ve found out how to fit it in to the every day way of living that I want”.

"Before I was pregnant I had a craving for sweets. My sugar levels are now fantastic”.

"My blood sugars are more stable and near normal. When not pregnant I tend to ignore my diabetes”

"I’m better controlled and have a healthier diet with no alcohol”.

"I’ve always had good control, but I’ve wanted it to be even better whilst pregnant”.

Against this positive picture though, it is important to note that a minority of the P/D women highlighted the difficulties that they were experiencing with their diabetes during pregnancy.

- "It has become almost an obsession. Everything revolves around insulin, food and blood tests”.
- "I’ve got no awareness of hypos. It’s a greedy baby who grabs every passing molecule of glucose at night!”
- "It’s more important for the baby’s sake to keep a much tighter control which is very difficult because the very fact of being pregnant causes fluctuating blood sugars which cause problems to the baby. A very anxious time which also does not help diabetic control”.

173
6.8.2 Open-ended responses in the N-P/D group

Figure 6.7 illustrates the responses of the N-P/D women. Again it can be seen that the two major reasons cited were the desire to avoid complications and maintaining one’s own health. Furthermore, as with the responses of the P/D group displayed in Figure 6.5, a few of the N-P/D women also cited factors such as the desire to avoid weight gain or episodes of poor glycaemic control.

Figure 6.7 Responses to question “What would you say are the major factors that motivate you to follow your regimen at the moment?” N-P/D group (23 women responded)
CHAPTER 7
ADHERENCE TO THE INSULIN INJECTION AND DIETARY REGIMEN

7.1 INTRODUCTION

This chapter analyses adherence to the insulin injection schedule and to the dietary regimen in the two diabetic groups in the study. It begins with a description of the recommendations that women have been given about their insulin schedules and diets. Levels of adherence are then calculated for both regimen areas, and the two groups compared on these indices.

7.2 COMPARING INSULIN PRESCRIPTIONS

7.2.1 Recall of regimen prescriptions

In the Regimen Characteristics questionnaire described in the Chapter 4, women in both of the diabetic groups were asked about the details of their self-care regimen. In the previous chapter it was shown that many of the women, particularly in the N-P/D group, could not recall the details of their blood glucose testing prescriptions. In contrast, all of the women were able to recall the number, timing, and dosages of their insulin injections and the missing data from the P/D group were due to four women who terminated the interview before completing the questionnaire which covered the details of their insulin regimen.

7.2.2 Comparison of number and type of recommended weekly injections

The two groups were compared on the number of recommended weekly injections and the results displayed in Figure 7.1. It is apparent that the two groups did not differ significantly in the number of injections that they had been recommended to carry out each week.

The women were also asked about the type of insulin that they had been prescribed. All except 5 women in the P/D group and 5 women in the N-P/D group had been prescribed a quick-acting form of insulin during the day.
7.3 ADHERENCE TO THE INSULIN REGIMEN

Figure 7.2 shows the percentage of weekly injections carried out by the women in the two diabetic groups. It is apparent that adherence was nearly 100% in both of the groups. Furthermore, adherence was greater than 100% amongst the P/D women. The breakdown of frequencies displayed in Figure 7.2 shows that 3 women actually gave themselves more injections than their normal weekly total. As explained in Chapter 3, when women are trying to maintain strict glycaemic control during pregnancy, they may be encouraged to modify insulin intake in the light of blood glucose test results, and thus this 'over-adherence' does not fall outside the realms of recommended behaviour.

In Glasgow et al’s (1987) study two aspects of insulin regimen adherence were assessed, namely adherence to the number and to the timing of injections. The fact that Figure 7.2 shows that there was nearly perfect concordance between the recommended and actual number of insulin injections in this study means that it would be not be possible or meaningful to identify predictors of the number of insulin injections that patients carried out, as there is insufficient variability in patient behaviour in either group.

Glasgow et al (1987) also examined adherence to the timing of injections, and predictors of accurate timing. However, as described above, nearly all the women in this study were prescribed a quick-acting form of insulin. With this type of regimen patients have much greater flexibility in terms of the precise timing of their meals and injections and therefore it becomes meaningless to assess adherence to the prescribed timing.
Given that there was no variability in adherence to the number of insulin injections and adherence to the timing of injections was not meaningful to assess for the majority of patients, no further analyses on insulin regimen adherence were undertaken in this study.

7.4 COMPARING THE DIETARY PRESCRIPTIONS

7.4.1 Proportion advised to follow a particular diet

Women in both of the diabetic groups were asked whether they had currently been prescribed a particular diet. Table 7.1 shows the responses of women in both the diabetic groups. Given that medical records were not consulted, it was not possible to distinguish those who had been prescribed a particular diet and had forgotten it, from those who had never actually been prescribed a particular diet. However, Table 7.2 shows that less than half the women in each group felt that they were currently supposed to be following a particular dietary regimen and the proportion did not differ significantly between the P/D and the N-P/D groups.

Table 7.1 Frequencies of subjects who had been prescribed a particular diet. P/D and N-P/D groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>( \chi^2 ) corrected = 0.02</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed a particular diet</td>
<td>yes</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( df = 1 )</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>( p = 0.89 )</td>
</tr>
</tbody>
</table>
7.4.2 Source of dietary recommendations

The source of dietary information was also examined. Figure 7.3 shows that 12 of the women in the N-P/D group reported receiving dietary information at some point and of those 12, 7 reported that they had received information from a dietitian. More women in the N-P/D group reported receiving dietary information than reported being prescribed a particular diet. It is therefore clear that receiving such information, from whatever source, is not synonymous with feeling that one is supposed to be following a particular diet.

Figure 7.3 Sources of dietary advice

As regards the P/D group, only 15 of the women (37.5%) reported that they had actually received any dietary advice during pregnancy (See Figure 7.3). In terms of who had provided this dietary
advice, Figure 7.3 indicates that 8 of the women had seen the dietitian, 5 had talked about diet with their doctor, whilst 2 had consulted the nurse or the midwife.

Additional analyses were carried out to see if there was a significant association between feeling that one had been prescribed a particular diet, and having received dietary advice during pregnancy. Table 7.2 indicates that there was no significant association between these two factors.

Table 7.2 Frequencies of being prescribed a particular diet and receiving dietary advice during pregnancy. P/D group

<table>
<thead>
<tr>
<th>Received dietary advice during pregnancy</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribed a particular diet yes</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Prescribed a particular diet no</td>
<td>4</td>
<td>9</td>
</tr>
</tbody>
</table>

Fisher’s Exact Test

p = 0.28

Taken together these findings demonstrate that less than half the women in both groups felt that they had been put on a particular diet and that the majority of them had not received recent dietary advice from any of the health professionals. Furthermore, whether or not they had received such advice was independent of whether they felt that they were supposed to be following a particular diet.

7.4.3 Proportion recommended to follow dietary principles

Although it is clear that the majority of women in both groups were not following a strictly prescribed diet, it is possible that they were attempting to adhere to broad dietary principles, as it is this type of dietary advice that is recommended by the British Diabetic Association (BDA, 1992). Women in both groups were therefore asked whether they had ever been advised to stick to five broad dietary principles, namely, spacing carbohydrate through the day; reducing the intake of fatty food; reducing sugar intake (except when compensating for being hypoglycaemic); having a moderate protein intake and eating sufficient fibre. The source of this advice could either be a health professional, or a relevant publication such as Balance (newsletter of the British Diabetic Association), which frequently contains dietary information for patients with diabetes.

Table 7.3 displays the results to these questions and indicates that nearly all of the women in both groups indicated that they had at some time been advised to cut down on their sugar intake. In
addition, the majority of women in both groups reported that they had been advised to space their carbohydrate throughout the day, eat sufficient fibre and reduce their fat intake. In contrast, the majority of women said that they had not been advised to eat only moderate amounts of protein.

Table 7.3 Frequencies of subjects who had been advised to adhere to different dietary principle

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Advised to limit sugar</td>
<td>yes</td>
<td>33</td>
<td>19</td>
<td>Fisher's Exact</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>1</td>
<td>2</td>
<td>p = 0.32</td>
</tr>
<tr>
<td>Advised to eat adequate fibre</td>
<td>yes</td>
<td>28</td>
<td>19</td>
<td>Fisher's Exact</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>8</td>
<td>2</td>
<td>p = 0.17</td>
</tr>
<tr>
<td>Advised to moderate protein intake</td>
<td>yes</td>
<td>12</td>
<td>5</td>
<td>$\chi^2$ corrected = 0.11</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>19</td>
<td>12</td>
<td>df = 1</td>
</tr>
<tr>
<td>Advised to limit fat</td>
<td>yes</td>
<td>24</td>
<td>18</td>
<td>Fisher's Exact</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>10</td>
<td>3</td>
<td>p = 0.17</td>
</tr>
<tr>
<td>Advised to space carbohydrate intake</td>
<td>yes</td>
<td>28</td>
<td>18</td>
<td>Fisher's Exact</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>7</td>
<td>3</td>
<td>p = 0.44</td>
</tr>
</tbody>
</table>

Table 7.3 also indicates that the proportion of women who had or who had not been advised to follow these different dietary principles did not differ between the pregnant and the non-pregnant groups.

7.5 ADHERENCE TO DIETARY PRINCIPLES

Women were asked on a self-report questionnaire how often they adhered to the 5 broad dietary principles. Data were also available on whether they had ever actually been advised to adhere to each of these principles. For each dietary principle it was therefore possible to work out who had been advised to follow that particular principle, and amongst that group, the extent of adherence could be assessed from the self-report questionnaire.
Table 7.4 illustrates how frequently women in each of the two diabetic groups adhered to 4 out of the 5 dietary principles. Adherence to a moderate protein intake was not calculated as the majority of women reported that they had not been recommended to adhere to this particular principle.

Table 7.4  **Frequencies of self-reported adherence to each of the 4 dietary principles amongst those subjects who had been advised about that particular principle**

<table>
<thead>
<tr>
<th>Dietary Principle</th>
<th>P/D</th>
<th>N-P/D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limit sugar intake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>18</td>
<td>5</td>
</tr>
<tr>
<td>Often</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Occasionally</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Eat sufficient fibre</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Often</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Occasionally</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Limit fat intake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Often</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Sometimes</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Occasionally</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td><strong>Space carbohydrate intake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>Often</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Occasionally</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Never</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>n</th>
<th>median</th>
<th>mean rank</th>
<th>n</th>
<th>median</th>
<th>mean rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit sugar intake</td>
<td></td>
<td>21.97</td>
<td></td>
<td>31.78</td>
<td>W = 572.0 p = 0.01</td>
</tr>
<tr>
<td>Eat sufficient fibre</td>
<td></td>
<td>19.90</td>
<td></td>
<td>23.64</td>
<td>W = 425.5 p = 0.30</td>
</tr>
<tr>
<td>Limit fat intake</td>
<td></td>
<td>20.07</td>
<td></td>
<td>21.09</td>
<td>W = 358.5 p = 0.77</td>
</tr>
<tr>
<td>Space carbohydrate intake</td>
<td></td>
<td>23.78</td>
<td></td>
<td>20.47</td>
<td>W = 348.0 p = 0.36</td>
</tr>
</tbody>
</table>

**Note** Adherence to each dietary principle was scored from 1 (always adheres) to 5 (never adheres).

From Table 7.4 it is apparent that adherence to the spacing of carbohydrate was high in both groups. Although the N-P/D group reported a higher level of adherence to this principle, this difference was not statistically significant. Adherence to limiting one's fat intake was moderately high in both groups, and it did not differ between the two groups. Similarly, adherence to eating sufficient fibre was moderately high in both groups, and although it was higher amongst the pregnant women, this difference between the two groups was not statistically significant.

The only statistically significant difference between the two groups was in terms of sugar intake. Table 7.4 indicates that 81.3% of the pregnant diabetic women reported always or often avoiding
sweet foods, whereas 66.7% of the non-pregnant women reported always or often avoiding sweet food.

Women in the P/D group were also asked about how frequently they had adhered to these four dietary principles before they were pregnant or trying to conceive the current baby. Table 7.5 indicates that self-report levels of adherence to carbohydrate spacing and fat limitation did not differ pre to during pregnancy. In contrast, the P/D women reported that they currently had higher levels of adherence to avoiding sugar and to eating sufficient fibre, compared to their behaviour prior to the current pregnancy.

Table 7.5  Self-reported adherence to the 4 dietary principles prior to pregnancy, compared to adherence during pregnancy. P/D group only

<table>
<thead>
<tr>
<th></th>
<th>Prior to Pregnancy</th>
<th>During Pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>median</td>
</tr>
<tr>
<td>Limit sugar intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Often</td>
<td>7</td>
<td>7.45</td>
</tr>
<tr>
<td>Sometimes</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Occasionally</td>
<td>1</td>
<td>7.45</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Eat sufficient fibre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Often</td>
<td>4</td>
<td>4.64</td>
</tr>
<tr>
<td>Sometimes</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Limit fat intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Often</td>
<td>9</td>
<td>6.75</td>
</tr>
<tr>
<td>Sometimes</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Occasionally</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Space carbohydrate intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Often</td>
<td>7</td>
<td>7.40</td>
</tr>
<tr>
<td>Sometimes</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Occasionally</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Never</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Note  Adherence to each dietary principle was scored from 1 (always adheres) to 5 (never adheres).
The second measure of dietary behaviour was the detailed analysis of the 4 day food diaries that the women were asked to fill out. As explained in Chapter 4, a trained dietitian coded the diaries and then analysed them using the COMP-EAT programme. Given that less than half the women in each of the diabetic groups felt that they were supposed to be following a particular diet, analysing levels of adherence to a particular dietary prescription is not meaningful. Instead, the dietary diaries were used to calculate absolute levels of dietary behaviour such as daily fibre intake, or the proportion of energy derived from carbohydrate, rather than adherence indices which compare observed behaviour to a prescribed dietary regimen.

### 7.6.1 Proportion of usable diaries

27 women in the P/D group, and 21 women in the N-P/D group completed dietary diaries. However, although all of these women had received detailed written instructions on filling in the diaries and the researcher talked through these instructions with each of the women, over half of the diaries contained insufficient information to carry out a detailed nutritional breakdown. For example, women were asked to specify the type of bread that they ate, given the difference in fibre content between different sorts of brown bread, but frequently they would fail to specify this detail on all occasions. Similarly, types of milk used, whether there was butter or margarine in a sandwich or the composition of a sauce was often not recorded and details of portion size were frequently inadequate.

In the end, the dietitian decided that only 12 out of the 27 diaries from the P/D group and 12 out of the 21 diaries from the N-P/D group gave sufficient detail to warrant a nutritional breakdown. This difference in the proportion of usable diaries between the two groups was not significant. (Chi-squared (corrected) = 0.34, df=1, p=0.56).

### 7.6.2 Comparison of intake of nutritional components between the two groups

Table 7.6 gives the breakdown of the dietary diaries according to a number of different nutritional components in each of the two diabetic groups. This table also displays the recommendations for patients with diabetes and the approximate content of the usual UK non-diabetic diet, both of which were taken from the Dietary Recommendations for People with Diabetes published by the British Diabetic Association (1992).
Table 7.6 Comparison of intake of nutritional components between the 2 diabetic groups. Data from 4-day dietary diaries, analysed by Comp-EAT programme

<table>
<thead>
<tr>
<th>Dietary Component</th>
<th>BDA Recommendations</th>
<th>Average UK Diet</th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for Difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate (% of energy)</td>
<td>50-55%</td>
<td>45%</td>
<td>x = 43.42%&lt;br&gt;n = 12&lt;br&gt;SD = 7.76</td>
<td>x = 44.80%&lt;br&gt;n = 12&lt;br&gt;SD = 6.13</td>
<td>-1.38</td>
<td>(-7.32, 4.55)</td>
<td>-0.48</td>
<td>0.63</td>
</tr>
<tr>
<td>Dietary Fibre (g day⁻¹)</td>
<td>&gt;30g</td>
<td>19-25g</td>
<td>x = 23.52g&lt;br&gt;n = 12&lt;br&gt;SD = 20.16</td>
<td>x = 18.33g&lt;br&gt;n = 12&lt;br&gt;SD = 4.71</td>
<td>5.18</td>
<td>(-7.36, 17.71)</td>
<td>0.86</td>
<td>0.40</td>
</tr>
<tr>
<td>Total Fat (% of energy)</td>
<td>30-35%</td>
<td>40%</td>
<td>x = 38.85%&lt;br&gt;n = 12&lt;br&gt;SD = 5.75</td>
<td>x = 35.01%&lt;br&gt;n = 12&lt;br&gt;SD = 4.71</td>
<td>3.83</td>
<td>(-0.62, 8.28)</td>
<td>1.78</td>
<td>0.09</td>
</tr>
<tr>
<td>Saturated Fatty Acids (% of energy)</td>
<td>&lt;10%</td>
<td>17%</td>
<td>x = 14.08%&lt;br&gt;n = 12&lt;br&gt;SD = 2.84</td>
<td>x = 11.62%&lt;br&gt;n = 12&lt;br&gt;SD = 2.81</td>
<td>2.46</td>
<td>(0.07, 4.85)</td>
<td>2.13</td>
<td>0.04</td>
</tr>
<tr>
<td>Mono-unsaturated Fatty Acids (% of energy)</td>
<td>10-15%</td>
<td>11%</td>
<td>x = 12.33%&lt;br&gt;n = 12&lt;br&gt;SD = 3.05</td>
<td>x = 10.26%&lt;br&gt;n = 12&lt;br&gt;SD = 2.60</td>
<td>2.07</td>
<td>(-0.33, 4.46)</td>
<td>1.79</td>
<td>0.09</td>
</tr>
<tr>
<td>Poly-unsaturated Fatty Acids (% of energy)</td>
<td>&lt;10%</td>
<td>6%</td>
<td>x = 5.83%&lt;br&gt;n = 12&lt;br&gt;SD = 2.36</td>
<td>x = 5.06%&lt;br&gt;n = 12&lt;br&gt;SD = 2.36</td>
<td>0.78</td>
<td>(-1.12, 2.67)</td>
<td>0.85</td>
<td>0.40</td>
</tr>
<tr>
<td>Protein (% of energy)</td>
<td>10-15%</td>
<td>12-15%</td>
<td>x = 16.01%&lt;br&gt;n = 12&lt;br&gt;SD = 1.91</td>
<td>x = 14.05%&lt;br&gt;n = 12&lt;br&gt;SD = 2.08</td>
<td>1.96</td>
<td>(0.27, 3.65)</td>
<td>2.40</td>
<td>0.03</td>
</tr>
</tbody>
</table>
7.6.2.1 Carbohydrate intake

Patients with diabetes are advised to have a high-carbohydrate, high-fibre diet with a low fat and moderate protein intake. These basic principles remain true during pregnancy. In terms of the proportion of the diet derived from carbohydrates, Table 7.6 indicates that both of the diabetic groups failed to attain the high levels recommended by the British Diabetic Association, and the intake of the 2 groups was instead closer to the national UK average. The two diabetic groups did not differ from each other in terms of the proportion of their energy requirements that were derived from carbohydrate sources.

7.6.2.2 Sugar intake

The two groups also did not differ from each other in terms of the percentage of energy derived from sugar sources. However, this sugar component includes all sugars (ie sucrose, fructose and lactose) and therefore would not allow one to see if pregnant women were for example, shifting from foods that were high in sucrose such as biscuits and cakes, to eating greater quantities of fresh fruit. Unfortunately, the COMP-EAT computer programme did not permit a detailed breakdown of the type of sugar that different foods contained, so it was not possible to analyse this point any further.

An additional index of sugar consumption was available from the dietary diaries by recording all instances of high sugar snacks (eg biscuits, cakes, confectionery and sugary drinks) taken between meals. Plain digestive biscuits, which are frequently used to alleviate symptoms of hypoglycaemia were not included. As this index did not require detailed dietary information, eg on portion size, or on type of chocolate biscuit, all of the dietary diaries were included. Table 7.7 displays the frequency with which high sucrose snacks was consumed. Whilst the P/D group had an average of just under one such snack every two days, the average of the N-P/D group was nearly double that rate. This difference between the two groups was statistically significant, indicating a lower level of sugar snacks amongst the P/D women.

Table 7.7 Comparison between the 2 diabetic groups of number of daily high sugar snacks taken between meals

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of daily high sugar snacks</td>
<td>x = 0.47</td>
<td>0.83</td>
<td>-0.35</td>
<td>(-.70, -.01)</td>
<td>2.09</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>SD = 3.90</td>
<td>0.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 27</td>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Number of high sugar snacks were calculated from the 4 day dietary diaries.
It must be emphasised that this index is crude as it does not take the portion size or type of snack into account. Furthermore, given that Chapter 5 indicated that perceived susceptibility to hypoglycaemia was more of a problem amongst the P/D women, it is possible that a higher proportion of these snacks in the P/D group were deliberate attempts to alleviate hypoglycaemic symptoms, rather than eating high sugar foods out of preference. However, if a higher proportion of the snacks amongst the P/D women were actually attempts to alleviate hypoglycaemia, this would suggest that the frequency of snacking out of choice (i.e., for reasons other than alleviating hypoglycaemia) may have actually been lower in the P/D group. Thus the difference between the two groups in snacking frequency for reasons other than alleviating hypoglycaemia may in fact be even greater than the levels reported in Table 7.7.

7.6.2.3 Fibre intake

In terms of fibre intake, both groups were closer to the national average than to the levels recommended by the British Diabetic Association. Although the fibre intake was higher amongst the P/D women than the N-P/D women, this difference was not statistically significant.

7.6.2.4 Fat intake

Whilst the two groups did not differ in terms of the proportion of energy derived from all fat sources, when a breakdown according to type of fat was carried out, a significant difference was obtained indicating that the P/D women derived more of their total energy from saturated fat sources than the N-P/D women. Given that restriction of saturated fatty acid sources is advised in patients with diabetes (as it is in the general population), this finding indicates that the P/D women had a poorer diet in this respect than the N-P/D women.

As regards the other fat sources, the two diabetic groups did not differ from each other in terms of mono-unsaturated fatty acids or in terms of polyunsaturated fatty acids. Moreover, both of the diabetic groups were within the recommended BDA guidelines for these two particular components.

7.6.2.5 Protein intake

The two groups were found to differ significantly, with the P/D group having a significantly higher proportion of energy intake from protein sources than the N-P/D group. Again, as with the saturated fatty acid component, in terms of protein intake, the N-P/D group was within the BDA guidelines, whereas the P/D group exceeded the recommended limits.
7.7.2.6 Alcohol intake

Unlike the inadequate detail provided about food substances, the women who filled out the diaries gave sufficient information to code alcohol intake. This meant that all the diaries could be used, rather than the subset of more detailed diaries that were used for the other nutritional component comparisons. Figure 7.4 shows the frequency of mean daily alcohol intake, separately for each of the two groups with diabetes. Whereas 70.4% of the women in the P/D group reported drinking no alcohol over the 4 day period, only 32.0% of the N-P/D group reported drinking no alcohol during a corresponding period.

Figure 7.4 Comparison of mean daily alcohol intake between the 2 diabetic groups (Data taken from the 4 day dietary diaries)

![Bar chart showing alcohol intake comparison]

P/D group: Mean=2.65g SD=5.67 n=27
N-P/D group: Mean=15.93g SD=3.60 n=21
(t=23.69 p<0.01)

Those P/D women who were drinking alcohol during pregnancy tended also to be drinking at a very low level. Outside of pregnancy women are advised to have a limit of 14 units per week, which corresponds to 2 units (or 20g) per day. In terms of drinking during pregnancy, latest recommendations from the Department of Health were that pregnant women should not have more than 4 units per week (Department of Health, 1995).

It can be seen from Figure 7.4 that only 1 woman in the P/D group exceeded the limit of 20g of alcohol per day, ie the non-pregnant daily alcohol limit. In contrast, 8 out of the 21 N-P/D women who filled out the dietary diaries exceeded the 20g limit. Figure 7.4 also indicates that
the difference in alcohol consumption between the two diabetic groups in the study was statistically significant.

In terms of meeting the pregnancy limits, a weekly intake of 4 units (40g) corresponds to a daily maximum limit of 5.71g. Using this as an index, it can be seen from Figure 7.4 that 6 women from the P/D group exceeded this limit. It must be realized though that even if 6 women exceeded the recommended pregnancy level of 4 units per week, levels of alcohol consumption were not in fact very high, given that only 2 women reported drinking more than a glass of wine a day.

Additional analyses identifying correlates of alcohol intake amongst the P/D women were not possible, given that only 8 women reported drinking any alcohol at all during the 4 day period and only 2 women reported drinking more than a glass of wine a day. Although it would have been possible to identify correlates of alcohol consumption amongst the N-P/D women given the higher levels of alcohol consumption observed in that group, such analyses were beyond the focus of the study.
CHAPTER 8
ANTENATAL ATTACHMENT AND FEELINGS ABOUT THE PREGNANCY

8.1 DIFFERENTIATING BETWEEN ANTENATAL ATTACHMENT AND FEELINGS ABOUT THE PREGNANCY

In Chapter 2, it was argued that many measures of antenatal attachment confound feelings about the developing baby with feelings about the state of pregnancy per se. In this study therefore, an attempt was made to separate the two, by providing a measure of antenatal attachment using Condon's (1993) 19 item questionnaire, and a measure of feelings about the pregnancy using appropriate items taken from Lederman's (1984) questionnaire.

The first question to address is whether the results of this study support Condon's contention that antenatal attachment and feelings about the pregnancy are separate constructs. From Table 8.1, it can be seen that within both the P/D group, and the P/N-D group, antenatal attachment was not significantly correlated with feelings about the pregnancy. Given this result, for the rest of this chapter, these two facets of emotional adaptation to pregnancy will be treated separately.

Table 8.1 Intercorrelation between antenatal attachment and feelings about the pregnancy. P/D and N-P/D groups.

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>0.18</td>
<td>0.17</td>
</tr>
<tr>
<td>n</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>p</td>
<td>0.32</td>
<td>0.32</td>
</tr>
</tbody>
</table>

8.2 COMPARING ANTENATAL ATTACHMENT

In Chapter 5, the two pregnant groups were compared on a number of factors that have been found to be related to emotional well-being during pregnancy, including antenatal attachment. It will be recalled from this chapter, that the results indicated that the two pregnant groups did not differ in terms of levels of antenatal attachment. (See Table 5.12).
8.3 IDENTIFICATION OF FACTORS ASSOCIATED WITH ANTENATAL ATTACHMENT

8.3.1 Demographic factors

Table 8.2 shows that within both of the pregnant groups primips reported higher levels of antenatal attachment than multips. In addition, Table 8.2 also shows that within both the P/D group and the P/N-D group, antenatal attachment was unrelated to maternal age, social class or whether the mother was currently employed outside the home. It was not possible to investigate the effect of marital status on antenatal attachment given the very small number of women in both of the two pregnant groups who were not either married or living as married.
Table 8.2  Relationship between demographic factors and antenatal attachment, P/D group and P/N-D groups

| Demographic Factor | P/D | | | | | P/N-D | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Median | Mean Rank | Range | | n | Median | Mean Rank | Range | | |
| Social Class | | | | | | | | | | | |
| I | 13 | 2.11 | 19.50 | 1.58 - 2.63 | Kruksall- Wallis | 6 | 2.01 | 11.83 | 1.42 - 2.47 | |
| II | 14 | 1.84 | 15.04 | 1.42 - 2.94 | Wallis | 10 | 1.87 | 8.15 | 1.26 - 2.63 | |
| III | 7 | 2.16 | 18.71 | 1.58 - 2.74 | | 2 | 1.79 | 9.25 | 1.21 - 2.84 | H = 1.49 p = 0.47 | |
| p = 0.47 | | | | | | | | | | | | |
| Currently employed | | | | | | | | | | | | |
| yes | 21 | 2.16 | 19.83 | 1.42 - 2.94 | W = 178.5 | 18 | 2.03 | 18.28 | 1.26 - 2.84 | W = 266.0 |
| no | 13 | 1.79 | 13.73 | 1.58 - 2.63 | | 16 | 1.95 | 16.63 | 1.21 - 2.63 | p = 0.08 | p = 0.63 |
| Living with partner | | | | | | | | | | | | |
| yes | 31 | Numbers too small to permit analysis | | | | 34 | Numbers too small to permit analysis | | | | |
| no | 3 | | | | | 1 | | | | | |
| Parity | | | | | | | | | | | | |
| 0 | 15 | 1.74 | 13.77 | 1.42 - 2.74 | W = 206.5 | 18 | 1.76 | 13.44 | 1.21 - 2.37 | W = 388.0 |
| ≥ 1 | 19 | 2.11 | 20.45 | 1.68 - 2.94 | P = 0.05 | 17 | 2.0 | 22.82 | 1.42 - 2.84 | p = < 0.01 |
| Age | | | | | | | | | | | | r = 0.24 |
| n = 34 | p = 0.18 | r = 0.27 |
| Disease duration | | | | | | | | | | | | r = 0.05 |
| n = 34 | p = 0.79 |
8.3.2 Obstetric factors

Table 8.3 shows that within both the P/D group and the P/N-D group, antenatal attachment was unrelated to the gestational age of the baby, whether the pregnancy was planned, whether the woman had difficulty conceiving the baby or whether the woman had previously experienced a miscarriage.
Table 8.3 Relationship between obstetric factors and antenatal attachment. P/D and P/N-D groups

<table>
<thead>
<tr>
<th>Obstetric Factor</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Pregnancy planned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>20</td>
<td>2.11</td>
</tr>
<tr>
<td>no</td>
<td>14</td>
<td>1.84</td>
</tr>
<tr>
<td>Previous miscarriages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>19</td>
<td>1.95</td>
</tr>
<tr>
<td>≥1</td>
<td>10</td>
<td>2.29</td>
</tr>
<tr>
<td>Previous terminations of pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>22</td>
<td>2.11</td>
</tr>
<tr>
<td>≥1</td>
<td>6</td>
<td>2.13</td>
</tr>
<tr>
<td>Difficulty in conception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>6</td>
<td>1.92</td>
</tr>
<tr>
<td>no</td>
<td>28</td>
<td>2.05</td>
</tr>
<tr>
<td>Hospitalised during pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>5</td>
<td>1.68</td>
</tr>
<tr>
<td>no</td>
<td>29</td>
<td>2.0</td>
</tr>
<tr>
<td>Felt foetus move</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>28</td>
<td>1.92</td>
</tr>
<tr>
<td>no</td>
<td>6</td>
<td>2.45</td>
</tr>
<tr>
<td>Weeks pregnant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r = -0.03</td>
<td></td>
<td>n = 34</td>
</tr>
<tr>
<td>r = -0.20</td>
<td></td>
<td>n = 35</td>
</tr>
</tbody>
</table>
Within the P/N-D group, too few women had been hospitalized during pregnancy, had experienced a prior termination of pregnancy or had not yet felt the foetus move to investigate the effect of these factors on antenatal attachment. However, in the P/D group hospitalization, prior termination of pregnancy and the detection of foetal movement were not found to effect antenatal attachment. It must be pointed out though that even in the pregnant diabetic group, the numbers of women experiencing hospitalization, prior termination or who had not yet felt the foetus move were very small which would reduce the power of the statistical tests to detect a significant difference.

8.3.3 Psychosocial Factors

Table 8.4 demonstrates that marital satisfaction (as assessed by the relevant Lederman subscale) was significantly correlated with antenatal attachment within both of the pregnant groups, with those women who were more satisfied with the relationship with their partner experiencing higher levels of antenatal attachment. Similarly, within both of the pregnant groups, Table 8.4 shows that those women who expressed greater identification with the motherhood role (as assessed by the relevant Lederman subscale), had significantly higher levels of antenatal attachment.

Table 8.4 Relationship between antenatal attachment and psychosocial variables

<table>
<thead>
<tr>
<th>Psychosocial Variable</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with marital relationship during pregnancy</td>
<td>r = 0.48</td>
<td>r = 0.33</td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td>n = 35</td>
</tr>
<tr>
<td></td>
<td>p = 0.01</td>
<td>p = 0.05</td>
</tr>
<tr>
<td>Identification with motherhood role</td>
<td>r = 0.66</td>
<td>r = 0.52</td>
</tr>
<tr>
<td></td>
<td>n = 34</td>
<td>n = 34</td>
</tr>
<tr>
<td></td>
<td>p &lt; .001</td>
<td>p = 0.01</td>
</tr>
<tr>
<td>Health anxieties about the baby/labour</td>
<td>r = 0.06</td>
<td>r = 0.28</td>
</tr>
<tr>
<td></td>
<td>n = 34</td>
<td>n = 35</td>
</tr>
<tr>
<td></td>
<td>p = 0.72</td>
<td>p = 0.72</td>
</tr>
<tr>
<td>Body image</td>
<td>r = -0.21</td>
<td>r = -0.17</td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td>n = 33</td>
</tr>
<tr>
<td></td>
<td>p = 0.25</td>
<td>p = 0.34</td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic complications</td>
<td>r = -0.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p = 0.92</td>
<td></td>
</tr>
<tr>
<td>Diabetic related stress</td>
<td>r = 0.23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p = 0.18</td>
<td></td>
</tr>
</tbody>
</table>
In contrast, using the relevant Lederman subscale as an index, there was no significant correlation between health anxieties about labour/ the baby, and antenatal attachment, within either of the two pregnant groups. (See Table 8.4).

Within the P/D group 2 additional analyses were carried out; namely the correlation between diabetic stress and antenatal attachment and the correlation between perceived susceptibility to diabetic related pregnancy problems and antenatal attachment. Neither perceived susceptibility to diabetic related pregnancy problems or diabetic stress were found to be related to antenatal attachment within the P/D group. (See Table 8.4).

8.3.4 Physical aspects of pregnancy

Only 3 women in the P/D group and 3 women in the P/N-D group reported having a current illness other than diabetes. It was not therefore possible to investigate the effect of current illness on antenatal attachment within either of the 2 pregnant groups. Similarly, it was not possible to investigate the effect of current nausea as too few women reported that they still experienced nausea at the time of the interview.

It was however possible to investigate the role of nausea during the first trimester, tiredness during the first trimester and current tiredness on antenatal attachment. Table 8.5 indicates that these factors did not have an effect on levels of antenatal attachment, within either of the two pregnant groups in the study.

8.3.5 Stepwise Multiple Regression Analysis

A stepwise multiple regression analysis was carried out to investigate the simultaneous effect of different factors on antenatal attachment. In order to maintain an appropriate subjects-to-predictor variables ratio (Cohen and Cohen, 1983), only those factors that had been found to be significant predictors of antenatal attachment in both of the pregnant groups were included in the analysis. In addition, the diabetic status of the individuals was also considered. Each factor was allowed to enter stepwise into the equation only so long as its entry produced a significant increment in $R^2$ at the 0.05 level of significance.
Table 8.5  Relationship between antenatal attachment and physical aspects of pregnancy
P/D group and P/N-D group

<table>
<thead>
<tr>
<th>Somatic Factor</th>
<th>P/D</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>P/N-D</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nausea in first trimester</td>
<td>n</td>
<td>11</td>
<td>23</td>
<td>13</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>2.0</td>
<td>2.07</td>
<td>1.88</td>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.43</td>
<td>0.39</td>
<td>0.42</td>
<td>0.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difference in mean</td>
<td>0.07</td>
<td>0.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>95% CI for difference</td>
<td>(-.23, .37)</td>
<td>(-.14, .46)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t</td>
<td>0.50</td>
<td>1.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.62</td>
<td>0.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current tiredness</td>
<td>n</td>
<td>13</td>
<td>21</td>
<td>13</td>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>2.03</td>
<td>2.06</td>
<td>2.06</td>
<td>1.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.38</td>
<td>0.42</td>
<td>0.48</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difference in mean</td>
<td>0.03</td>
<td>-.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>95% CI for difference</td>
<td>(-.26, .32)</td>
<td>(-.50, .09)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t</td>
<td>0.24</td>
<td>-1.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.81</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tiredness in first trimester</td>
<td>n</td>
<td>19</td>
<td>15</td>
<td>23</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>x</td>
<td>2.07</td>
<td>2.02</td>
<td>1.97</td>
<td>1.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>0.41</td>
<td>0.39</td>
<td>0.42</td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difference in mean</td>
<td>-0.05</td>
<td>-.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>95% CI for difference</td>
<td>(-.33, .23)</td>
<td>(-.42, .20)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>t</td>
<td>-.37</td>
<td>-.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>0.72</td>
<td>0.48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The three factors that had been found to be significant predictors of antenatal attachment within both of the pregnant groups were parity, identification with the motherhood role, and satisfaction with the marital relationship during pregnancy. In addition to these three factors, the diabetic status of the individuals was also entered into the analysis, and the results are shown in Table 8.6. The multiple regression analysis as a whole was able to explain a significant proportion of the variance in antenatal attachment scores. In line with the univariate analyses, the diabetic status of the individuals was not found to exert a significant effect. Furthermore, Table 8.6 also demonstrates that whilst identification with the motherhood role and parity were both able to exert significant independent effects on antenatal attachment scores, satisfaction with the marital relationship did not account for a significant proportion of the variance in scores, once the effects of the other two factors had been taken into account. Taken together, parity and identification...
with the motherhood role were able to account for 34% of the variance in antenatal attachment scores.

Table 8.6 Stepwise Multiple Regression Analysis predicting antenatal attachment
Both pregnant groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error of B</th>
<th>95% CI for B</th>
<th>t</th>
<th>p</th>
<th>R^2 obtained at each step of the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification with the motherhood role</td>
<td>0.34</td>
<td>0.07</td>
<td>(0.20, 0.48)</td>
<td>4.62</td>
<td>&lt;0.001</td>
<td>0.25</td>
</tr>
<tr>
<td>Parity</td>
<td>0.22</td>
<td>0.07</td>
<td>(0.08, 0.36)</td>
<td>3.01</td>
<td>&lt;0.005</td>
<td>0.09</td>
</tr>
</tbody>
</table>

R^2 model (final) = 0.34, F = 16.67, df = 59, 2, p = <0.001

Notes - Table 8.6
1 Variables have been listed in order of entry into the model.
2 F ratio for model obtained in the final step of the analyses.

8.4 COMPARING FEELINGS ABOUT THE PREGNANCY

Table 8.7 indicates that there was no significant difference between the two pregnant groups on their feelings about the pregnancy.

Table 8.7 Comparison of feelings about the pregnancy between the 2 pregnant groups

<table>
<thead>
<tr>
<th>Feelings about the pregnancy¹</th>
<th>P/D</th>
<th>P/N-D</th>
<th>Difference in mean</th>
<th>95% CI for difference</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>x =</td>
<td>2.12</td>
<td>2.08</td>
<td>0.03</td>
<td>(-.341, .409)</td>
<td>1.04</td>
<td>0.86</td>
</tr>
<tr>
<td>SD = 0.58</td>
<td>0.95</td>
<td>0.95</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>35</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Items in the scale were rated from 1 (of low pregnancy difficulty) to 5 (of high pregnancy difficulty). Mean item score is reported.
8.5 IDENTIFICATION OF FACTORS ASSOCIATED WITH FEELINGS ABOUT THE PREGNANCY

In this section, the relationship was first examined between demographic/obstetric factors and feelings about the pregnancy. However, identifying other potential correlates of feelings about the pregnancy was difficult. Previous research had not identified factors which were specifically associated with feelings about the pregnancy as opposed to antenatal attachment. In an attempt to identify possible correlates of feelings about the pregnancy two strategies were adopted. Firstly, those factors that have previously been found in the literature to be associated with antenatal attachment were examined to see if they were also associated with feelings about the pregnancy. Secondly, the effect of different aspects of physical well-being such as nausea and tiredness were examined, as it was predicted that feelings about the state of pregnancy would be particularly sensitive to the woman's physical well-being during pregnancy. Finally, the effect of health anxieties were also investigated, to see if such anxieties were related to the women's experience of pregnancy.

8.5.1 Demographic factors.

Table 8.8 shows that within both the P/D group and the P/N-D group, feelings about the pregnancy were unrelated to social class, to parity, to maternal age or to whether the mother was currently employed outside the home. It was not possible to investigate the effect of marital status on feelings about the pregnancy given the very small number of women in both of the two pregnant groups who were not either married or living as married.
<table>
<thead>
<tr>
<th>Demographic Factor</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Social Class</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>13</td>
<td>2.0</td>
</tr>
<tr>
<td>II</td>
<td>14</td>
<td>2.17</td>
</tr>
<tr>
<td>III</td>
<td>7</td>
<td>2.17</td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>21</td>
<td>2.0</td>
</tr>
<tr>
<td>no</td>
<td>13</td>
<td>2.0</td>
</tr>
<tr>
<td>Living with partner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 ≥</td>
<td>15</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>2.0</td>
</tr>
<tr>
<td>Age</td>
<td>r = -0.09</td>
<td>n = 34</td>
</tr>
<tr>
<td>Disease duration</td>
<td>r = 0.06</td>
<td>n = 34</td>
</tr>
</tbody>
</table>
8.5.2 Obstetric factors

Table 8.9 shows that within both the P/D group and the P/N-D group, feelings about the pregnancy were unrelated to the gestational age of the baby, whether the pregnancy was planned, whether the woman had difficulty conceiving the baby or whether the woman had previously experienced a miscarriage.
Table 8.9  Relationship between obstetric factors and feelings about the pregnancy. P/D and P/N-D groups

<table>
<thead>
<tr>
<th>Obstetric Factor</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Pregnancy planned</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>planned no</td>
<td>14</td>
<td>2.0</td>
</tr>
<tr>
<td>Previous miscarriages ≥1</td>
<td></td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>2.17</td>
</tr>
<tr>
<td>Previous terminations of pregnancy ≥1</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1.83</td>
</tr>
<tr>
<td>Difficulty in conception</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>yes</td>
<td>28</td>
<td>2.0</td>
</tr>
<tr>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>2.33</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1.67</td>
</tr>
<tr>
<td>Felt foetus move</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>yes</td>
<td>6</td>
<td>1.67</td>
</tr>
<tr>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>r = -0.09</td>
</tr>
<tr>
<td>Weeks pregnant</td>
<td></td>
<td>n = 34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>p = 0.63</td>
</tr>
</tbody>
</table>
Within the P/N-D group, too few women had been hospitalized during pregnancy, had experienced a prior termination of pregnancy or had not yet felt the foetus move to investigate the effect of these factors on feelings about the pregnancy. However, in the P/D group neither hospitalization during pregnancy or the detection of foetal movement were found to effect feelings about the pregnancy.

In contrast, Table 8.9 indicates that amongst the P/D women a significant effect of previous termination of pregnancy was obtained with those women who had previously experienced a termination reporting significantly more difficult pregnancies.

8.5.3 Psychosocial factor

From Table 8.10 it can be seen that marital satisfaction, was significantly correlated with feelings about the pregnancy within the P/N-D group, with those women who were more satisfied with the relationship with their partner rating their pregnancy as less difficult. No significant relationship was observed between marital satisfaction and feelings about the pregnancy amongst the P/D women.

Table 8.10 Relationship between feelings about the pregnancy and psychosocial variables

<table>
<thead>
<tr>
<th>Psychosocial Variable</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with marital relationship during pregnancy</td>
<td>r = 0.19</td>
<td>r = 0.43</td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td>n = 35</td>
</tr>
<tr>
<td></td>
<td>p = 0.31</td>
<td>p = 0.01</td>
</tr>
<tr>
<td>Identification with motherhood role</td>
<td>r = 0.43</td>
<td>r = 0.22</td>
</tr>
<tr>
<td></td>
<td>n = 34</td>
<td>n = 35</td>
</tr>
<tr>
<td></td>
<td>p = 0.01</td>
<td>p = 0.21</td>
</tr>
<tr>
<td>Health anxieties about the baby/labour</td>
<td>r = 0.49</td>
<td>r = 0.46</td>
</tr>
<tr>
<td></td>
<td>n = 34</td>
<td>n = 35</td>
</tr>
<tr>
<td></td>
<td>p = &lt;0.01</td>
<td>p = 0.01</td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic complications</td>
<td>r = -0.38</td>
<td>r = -0.51</td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td>n = 33</td>
</tr>
<tr>
<td></td>
<td>p = 0.03</td>
<td>p = &lt;0.01</td>
</tr>
<tr>
<td>Body image</td>
<td>r = -0.31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n = 32</td>
<td></td>
</tr>
<tr>
<td></td>
<td>p = 0.08</td>
<td></td>
</tr>
</tbody>
</table>

In terms of the association between the identification with the motherhood role and feelings about the pregnancy, a different pattern was observed in the two pregnant groups. Amongst the PD women Table 8.10 indicates that those women who had a more positive identification with
the motherhood role reported that the pregnancy was significantly easier. In contrast, amongst
the P/N-D women, no significant correlation between identification with the motherhood role and
feelings about the pregnancy was observed.

Table 8.10 shows that within both pregnant groups, there was a significant positive correlation
between health anxieties about labour/the baby and the feelings about the pregnancy. The
direction of these correlations indicated that those women who were more anxious about these
health issues rated the pregnancy as being significantly more difficult. Similarly amongst the
P/D women, two diabetic specific factors, perceived susceptibility to diabetes related pregnancy
problems, and diabetic related stress, were also significantly related to feelings about the state of
pregnancy. The direction of these significant correlations indicated that those women who felt
more susceptible to diabetic related problems of pregnancy or who experienced higher levels of
diabetic related stress also rated their pregnancies as being significantly more difficult.

In the section above (see section 8.51) it was reported that those P/D women who had previously
experienced a termination of pregnancy had more negative feelings about the state of pregnancy
than those P/D women who had not previously experienced a termination. Stratham and Green
(1994) reported a complex association between previous terminations of pregnancy and raised
anxiety levels during pregnancy. As in this section, it was found that health anxieties were
related to feelings about the pregnancy, it is possible that the relationship between previous
terminations and feelings about the pregnancy (see section 8.51) arises through the effect of
previous terminations on health anxiety levels.

Numbers who had experienced previous terminations of pregnancy were too low in the P/N-D
group to permit statistical analyses. This question could be examined within the P/D group, and
the results indicated that those P/D women who had previously had a termination of pregnancy
had higher anxiety levels about the health of the baby than those P/D women who had not
previously experienced a termination. (W=130.0, n= 6, 22, p=0.01). Unfortunately it was not
possible to explore this question in more detail; given the small number of P/D women who had
previously experienced a termination of pregnancy, it was not possible to carry out an analysis of
covariance that could examine the relationship between prior termination and feelings about the
pregnancy, whilst controlling for anxieties about the health of the baby.

The last psychosocial factor that was examined was body image. Table 8.10 indicates that
amongst the P/D women, there was no significant association between body image and feelings
about the state of pregnancy. In contrast, this factor was significantly associated amongst the
P/N-D women. The direction of the correlation indicated that those women who had a more negative body image reported significantly more difficult pregnancies.

8.5.4 Physical aspects of pregnancy

Only 3 women in the P/D group and 3 women in the P/N-D group reported having a current illness other than diabetes. It was not therefore possible to investigate the effect of current illness on feelings about the pregnancy within each of the 2 pregnant groups. Similarly, it was not possible to investigate the effect of current nausea as too few women reported that they still experienced nausea at the time of the interview.

It was however possible to investigate the role of nausea during the first trimester, tiredness during the first trimester and current tiredness on feelings about the pregnancy. Table 8.11 indicates that these factors had a different effect on feelings about the pregnancy in the P/D group, than in the P/N-D group. In the pregnant P/N-D group, nausea during the first trimester, tiredness during the first trimester, and current tiredness were all significantly related to feelings about the pregnancy. These significant associations indicated that those women who felt more tired or more nauseous, rated their pregnancy as significantly more difficult. In contrast, in the P/D group, none of these somatic indices were significantly related to feelings about the pregnancy.
Table 8.11 Relationship between feelings about the pregnancy and physical aspects of pregnancy. P/D and P/N-D groups

<table>
<thead>
<tr>
<th>Somatic Factor</th>
<th>P/D</th>
<th></th>
<th>P/N-D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Nausea in first trimester</td>
<td>11</td>
<td>23</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>x SD</td>
<td>2.32</td>
<td>2.02</td>
<td>2.58</td>
<td>1.79</td>
</tr>
<tr>
<td>Difference in mean</td>
<td>0.33</td>
<td>0.67</td>
<td>1.01</td>
<td>0.75</td>
</tr>
<tr>
<td>95% for CI for difference</td>
<td>-0.30</td>
<td></td>
<td>-0.79</td>
<td></td>
</tr>
<tr>
<td>t p</td>
<td>(-.74, .14)</td>
<td></td>
<td>(-1.40, -.19)</td>
<td></td>
</tr>
<tr>
<td>Current tiredness</td>
<td>13</td>
<td>21</td>
<td>13</td>
<td>22</td>
</tr>
<tr>
<td>x SD</td>
<td>2.24</td>
<td>2.04</td>
<td>2.69</td>
<td>1.72</td>
</tr>
<tr>
<td>Difference in mean</td>
<td>0.47</td>
<td>0.69</td>
<td>0.94</td>
<td>0.70</td>
</tr>
<tr>
<td>95% for CI for difference</td>
<td>-0.21</td>
<td></td>
<td>-0.97</td>
<td></td>
</tr>
<tr>
<td>t p</td>
<td>(-.64, .23)</td>
<td></td>
<td>(-1.54, -.40)</td>
<td></td>
</tr>
<tr>
<td>Tiredness in first trimester</td>
<td>19</td>
<td>15</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>x SD</td>
<td>2.29</td>
<td>1.89</td>
<td>2.35</td>
<td>1.57</td>
</tr>
<tr>
<td>Difference in mean</td>
<td>0.65</td>
<td>0.58</td>
<td>0.91</td>
<td>0.76</td>
</tr>
<tr>
<td>95% for CI for difference</td>
<td>-0.41</td>
<td></td>
<td>-0.78</td>
<td></td>
</tr>
<tr>
<td>t p</td>
<td>(-.85, .03)</td>
<td></td>
<td>(-1.40, -.16)</td>
<td></td>
</tr>
</tbody>
</table>

8.5.5 Stepwise multiple regression analysis

Only one factor (health anxieties about the baby/labour) was found to be significantly related to feelings about the pregnancy within both of the pregnant groups. In addition to this factor, the effect of the diabetic status of the individuals was also examined in a stepwise multiple regression analysis.

Table 8.12 demonstrates that as with the univariate analyses, the diabetic status of the individuals was not able to account for a significant proportion of the variance in scores. In contrast, the single factor, health anxieties about the baby/labour was able to account for a significant proportion (18%) of the variance in scores on the feelings about the pregnancy scale.
Table 8.12  Stepwise Multiple Regression Analysis predicting feelings about the pregnancy.

Both pregnant groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error of B</th>
<th>95% CI for B</th>
<th>t</th>
<th>p</th>
<th>$R^2$ obtained at each stage of the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health anxieties about the baby/labour</td>
<td>0.61</td>
<td>0.16</td>
<td>(0.03, 0.92)</td>
<td>3.79</td>
<td>&lt;0.001</td>
<td>0.18</td>
</tr>
</tbody>
</table>

$F = 14.38, df = 61,1$  $p = <0.001$
CHAPTER 9
PREVIOUS EMOTIONAL HISTORY AND DEPRESSED MOOD

This chapter shows the results of 3 sets of analyses. Firstly, analyses on whether the 3 groups differ in terms of the proportion who have previously experienced emotional problems. Secondly, analyses on whether the 3 groups differ in terms of current levels of depressed mood. Thirdly, analyses on factors that best predict the observed levels of depressed mood.

9.1 COMPARISON OF PREVIOUS EMOTIONAL HISTORY

9.1.1 Distinguishing between previous postnatal and previous non-postnatal emotional problems

Women in all three groups were asked about previous episodes of emotional problems. The wording of these questions were taken from Leverton and Elliott’s (1989) questionnaire on vulnerability to postnatal depression, and the criterion used was that the problems had been of sufficient severity that the women had had to seek medical assistance. These questions covered two different time periods, namely emotional problems occurring within and emotional problems occurring outside the postnatal period, with the postnatal period defined as within three months of giving birth. Table 9.1 shows the frequency with which women had previously experienced emotional problems within and outside the postnatal period. Obviously cell sizes are smaller for previous problems during the postnatal period, as this question was only relevant for the multips in the study.

Table 9.1 Frequencies of previous episodes of emotional problems, both within and outside the postnatal period. All 3 groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous episodes yes</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>during postnatal period' no</td>
<td>17</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Previous episodes yes</td>
<td>3</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>outside postnatal period no</td>
<td>32</td>
<td>16</td>
<td>31</td>
</tr>
</tbody>
</table>

1 Using Leverton and Elliott’s 1989 questionnaire. The postnatal period was defined as within 3 months of giving birth.

9.1.2 Combining postnatal and non-postnatal data

Cell sizes were too small to permit a comparison of the groups in terms of previous postnatal emotional problems or in terms of previous emotional problems outside of the postnatal period.
Data were therefore combined so that the women were divided into two groups: those who had ever sought medical advice for an emotional problem and those who had never sought medical advice for an emotional problem. Using these combined categories, Table 9.2 shows that a statistically significant difference between the three groups was obtained. Inspection of the frequencies reported in Table 9.2 suggests that the frequency of previous emotional problems was significantly higher amongst the N-P/D group than in either of the two pregnant groups.

Table 9.2 Frequencies of previous episodes of emotional problems at any time. All 3 groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
<th>(\chi^2) (all 3 groups)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous episodes at any one time(^1) yes</td>
<td>3</td>
<td>7</td>
<td>4</td>
<td>6.65</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>15</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact (P/D v N-P/D) p = 0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact (P/D v P/N-D) p = 0.71</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Frequencies of previous episodes at any time cannot be calculated by summing previous episodes within and previous episodes outside the postnatal period as some subjects had experienced episodes in both these time periods.

Two additional analyses were carried out. Firstly, the two pregnant groups were compared on the frequency of previous emotional problems and the results indicated that there was no significant difference between the two pregnant groups (See Table 9.2). A second analysis compared the two diabetic groups on the frequency of previous emotional problems and found that a significantly higher proportion of the N-P/D group had previously experienced emotional problems than the P/D group. (See Table 9.2).

9.1.2.1 The role of marital status

The results of Table 9.2 suggest that the N-P/D group had experienced a greater frequency of previous episodes of emotional problems than the P/D group. The two diabetic groups differ from each other in that, as discussed above in the section on marital status, there was a higher proportion of women without partners in the N-P/D group than in the P/D group. Given that Robinson et al (1988) reported a higher prevalence of depression amongst diabetic patients without partners, it is therefore possible that the difference in marital status between the two diabetic groups contributed to the increased rate of previous episodes of emotional problems in this group. The comparison between the three groups was therefore repeated omitting the unmarried women. Even when the unmarried women were omitted, Table 9.3 indicates that the three groups still differed significantly in terms of the frequency of previous episodes of
emotional problems. Thus the observed difference between the three groups does not seem to be a straightforward effect of marital status.

Table 9.3  **Frequencies of previous episodes of emotional problems at any time**

P/D and N-P/D groups

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>P/D</th>
<th>N-P/D</th>
<th>Fisher’s Exact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married Women only</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous episodes at any time</td>
<td>yes</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>Parity = 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous episodes at any time</td>
<td>yes</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Parity ≥ 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous episodes at any time</td>
<td>yes</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>16</td>
<td>9</td>
</tr>
</tbody>
</table>

9.1.2.2 The role of childlessness

Another way in which the two diabetic groups differ is that there are women in the N-P/D group who have not yet ever been pregnant, whereas obviously this does not apply to the P/D group! The comparison between the two diabetic groups was repeated separately for those who had children and those who did not have any children. Amongst those who had not yet had children, there was a significant difference in previous episodes of emotional problems between the two diabetic groups (see Table 9.3). This indicates that the rate of previous episodes of emotional problems is higher amongst N-P/D women who have never had children, than amongst P/D women who have not yet had children, but who are currently pregnant with their first child. In contrast, when the same comparison between the two diabetic groups was carried out amongst those women who already have living children (see Table 9.3) the significant difference between the two diabetic group disappeared. It therefore appears that previous episodes of emotional problems were more frequent amongst the N-P/D women who did not have any children.

9.2 **COMPARISON OF LEVELS OF DEPRESSED MOOD**

A previous history of emotional problems has been associated with elevated depression scores in pregnant women (Zajicek and Wolkind, 1978) and amongst patients with diabetes (Lustman et al, 1988). Given that the results reported in Table 9.2 above indicate that the rate of previous
episodes of emotional problems was elevated in the N-P/D group, previous emotional history was entered as a covariate in the group comparisons of current levels of depressed mood.

9.2.1 Total BDI scores

The three groups were compared on their scores on the total Beck Depression Inventory. (See Table 9.4). The results of these analyses indicated that the covariate itself (ie previous emotional history) exerted a significant effect. In addition, there was also a significant difference between the three groups, with the N-P/D group scoring significantly lower total BDI scores than the two pregnant groups.

Table 9.4 Comparison of group mean scores on the total Beck Depression Inventory and on the 2 subscales, co-varying for previous emotional problems. All 3 groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N = P/D</th>
<th>P/N = D</th>
<th>Co-variate (Previous emotional problems)</th>
<th>ANCOVA for all 3 groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Depressed mood (total BDI score)</strong></td>
<td></td>
<td></td>
<td></td>
<td>F = 20.32</td>
<td>F = 8.27</td>
</tr>
<tr>
<td>n</td>
<td>36</td>
<td>24</td>
<td>35</td>
<td>df = 1</td>
<td>df = 2</td>
</tr>
<tr>
<td>SD</td>
<td>6.38</td>
<td>6.13</td>
<td>4.88</td>
<td>p = &lt;0.001</td>
<td>p = 0.001</td>
</tr>
<tr>
<td>95% CI</td>
<td>(2.20, 10.37)</td>
<td>(2.20, 738)</td>
<td>(5.69, 9.05)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Depressed mood (cognitive affective items)</strong></td>
<td></td>
<td></td>
<td></td>
<td>F = 20.84</td>
<td>F = 2.59</td>
</tr>
<tr>
<td>n</td>
<td>36</td>
<td>24</td>
<td>35</td>
<td>df = 1</td>
<td>df = 2</td>
</tr>
<tr>
<td>SD</td>
<td>0.34</td>
<td>0.31</td>
<td>0.21</td>
<td>p = &lt;0.0001</td>
<td>p = 0.08</td>
</tr>
<tr>
<td>95% CI</td>
<td>(0.11, 0.33)</td>
<td>(0.06, 0.32)</td>
<td>(0.06, 0.32)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean item score x 21</strong></td>
<td>4.61</td>
<td>3.99</td>
<td>3.99</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Depressed mood (somatic items)</strong></td>
<td></td>
<td></td>
<td></td>
<td>F = 10.47</td>
<td>F = 9.63</td>
</tr>
<tr>
<td>n</td>
<td>36</td>
<td>24</td>
<td>35</td>
<td>df = 1</td>
<td>df = 2</td>
</tr>
<tr>
<td>SD</td>
<td>0.58</td>
<td>0.26</td>
<td>0.51</td>
<td>p = 0.002</td>
<td>p = &lt;0.0001</td>
</tr>
<tr>
<td>95% CI</td>
<td>(0.42, 0.74)</td>
<td>(0.12, 0.60)</td>
<td>(0.37, 0.65)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mean item score x 21</strong></td>
<td>12.18</td>
<td>5.46</td>
<td>10.71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Scores from items 1-9 from the Beck Depression Inventory expressed as a mean score per item.
2 Scores from items 15-21 from the Beck Depression Inventory expressed as a mean score per item.

9.2.2 Somatic Items from the BDI

The three groups were then compared in terms of their response to the somatic items (ie items 15-21 inclusive) from the Beck Depression Inventory. Table 9.4 indicates that the covariate itself exerted a significant effect, as did the effect of group. Additional analyses indicated that women in the 2 pregnant groups scored significantly higher on the somatic items from the BDI than women in the N-P/D group.
9.2.3 Cognitive-Affective items from the BDI

Finally the 3 groups were compared on the 9 cognitive-affective items from the Beck Depression Inventory that Huffman et al (1990) have identified as being most appropriate for assessing mood state during pregnancy. Using this index, whilst the covariate itself exerted a significant effect, there was no significant main effect of group on cognitive-affective item scores.

Taken together, these analyses of the BDI total and subscale scores clearly indicate that pregnancy has a significant effect on somatic scores, and also on the total inventory scores, but not on the cognitive-affective items that Huffman et al (1990) have argued provides the clearest indicator of mood state during pregnancy.

9.3 THE IDENTIFICATION OF POSSIBLE CASES OF CLINICAL DEPRESSION IN THE THREE GROUPS

The Beck Depression Inventory does not permit a firm diagnosis of clinical depression, as it is not a diagnostic tool. However, different cut-off points on the inventory are taken as possible indicators of different levels of depression, and these different points were described in Chapter 4.

9.3.1 Comparing group mean scores to cut-off points

Cut-off points for the 9 cognitive-affective items have not been described in the literature. However, as within the inventory each item has an equal weight, scores from the 9 cognitive-affective items can be converted to mean item scores, and these can then be multiplied by 21, to make them comparable to scores obtained across the whole inventory. Cut-off points for the whole 21 item inventory (see Shaw et al, 1985) can then be applied to these converted scores.

Table 9.4 indicates when the mean item scores from the 9 cognitive-affective items were multiplied by a factor of 21 in order to apply the cut-off points recommended for the whole 21 item inventory, scores of all three groups were less than the cut-off point of 10. Only the mean scores from the somatic subscale were over the cut-off point of 10, in both of the pregnant groups.
9.3.2 Frequencies of subjects experiencing different levels of depression

The cut-off points described by Shaw et al. (1985) were applied to the mean item scores obtained with the 9 cognitive-affective items. Table 9.5 indicates that the numbers of women who had experienced mild, moderate or severe depression were small in each of the 3 groups. The 4 depression categories were therefore combined into 2 categories: not depressed / at least mildly depressed. Table 9.5 indicates that the proportion of women experiencing mild or more severe depression did not differ significantly between the 2 diabetic groups or between the 2 pregnant groups.

Table 9.5 Frequencies of subjects experiencing different levels of depression, based on the cut-off points described by Shaw et al. (1985), and applied to the 9 cognitive-affective items

<table>
<thead>
<tr>
<th>Severity of Depression</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not depressed</td>
<td>31 = a</td>
<td>20 = a</td>
<td>33 = a</td>
</tr>
<tr>
<td>Mild depression</td>
<td>2} = b</td>
<td>3} = b</td>
<td>0} = b</td>
</tr>
<tr>
<td>Moderate depression</td>
<td>2} = b</td>
<td>0} = b</td>
<td>2} = b</td>
</tr>
<tr>
<td>Severe depression</td>
<td>1}</td>
<td>1}</td>
<td>0}</td>
</tr>
</tbody>
</table>

Fisher's Exact a.v.b.  
P/D v N-P/D  
\( p = 0.52 \)

p = 1.0

9.4 IDENTIFICATION OF FACTORS ASSOCIATED WITH DEPRESSED MOOD

9.4.1 Demographic factors

Table 9.6 shows that within the three groups in the study there was no relationship between age and depressed mood. In addition, within each group there was no effect of parity, social class or current employment status on levels of depressed mood. Due to the small number of women without partners in the two pregnant groups, it was not possible to investigate the possible effect of marital status on depressed mood within these two groups. In the N-P/D group there was no effect of marital status on levels of depressed mood.
Table 9.6 Relationship between demographic factors and depressed mood. All 3 groups

<table>
<thead>
<tr>
<th>Demographic Factor</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td>Social class</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>13</td>
<td>0.0</td>
<td>17.50</td>
</tr>
<tr>
<td>II</td>
<td>16</td>
<td>0.11</td>
<td>18.94</td>
</tr>
<tr>
<td>III</td>
<td>7</td>
<td>0.11</td>
<td>19.36</td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>21</td>
<td>0.11</td>
<td>18.21</td>
</tr>
<tr>
<td>no</td>
<td>15</td>
<td>0.11</td>
<td>18.90</td>
</tr>
<tr>
<td>Living with partner</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>33</td>
<td>Numbers too small to permit analysis</td>
<td></td>
</tr>
<tr>
<td>no</td>
<td>3</td>
<td>0.11</td>
<td>17.32</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>17</td>
<td>0.11</td>
<td>19.55</td>
</tr>
<tr>
<td>≥</td>
<td>19</td>
<td>0.11</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td>r = -0.12</td>
<td>n = 36</td>
</tr>
<tr>
<td>Disease duration</td>
<td></td>
<td>r = -0.04</td>
<td>n = 24</td>
</tr>
</tbody>
</table>
9.4.2 Obstetric factors

The effect of a number of different aspects of previous obstetric history are shown in Table 9.7. It should be noted that sample sizes in a number of these different comparisons are extremely small.
Table 9.7 Relationship between obstetric factors and depressed mood. P/D group and P/N-D group

<table>
<thead>
<tr>
<th>Obstetric Factor</th>
<th>P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
</tr>
<tr>
<td>Pregnancy planned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>20</td>
<td>0.0</td>
</tr>
<tr>
<td>no</td>
<td>14</td>
<td>0.17</td>
</tr>
<tr>
<td>Previous miscarriages</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>22</td>
<td>0.06</td>
</tr>
<tr>
<td>≥1</td>
<td>10</td>
<td>0.44</td>
</tr>
<tr>
<td>Previous terminations of pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>24</td>
<td>0.06</td>
</tr>
<tr>
<td>≥1</td>
<td>7</td>
<td>0.22</td>
</tr>
<tr>
<td>Difficulty in conception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>7</td>
<td>0.0</td>
</tr>
<tr>
<td>no</td>
<td>27</td>
<td>0.11</td>
</tr>
<tr>
<td>Hospitalised during pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>yes</td>
<td>7</td>
<td>0.11</td>
</tr>
<tr>
<td>no</td>
<td>28</td>
<td>0.0</td>
</tr>
<tr>
<td>Weeks pregnant</td>
<td></td>
<td></td>
</tr>
<tr>
<td>r = 0.07</td>
<td></td>
<td>n = 36</td>
</tr>
</tbody>
</table>
Table 9.7 indicates that there was no significant relationship between the number of weeks pregnant and levels of depressed mood within either of the two pregnant groups. In addition, there was no effect of difficulty in conception or planning of pregnancy on levels of depressed mood within either of the two pregnant groups.

The effect of previous miscarriage on levels of depressed mood differed between the two pregnant groups in the study. In the P/D group, those women who had previously experienced at least one miscarriage had significantly higher levels of depressed mood. A comparable effect of previous miscarriages on depressed mood was not obtained within the P/N-D group.

Seven P/D women reported having had a previous termination of pregnancy. A comparison of levels of depressed mood between these seven women and those women who had not experienced a previous termination did not obtain a significant difference in depressed mood. In the P/N-D group, as only two women had had a previous termination of pregnancy, it was not possible to analyze the effect of previous terminations on depressed mood.

Only four women in the P/N-D group were hospitalized during pregnancy and it was therefore not possible to investigate the effect of hospitalization on current levels of depressed mood in this group. In the P/D group the results indicated that hospitalization does not result in greater current levels of depressed mood.

9.4.3 Physical well-being

In the P/N-D group only three women had a current illness and therefore it was not possible to examine the effect of current illness on levels of depressed mood in this group. In the two other groups the results did not suggest that the presence of an illness other than diabetes was associated with increased levels of depressed mood. (See Table 9.8).
Table 9.8 Relationship between physical well-being and depressed mood (all 3 groups)

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td>Current illness yes</td>
<td>5</td>
<td>0.11</td>
<td>20.60</td>
</tr>
<tr>
<td>Current illness no</td>
<td>29</td>
<td>0.0</td>
<td>16.97</td>
</tr>
<tr>
<td>Current high tiredness yes</td>
<td>13</td>
<td>0.11</td>
<td>17.88</td>
</tr>
<tr>
<td>Current high tiredness no</td>
<td>21</td>
<td>0.11</td>
<td>17.26</td>
</tr>
<tr>
<td>Current low tiredness yes</td>
<td>13</td>
<td>0.11</td>
<td>19.85</td>
</tr>
<tr>
<td>Current low tiredness no</td>
<td>22</td>
<td>0.11</td>
<td>16.91</td>
</tr>
</tbody>
</table>
As only one woman in the P/D group and three women in the P/N-D group were currently experiencing symptoms of nausea it was not possible to investigate the effect of this factor. In terms of the effect of current tiredness, the analyses indicated that there was no effect of greater levels of current tiredness on current levels of depressed mood, within either the P/D or within the P/N-D group. Similarly, there was no effect of tiredness during the first trimester or sickness during the first trimester on current levels of depressed mood, within either the P/D or the P/N-D group. (See Table 9.8).

9.4.4 The effect of vulnerability factors

As discussed in Chapter 2, a number of factors have consistently been found to be associated with increased levels of depression in pregnancy. Some of these factors are general risk factors for depression as they have also been found to predict depression outside of pregnancy eg poor marital relationship, lack of social support and previous history of emotional problems. However, Chapter 2 also identified a number of pregnancy specific risk factors for depression such as worries about coping with the baby, health worries about labour and the baby, and lack of emotional attachment to the unborn child.

The other set of vulnerability factors that need to be considered are those factors that have been found to be associated with depression amongst patients with diabetes. In Chapter 1, this literature was critically reviewed, and the conclusion was reached that poor glycaemic control and feeling that diabetes was stressful had both been consistently found to predict increased levels of depression amongst patients with diabetes. In addition, poor adherence to the self-care regimen had been found to predict depression in some, but not all studies.

By combining the literature on depression in pregnancy and depression amongst patients with diabetes, it is therefore possible to construct a list of vulnerability factors that may be associated with depressed mood amongst pregnant diabetic women. (See Table 9.9).
Table 9.9 Potential vulnerability factors for predicting depressed mood

<table>
<thead>
<tr>
<th>Factors applying to all 3 groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous episodes of emotional problems.</td>
</tr>
<tr>
<td>Satisfaction with social support.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factors applying to the 2 pregnant groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of marital relationship during pregnancy.</td>
</tr>
<tr>
<td>Health anxieties about labour/the baby.</td>
</tr>
<tr>
<td>Confidence in one's ability to look after the baby.</td>
</tr>
<tr>
<td>Emotional attachment to the foetus.</td>
</tr>
<tr>
<td>Body image during pregnancy.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factors applying to the 2 diabetic groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic related stress.</td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic problems.</td>
</tr>
<tr>
<td>Regimen adherence.</td>
</tr>
</tbody>
</table>

9.4.4.1 Factors applying to all three groups

9.4.4.1.1 Previous episodes of emotional problems

Table 9.1 above showed the frequencies of women in each of the three groups who had experienced previous emotional problems, both within and outside the postnatal period. The numbers of women in each group who reported having experienced previous emotional problems during the postnatal period were too small to permit an analysis of its effect on current levels of depressed mood. As described above, the data from postnatal and non-postnatal episodes were therefore combined to create two categories: those who had ever sought medical advice for an emotional problem and those who had never sought medical advice for an emotional problem.

Using these combined categories three women in the P/D group, seven women in the N-P/D group and four women in the P/N-D group reported previous episodes of emotional problems. Clearly a comparison of current levels of depressed mood between those who had and those who had not experienced previous emotional problems could not take place within the P/D group or the P/N-D group as only three and four women respectively in each of these groups had previously experienced emotional problems. Within the N-P/D group where seven women reported previous episodes of emotional problems a non-parametric analysis was carried out. This analysis indicated that those N-P/D women who had previously experienced emotional problems currently had significantly higher current levels of depressed mood. (See Table 9.10).
Table 9.10  Relationship between previous emotional history and depressed mood. All 3 groups

<table>
<thead>
<tr>
<th>Experience previous episodes of emotional problems</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>n</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>0.22</td>
<td>14.50</td>
</tr>
<tr>
<td>no</td>
<td>32</td>
<td>0.0</td>
<td>9.25</td>
</tr>
</tbody>
</table>

Numbers too small to permit analysis

W=101.5
p=0.05
Additional analyses were carried out examining the association between having previously experienced emotional problems and currently experiencing BDI scores (cognitive-affective items only) that were indicative of at least mild levels of depression. (See Table 9.5 for frequencies of women in each group whose BDI scores were indicative of at least mild depression). These additional analyses reported in Table 9.11 indicate that previous emotional history had a different effect within the 2 diabetic groups than within the non-diabetic group. Within both of the diabetic groups previous emotional history was associated with current BDI scores exceeding the cut of point of greater than or equal to 10. In contrast, amongst the P/N-D women, no significant association was obtained between previous emotional history and having a current BDI score that exceeded the cut-off point of greater than or equal to 10.
Table 9.11  Relationship between previous emotional history and suggested diagnosis of current depression. All 3 groups

<table>
<thead>
<tr>
<th>Experienced previous episodes of emotional problems</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not depressed currently</td>
<td>Depressed currently</td>
<td>Not depressed currently</td>
</tr>
<tr>
<td>yes</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>no</td>
<td>29</td>
<td>3</td>
<td>14</td>
</tr>
</tbody>
</table>

Fisher's Exact  
\[ p = 0.05 \]  
\[ p = 0.03 \]  
\[ p = 1.0 \]

Subjects in each of the 3 groups were grouped into 2 categories. Scores on cognitive affective items indicative of at least mild depression / scores indicative of not being currently depressed. See Table 9.5.
9.4.4.1.2 Satisfaction with social support

In each of the three groups interviewed in this study, satisfaction with social support as measured by Sarason’s (1987) six-item questionnaire was significantly correlated with levels of depressed mood. Within each group those women who reported less satisfaction with their social support reported significantly higher levels of depressed mood. (see Table 9.12).
Table 9.12  Relationship between depressed mood and psychosocial risk factors.  All groups

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>P/D</th>
<th>N-P/D</th>
<th>P/N-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factors applying to all 3 groups</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction with social support</td>
<td>r = -0.45</td>
<td>r = -0.56</td>
<td>r = -0.71</td>
</tr>
<tr>
<td>n = 34</td>
<td>n = 24</td>
<td>n = 35</td>
<td></td>
</tr>
<tr>
<td>p = 0.01</td>
<td>p = &lt;0.01</td>
<td>p = &lt;0.01</td>
<td></td>
</tr>
<tr>
<td><strong>Factors applying to the 2 pregnant groups</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of marital relationship during pregnancy</td>
<td>r = 0.44</td>
<td></td>
<td>r = 0.34</td>
</tr>
<tr>
<td>n = 32</td>
<td>n = 35</td>
<td></td>
<td>p = 0.04</td>
</tr>
<tr>
<td>p = 0.01</td>
<td>p = &lt;0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health anxieties about the baby/labour</td>
<td>r = 0.47</td>
<td></td>
<td>r = 0.54</td>
</tr>
<tr>
<td>n = 33</td>
<td>n = 35</td>
<td></td>
<td>p = &lt;0.01</td>
</tr>
<tr>
<td>p = 0.01</td>
<td>p = &lt;0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confidence in one’s ability to look after the baby</td>
<td>r = 0.44</td>
<td></td>
<td>r = 0.34</td>
</tr>
<tr>
<td>n = 33</td>
<td>n = 35</td>
<td></td>
<td>p = 0.04</td>
</tr>
<tr>
<td>p = 0.01</td>
<td>p = &lt;0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional attachment to the foetus</td>
<td>r = 0.40</td>
<td></td>
<td>r = 0.18</td>
</tr>
<tr>
<td>n = 33</td>
<td>n = 31</td>
<td></td>
<td>p = 0.31</td>
</tr>
<tr>
<td>p = 0.02</td>
<td>p = 0.31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body image during pregnancy</td>
<td>r = -0.12</td>
<td></td>
<td>r = -0.46</td>
</tr>
<tr>
<td>n = 34</td>
<td>n = 33</td>
<td></td>
<td>p = 0.01</td>
</tr>
<tr>
<td>p = 0.50</td>
<td>p = 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factors applying to the 2 diabetic groups</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic problems</td>
<td>r = -0.39</td>
<td>r = -0.50</td>
<td></td>
</tr>
<tr>
<td>n = 34</td>
<td>n = 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p = 0.02</td>
<td>p = 0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived susceptibility to diabetic related pregnancy problems</td>
<td>r = -0.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p = 0.04</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetic related stress</td>
<td>r = 0.40</td>
<td></td>
<td>r = 0.51</td>
</tr>
<tr>
<td>n = 33</td>
<td>n = 23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p = 0.02</td>
<td>p = 0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of blood tests per week</td>
<td>r = -0.06</td>
<td></td>
<td>r = 0.01</td>
</tr>
<tr>
<td>n = 27</td>
<td>n = 22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p = 0.75</td>
<td>p = 0.98</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of recommended blood tests per week</td>
<td>r = 0.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>n = 24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p = 0.56</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9.4.4.2  Factors applying to the 2 pregnant groups

9.4.4.2.1 Quality of the marital relationship during pregnancy

The relevant subscale from Lederman (1984) Prenatal Inventory was used. Using this index, satisfaction with the marital relationship and depressed mood were found to be significantly associated within the two pregnant groups. The direction of these significant correlations indicated that those women who rated their relationship as more satisfactory experienced lower levels of depressed mood during pregnancy. (See Table 9.12).

9.4.4.2.2 Health anxieties about labour/the baby

The index of anxieties about labour and the well-being of the baby was taken from Lederman’s (1984) Prenatal Inventory. Within both of the pregnant groups there was a significant positive correlation between health anxieties and current levels of depressed mood. The direction of these correlations indicated that within both group, those women who were more concerned about labour, and the well-being of the baby, also had significantly higher levels of depressed mood. (See Table 9.12).

9.4.4.2.3 Confidence in one’s ability to look after the baby

Items from scale III of Lederman’s (1984) Prenatal Inventory were used to assess the woman’s confidence in her ability to look after the baby. Using this index, within both of the pregnant groups, those women who expressed greater concern about their ability to look after the baby, had significantly higher levels of depressed mood. (See Table 9.12).

9.4.4.2.4 Emotional attachment to the foetus

Condon’s (1993) index of antenatal attachment was used to assess the mother’s feelings about the baby. Within the P/D group emotional attachment to the baby was significantly associated with depressed mood, with those women who reported lower levels of attachment to the foetus reporting higher levels of depressed mood. In contrast, amongst the P/N-D women antenatal attachment was not found to be significantly associated with depressed mood. (See Table 9.12).
9.4.4.2 Body image during pregnancy

Kumar et al’s (1984) index of body image was used. Using this index a different pattern of results was obtained in the two pregnant groups. Amongst the P/N-D group, those women who reported a more negative body image were also more depressed. In contrast, amongst the P/D women, there was no significant association between body image and depressed mood. (See Table 9.12).

9.4.4.3 Factors applying to the 2 diabetic groups

9.4.4.3.1 Diabetic related stress

The correlation between diabetic related stress and depression was examined, using Factor 1 of Dunn’s ATT39 instrument as the index of diabetic related stress. A significant positive correlation between depressed mood and diabetic related stress was obtained within both the diabetic groups in the study. (See Table 9.12).

9.4.4.3.2 Perceived Susceptibility to diabetic problems

Within both of the diabetic groups those women who felt more susceptible to diabetic problems reported higher levels of depressed mood. (See Table 9.12). In addition, within the P/D group, the effect of perceived susceptibility to diabetic related pregnancy problems was also examined. This variable was also found to be significantly related to depressed mood, with those women who perceived themselves to be more susceptible to diabetic related pregnancy problems experiencing higher levels of depressed mood. (See Table 9.12).

9.4.4.3.3 Levels of self-care and adherence to the self-care regimen

The number of weekly blood glucose tests carried out was not found to be significantly related to levels of depressed mood in either of the two diabetic groups in the study. As discussed in chapter 6, in the P/D group, but not in the N-P/D group, it was possible to calculate the proportion of recommended weekly blood glucose tests carried out. A similar pattern of results was obtained using this adherence measure as was obtained with the number of weekly blood glucose tests, namely no significant association, with depressed mood was obtained. (See Table 9.12).
9.4.5 Stepwise multiple regression analyses

A series of multiple regression analyses were carried out to investigate the simultaneous effect of different factors on depressed mood scores. As with the multiple regression analyses carried out in Chapter 8, each factor was allowed to enter stepwise into the equation, only so long as its entry produced a significant increment in $R^2$ at the 0.05 level of significance. Three analyses were performed; the first analysed the role of the factors that were common to all three groups, the second considered the role of pregnancy related factors and the final analysis considered the role of diabetes related factors.

9.4.5.1 All three groups

The two factors that were common to all three groups and had been found to be significant predictors of depressed mood (ie satisfaction with social support and previous emotional history) were entered into the analysis. In addition, the effect of diabetes, pregnancy and the interaction between these two variables were also considered. The results of this analysis are shown in Table 9.13

Table 9.13 Stepwise Multiple Regression predicting depressed mood. All 3 groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error of B</th>
<th>95% CI for B</th>
<th>t</th>
<th>p</th>
<th>$R^2$ obtained at each step of the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support</td>
<td>-0.15</td>
<td>0.03</td>
<td>(-0.21, -0.09)</td>
<td>-4.97</td>
<td>&lt;0.001</td>
<td>0.21</td>
</tr>
<tr>
<td>Previous emotional history</td>
<td>0.06</td>
<td>0.06</td>
<td>(0.04, 0.28)</td>
<td>2.69</td>
<td>&lt;0.01</td>
<td>0.05</td>
</tr>
</tbody>
</table>

$R^2$ (final model) = 0.26, $F = 16.86$, df = 2, 87, $p = <0.001$ (2)

1 Variables have been listed in order of entry into the model.
2 F-ratio for model obtained in the final step of the analysis.

Table 9.13 indicates that the analysis as a whole was able to explain a significant proportion of the variance in depressed mood scores. Both the diabetes status and the pregnancy status of the individual failed to predict any significant variance in scores as did the interaction between these two factors. In contrast the two psychosocial factors were both significant predictors in the
regression analysis. Together these variables were able to predict over 25% of the variance in depressed mood scores when all three groups were combined together.

9.4.5.2 The two pregnant groups

In this analysis those psychosocial factors that had been found to be significant predictors of depressed mood in both pregnant groups were entered into the analysis; ie previous emotional history, satisfaction with social support, health anxieties; satisfaction with marital relationship and confidence in one’s ability to look after the baby. In addition, the diabetes status of the individuals was also included. The results are shown in Table 9.14

Table 9.14 Stepwise Multiple Regression predicting depressed mood. Both pregnant groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error of B</th>
<th>95% CI for B</th>
<th>t</th>
<th>p</th>
<th>R² obtained at each step of the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support</td>
<td>-0.17</td>
<td>0.04</td>
<td>(-0.25, -0.09)</td>
<td>-4.60</td>
<td>&lt;0.001</td>
<td>0.24</td>
</tr>
<tr>
<td>Previous emotional history</td>
<td>0.17</td>
<td>0.04</td>
<td>(0.09, 0.25)</td>
<td>-4.51</td>
<td>&lt;0.001</td>
<td>0.18</td>
</tr>
<tr>
<td>Confidence in one’s mothering ability</td>
<td>0.17</td>
<td>0.06</td>
<td>(0.05, 0.29)</td>
<td>2.90</td>
<td>&lt;0.01</td>
<td>0.06</td>
</tr>
<tr>
<td>Health anxiety about baby/labour</td>
<td>0.114</td>
<td>0.04</td>
<td>(0.06, 0.22)</td>
<td>3.79</td>
<td>&lt;0.001</td>
<td>0.04</td>
</tr>
</tbody>
</table>

R² (final model) = 0.52, F = 18.08, df = 4,60, p = <0.001

1 Variables have been listed in order of entry into the model.
2 F-ratio for model obtained in the final step of the analysis.

The model as a whole was statistically significant and was able to account for over 55% of the variance in depressed mood scores across the two pregnant groups. As with the previous analysis which considered all three groups of patients, social support and previous emotional history were both significant factors. In addition two factors related to pregnancy, (health anxieties about the baby and confidence in one’s mothering ability) were also able to account for a significant
proportion of the variance. The diabetes status of the individuals was not a significant factor in this analysis.

9.4.5.3 The two diabetic groups

In this analysis those psychosocial factors that had been found to be significant predictors of depressed mood in both diabetic groups were entered into the analysis; ie previous emotional history, satisfaction with social support, perceived susceptibility to diabetic problems and diabetic related stress. In addition, the pregnancy status of the individuals was also included. The results are shown in Table 9.15.

Table 9.15 Stepwise multiple regression analysis predicting depressed mood.

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Standard Error of B</th>
<th>95% CI for B</th>
<th>t</th>
<th>p</th>
<th>R² obtained at each step of the model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived susceptibility to diabetic problems</td>
<td>-0.20</td>
<td>0.06</td>
<td>(-0.32, -0.08)</td>
<td>-3.22</td>
<td>&lt;0.005</td>
<td>0.16</td>
</tr>
<tr>
<td>Previous emotional history</td>
<td>0.28</td>
<td>0.10</td>
<td>(0.08, 0.48)</td>
<td>-2.87</td>
<td>&lt;0.01</td>
<td>0.11</td>
</tr>
</tbody>
</table>

R² (final model) = 0.27, F = 10.09, df = 2,46, p = <0.001

1 Variables have been listed in order of entry into the model.
2 F-ratio for model obtained in the final step of the analysis.

This model was able to account for over 25% of the variance in depressed mood scores observed amongst the diabetic women. Again, previous emotional history was found to be a significant predictor of depressed mood scores, but in this analysis, satisfaction with social support did not enter into the model. Perceived susceptibility to diabetic problems was also found to be a significant predictor of depressed mood scores amongst the diabetic women in this study. The pregnancy status of the individuals was not found to account for a significant proportion of the variance in depressed mood scores.
Chapter 10
Discussion

This thesis has examined psychological aspects of pregnancy in women with insulin-dependent diabetes concentrating on two main areas; adherence to the self-care regimen and different facets of emotional adjustment. In addition to the target P/D group, the design of the study incorporated two control groups, namely a P/N-D group and also a N-P/D group. Questions about the impact of diabetes on the emotional adjustment to pregnancy were examined by comparing the P/D group to the P/N-D group. The inclusion of the N-P/D group allowed questions about the impact of pregnancy on adherence to the self-care regimen and on psychological adjustment to diabetes to be answered.

10.1 LIMITATIONS OF THE STUDY

The main limitation to the current study is sample size. However, this limitation needs to be put into context. With the exception of Barglow et al (1981), the current study had the largest sample of insulin-dependent patients studied during pregnancy, and it will be remembered that Barglow et al had neither a pregnant non-diabetic control group, or a non-pregnant diabetic control group included in their design. Given that the prevalence of pregnancy complicated by IDDM has been estimated as 0.2% of all pregnancies, (Connell et al, 1985), the current sample size should not be seen as atypically low.

Two additional points about the sample size need to be made. Firstly, the power calculations described in Chapter 4 indicate that the sample size was sufficiently large to be able to detect clinically meaningful differences in depressed mood between the three groups. Secondly, a coherent pattern of statistically significant results was obtained in the current study, and moreover, these results were congruent with the wider pregnancy and diabetes literatures. So, for example in the current study, the two diabetic groups differed in their blood glucose testing behaviour, and this result confirmed the earlier findings of Ruggiero et al (1993), whilst the two pregnant groups were found to differ in terms of Foetal Health Locus of Control, confirming the earlier finding of Sprito et al, 1990. Thus it is argued that the sample size, although small, was large enough for differences in psychological variables between the three groups to be detected.

However, the sample size used in the current study has limited the type of questions that can be answered. Specifically, with the exception of analyses on depressed mood and attachment to the foetus, the size of the sample did not permit multivariate statistical techniques to be used. These techniques would have allowed one to examine the simultaneous effect of a number of predictors...
on one particular dependent variable. It therefore remains theoretically possible that a given
significant univariate correlation obtained in this study was actually due to the effect of another
variable that correlated significantly with both of the variables considered in the univariate
correlation. Patterns of this type could not be tested in the current study. Therefore, if the study
were to be repeated, it would clearly be advisable to draw the sample from a larger number of
referring hospitals, in order to increase significantly the size of the sample.

Another effect of the low initial sample size was that a number of questions which only applied
to a sub-set of the initial sample (e.g. the effect of termination of pregnancy on a particular
variable) could not be answered because the number of patients involved became too small even
for using non-parametric techniques. Thus as discussed later on in this chapter, a full analysis of
the effect of different previous obstetric events on psychological adjustment could not be carried
out in the current study.

Sample size constraints also prohibited analyzing whether differences between the 5 referring
hospitals exerted a significant impact on any of the psychological variables. It is argued below,
that women in the pregnant diabetic group had generally optimistic beliefs about the likely
impact of diabetes on their pregnancy. However, it would have been extremely interesting to see
if there were significant differences in health beliefs, attitudes or behaviour between women in
the 5 different hospitals, and in turn, see if any observed differences could be linked to
differences in the way the clinics were managed or to the amount or the type of health
information that the women received. However, such analyses were beyond the scope of the
current study.

The sample interviewed was also restricted to caucasian women, as there was an insufficient
number of non-caucasian referrals to be able to analyze the impact of ethnic origin on any of the
psychological variables considered in the current study. Previous studies on psychological
aspects of diabetes (see Chapter 1), or on psychological aspects of pregnancy (see Chapter 2) do
not lead to the prediction that ethnic origin would have a significant impact on psychological
aspects of pregnancy amongst women with IDDM. However, the design of the current study did
not allow this issue to be addressed.

In each of the three groups, a number of women declined to take part in the study. Demographic
details of these women who declined to take part were only available for the pregnant non-
diabetic group, and this was a second weakness of the study. It is therefore possible that the non-
responders differed on demographic criteria, from the responders, and this effect could not be
adequately examined within the current study. However, the proportion of women who declined
to take part did not differ significantly between the three groups, and as discussed in Chapter 4, within each of the three groups, the proportion of non-responders was comparable to that reported in other studies.

A third weakness of the study was that in both of the diabetic groups a number of patients failed to complete the week of self-monitoring. Although a higher proportion of P/D women than N-P/D women failed to complete the self-monitoring forms, the proportion did not differ significantly between the two groups. Within the N-P/D group sample sizes were too small to compare those who had and those who had not completed the self-monitoring forms on demographic criteria. Within the P/D group such comparisons could be carried out and they did not suggest that the non-completers differed from the completers in age, parity or marital status. The data suggested that the rate of non-completers may have been increased amongst women in social class III, but due to the low numbers involved, the statistical significance of this pattern could not be calculated.

Given that the proportion of completers did not differ between the groups and also that within the pregnant diabetic group, the group of completers did not appear to differ significantly from the non-completers in terms of most demographic criteria, there is little to suggest that the drop-out from the study at the self-monitoring stage significantly skewed the adherence data. Furthermore, even if the rate of drop-out was increased amongst those in social class III, this effect would only be limited to the self-monitoring data where the drop-out occurred, rather than to the data set as a whole. Analyses in this study failed to find a relationship between social class and blood glucose testing, and this result fits in with the general lack of predictive power of demographic factors on adherence, Rosenstock (1985). This also suggests that the social class skewing that may have effected the self-monitoring data is unlikely to have exerted a dramatic influence on the pattern of results obtained.

A fourth limitation of the study relates to difficulties with some of the scales. As discussed in Chapter 4, a number of the scales had not been standardized on UK populations prior to the current study. In general it will become apparent throughout this chapter that the results obtained with most of the scales were congruent with those obtained with earlier American or Australian samples. There were however a few exceptions to this pattern, for example with the Identification with the Motherhood Role scale, (Lederman, 1984), where the scores obtained in the current study indicated lower levels of identification than those obtained in 2 American studies. It is suggested later on in this chapter that the wording of some of the items may have contributed to the lower levels obtained in the current study, but the important point is that the
general pattern of results (ie that experiencing a higher risk pregnancy does not impair the woman's capacity to identify with the motherhood role) confirms the earlier conclusion reached by Curry (1987). Even in the specific examples where the results differed from earlier studies, the overall pattern of findings was congruent with the wider literature. There is therefore no reason for concluding that the use of scales that have not been standardized on the UK population has critically skewed the results obtained in the current study.

The health belief model scales were specifically constructed for the current study and the internal consistency of some but not all of the subscales was low. However, it is argued later on in this chapter that the majority of those subscales that were found to be significant predictors of blood glucose testing behaviour had adequate internal consistency. Therefore the lower consistency of some of the subscales is unlikely to have impacted on the interesting patterns that emerged in the current study, namely that perceived benefits were significant predictors of behaviour amongst the pregnant diabetic women, whilst perceived barriers were significant predictors amongst the non-pregnant diabetic women.

Another limitation relating to the scales was that with the exception of a few open ended items about the reasons underlying regimen adherence, the remainder of the questions posed in the current study used structured questionnaire items. As discussed in Chapter 4, only the health belief model subscales were written for the study, and therefore descriptions of the range of scores obtained with all the other questionnaires were available from previous studies that have used these scales. Undoubtedly the fact that previous studies had reported results with all of these questionnaires facilitated the analysis of the results in the current study, as for all of these scales it was possible to compare the results with those obtained in previous studies using the same scale. However, relying entirely on structured questionnaire items also has its disadvantages, and if the study was to be repeated it would certainly be fruitful to include more opportunities for the women to give open-ended answers to questions about how they managed their diabetes during pregnancy. Smith (1995) has recently described the use of qualitative methods in the analysis of the transition to motherhood, and a repeat of the current study could adopt some of the methods that he has described.

A final limitation of the study was that in all three groups women were only interviewed once. Clearly prospective studies following up women from before they conceive through to the postnatal period are not practicable. However, it would have been highly desirable to interview the women more than once during pregnancy in order to investigate how different facets of adjustment changed throughout the course of pregnancy. Given the enormous geographical area
from which the pregnant diabetic women were recruited, it was beyond the scope of this study to do so.

As the women were only interviewed once, it was not possible to address questions of causality. So, for example, with the observed significant correlation between anxieties about the health of the baby and depressed mood discussed in earlier chapters, it was not possible to unravel the causal direction of this relationship. In addition, the fact that a cross-sectional design was used meant that the more dynamic notion of the inter-relationship between cognitions and behaviour incorporated into the SRM could not be investigated. However, despite the limitations of only interviewing the women once, it is argued that the size of the current sample, coupled with the wealth of data gathered in this study, justifies the claim that it is a unique and valid data set.

If the study was to be repeated though, it would certainly be worthwhile to use a longitudinal design, and follow up the pregnant women during pregnancy right the way through to the postnatal period. It will be recalled that recent studies on postnatal depression have suggested that between 25-40% of cases of postnatal disorder actually started during pregnancy, (Whiffen, 1992). It is only by adopting a longitudinal design that the question of the relationship between pregnancy and postnatal emotional functioning can be addressed amongst pregnant women with diabetes.

10.2 THE IMPACT OF PREGNANCY ON WOMEN WITH DIABETES

10.2.1 Medical aspects of diabetes

The two diabetic groups were closely matched in terms of disease duration and severity of their diabetes. This means that any differences in psychological functioning are unlikely to be due to underlying differences in disease severity between the two diabetic groups. Only a few women in either group had experienced diabetic complications, but the majority in both groups had at times experienced problems with glycaemic control.

In Chapter 1 the link between adherence and glycaemic control was discussed. The conclusion was reached that it was not only levels of adherence but also other factors such as the appropriateness of the regimen prescription, individual differences in responsiveness to insulin and previous levels of diabetic control that determined the extent to which behavioural changes resulted in changes in glycaemic control. In the context of the current study, it was not therefore possible to analyze why glycaemic control differed significantly between the two diabetic
groups; regimen behaviour was only assessed for one week, data on prior levels of glycaemic control were not available and it was not possible to assess the appropriateness of the regimen.

However, the current study was able to address the question of whether the actual levels of glycaemic control differed between the two diabetic groups. Current blood sugar levels, as assessed by pre-prandial blood tests indicated that the P/D group were in better glycaemic control than the N-P/D group. Mean pre-prandial blood glucose levels of the P/D group were within the recommended limits (mean value = 5.42 mmol/l, SD=1.49) whilst mean values of the N-P/D group marginally exceeded the limit of 7 mmol/l (mean = 7.01, SD=2.26). Furthermore the results suggested that blood glucose levels were significantly more variable amongst the N-P/D than the P/D group, which also suggests poorer glycaemic control amongst the N-P/D women.

Results from the open-ended questions about the regimen tied in with these findings. When asked how their diabetes differed during pregnancy to how it was before, the most frequently cited response was that it was currently much better controlled compared to how it had been prior to pregnancy. Clearly, the P/D women were aware of the improvements in glycaemic control that had occurred during pregnancy.

10.2.2 Health beliefs about diabetes

As discussed in chapter 1, the plethora of different health belief scales makes comparison between studies difficult. Not only do the different scales ask radically different questions, but sometimes indices such as perceived barriers may be rated in terms of the frequency of occurrence, (e.g. Glasgow et al, 1986), whereas other scales assess agreement/disagreement with relevant statements (e.g. Webb et al., 1982). It is therefore difficult to compare a given absolute score obtained with a particular health beliefs component in this study, to scores obtained in previous studies. However, it is still possible to undertake broadly based comparisons, to see if, for example, pregnant diabetic women tend to believe that the regimen is or is not reasonably beneficial, whether they report high or moderate levels of perceived susceptibility, etc.

Previous studies have suggested that patients with diabetes rate the diabetes self care regimen as being very beneficial. (Webb et al, 1982; Bradley et al, 1984). Comparable results were obtained in this study as mean item scores on the perceived benefits scale suggest that women in both of the diabetic groups thought the regimen was very beneficial in preventing the range of potential problems assessed by the scale. (See Table 5.17). Ratings on the scale did not differ between the two diabetic groups indicating that pregnancy was not associated with a significant shift in beliefs about the potential benefits of the regimen.
This tendency for patients with diabetes to report positive beliefs about the self-care regimen also extends to perceptions of barriers to adherence. Both Glasgow et al (1986) and McCaul et al (1987) found that subjects gave low to moderate ratings on scales assessing perceived barriers to adherence and a similar pattern was obtained in the current study. As with the perceived benefits scale, no significant difference was found between the two diabetic groups, indicating that pregnancy was not associated with a significant re-appraisal about potential barriers to regimen adherence.

Ratings for perceived benefits and perceived barriers were then compared. The results demonstrated that within both groups, the women believed that the benefits of the regimen significantly outweighed any possible barriers to adherence, matching the earlier findings of Bradley et al (1984) on this question.

The findings obtained with the perceived susceptibility and perceived severity subscales also indicate a pattern of constancy in health beliefs between the two diabetic groups. When compared to the health beliefs of the N-P/D women, the P/D women did not rate themselves as more susceptible to kidney disease, eye problems, hyperglycaemia or daytime hypoglycaemia. They did however, feel significantly more susceptible to night-time hypos. This shift in perceived susceptibility is a realistic assessment given the greater frequency of night-time hypos occurring during pregnancy, (Drury et al, 1986).

Median susceptibility scores reported in Table 5.18 indicate that it was only with respect to difficulty anticipating hypos amongst the P/D group, that the women reported even moderate levels of susceptibility. In contrast, Bradley et al (1984) using a different scale reported high levels of perceived susceptibility to hypoglycaemia and to eye problems amongst a group of patients with IDDM. The age range of Bradley et al’s sample was considerably older (patients up to 59 years were included in the study, but no mean age was stated) than those in the current study. Given that the frequency of all potential complications of diabetes increases with greater disease duration (see Chapter 1), this difference in age structure of the two studies may have contributed to the higher levels of perceived susceptibility reported by Bradley et al.

Whilst the women in both groups did not feel highly susceptible to complications of diabetes, median scores reported in Table 5.17 indicate that the women in both groups did rate all potential problems of diabetes as serious. In this respect, the results parallel those reported by Bradley et al (1984). Pregnancy was not associated with shifts in beliefs about the perceived severity of different diabetic complications when they were considered as a group, or, with one exception, to
the perceived severity of specific diabetic complications. The single exception to this pattern was beliefs about kidney disease, where pregnant women rated this complication as less serious. There is no obvious reason for this difference in perceived severity beliefs between the two groups. It is possible though that as kidney disease has the potential to be fatal, it is particularly threatening to contemplate during pregnancy, leading the P/D women to deny the potential severity of the complication.

The fact that in this study women in both groups rated the potential complications of diabetes as serious needs to be counterbalanced by their perceived susceptibility to these problems. Perceived susceptibility to all the potential microvascular complications of diabetes was low, and thus the women did not perceive themselves currently to be at high risk. It is therefore not surprising that scores on the general health motivation scores indicated that women in both groups expressed relatively low levels of concern about their health (See Table 5.17).

Taking together the findings obtained with all the different components of the health belief model, two points emerge. Firstly, the results obtained with the N-P/D group tie in with those obtained in earlier studies as the N-P/D women rated themselves as experiencing low levels of barriers to adherence, low susceptibility to complications, etc. Secondly, the comparisons of diabetes related health beliefs between the 2 diabetic groups do not suggest that a radical shift occurred in pregnancy. Instead, the general picture to emerge from these comparisons was one of similarity of health beliefs about diabetes between the P/D and N-P/D women.

10.2.3 Diabetes specific indices of adjustment

A similar pattern emerges when scores on the different diabetes indices are examined. These indices assessed attributions of control of diabetes, treatment satisfaction, family support for diabetes and diabetic related stress.

McCaul et al (1987) in a combined adolescent and adult sample of patients with IDDM reported high levels of treatment satisfaction. Mean scores reported in Table 5.17 using McCaul et al's scale indicate that within both groups in the current study women reported being very satisfied with their treatment. Pregnancy was not associated with any shift in treatment satisfaction on the part of the women in the current study.

The attributions of control of diabetes scales assess another facet of how the women are responding to their treatment regimen during pregnancy. As explained in Chapter 4, Bradley et al's (1984) perceived control of diabetes scale was adapted for use in this study as some of the
hypothetical situations contained in the original scale could potentially confound the effects of pregnancy with the effects of changes in diabetic control. As the scale was adapted, comparisons of absolute scores obtained in this study with those reported by Bradley et al could not be undertaken. However, it is interesting to note that within each of the two diabetic groups the highest importance was attributed to internality, followed by personal control. This rank ordering of factors is the same as that reported by Bradley et al, in their description of the scales, and indicates that in general, insulin treated patients tend to attribute diabetic outcomes to factors over which they have some control, rather than to external factors or to chance.

The two diabetic groups differed significantly from each other in terms of two of the 6 subscales, namely treatment and medical control, (See Table 5.20). The P/D group attributed more importance than the N-P/D group, to both of these subscales, ie they thought that the treatment and the doctor exerted a greater effect on diabetic outcomes, than the N-P/D group did. Additional analyses reported in Table 5.21 indicated that attributing greater importance to the treatment and to the doctor did not extend across all the hypothetical situations, but only in terms of avoiding hyperglycaemic episodes.

The enormous increase in insulin requirements for IDDM women during pregnancy were described in Chapter 3. Throughout pregnancy P/D women, in consultation with the diabetologist, need to increase the required dosage, in order to avoid hyperglycaemic episodes. Given this pattern of physiological changes throughout pregnancy, it is not surprising that the P/D women attributed greater importance to the doctor and to the prescribed treatment in avoiding hyperglycaemic episodes.

Findings with the Diabetes Family Behaviour Checklist that assessed family support for adherence to the regimen were more complex. Women in both groups reporting receiving moderate levels of positive family support combined with low levels of negative family involvement. This pattern parallels earlier findings of Schafer et al (1986) and McCaul et al (1987). However, a number of further points need to be made. Firstly, the internal consistency of the negative scale was low, which suggests that the measure is not a coherent index. Secondly, the scale was originally designed for use with adolescents (see Schafer et al, 1983) and although it was subsequently used with adults (Schafer et al, 1986; McCaul et al, 1987), some of the items reflect a level of family support that may be more appropriate for an adolescent rather than an adult. Thirdly, other questions may not have been entirely relevant to the type of regimen that the women were following. For example one question asked if family members nagged about following the diet or helped with taking injections on time, but the majority of women in the study did not feel that they were on a particular diet, and most used quick acting insulin which
gave them flexibility in the timing of their injections). Thus the Diabetes Family Behaviour Checklist may not have provided an accurate assessment of family support for the regimen in the current study.

As discussed in Chapter 4, new scales were not specifically constructed for this study as it would make it much harder to compare the results of the current study with earlier studies on the role of family support. However, before it is concluded that pregnant women with IDDM received only moderate levels of support for their diabetes it would be necessary to develop an instrument that accurately assesses the types of support that women with IDDM find useful during pregnancy.

Diabetes related stress was assessed using factor 1 of the ATT39, an instrument that assessed emotional adjustment to diabetes. Mean item scores obtained with this instrument indicated that women within both groups experienced low to moderate levels of diabetes related stress. In the papers describing the development and use of the ATT39 (Dunn et al 1986; Dunn, 1986) mean scores for particular scales were not provided thus it was not possible to compare results obtained in this study with these earlier reports. Other studies using Factor 1 of the ATT39 are also not available. However, Duran et al (1995) recently reported results with another instrument assessing diabetes related stress. Although this instrument consisted of different items, and also the sample included IDDM and NIDDM patients, it is interesting to note that Duran et al also reported low to moderate levels of stress. In contrast, results with another new instrument, the Problem Areas in Diabetes Survey, PAID) have produced rather different findings. Scores obtained with the PAID suggested a higher level of diabetic related distress in their combined IDDM and NIDDM sample than those obtained by Duran et al, or in the current study. For example, in Polonsky et al’s study, 60.2% of the subjects reported that they were currently experiencing at least one serious diabetes related problem.

There is no simple explanation for the different pattern of results obtained with these studies. The samples interviewed in Polonsky et al, and Duran et al, were broadly comparable in terms of disease type, disease duration and levels of subjects experiencing diabetic complications. However, average levels of glycosylated haemoglobin were high in Polonsky et al’s sample, (mean HbA1 =10.7 (SD=2.1), but unfortunately were not available in Duran et al’s study. Given that Polonsky et al reported that PAID values were significantly correlated with levels of glycaemic control, the poor glycaemic control observed amongst Polonsky et al’s patients may have contributed to the high observed levels of diabetic related distress.

When the findings using these different indices are combined it is clear that previous studies have demonstrated that patients with diabetes tend to report a relatively positive outlook about their disease. The current study accords with this pattern as women in both groups were relatively optimistic about their diabetes. Levels of diabetic related stress were not high, both groups gave low weightings to chance as a factor that determined diabetic outcomes and reported high levels of satisfaction with their diabetic treatment. Just as pregnancy was not found to be associated
with significant shifts in health beliefs about diabetes, the results in this section indicate that pregnancy was not found to be associated with significant shifts in any of the other diabetes specific predictor variables. The shift in perceived control of hyperglycaemia was an exception to this pattern, but this can be seen to be a small and specific change in response to a particular physiological demand of pregnancy.

10.2.4 The blood glucose testing regimen

10.2.4.1 Levels of blood glucose testing

Ruggiero et al (1993) reported very high levels of blood glucose testing adherence during pregnancy amongst a group of women with IDDM or NIDDM, with subjects reporting a mean adherence score of 94% to this component of the regimen. In the current study, following the recommendations of Glasgow (1991) a number of different indices of blood glucose testing were assessed, namely retrospective self-report and current self-monitoring. The results obtained with these different indices were consistent. Median score on the retrospective self-report indicated that women carried out blood tests every day and moreover these scores were available for nearly all of the women in the sample. Similarly the concurrent self-monitoring scores (which were only available for a smaller subset of the sample) indicated that on average the pregnant women carried out over 100% of the recommended number of weekly blood glucose tests. Taken together, these results clearly demonstrate that as with Ruggiero et al, the P/D women performed very high levels of blood glucose testing.

Ruggiero et al (1993) did not include a non-pregnant diabetic group in their study design, so it was not possible to assess whether rates of blood glucose testing were significantly higher amongst pregnant diabetic women than amongst non-pregnant diabetic women. However, it was possible to address this question in the current study, and a number of separate findings clearly suggest that a significant shift in behaviour occurred during pregnancy. In comparison to the N-P/D group, the P/D women carried out significantly more blood glucose tests and wrote down the results of these tests more frequently. Furthermore, retrospective self-report of how many blood glucose tests were carried out prior to the current pregnancy confirmed the conclusion that blood glucose testing behaviour shifted dramatically during pregnancy.

Earlier studies discussed in Chapter 1 have suggested that self-monitoring reports of blood glucose testing during pregnancy may be unreliable (Langer and Mazze, 1986), although other studies have questioned this conclusion (Gonder-Frederick et al, 1988). However, in this study the self-monitoring index and the self-report index indicate that the P/D women carry out more
blood glucose tests than the N-P/D women, and within the P/D group the comparison of the pregnancy self-report with the prior to pregnancy self-report index additionally suggests a higher frequency of testing during pregnancy. Taken together these findings strongly support the conclusion that blood glucose testing behaviour did increase during pregnancy. On a methodological point, the current study also adds weight to Glasgow’s (1991) argument about the need to include more than one measure, in order to be able to discern patterns of regimen behaviour.

Each of these behavioural measures has limitations. With the self-monitoring measures there is the danger of a reactive effect, i.e., subjects altering their behaviour because they have been asked to fill-out the self-monitoring forms for the week (Meichenbaum and Turk, 1987). However, in the current study the women were specifically asked not to alter their behaviour during the week of self-monitoring (See Appendix C 1 for patient instruction sheet). Although this may not have entirely eliminated a reactive effect, any effect would have operated in both diabetic groups, and thus the results from the self-monitoring data in the current study clearly suggest that the pregnant diabetic women carried out more blood tests per week than the non-pregnant diabetic women.

Self-report assessment of adherence to the diabetic regimen tends to under-estimate the extent of non-adherence (Glasgow et al, 1985). Yet the fact that a difference on the self-report measures was obtained, and that within the pregnant diabetic group a shift pre to during pregnancy was observed, strongly suggests that a behavioural shift occurred during pregnancy.

The two diabetic groups also differed in terms of regimen recall; a significantly larger proportion of the P/D group recalled the details of their blood glucose testing regimen than the N-P/D group. In terms of failure to recall the blood glucose testing prescription it was not possible to differentiate those women who had been prescribed a regimen but could not recall it, from those who had never been given specific advice. Given the significant shift in terms of the frequency of testing that occurred during pregnancy, it is possible that women take more care about remembering the details of their blood glucose testing regimen when they are pregnant. However, it is also possible that the behaviour of the health care provider shifts and they adopt different strategies for ensuring that the pregnant patient is fully aware of the regimen details. Before any firm conclusions on this point can be made further studies are needed that assess the health care provider’s behaviour, as well as that of the patient. Only in this way can the relative importance be assessed of lack of recall as opposed to lack of being properly explained the exact details of the regimen.
10.2.4.2 Identifying predictors of blood glucose testing

10.2.4.2.1 Psychosocial factors

In Chapter 1, the findings on different psychosocial predictors of regimen adherence were described and the point was made that different studies frequently report inconsistent and conflicting results. For example, whilst Schafer et al (1986) reported a significant negative correlation between the frequency of negative family behaviours about diabetes and blood glucose testing, McCaul et al (1987), using the same index found that the two variables were not significantly related. Similarly, whilst Becker and Rosenstock (1984) and Alogna (1980) found no consistent relationship between locus of control subscales and regimen behaviour, Schlenk and Hart (1984) reported a significant correlation between internal attributions of control and regimen adherence.

In the current study the role of a number of different psychosocial factors were considered including locus of control subscales, foetal health locus of control subscales, family support for diabetes and depressed mood. (See Table 6.8) These different factors were included because they had been found to be significant predictors of adherence in at least one previous study. From Table 6.8 it can be seen that none of these different psychosocial factors were found to be related to blood glucose testing in either of the diabetic groups. This pattern of results is obviously surprising given that in at least one study, each of the variables had previously been found to be significantly related to adherence. However, sample sizes in this study were small, which reduces the power of the statistical test to detect a significant difference. Furthermore, as argued above, inconsistent results, even when using identical scales, frequently occur in studies of regimen adherence, and thus the pattern of results obtained in the current study should not be regarded as atypical.
10.2.4.2.2 The utility of the health belief model

In the current study, the association between the different components of the health belief model and blood glucose testing was examined. Table 10.1 summarizes those factors that were found to be significantly related to blood glucose testing in the current study. It will be recalled that amongst the P/D women a self-care measure (the number of weekly blood tests) and an adherence measure (the proportion of recommended weekly blood tests) were calculated. In contrast, amongst the N-P/D women it was only possible to calculate the self-care measure as nearly 50% of these women could not recall the details of the regimen that they had been prescribed.

Table 10.1 Summary of predictor variables that were significantly correlated with the adherence measure and the self-care measure of blood glucose testing. P/D and N-P/D groups

<table>
<thead>
<tr>
<th></th>
<th>P/D</th>
<th>N-P/D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy</td>
<td>Self-efficacy for blood glucose testing</td>
<td>Self-efficacy for blood glucose testing (self-care)</td>
</tr>
<tr>
<td></td>
<td>(self-care)</td>
<td>General health motivation (self-care)</td>
</tr>
<tr>
<td>Perceived</td>
<td>Perceived severity (adherence)</td>
<td>Perceived barriers to blood glucose testing (self-care)</td>
</tr>
<tr>
<td>severity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived</td>
<td>Perceived benefits blood glucose testing</td>
<td></td>
</tr>
<tr>
<td>benefits</td>
<td>(adherence)</td>
<td></td>
</tr>
<tr>
<td>blood</td>
<td>Pregnancy specific perceived benefits</td>
<td></td>
</tr>
<tr>
<td>glucose</td>
<td>blood glucose testing (adherence)</td>
<td></td>
</tr>
<tr>
<td>testing</td>
<td></td>
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</tbody>
</table>

It can be seen from Table 10.1 that within the P/D group the health belief model variables were significant predictors of the adherence measure, and in fact only one significant correlation with the self-care measure was obtained, namely the correlation with self-efficacy beliefs. In contrast, a number of significant correlations between health beliefs and the self-care measure were obtained within the N-P/D group.

To explain this pattern it is necessary to consider the details of the regimen that women have been prescribed in each group. Clearly, the discrepancy between the self-care measure and the adherence measure depends on how wide a range of scores have been prescribed. If, for example all the women in the P/D group had been advised to carry out 28 blood tests per week and they all actually carried out 14, then all the women would have had an identical adherence score (50%) and also an identical self-care score (14 tests per week). This can be compared to a hypothetical example where half of the women were advised to carry out 28 blood tests per week and half were advised to carry out 7 blood tests per week, but yet again all the women carried out 14 blood tests per week. In this second example adherence scores would range from 50% to 200%, but the self-care score would remain constant at 14 blood tests per week.
Figure 6.1 displays the number of weekly blood tests that women in each group had been recommended. From this figure it can be seen that recommendations amongst the P/D women varied from 9 weekly tests to 49 tests, whilst those for the N-P/D group varied between 7 and 26. Given this enormous range in recommendations within the P/D group, simply measuring the number of weekly tests may provide a misleading assessment of how the women are responding to their individual testing recommendations. In turn this enormous range in the number of recommended tests also provides an explanation of why the health belief model variables were significantly correlated with the adherence measure, (which in effect accounts for this variation in recommendations) rather than the self-care measure of the number of weekly blood tests.

A number of additional points need to be made. Firstly, even though recommendations were less varied within the N-P/D group than within the P/D group, there was still quite a considerable range (ie from 7 to 26). However, nearly 50% of the women in the N-P/D group could not recall their recommendations. It is theoretically possible that in a situation where people are unsure what recommendations they should be following, the absolute level of behaviour is influenced by the health beliefs. If, for example, two women in the N-P/D group were both unsure about details of the recommendations, it is possible that the woman who thought that blood testing was highly beneficial would carry out more blood tests per week than the woman who thought that testing was only moderately beneficial. In the absence of specific recommendations, (ie the situation that applied to a large proportion of the N-P/D women) there may be a closer fit between absolute levels of behaviour and health beliefs than there is in the situation where recommendations are recalled but vary significantly between individuals (ie the situation that applied in the P/D group).

Secondly, as described in Chapter 4, the health belief model questionnaires were written for this study, and therefore measures of internal consistency for the different subscales were not known at the outset. In terms of the components listed in Table 10.1, with the exception of 2 subscales (perceived severity and the pregnancy specific perceived benefits of blood glucose), acceptable levels of internal consistency were obtained with the other components. Therefore, with the exception of the results obtained with perceived severity and with the pregnancy specific perceived benefits of blood glucose testing, it is not necessary to question the reliability of these findings reported in Table 10.1.

In the current study perceived severity was found to be significantly correlated with adherence to blood glucose testing amongst the pregnant diabetic women. As described in Chapter 4, the Cronbach alpha score of the perceived severity was 0.6 indicating quite low levels of internal consistency. Given the range of different possible diabetic problems included in this subscale (eg
from problems anticipating hypos to kidney and eye failure) it is not surprising that a relatively low internal consistency score was obtained.

Additional analyses examined the relationship between each of the particular medical problems and adherence amongst the pregnant diabetic women (see Table 6.10). The findings strongly suggested that it was not perceived severity to all diabetic problems, but rather to problems with hypoglycaemia, that predicted blood glucose testing during pregnancy. If the argument had been made that perceived severity of all complications predicted levels of adherence, then the low internal consistency of the perceived severity subscale would have undermined the conclusion. However, as it was argued that it was perceived severity to particular diabetic complications (i.e., hypoglycaemia) that was the critical predictor, then the low internal consistency scores of the perceived severity subscale is not so problematic.

The other significant predictor of adherence detailed in Table 10.1 that had a low level of internal consistency was the pregnancy specific perceived benefits of blood glucose testing subscale. As the Cronbach alpha score for this scale was 0.64 obviously the results obtained with this subscale must be interpreted with caution. However, as will be discussed below, 2 general patterns emerged from Table 10.1; perceived benefits as opposed to barriers were better predictors of adherence amongst the pregnant diabetic women and secondly, regimen specific subscales were better predictors than whole regimen subscales. Therefore even though the pregnancy specific perceived benefits of blood glucose testing scale had low internal consistency, the results obtained with this scale were actually congruent with both of these patterns. Furthermore, as discussed below, both of these patterns have also been observed in a number of other studies. This therefore allows one to be more confident in the result with this subscale, despite its less than adequate level of internal consistency.

There were other components of the health belief model that did not significantly predict levels of blood glucose testing in either of the 2 diabetic groups (See Table 6.9). Some of these variables had very low levels of internal consistency (e.g., Cues-Whole Regimen/Blood glucose testing and Perceived Barriers to the Whole Regimen). It is therefore possible that if scales with greater internal consistency had been used that these components of the health belief model would also have been found to be significantly correlated with levels of blood glucose testing. The very low Cronbach alpha scores of the cues subscale is particularly noteworthy indicating very low consistency between the internal cues (i.e., perception of symptoms) and the external cues (i.e., reminders from other people). Although Becker and Rosenstock (1984) suggested that both types of prompts should be included in the ‘cues to action’ subscale, the very low internal
consistency scores obtained in this study suggest that it would be useful to assess internal and external cues separately.

Results obtained with self-efficacy beliefs are also noteworthy. In contrast to the other health belief model variables, perceived efficacy to the blood glucose testing regimen was significantly correlated with the self-care measure, but not with the adherence measure, amongst the P/D women. There is no obvious explanation for this finding. However, a possible reason for this pattern is that 4 of the 8 questions (i.e., questions 1-4) assessed efficacy beliefs about absolute levels of behaviour. In contrast, only 1 question (question 5) concerned efficacy beliefs about adhering to doctor’s recommendations. Given that a larger number of questions were assessing efficacy beliefs about absolute levels of behaviour, this may explain why it was the self-care index, as opposed to the adherence measure that was significantly correlated with the self-efficacy scores amongst the P/D women.

In Chapter 1, following Glasgow and his team’s work, the need to distinguish between self-care and adherence measures of adherence was discussed at length. In Chapter 3 when the rationale for the study was given, it was argued that the assessment of the regimen in previous studies of pregnant women with IDDM was inadequate because they had failed to incorporate this distinction into the study design. In the current study, if the details of the regimen prescriptions had not been obtained from the women, and absolute levels of blood testing had been the only index used, none of the significant correlations with the health belief model variables would have emerged in the P/D group. Thus the results of this study demonstrate the importance of the methodological points that Glasgow and his team have made about the measurement of regimen behaviour.

Although health belief model variables were significant predictors of behaviour within both groups, with the exception of self-efficacy beliefs, different variables correlated with behaviour within the two diabetic groups. (See Table 10.1). Each group will be considered in turn.

Firstly amongst the P/D women, Table 10.1 shows that the perceived benefits of the regimen and the pregnancy specific perceived benefits were both related to blood glucose testing. The specific direction of these correlations indicated that the more women believed that the regimen was beneficial for their own health or for the health of the baby, the higher the proportion of recommended blood glucose tests they carried out. Although perceived benefits is an essential component of the health belief model, only one study of adult patients with IDDM has reported that it is significantly related to regimen adherence (Brownlee-Duffeck et al, 1987). Furthermore
Brownlee-Duffeck et al's findings need to be interpreted with some caution as a composite measure of adherence was used, rather than separately assessing each regimen area.

The second significant predictor obtained amongst the P/D group indicated that those women who rated diabetic problems as more serious carried out a higher proportion of recommended blood glucose tests. Additional analyses indicated that it was not the perceived severity of long-term complications that correlated significantly with levels of blood glucose testing, but the perceived severity of different aspects of hypoglycaemia that were critical, (See Table 6.10).

Although numerous studies with NIDDM patients have reported that beliefs about perceived severity are significantly related to different aspects of regimen adherence (e.g. Cerkoney and Hart, 1980; Alogna, 1980; Harris et al, 1985), none of the studies that have examined this question amongst patients with IDDM have reported a significant effect of perceived severity amongst IDDM patients (e.g. Webb et al 1982; Brownlee-Duffeck et al, 1987). Perceived severity of different aspects of hypoglycaemia were the specific factors relating to levels of blood glucose testing amongst the P/D women. Given that the insulin demands of the women change throughout pregnancy, patients are constantly having their prescriptions altered and therefore there is an increased risk of hypoglycaemic episodes. It is therefore possible that specific beliefs about the perceived severity of hypoglycaemia have an impact on blood glucose testing during but not outside of pregnancy.

It is important to note that the general pattern of results obtained from the bi-variate correlations tied-in with the open-ended responses that the P/D women gave about their current motivation for regimen adherence. Out of 37 women who answered the open-ended items, 35 said that their major current motivation was the desire to produce a healthy baby. Given that this is the overriding motivation, it is not surprising that the more the women felt that the blood glucose regimen helped during pregnancy or the more serious they rated hypoglycaemia, the more blood glucose tests they carried out.

Table 10.1 demonstrates that a different pattern of predictors was obtained within the N-P/D group. Neither the potential benefits of the regimen, or the perceived severity of diabetic problems were related to blood glucose testing. Instead general health motivation was a significant predictor of blood glucose testing amongst the N-P/D women. Only one other study, Schlenk and Hart (1984) has examined the role of general health motivation as a predictor of regimen adherence amongst patients with IDDM, and they found no significant effect of this factor. However, Schlenk and Hart assessed the extent to which patients valued their health, and the uniformly high values given by almost all the sample would have reduced the likelihood of
obtaining a significant correlation with regimen adherence. In contrast in the current study, general health motivation was assessed in a different way. Using a question derived from Harris et al’s (1987) questionnaire, subjects were asked how much they worried about their health. Subjects’ scores on this variable varied across the whole range of possible scores, and N-P/D subjects who worried more about their health were found to carry out a higher number of weekly blood glucose tests.

This finding that general health motivation was a significant predictor of blood glucose testing amongst the N-P/D women tied in with the open-ended responses that they gave about current motivation for regimen adherence. Whereas nearly all the P/D women said that their primary motivation was the well-being of the baby, 15 of the 23 women mentioned their own health and 16 mentioned avoiding complications as major reasons motivating them to adhere to the regimen. Given this difference in motivation between the two diabetic groups, it is not surprising that general health motivation was a significant predictor of blood glucose testing amongst the N-P/D women, but not amongst the P/D women.

The other significant predictor of blood glucose testing amongst the N-P/D women was the perceived barriers to blood glucose testing. It is important to re-iterate that the two diabetic groups did not differ in terms of levels of perceived barriers to glucose testing, so for example the P/D women did not rate their blood glucose tests as less painful or as interfering less with their day to day activities. However, whereas within the P/D group the barriers score was not significantly associated with levels of testing, amongst the N-P/D women higher levels of perceived barriers was significantly correlated with a reduced level of blood glucose testing. Furthermore, a number of other studies such as McCaul et al (1987), Schafer et al (1986) and Lloyd et al (1993) have also demonstrated that perceived barriers are related to blood glucose testing behaviour. These studies therefore indicate that the finding observed with the N-P/D women is consistent with the wider literature.

A very interesting pattern therefore emerged in terms of predictors of blood glucose testing; amongst the P/D women the perceived benefits of the regimen for their own health and for the health of the baby were significant predictors of behaviour, whereas the perceived benefits scale was not a significant predictor for the N-P/D women. In contrast, the opposite pattern held with respect to perceived barriers in that it significantly predicted behaviour amongst the N-P/D women, but not amongst the P/D women. Given that studies of non-pregnant IDDM patients have tended to indicate that perceived barriers are more frequently associated with regimen adherence than perceived benefits, the results obtained in this study raise the possibility that during
pregnancy behaviour is more influenced by the potential benefits of the regimen, rather than by barriers to adherence.

A small number of other studies have used the health belief model to predict different self-care behaviours during pregnancy. Zweig et al (1988) used the model to predict attendance for antenatal care. Unfortunately Zweig et al used a composite measure of health beliefs rather than looking at specific dimensions, so it was not possible to use the results of Zweig et al’s study to compare the role of perceived benefits with perceived barriers on pregnancy self-care behaviour. Two other studies though have produced relevant results. Radius and Joffe (1988) reported that perceived benefits were more successful than perceived barriers in distinguishing between those pregnant women who did or did not intend to breast feed their babies. More recently Sagi et al (1992) found that the best predictor of the intention to use prenatal diagnostic techniques for cleft palate defects was the perceived benefits of the diagnosis. Thus the results of these two studies augment the conclusion reached in the current study of the importance of perceived benefits as a predictor of self-care behaviour during pregnancy.

Three other important points have emerged from Table 10.1. Firstly it is striking that of all the different psychosocial variables contained in Table 6.8 (eg attributions of control, social support, depressed mood, etc) none of them were found to correlate significantly with blood glucose testing. In contrast, if Rosenstock’s (1985) suggestion that self-efficacy beliefs should be incorporated into the health belief model is adopted, all of the factors that were found to be significantly correlated to blood glucose testing (See Table 10.1) were components of the health belief model. As discussed above, the fact that none of the psychosocial variables contained in Table 6.8 were found to be significantly correlated with blood glucose testing does not indicate that they invariably have no effect on blood glucose testing. However, the relative utility of the health belief model compared to other potential predictors of regimen adherence is certainly apparent from Table 10.1. It is also worth noting that self-efficacy beliefs were the only construct that correlated significantly with behaviour within both the P/D group and the N-P/D group. This finding confirms Norman and Connor’s (1996) conclusion that the self-efficacy construct is a key predictor of health behaviour.

The second point that emerged from Table 10.1 concerns the importance of specificity. Four of the variables contained in Table 10.1, namely perceived barriers, perceived benefits, self-efficacy and perceived benefits during pregnancy provided two different scores. One score was regimen specific, and therefore efficacy, benefits and barriers related to blood glucose testing were specifically assessed. The other score was a total score across all three aspects of the regimen
included in the study. So, for example, the total efficacy score assessed efficacy to diet, injections and blood glucose testing expressed in a single score.

Table 10.1 indicates that for each of the four variables that provided both total and regimen specific scores, it was the latter score that significantly correlated with blood glucose testing, rather than the total regimen score. Inspection of the internal consistency scores detailed in Chapter 4 indicates that of the whole regimen subscales, only two variables had low Cronbach alpha scores (ie perceived barriers to the whole regimen and the pregnancy specific perceived barriers to the whole regimen scale). In contrast perceived benefits of the whole regimen, self-efficacy to the whole regimen and perceived benefits during pregnancy of the whole regimen all had acceptable internal consistency.

Inspection of the internal consistencies of the regimen specific scores indicates that 2 out of the 4 blood glucose specific subscales had acceptable internal consistency, ie barriers to blood glucose testing and benefits of blood glucose testing, (see Chapter 4). The fact that it was the blood glucose specific subscales that were the significant predictors, rather than the whole regimen subscales is unlikely to be related to low internal reliabilities of the whole regimen subscales as internal consistency scores were higher for the whole regimen scales than for the regimen specific scales. Instead, this pattern is likely to be a genuine effect as similar results have also been reported by Glasgow et al (1986) who compared the role of regimen specific barriers with a total barriers score, and found that regimen specific barriers were better predictors of adherence than the overall total barriers score.

These results therefore demonstrate the importance of specific measures if one is attempting to identify predictors of regimen behaviour amongst patients with diabetes. This pattern of results also ties in with Horne (in press) who in the context of identifying predictors of adherence discussed the importance of narrowing the focus of assessment to beliefs about a specific behaviour, rather than assessing more general health beliefs.

The final point concerns the feasibility of carrying out additional multivariate analyses with this data set. Table 10.1 clearly demonstrates that only the adherence measure was consistently related to health belief model variables. However, it was not possible to calculate this index for the N-P/D group given the high proportion of women who were not aware of the details of their regimen. Although it would be theoretically interesting to apply multivariate statistics to the adherence data investigating the effect not only of being diabetic, but also of the different health belief model variables, this could not be carried out in the current study because the outcome measure that was meaningful for the P/D group (namely the adherence measure) was not
available for the other diabetic group. As only 28 P/D women completed the blood glucose testing self-monitoring, sample sizes were too small to apply multivariate techniques to that group on its own.

10.2.5 The Dietary Regimen

10.2.5.1 Dietary Advice

Less than half of the women in both of the diabetic groups classified themselves as currently following a particular diet. It was not possible to know from the responses whether the women had been prescribed a diet and could not recall it, or whether alternatively they had not been prescribed a particular diet. However, the results do indicate that the proportion who classified themselves as currently following a particular diet did not differ between the two diabetic groups.

This pattern of results contrasts with the pattern of results obtained with the glucose regimen. It will be recalled that amongst the P/D women only a very small proportion were unaware of the details of their blood glucose testing regimen. Furthermore, the proportion of women who could recall the details of their blood glucose testing prescription differed significantly between the two diabetic groups, with a significantly higher proportion of P/D women than N-P/D women recalling the details.

The proportion of women in both groups who had received dietary advice from the dietitian was very low. 28% of the N-P/D women reported receiving advice from a dietitian at some point whilst 20% of the P/D women had actually seen the dietitian during pregnancy. Within both groups having seen the dietitian and feeling that one had been prescribed a particular diet were not significantly associated with each other. Instead, it was clear that the majority of women in both groups were attempting to follow broad dietary principles such as spacing their carbohydrate throughout the day and eating sufficient fibre. The proportion of women who had been advised to follow these broad principles did not differ significantly between the two diabetic groups.

10.2.5.2 Dietary Behaviour

Women in both of the diabetic groups filled out a self-report questionnaire on dietary behaviour. With the exception of cutting down on sugary snacks, results of the self-report questionnaire did not differ significantly between the two groups indicating that the pregnant group were not changing the frequency with which they spaced carbohydrates, included fibre in their diet or
avoided fatty foods. A broadly similar conclusion emerged from the retrospective self-report of pre-pregnancy behaviour in that it was only in terms of sugar intake and fibre intake that the current and the pre-pregnancy levels differed amongst the pregnant women. Thus the results of the current study accord with those of Ruggerio et al (1993) who also reported only minimal shifts in dietary behaviour amongst pregnant women with IDDM and NIDDM.

In this study women were also asked to fill out a dietary diary for four days using the forms and explanation sheets developed for the UK Prospective Diabetes Survey. (UKPDS, 1983). However, only 12 diaries from the 27 submitted by the P/D group and 12 out of the 21 submitted by the N-P/D contained sufficient detail of information to permit a nutritional breakdown to be carried out. This difference in the proportion of usable diaries between the two diabetic groups was not found to be statistically significant.

Given that there were only 12 usable diaries within each of the two diabetic groups, results must be interpreted with extreme caution. Although the two groups did not differ significantly from each other in terms of the proportion of completed diaries that were usable, the usable diaries within each group may not have been a random selection from the group as a whole. It is at least possible that those women who are more careful with their diet are also the women who are more careful with filling out the dietary diaries. However it is reasonable to assume that if such a bias did operate, it would apply to both groups, and thus the comparison between the P/D and N-P/D groups is still possible, although the analysis is likely to be biased towards the more adherent members within the two groups.

The difficulty inherent in obtaining detailed dietary data from self-monitored diaries is a frequent finding. For example, Anderson et al (1990) attempted to compare the diets of pregnant diabetic women and pregnant non-diabetic women. In Anderson et al’s study there were only 10 diabetic women in the sample and the dietician visited the home twice during the week, spending a considerable amount of time on the detailed procedures involved in dietary diary keeping. Yet even with this enormous input from the dietician, 20% of the diaries were not completed satisfactorily. Therefore the fact that just under half the diaries in the P/D group were not completed adequately in this study should not be regarded as unusual.

In the current study data from the dietary diaries suggested that the rate of snacking on high sugar snacks was lower amongst the P/D women. In addition, the diaries indicated that alcohol intake fell dramatically during pregnancy; whilst 38% of the women in the N-P/D group exceeded the recommended (non-pregnant) daily limit, only 3.7% of the women in the P/D group exceeded the same limit. However, it must be noted that even though levels of alcohol intake amongst the P/D
women were significantly lower than those observed amongst the N-P/D women, and only 2 pregnant women reported drinking more than one glass of wine per day, 22% of the women exceeded the pregnancy weekly limit of 4 units per week.

It is possible though that the alcohol levels reported in both groups are over-estimates of weekly drinking patterns. Women were asked to record two weekdays plus Saturday and Sunday, in order to sample intake across the whole of the week. If there is a tendency to drink more alcohol at the weekends than during the week, then the fact that the 4 day diaries included 2 weekdays and 2 weekend days could lead to over-estimating the daily alcohol level as the estimate was based on an equal number of weekdays and weekend days, rather than the usual 5:2 weekday to weekend ratio. Unfortunately this could not be investigated further because a number of women had not specified the day of the week on their 4 day food records. However, even if the mean daily total is an over-estimate, this bias would operate equally in both groups, and thus the results clearly demonstrate that the N-P/D group are consuming more alcohol.

With the exception of these changes in sugar and alcohol intake, the dietary diaries confirmed the conclusion drawn from the self-report questionnaires that major dietary shifts did not occur during pregnancy. The two groups did not differ in terms of the proportion of energy derived from carbohydrate or fat sources, or in terms of fibre intake and neither of the diabetic groups met the BDA recommendations for these nutritional components. (See Table 7.6).

Anderson et al (1990) provide the only other study that has analyzed dietary behaviour in detail amongst pregnant women with IDDM. In Anderson et al’s study the sample consisted of 8 diabetic women (6 with IDDM and 2 with GD) so results must be interpreted with caution. However, it is interesting to note that Anderson et al also reported that the pregnant diabetic women failed to reach BDA targets of the percentage of energy to be derived from carbohydrates, or from fats, and that it was only in terms of simple sugar intake that a shift in behaviour occurred. Thus the results of the current study are in exact accordance with Anderson et al’s earlier findings.

In terms of the behaviour of non-pregnant diabetic patients, Renggli and Keller (1995) also reported that adult (non-pregnant) subjects with IDDM failed to derive a sufficient proportion of their total energy intake from carbohydrate sources whilst deriving too much energy from fatty (particularly saturated fatty acid) sources. Taken together, Anderson et al, Renggli and Keller, and the current study all demonstrate that patients with diabetes, whether pregnant or not, do not tend to shift their behaviour in accordance with the dietary guidelines given by the BDA.
In the current study the diet of the P/D women was actually further away from the BDA guidelines in terms of the proportion of energy derived from proteins and fatty acids than the diets of the N-P/D women. (Table 7.6). Unfortunately, as discussed in Chapter 7, the dietary analysis did not permit a further breakdown of the carbohydrate sources to identify sucrose intake. However, the pattern of results obtained in this study, particularly, the significantly higher proportion of energy derived from fatty acid sources, raises the possibility that the P/D women were cutting down on sugary snacks, but substituting high fat snacks (e.g. cheese, crisps) in their place.

The dietary diaries and the self-report questionnaires clearly suggest that the optimization of behaviour obtained with the blood glucose testing regimen had not extended to dietary behaviour. Because the women were reducing their snacking of high sugar foods and cutting down on their alcohol intake, it is possible that they thought their diet was adequate for pregnancy. But few women had been given detailed dietary advice during pregnancy, and perhaps unwittingly, the pregnant women were eating a less adequate diet than they realized.

10.2.6 The insulin regimen

The final regimen area to be considered in the study was adherence to the insulin injections. This study found a very similar pattern of results to those obtained earlier by Glasgow et al (1987) in his comprehensive study of regimen adherence. Glasgow et al (1987) found that missing insulin injections was extremely rare with 98% of subjects reporting full adherence to injections. In this study, amongst the N-P/D group 99.6% of the recommended injections were carried out. Amongst the pregnant women 101.6% of the recommended injections were carried out because a small minority of women had been advised to add in an extra occasional injection, if a previous blood glucose test reading was high, thus accounting for the extra 1.6%. Given the lack of variability in insulin behaviour within both groups, further analyses on predictors of insulin adherence were not undertaken.

10.3 THE IMPACT OF DIABETES ON PREGNANCY

10.3.1 Medical aspects and antenatal treatment

10.3.1.1 Previous obstetric history

Miodovnik et al, (1985) and Hare (1994) examined the effect of diabetes on the miscarriage rate and concluded that it is only when first trimester glycaemic control is very poor that pregnancy
complicated by diabetes results in an increased risk of miscarriage. The results from these two studies are congruent with the finding obtained in the current study that the two pregnant groups did not differ in the proportion of women who had previously experienced a miscarriage. The two pregnant groups were also asked how long they had been trying to conceive a baby before they became pregnant with the current pregnancy and the results suggested that there was no significant difference between the two groups. Other studies (e.g. Steel, 1985) have also reported that with the exception of cases complicated by renal failure, diabetes does not result in a significant reduction in fertility.

10.3.1.2 Planning of Pregnancy and Pre-conception care

Planning the pregnancy and optimizing glycaemic control prior to conception is advocated as an essential component of the management of pregnancy complicated by diabetes (Steel et al, 1982). In this study the two pregnant groups did not differ in the proportion of pregnancies that had been planned with 58% of the pregnancies in the P/D and 66% of the pregnancies in the P/N-D group being planned jointly by the woman and her partner. Similarly Kimmerle et al (1994) reported that the rate of planning of pregnancy did not differ between a group of women with IDDM and a non-diabetic control group.

Amongst the P/D women the relationship between planning of pregnancy and receiving preconception counselling was explored. Of the 18 women who reported having planned their pregnancy, 13 (i.e. 72.2%) also reported receiving preconception counselling and checking first that their blood glucose profile indicated that pregnancy was appropriate. In contrast, of the 15 women who reported that the current pregnancy had been unplanned, only 3 women knew what their blood sugar levels were like at the time of conception through carrying out blood glucose testing very frequently. The remaining 12 women with unplanned pregnancies were not performing frequent blood glucose testing at the time of conception, although subsequent glycosylated haemoglobin tests would have reassured them retrospectively that their blood glucose profiles at the time of conception were unlikely to pose a serious health risk to the foetus.

Taken together these results indicate that not only is the rate of unplanned pregnancies amongst women with diabetes the same as that observed in the wider population, but that in turn, not planning the pregnancy is closely but not invariably associated with not knowing one’s blood glucose levels at the time of conception. Recent studies have suggested that intensive glucose monitoring should begin prior to conception in order to minimize the risk of congenital malformations amongst women with IDDM (Willhoite et al, 1993). The high rate of unplanned pregnancies observed in this study, and the fact that only 16 women from the PD group reported
checking their blood glucose levels prior to conception is therefore a cause of concern. It should not, however, be regarded as atypically low, given that Bryce et al's recent survey of the management of diabetic pregnancies in the UK reported that only 12% of clinics offered preconception counselling (Bryce et al, 1991).

The fact that so few health districts are offering preconception counselling sessions, and furthermore, that this study found that many women are proceeding with pregnancies without first checking their blood glucose levels, suggests that the issue of preconception management of patients with IDDM is not receiving the attention that it deserves. Similar figures for the United States have recently been reported by Janz et al (1995) who found that only one-third of diabetic women (both IDDM and NIDDM) received any pre-conception care.

10.3.1.3 Antenatal treatment

In terms of the antenatal treatment that the women received, the overwhelming majority of women in both of the groups had had their routine ultrasound scan by the time they were interviewed but there was a significant difference between the two groups in the rate of additional ultrasound scanning, with a much higher rate of second or third scans occurring in the pregnant diabetic group. The two groups did not differ however in the proportion who had had amniocentesis carried out. In both groups this rate was extremely low, and was associated with the age of the mother.

10.3.1.4 Hospitalization during pregnancy

This study demonstrated the enormous shifts that have taken place in the last 20 years in the care of IDDM women during pregnancy. For example, Merkatz et al (1979) described the medical management of pregnancy complicated by IDDM as requiring 'repeated and often prolonged periods of hospitalization'. Currently, with outpatient glycosylated haemoglobin tests which can provide a measure of average blood glucose control in the preceding 4-6 weeks combined with daily self-monitoring of blood sugars at home, frequent periods of hospitalization are no longer routine for diabetic women during pregnancy. In this study therefore, rates of hospitalization did not differ significantly between the P/D and the P/N-D women.

The fact that glycaemic control improved significantly during pregnancy was discussed above. Home based self-monitoring, combined with regular glycosylated haemoglobin tests allows pregnant IDDM patients to avoid routine hospitalization whilst simultaneously keeping blood glucose readings at low limits. In turn, these intensive regimens have been associated with
dramatic reductions in the rate of congenital malformations (Willhoite et al, 1993) and perinatal mortality (Peck et al, 1991; Hanssen, 1992). In keeping with these trends only 1 perinatal death occurred amongst the infants of the pregnant diabetic women, and none of the women in the pregnant diabetic group had a baby who had a congenital malformation.

10.3.1.5 Physical well-being

Women in both of the pregnant groups were asked about two somatic aspects of pregnancy namely tiredness and nausea and also about body image during pregnancy. There are no reports in the literature of any studies that have examined these questions amongst women with IDDM.

In this study the two groups were not found to differ in current levels of tiredness, current levels of nausea, or in retrospective ratings of tiredness and nausea that they experienced during the first trimester. Within both groups, more women reported feeling nauseous during the first trimester than during the second trimester, and numbers of women currently experiencing nausea within both groups were very small. Similarly, in terms of tiredness, more women reported feeling tired during the first trimester, than they did during the second trimester. The majority of women in both pregnant groups reported that they currently felt tired 'some of the time', whilst in the first trimester, the majority of women reported feeling tired 'all or most of the time'.

Given that the P/D women were managing a chronic illness throughout their pregnancy, it might have been predicted that they would have experienced greater difficulty with physical aspects of pregnancy. However, these findings clearly suggest that the P/D women do not experience any particular difficulties in this respect, when compared to a non-diabetic pregnant control group. The dramatic improvements in the management of diabetic pregnancy discussed above, and the fact that on average the women were able to achieve excellent levels of glycaemic control, may have contributed to these findings on the physical wellbeing of the P/D women.

10.3.2 Adjustment to the medical aspects of pregnancy

A number of different indices assessed how women in both groups had adjusted to the medical aspects of pregnancy. This enabled an assessment to be made of questions such as whether the P/D women worried more about the health of the baby, whether they felt the health of the baby was more in the hands of the medical profession than P/N-D women and whether they were more or less satisfied with the antenatal care that they had received.
Furlong-Lind and Beck-Black (1989) have suggested that women with diabetes may have difficulty adapting to the demands of the pregnancy because they may feel that their bodies were damaged. Body image during pregnancy was assessed in the current study and there was no evidence that the diabetic women reported a more negative body image during pregnancy than their non-diabetic counterparts. Within both groups, women expressed modest satisfaction with their bodies. (See Table 5.12).

The question of body image during pregnancy amongst women with IDDM has not been investigated before. Amongst non-pregnant diabetic samples Ben-Tovim and Walker (1995) reported that women with IDDM rated themselves as less attractive to the opposite sex than a matched group of non-diabetic women. However, Davies and Wardle (1994) found that pregnant women had significantly lower body dissatisfaction scores than non-pregnant women. It is therefore possible that this increased tolerance of one's body during pregnancy that Davies and Wardle reported offsets the diminished sense of attractiveness reported by Ben-Tovim and Walker, with the result that the P/D did not differ from P/N-D women in their body image.

The two pregnant groups were also compared on the three locus of control subscales, (Labs and Wurtele, 1986). These scales assess the extent to which women believe that they themselves are responsible for the health of the baby (internality), that the health professionals are responsible (high powerful others) or alternatively whether the health of the baby depends on fate and essentially uncontrollable factors (chance). Spirito et al (1990) investigated foetal health locus of control scores amongst pregnant women with diabetes and found that the 'overt diabetic' (ie both IDDM and NIDDM) women reported higher scores on the powerful others subscale than the non-diabetic control group, but no differences between the 2 groups on the other two subscales were obtained. An identical pattern of results was obtained in the current study as it was only with respect to the powerful others subscale that significant differences were obtained between the two pregnant groups. A possible explanation for the increased powerful others score obtained in this study, and also in Spirito et al (1990), is that it is an accurate reflection of the need for P/D women to adjust their regimen during pregnancy, in order to maximize glycaemic control. Given that insulin dosages increase dramatically during pregnancy, the P/D women have to consult the diabetologists frequently, in order to have appropriate changes to their regimen, and in turn, this may have resulted in increased powerful others subscale scores.

However, even though the responses of the P/D women may reflect the fact that medical staff are more directly involved in the management of diabetic pregnancy, than in a non-diabetic pregnancy, the results do not suggest that the P/D women were denying their own responsibility for the health of the baby. In fact, within both groups, internality scores were significantly higher.
than chance and powerful others scores, indicating that both groups attributed the greatest importance to their own behaviour as an influence on foetal wellbeing and least to the effect of the medical profession. Spirito et al (1990) did not compare subjects scores across the three subscales, but the mean scores reported in the study indicate that internality scores were higher than those obtained on the other two subscales.

P/D women reported significantly higher levels of satisfaction with their antenatal care than the P/N-D women and also significantly higher levels of continuity of antenatal care. The correlation between satisfaction with care and continuity of care was then examined, and low continuity was found to be significantly correlated with low antenatal satisfaction. The results therefore suggest that the higher continuity of care that the P/D women received contributed to their greater satisfaction with the treatment. This is a small but interesting example of a potential compensation of experiencing a higher risk condition during pregnancy.

A full assessment of the health beliefs about diabetic pregnancy amongst the P/D women was made. The majority of women believed the regimen to be beneficial and only a minority felt that there were significant barriers to regimen adherence during pregnancy. Furthermore, although a number of women reported that they felt susceptible to potential problems such as needing a caesarean section or having a heavy baby, most of the women felt that these problems were not very serious. Very few women in the group reported feeling susceptible to problems that they also rated to be serious reflecting the optimistic prognoses that they were given in the diabetic pregnancy clinics.

Using the relevant Lederman subscale women in the two pregnant groups were compared on their health anxieties about labour and the well-being of the baby. The results indicated that the two groups did not differ significantly in terms of this subscale with both groups reporting that on average they worried ‘moderately’ about the various health problems included in the scale. This result ties in with the results about the health beliefs of the pregnant diabetic women discussed above and suggests that these women tended to believe that their own health risks were not significantly greater than those of their non-diabetic pregnant counterparts, as long as they managed to maintain good glycaemic control throughout the pregnancy.

It is of course possible that these generally optimistic health beliefs and low levels of health anxiety represent denial on the part of the P/D women. However there are other points of evidence that do not concur with the conclusion that the women are denying the severity of their condition. Firstly Dunn (1986) has demonstrated that attitudes of denial are frequently associated with poor levels of adherence on the part of insulin dependent patients. Given that in this study
levels of adherence to the blood glucose testing and insulin components of the regimen were extremely high amongst the P/D women, this suggests that the generally positive attitudes of the women were not indicative of high levels of denial. Secondly, Peyrot and McMurray (1985) highlighted the fact that amongst insulin dependent patients denial tends to be associated with poor levels of glycaemic control. Again, average glycaemic control was extremely good amongst the pregnant diabetic patients, which again suggests that it is unlikely that they were denying the severity of their condition. It will also be recalled when the P/D women were asked how their diabetes differed during pregnancy to how it was prior to pregnancy, the most frequently cited response was that it was actually better controlled during pregnancy.

Taken together the results suggest that the P/D women had adjusted well to the medical aspects of pregnancy. There was no evidence, despite the speculation of earlier authors, that they actually felt damaged, or acutely anxious about the health and wellbeing of the baby. With the exception of the higher internality scores there were no differences between the two groups, and, as mentioned above, linked to the greater continuity of care that the P/D women received, they actually reported higher treatment satisfaction levels.

10.3.3 Adjustment to the motherhood role

In Chapter 3 developments in understanding the psychological aspects of diabetic pregnancy were described. The first papers offered predictions, often based on psychoanalytic theorists such as Caplan and Bibring that having diabetes could seriously disrupt the ability of the women to adjust to pregnancy and impending motherhood. For example, Furlong-Lind and Beck-Black (1989) suggested that women with IDDM may have particular difficulties with their spouses during pregnancy as they may have to confront the issue of their own disabilities. Other authors (eg Hare, 1989) suggested that women with IDDM may have difficulty becoming attached to the baby, or in accepting that they are pregnant.

Prior to the current study, these questions have not been empirically investigated. However, outside the specific context of diabetes, investigators have examined the impact of other medical conditions on emotional functioning during pregnancy. The conclusion to emerge from these studies does not tally with these early speculations about the impact of diabetes on pregnancy. For example, Curry (1987) reported that women who had to be hospitalized during pregnancy did not differ from a group of low risk pregnant women in their ability to identify with the maternal role. Similarly, Kemp and Page (1987) Curry (1987) and Mercer et al, (1988) have all found that antenatal attachment is not compromised amongst women experiencing high risk pregnancies.
In parallel with these findings in the non-diabetic literature, the results obtained in the current study suggest that experiencing pregnancy complicated by diabetes does not in fact disrupt the emotional wellbeing of the women in the way that Hare and other authors had suggested. For example, both groups reported moderate levels of satisfaction with the marital relationship and moderate levels of identification with the motherhood role. (See Table 5.12).

Comparing the results obtained with the 2 groups in the current study to those obtained by Lederman (1984) suggest that scores on the satisfaction with the marital relationship scale were extremely close to those reported in the earlier study. (P/D group mean item score =1.71, N-P/D group mean item score = 1.64, Lederman (1984)=1.6). However, although the two groups in the current study did not differ from each other in terms of identification with the motherhood role, both groups reported lower levels of identification than those reported by Lederman (1984) or by Halman et al (1995).

There is no obvious explanation why the scores on this scale in the current study should suggest lower levels of identification with the motherhood role than these other two studies. It is at least possible that the wording of some of the questions may have jarred slightly for British women (e.g. I feel that rearing children is rewarding) but as no British studies have reported results with the scale, this factor cannot be explored any further. However, the finding that identification with the motherhood role did not differ significantly between the two groups in the current study replicates the finding of Curry (1987) discussed above.

Similarly, the results of the study indicated that the two pregnant groups did not differ in terms of levels of antenatal attachment. Items on the antenatal attachment questionnaire were each rated on a 5 point scale from 1 (very low attachment) to 5 (very high attachment). Mean per item scores of the pregnant diabetic group were 3.95 and for the non-diabetic group were 4.06 indicating high levels of attachment within both groups.

Condon et al’s (1993) scale of attachment to the foetus consisted of 19 items. The mean items scores converted to a mean total questionnaire score of 38.9 for the P/D group and 36.6 for the P/N-D group. Both of these mean scores are close to the mean score of 38.3 reported by Condon et al (1993) in their sample of 112 women. Clearly there is no evidence in this study to suggest that diabetes impaired the woman’s capacity to become attached to the foetus.

In the current study, not only was attachment to the foetus investigated, but also, following on from the work of Condon (1985) an attempt was made to separate the measurement of antenatal attachment from the measurement of feelings about the state of pregnancy. Empirical
justification for this suggestion was provided in the current study, as within both groups, antenatal attachment and feelings about the state of the pregnancy were not significantly correlated with each other.

The results of this study found that the two groups did not differ in terms of their feelings about the state of pregnancy. Despite the fact that the P/D women had to perform a complicated range of self-care tasks, the two groups did not feel more negative about the state of pregnancy. Items on the feelings about the state of pregnancy scale were rated from 1 (strong agreement that the pregnancy had been a positive experience) to 4 (strong agreement that the pregnancy had been a negative experience). Mean item scores were 2.12 for the P/D group and 2.08 for the P/N-D group indicating that both groups felt that the pregnancy had been moderately pleasant.

Although the two groups were not found to differ significantly on either the attachment scale, or on the feelings about the state of pregnancy scale, an interesting pattern of results emerged when the predictors of these two scales were identified. These analyses not only highlighted some of the key differences between the two constructs, but also pointed to a subtle way in which the psychological functioning of the two pregnant groups differed.

In the literature reviewed in Chapter 2, three consistent predictors of antenatal attachment were described; parity, satisfaction with the relationship with one’s partner and identification with the motherhood role. In this study, within both of the pregnant groups, findings were entirely consistent with earlier studies. Primips had higher levels of antenatal attachment than multips, those women who reported having more satisfactory relationships with their partner had significantly higher levels of antenatal attachment as did those women who reported higher levels of identification with the motherhood role. The multiple regression analysis reported in Table 8.6 found that parity and satisfaction with the marital relationship both accounted for a significant proportion of the variance in attachment scores. Diabetes did not emerge as a significant predictor, reinforcing the conclusion gained from the univariate analyses that being diabetic does not impair the process of antenatal attachment.

A number of factors related to physical and medical aspects of pregnancy were also examined. Within both pregnant groups anxieties about the health of the baby was unrelated to antenatal attachment and within the P/D group diabetic related stress was unrelated to antenatal attachment. Similarly, when the role of physical aspects of pregnancy was investigated, the results suggested that within both groups being sicker or tireder did not make one less emotionally attached to the foetus. This replicates the findings of Lerum et al (1989) who
reported that the presence of physical discomfort did not disrupt the process of antenatal attachment.

Taken together, this pattern of results illustrates the contrasting effects of two types of factors. Within both groups antenatal attachment was related to the psychological aspects of role change associated with pregnancy, and was therefore, as in previous studies, found to be correlated with factors such as satisfaction with the marital relationship and whether or not this was one’s first child. However, this study suggested that health anxieties (eg worries about the health of the baby and diabetic stress) or physical aspects of pregnancy (eg tiredness and nausea) do not impact on the development of antenatal attachment.

As discussed above, this study, and others, have indicated that experiencing a higher risk pregnancy does not alter the pregnant woman’s capacity to become attached to the baby. In parallel, these results suggest that being more worried about the health of the baby, having a medical complication of pregnancy or experiencing more illness related stress also does not impair antenatal attachment.

A different pattern of results emerged when predictors of feelings about the state of pregnancy were identified. Within both of the pregnant groups, anxieties about the health of the baby were significantly correlated with feelings about the pregnancy, with those women who experienced more worries about the baby rating their pregnancies more negatively.

Amongst the P/D women, the role of diabetic related stress was also investigated. The results indicated that those women who experienced more diabetic related stress also rated their pregnancies more negatively. Clearly, this pattern of results contrasts with the pattern obtained with antenatal attachment.

Up to this point, an identical pattern of predictors occurred in the two pregnant groups. However, the impact of somatic aspects of pregnancy and body image on how the women felt about the state of pregnancy was also examined. The results of these analyses highlighted an interesting difference in functioning between the two pregnant groups.

Amongst the P/N-D women in the current study, tiredness during the first trimester, current tiredness, and body image were all significantly related to feelings about the pregnancy. The direction of these significant correlations indicated that those women who felt more tired, more nauseous, or more negative about their body image, rated their pregnancies significantly more
negatively. In contrast though, none of these indices were significantly related to feelings about the pregnancy amongst the P/D women.

This pattern of results suggests that the two pregnant groups may have different expectations, or different thresholds of tolerance. Whereas for P/N-D women, feeling tireder, sicker or having a more negative body image is experienced as having a less positive pregnancy, the results suggest that the P/D women may not experience these symptoms in this way. Perhaps for the P/D women the threshold of what constitutes a ‘difficult’ pregnancy is much higher, due to the demanding regimen that they have had to follow throughout pregnancy. If the primary concern is to optimize blood glucose control in order to produce a healthy baby, the fact that one has at times felt tired, sick or dissatisfied with one’s body may not seem so important.

There have been no other studies that have directly addressed this question. However, Ben-Tovim and Walker (1995) have recently reported that women with IDDM were less pre-occupied with issues of weight and weight change than women in a non-diabetic comparison group matched for age, weight and height. These authors concluded that in the context of having a potentially serious illness such as diabetes, concern about weight change assumed less importance. The findings reported in this study about the relationship between somatic factors and feelings about the pregnancy suggest that a similar shift in priorities may occur amongst women with IDDM during pregnancy, resulting in the differential pattern of results obtained between the two pregnant groups.

Taking all these results together, they confirm Condon’s (1985) suggestion that antenatal attachment and feelings about the pregnancy need to be considered as separate constructs. Health anxieties and physical aspects of pregnancy did not impact significantly on antenatal attachment. In contrast, how women felt about the state of pregnancy was influenced by these health worries within both groups, and in the P/N-D group physical aspects of pregnancy also exerted a significant influence.

Two other findings did not fit so neatly into this pattern. Amongst the P/D women, identification with the motherhood role was associated with feelings about the state of pregnancy. Those P/D women who identified more with the motherhood role felt that the pregnancy had been more positive. No significant correlation between these two variables was obtained within P/N-D group. The opposite pattern of results was obtained with respect to satisfaction with the marital relationship in that satisfaction with the marital relationship was significantly correlated with feelings about the state of pregnancy amongst the P/N-D women, but not significantly related amongst the P/D women.
It is difficult to explain the significance of these observed relationships or to predict whether different factors may operate in the P/D from the P/N-D group. Very little previous work has distinguished feelings about the pregnancy from antenatal attachment, and theoretical models for understanding the factors that predict feelings about the pregnancy have not yet been developed. However, the results obtained with many of the bi-variate analyses suggest the differential impact of medical risk factors on feelings about the pregnancy as opposed to on antenatal attachment may form a useful starting point for further work.

One final factor that needs to be discussed is the impact of previous terminations of pregnancy. Within the P/D group those women who had previously experienced a termination of pregnancy rated their pregnancies more negatively, although there was no effect on antenatal attachment. This relationship could not be investigated amongst the P/N-D group as too few women had previously had a termination to carry out statistical analyses. Numbers in the P/D group were also very small, so obviously this finding must be interpreted with caution. However, it does raise the possibility that previous termination of pregnancy may make women feel that the current pregnancy has been more difficult to manage.

Of relevance here is Stratham and Green's (1994) finding that an interactive effect occurred with previous miscarriage and previous termination such that women who had experienced both of these events had higher anxiety scores than women who had only experienced a miscarriage. Although Stratham and Green were unable to analyze causal mechanisms, they suggested that women who had experienced a miscarriage following a prior termination may attribute the miscarriage to damage that had occurred earlier at the time of the termination or even as a punishment that might be meted out again in the current pregnancy. In this study for the P/D women experiencing a prior termination was associated with feeling that the pregnancy was more difficult to manage. In addition, those P/D women who experienced a prior termination also had greater health worries about the well-being of the baby. It therefore seems that just as Stratham and Green (1994) found that prior termination and miscarriage interacted to produce higher anxiety levels, in this study diabetes combined with prior termination was associated with higher levels of worry about the baby and also feeling that the pregnancy had been more difficult.

Given the small numbers of P/D women who had previously experienced a termination of pregnancy it was not possible to carry out multivariate analyses, that could look at the relationship between prior termination and feelings about the pregnancy, whilst controlling for anxieties about the health of the baby. But Strathman and Green’s study highlights the fact that more complex interactive patterns between variables may be important in understanding the
impact of factors such as previous termination of pregnancy on the adjustment of diabetic women during pregnancy.

### 10.4 THE IMPACT OF PREGNANCY AND DIABETES ON ANXIETY

Previous work on psychological adjustment of women with IDDM during pregnancy has focused on the mood state variables of anxiety and depression. As discussed in Chapter 3, Spirito et al (1992) found that although the pregnant diabetic women (IDDM and NIDDM) and pregnant non-diabetic women both had mean anxiety values within the normal range, anxiety levels were significantly higher amongst the diabetic group. However the particular measure of anxiety used by Spirito et al (namely the tension-anxiety scale from the Profile of Mood States) is extremely problematic as it measures physical tension rather than anxiety per se. Furthermore, another study (Shroeder-Zwelling and Hock (1986) found that anxiety levels were not increased amongst diabetic women during pregnancy. Shroeder-Zwelling and Hock also reported that the IDDM women had lower anxiety levels than the GD women, and suggested that attention should actually be directed at GD rather than IDDM women.

In the current study state anxiety scores of women in all three groups were compared using the State Anxiety Scale from the STAI (Spielberger et al, 1970). The results indicated that women’s scores did not differ between the three groups. Scores on the STAI can range from 20 (very low anxiety) to 80 (very high anxiety). Mean scores for the P/D group were 36.9 for the N-P/D group, 35.67 and for the P/N-D group and 35.15 indicating that anxiety levels were moderately low within each of the three groups. Cox and Reading (1989) reported state anxiety scores for a group of pregnant women followed longitudinally during pregnancy. Mean scores during the second trimester assessment were 36.59 which is extremely close to the range of scores reported in this study. Therefore not only are the scores obtained in this study comparable to earlier research, but it is also clear that the P/D group do not have elevated scores on the state scale during pregnancy.

The results of this study therefore confirm Shroeder-Zwelling and Hock’s findings that IDDM women are not prone to high anxiety levels during pregnancy. Amongst the P/D group there was no evidence that either state anxiety scores, or, as discussed earlier, specific anxieties about the health of the baby were elevated.

Clearly it would have been possible to identify predictors of state anxiety within each of the three groups. However, the high degree of correlation between self-report measures of anxiety such as the STAI and self-report measures of depression such as the Beck Depression Inventory have been noted by many authors and discussed at length in Gotlib and Cane’s (1989) review. In line
with this consistent finding, within the current study, scores from the STAI and Beck Depression Inventory scores were significantly correlated within each of the 3 groups, (P/D r=0.53, n=30, p=<0.005; N-P/D r=0.51, n=24, p=<0.01; P/N-D r=0.63, n=34, p=<0.001).

In this study both the BDI and the state form of the STAI were assessed for all women. Gotlib and Cane (1989) reviewed DSM-III-R symptoms of depression and anxiety and categorized each symptom as specific to depression, specific to anxiety or common to both constructs. They then calculated the proportion of items that assessed the intended construct (ie specific depression items for the depression inventory) and the proportion of items that assessed the unintended construct. On the basis of this analysis the ratio of intended to unintended items was more favourable for the BDI than the STAI. In addition, the state scale assesses how subjects are feeling ‘at this precise moment’ and therefore may be influenced by how stressful subjects find the process of being interviewed. In contrast, the Beck Depression Inventory asks subjects to reflect on how they have been feeling in the past week, and therefore is more likely to provide a more accurate assessment of mood state during pregnancy. For these reasons, detailed analyses of predictors were restricted to the BDI.

10.5 THE IMPACT OF PREGNANCY AND DIABETES ON DEPRESSED MOOD

In Chapter 1, the literature on depression and diabetes was discussed, and the conclusion was reached that not only is IDDM associated with an increased risk of depression, but that the rate of relapse may be higher amongst diabetics than non-diabetics (see Lustman et al 1988). In Chapter 2 the literature on depression in pregnancy was discussed and it was concluded that although particularly late pregnancy may be associated with an increase of related somatic symptoms, cognitive and affective symptoms do not significantly increase during pregnancy, nor is there a significant increase in case of major depression.

The existing literature on depression amongst pregnant women with IDDM was described in Chapter 3. Previous studies have produced conflicting results ranging from findings which suggest high levels of psychopathology (Barglow et al, 1981) to more recent studies that have suggested that depression is not a key issue amongst pregnant diabetic women. (Spirito et al, 1992). Methodological problems including the lack of appropriate control groups and heterogeneous diabetic samples may have contributed to these divergent findings, and thus the question as to the impact of diabetic pregnancy on depression and depressed mood remains open.
10.5.1 Previous emotional history

The first issue that was addressed in this study was whether the three groups differed in the rates of previous episodes of emotional problems. This was important because a number of studies have indicated that a previous history of emotional problems is associated with increased risk of depression during pregnancy (e.g. Zajicek and Wolkind 1978; Elliott et al 1983). Similarly in the diabetic literature, the recurrent nature of depression has been described (Lustman et al, 1988). Thus it is necessary to know whether or not the three groups had experienced a comparable rate of previous episodes of emotional problems.

The results obtained in this study suggest that women in the N-P/D group had experienced a higher rate of previous episodes of emotional problems than women in either of the two other groups. Additional analyses indicate that this increased rate was not associated with marital status, but rather was associated with not having children. Specifically, when the rate of previous episodes of emotional problems was compared between the P/D women who had children and the N-P/D women who had children, no difference in rate was obtained. In contrast, a significant difference was obtained when P/D women who did not have any children were compared to N-P/D women who did not have any children. (See Table 9.3).

Possible reasons for the increased rate amongst these childless diabetic women include fertility problems, feeling that the relationship is not strong enough to embark on a pregnancy, or feeling that one’s diabetes would make pregnancy too difficult to manage. Of relevance to the latter factor are the findings of three separate studies that rates of voluntary childlessness are elevated amongst married women with diabetes. (Ahlfield et al, 1985; Kimmerle et al 1994; Kjaer et al, 1992).

The childless N-P/D women were not asked for the reasons underlying their childlessness in this study making further exploration of this issue impossible. The results do however raise the interesting possibility that childlessness may be a risk factor for emotional problems amongst women with IDDM.

10.5.2 Comparison of levels of depressed mood between the three groups

In order to explore the impact of diabetes and of pregnancy on depressed mood, the three groups were compared on their total BDI scores with previous emotional history entered as a covariate. In terms of the effect of pregnancy on depressed mood, earlier studies such as O’Hara et al (1990) and Huffman et al (1990) have both found that non-pregnant women had significantly lower total
BDI scores than pregnant women, i.e., that pregnancy was associated with a significant increase in total BDI scores. However, the BDI has not previously been used in a study of pregnancy complicated by IDDM.

In the current study not only did the co-variate (previous emotional history) exert a significant effect, but there was also a significant difference between the three groups, with the non-pregnant group scoring significantly lower total BDI scores than both of the two pregnant groups. (See Table 9.4). The finding that the N-P/D group had significantly lower scores than the P/N-D group is difficult to interpret as these two groups differ from each other with respect to both diabetes and pregnancy. However, the finding that the N-P/D group had significantly lower scores than the P/D group is certainly congruent with the earlier studies of O'Hara et al (1990) and Huffman et al (1990). What this finding suggests is that the previous observations about the increase in total BDI scores associated with pregnancy also applies in situations where the pregnancy is complicated by diabetes.

A previous study on the effect of diabetes on BDI scores amongst non-pregnant patients reported significantly higher scores amongst patients with IDDM compared to a matched control group, (Roy et al, 1994). In contrast, in the current study the P/D women did not have higher BDI scores than the P/N-D women. This suggests that Roy et al’s finding that amongst non-pregnant patients, IDDM is associated with an elevation of BDI scores, does not apply in the context of pregnancy.

The most likely explanation of this pattern of results is that total BDI scores were also elevated amongst the P/N-D women, and as a result no significant difference between the P/N-D and P/D groups was obtained. In the current study, a non-pregnant non-diabetic group was not included in the study design. However, it was possible to compare the BDI scores obtained in the P/N-D group (i.e., mean of 7.37) to those obtained by the non-pregnant (and non-diabetic) control group in Huffman et al’s study, who reported a mean score of 2.69 (SD=3.55). The results of this analysis indicated that the P/N-D women in this study had significantly higher BDI scores than the non-pregnant non-diabetic control group in Huffman et al’s study (t=4.68, df=73, p=<0.001) showing that their scores were elevated during pregnancy.

Mean scores for the total BDI were reported in Table 9.4. These scores could then be compared to earlier studies that had examined pregnant non-diabetic and diabetic non-pregnant samples. In this study the mean score for the P/N-D group, i.e., 7.37 was comparable to Huffman et al (1990) who reported a mean score of 7.04 in a sample of pregnant women and also to O’Hara et al (1990) who reported a mean score of 7.5 in a pregnant sample. Similarly, in this study, the mean
The three groups were also compared on the somatic items of the BDI, ie items 15-21. Results of this analysis indicated that the co-variate (previous episodes of emotional problems) exerted a significant effect. In addition, a significant difference between the three groups was obtained. Additional analyses indicated that significantly lower scores were obtained in the N-P/D group, than amongst women in either of the two pregnant groups.

O’Hara et al (1990) and Huffman et al (1990) have both previously reported a significant elevation of somatic items on the BDI during pregnancy. The finding in this study that the P/D women had higher somatic scores than the N-P/D women therefore fits in with these earlier studies. Just as amongst non-diabetic women, pregnancy is associated with an increased somatic score, this effect also occurs amongst diabetic women.

A comparison of the somatic items of the BDI between diabetic and non-diabetic patients has not previously been undertaken. The current pattern of results suggests that the somatic scores of the P/D women did not differ significantly from those of the P/N-D women. As with the total BDI scores, a possible reason for this is the elevation of somatic scores amongst the P/N-D women. However, neither Huffman et al (1990) or O’Hara et al (1990) reported complete summary statistics on the somatic subscale for the non-pregnant control group. As a results, it was not possible to assess whether the P/N-D women in this study had significantly elevated somatic scores compared to a non-pregnant non-diabetic control group of women of childbearing age.

In Chapter 1 Huffman et al’s (1990) study was discussed, and it was concluded that the 9 cognitive-affective items from the BDI provide a measure of emotional functioning during pregnancy that is uncontaminated by normative somatic changes. In the current study scores on these 9 items were compared between the three groups, whilst co-varying for previous emotional history. The results of this analysis indicated that whilst the co-variate (ie previous episodes of emotional problems) had a significant effect on the cognitive-affective scores, no significant difference between the three groups was obtained. (See Table 9.4).

No previous studies have examined this set of cognitive-affective items amongst diabetic patients. However, Huffman et al (1990) compared scores on these 9 items between pregnant and non-pregnant women and concluded that there was no elevation of scores associated with
pregnancy. Thus the finding that in this study the P/D group did not differ significantly from the N-P/D group ties in with Huffman et al's earlier results, and extends Huffman et al's results into the diabetic sphere.

Taken together three key findings emerge from this set of analyses. Firstly it is apparent that the co-variate (previous emotional history) exerted a significant effect on the total BDI scores, and also on both of the subscales. Earlier studies on depression during pregnancy (e.g. Zajicek and Wolkind, 1978; Kumar and Robson, 1984) and on depression amongst patients with diabetes (e.g. Lustman et al, 1988, Roy et al, 1994) consistently demonstrated the importance of this factor. Therefore this finding about the effect of previous emotional history ties in with numerous other studies.

Secondly, the comparison of the P/D group with the N-P/D group indicates that pregnancy had a significant effect on somatic scores, and also on the total BDI scores, but not on the key cognitive-affective items, that are likely to provide the clearest indicator of depressed mood during pregnancy. These findings replicate the pattern of results obtained by Huffman et al (1990) and demonstrate that the findings on the impact of pregnancy obtained amongst non-diabetic patients also extends to diabetic patients.

Thirdly the comparison of the P/D group with the P/N-D group demonstrates that when pregnancy is complicated by diabetes, it does not elevate the total BDI score or either of the two subscales. These results are similar to the findings of Spirito et al (1992) who reported that amongst a group of pregnant diabetic women who had IDDM or NIDDM, scores on the depression subscale of the POMS-BI (Lorr and McNair, 1982), were not significantly greater than a group of non-diabetic pregnant women.

Spirito et al (1992) also reported that the mean scores of the pregnant diabetic women were not in the clinically significant range. A similar conclusion emerges from the analyses in the current study. When the mean item scores from the 9 cognitive-affective items were multiplied by a factor of 21 to make them comparable to the cut-off points recommended for the whole 21 item inventory, scores of all three groups were less than the cut-off point of 10. Only the mean scores from the somatic subscale were over the cut-off point of 10, in both of the pregnant groups. However, as has been argued throughout, based on Huffman et al's (1990) findings, these somatic items alone cannot be taken as indicative of depressed mood during pregnancy, as many of the somatic changes are related to pregnancy.
It is apparent that the results of the current study, and also those of Spirito et al (1992) conflict with those of Barglow et al (1981) who reported extremely high levels of psychopathology in his sample (e.g. 33% of his sample showed evidence of clinically significant depression). Unfortunately, no details of the demographic composition of the 1981 sample were included in the study, but in a later study (Barglow et al 1984), the composition of a sample of women attending the same Diabetes in Pregnancy Clinic in Chicago was given and it is reasonable to assume that the demographic composition of the later sample is likely to be closely comparable to the one sampled 3 years earlier at the same clinic. Assuming then that the two samples were comparable, what is striking is the degree of deprivation represented in the sample, with for example, just under 40% of the sample living below the current poverty line (income of less than $10,000 per year).

Barglow et al’s 1981 finding that 33% of the pregnant diabetic women exhibited evidence of clinically significant depression needs to be put in the wider context of the extent of poverty and deprivation that these pregnant diabetic women were also experiencing. Without a non-diabetic pregnant control group, it is impossible to attribute this level of psychopathology to the diabetes. Other researchers who have assessed the extent of depressive symptoms during pregnancy in comparable samples have also detected high rates amongst non-diabetic pregnant women. For example, Zuckerman et al (1989) in a deprived inner-city sample of 1014 pregnant women from Boston found that the median score on the CES-D scale of depressive symptoms was greater than the cut-off score that is taken to indicate a high risk of clinical depression. Obviously the CES-D scale of symptoms is not identical to a clinical diagnostic interview, but the fact that the median score was greater than the cut-off point suggests that many of the women in the sample may have been suffering from clinical depression. Thus it becomes clear that the high rate of depression observed in Barglow et al’s study may not have been specifically due to diabetic pregnancy, but to the fact that many of the women were living in conditions of extreme deprivation.

10.5.3 Identifying psychosocial predictors of depressed mood

10.5.3.1 Previous emotional history and social support

In the current study the role of three categories of predictors were examined. Firstly those factors that were relevant to all three groups, namely previous emotional history and social support. Secondly, pregnancy specific factors, and finally factors related to diabetes.

A previous history of emotional problems increases the risk of experiencing emotional problems during pregnancy, (Zajicek and Wolkind 1978; Elliott et al 1983; Kumar and Robson 1984 and
Buesching et al 1986). Similarly, a previous history of emotional problems also increases the risk of depression amongst patients with diabetes (Lustman et al 1988; Roy et al, 1994). The analyses of covariance reported above indicated that when all the patients in the study were considered as a group, previous emotional history exerted a significant effect on current levels of depressed mood (ie the 9 cognitive-affective items of the BDI). However, due to the low numbers who had previously experienced emotional problems within each group, it was not possible to investigate the effect of this factor on current levels of depressed mood within either of the pregnant groups in this study.

It was however possible to investigate this question amongst the N-P/D women, and it was found that those women who had previously experienced emotional problems had significantly higher levels of depressed mood. Similar results have recently been reported by Roy et al (1994) who found that diabetic patients who had experienced depression in the past had significantly higher BDI scores than patients without such a history.

Additional analyses were also undertaken to investigate the relationship between previous emotional history and having a current BDI score (cognitive-affective items only) that exceeded the cut-off point for the diagnosis of mild depression. (See Table 9.10). These analyses indicated that amongst the P/D women and amongst the N-P/D women currently exceeding the cut off point was significantly associated with a previous history of emotional problems. A similar pattern of results was not obtained with the P/N-D women.

Numbers of patients are very small, and it is certainly necessary to be cautious. However, the findings outlined in Table 9.10 indicate that whereas a current BDI score over the cut-off point and previous history of emotional problems are significantly associated within the two diabetic groups, this pattern of results did not hold for the P/N-D group. One possible explanation for these findings, is that they are due to the more frequent rate of relapse reported for depressed diabetic patients than for depressed non-diabetic patients (Lustman et al, 1988).

The second factor that was potentially relevant to all three groups was that of social support. Connell et al (1994) in a large study of adult patients with diabetes reported that the perceived availability of social support had a direct effect on levels of depression as well as an indirect effect (ie buffering the impact of the perceived threat posed by diabetes). Other earlier studies (e.g. Littlefied et al 1990) have previously provided evidence supporting the buffering model of social support as individuals with inadequate support and highest levels of illness-related disability were at the highest risk for depression.
Numerous studies have also investigated the link between the adequacy of social support and depression amongst pregnant women. As discussed in Chapter 2, a consistent finding is that during pregnancy those women who rate their available social support as being inadequate are at a greater risk of becoming depressed, (Norbeck and Tilden 1983; O'Hara 1986; Thorpe et al 1992).

Given that social support has consistently been shown to have an effect on depression amongst diabetic patients and also amongst pregnant women, it would be predicted that a similar pattern would hold amongst pregnant diabetic women. No studies though have previously addressed the question of the role of social support amongst pregnant women with diabetes.

Sarason et al’s (1987) 6 item satisfaction with social support scale was used as the relevant index. Each of the 6 items were rated on a 6 point scale from 1 (very dissatisfied) to 6 (very satisfied). Mean item scores for the three groups were 5.65 for the P/D group, 5.59 for the N-P/D group and 5.50 for the P/N-D group and the scores did not differ significantly between the three groups. (See Table 5.5).

Clearly these scores indicate that women in all three groups had high levels of satisfaction with their social support. However, despite these high mean satisfaction scores, within each group variation in satisfaction with social support was systematically associated with variations in depressed mood. As predicted, the direction of these significant correlations indicated that those women who were less satisfied with their social support reported higher levels of depressed mood.

The stepwise multiple regression analysis evaluated the relative importance of different variables in predicting depressed mood across all three groups. (See Table 9.13). The 2 factors that had been significant in the univariate analyses (previous emotional history and satisfaction with social support) were entered into the model, together with the diabetes status and the pregnancy status of each individual. As with the univariate analyses, the results of the multiple regression indicate that neither the diabetes status or the pregnancy status (or the interaction between the two) contributed significantly to observed levels of variance in depressed mood. In contrast, both satisfaction with social support and previous emotional history entered into the model and in combination were able to account for over 27% of the variance in depressed mood scores.

This stepwise analysis augments the results from the earlier univariate analyses. Again it becomes apparent that being diabetic, being pregnant, or being a pregnant diabetic does not have an influence on levels of depressed mood. Instead, the two key factors are those that have
occurred throughout the literature on depression, namely the importance of satisfaction with
one’s social support, and the impact of previous emotional history on current levels of emotional
functioning.

One final point needs to be made. The finding in the current study that diabetes does not have an
impact on levels of depressed mood appears at first to contradict the studies that have found
increases in levels of depressed mood amongst patients with diabetes (eg Ray et al, 1994).
However, in this study, the only non-diabetic patients were patients who were also pregnant, ie a
fourth group of non-diabetic non-pregnant patients was not included in the study design.
Therefore in the results of the multiple regression analysis, when the effect of diabetes was
analysed, the scores of the two diabetic groups (both pregnant and non-pregnant) were compared
to a group of non-diabetic but currently pregnant women. This result tells us nothing about the
impact of diabetes on its own, as a factor outside the context of pregnancy.

10.5.3.2 Pregnancy related predictors of depressed mood

The second group of factors that were examined were factors related to pregnancy.

Considering first the impact of previous miscarriages, earlier studies on this issue have produced
inconsistent results; Kumar and Robson (1984) in a predominantly middle-class sample reported
no effect, whilst Zuckerman et al (1989) in a deprived sample of inner-city women reported that
previous miscarriages were associated with increased depressive symptomatology.

In the current study amongst the P/D women, levels of depressed mood were higher amongst
those women who had previously experienced a miscarriage, compared to those who had never
previously experienced a miscarriage. In contrast, no significant effect of miscarriage was
observed amongst the P/N-D women. Obviously this difference may be due to the small numbers
involved; numbers who had experienced a previous miscarriage were small in both pregnant
groups, but were slightly smaller (n=8) in the P/N-D than in the P/D group (n=11) group.
However, it is also possible that the effect of previous miscarriage on depressed mood may differ
between the two groups.

As discussed above, Stratham and Green (1994) have suggested that there may be an interactive
effect of previous obstetric events on anxiety levels during pregnancy with prior termination and
prior miscarriage interacting to produce high anxiety levels. Extending this notion of the
interactive effect of different factors, it is possible that whilst miscarriage per se does not
increase levels of depressed mood, miscarriage in combination with an additional potential stressor such as diabetes does have a significant effect.

The literature reviewed in chapter 2 also demonstrated that an unsatisfactory marital relationship during pregnancy increased the risk of becoming depressed (Elliott et al 1983; Kumar and Robson 1984, Dimitrovsky et al, 1987). Other studies have indicated that the more a woman expresses doubts about her ability to cope with the baby, the more likely she is to be depressed during pregnancy (Affonso et al 1991; Anderson et al 1994).

Within the two pregnant groups in this study both of these factors were significantly correlated with levels of depressed mood (See Table 9.11). The finding that an unsatisfactory marital relationship and doubts about how she will cope with the baby were related to depressed mood amongst the P/N-D women replicates the results obtained in earlier studies. However, the fact that these two factors were also significantly related to depressed mood amongst the P/D women demonstrates the similarity in functioning between the two pregnant groups in this study. Not only did the two groups not differ in terms of depressed mood, but furthermore, within both groups the same factors were related to variations in depressed mood scores.

The role of health anxieties about the baby was also examined. Zajicek and Wolkind's (1978) found that women who rated their health as more of a problem were more depressed during pregnancy. In Chapter 2 it was suggested that such a relationship may not necessarily be reactive but may instead be the result of the fact that those who are more emotionally distressed during pregnancy rate the physical changes associated with pregnancy as more problematic. In this study within both of the pregnant groups, those women who were more worried about the health of their baby had higher levels of depressed mood. This significant correlation could be due to the fact that greater anxieties about the health of the baby increases the level of depressed mood or alternatively it may be that those women who have higher levels of depressed mood are more predisposed to worrying more about the health of the baby. Either way, given that levels of depressed mood and levels of health anxieties about the baby did not differ between the two pregnant groups, and furthermore that the significant relationship between depressed mood and health anxieties occurred within both of the pregnant groups, this pattern of results cannot be attributed in any way to whether or not the pregnancy is complicated by a chronic illness.

The stepwise multiple regression analysis then explored the relative contribution of these three pregnancy specific factors (ie health anxieties, confidence in one's mothering ability and satisfaction with the marital relationship) that had been found to be significantly correlated with depressed mood within both of the pregnant groups. In addition, the two general factors
(satisfaction with social support and previous emotional history) as well as the effect of diabetes was also considered in the analysis.

As with the analysis comparing all three groups, previous depression and social support were significant predictors of levels of depressed mood. In addition both health anxieties and confidence in one’s mothering ability were also able to contribute significantly to the model. However, the diabetes status of the individual or satisfaction with the marital relationship did not enter into the equation.

Again this result is consistent with those obtained in the univariate analyses. Within the context of pregnancy, having or not having diabetes does not have an effect on levels of depressed mood. Instead, the important factors emerging from the study are those that the wider pregnancy literature has consistently demonstrated are important; previous emotional history, satisfaction with social support, confidence in one’s mothering ability and health anxieties about the baby. In this stepwise analysis, satisfaction with the marital relationship did not explain a significant amount of the variance. However, in a stepwise procedure, variables with the highest correlation with the criterion will be entered first, if other variables are highly correlated with this variable, they may not make a sufficiently large additional contribution to be entered before the procedure is terminated by non-significance. Satisfaction with the marital relationship and satisfaction with social support were highly correlated with each other ($r = -0.37$, $n = 67$, $p = <0.005$) and therefore satisfaction with the marital relationship may not have been able to contribute to levels of depressed mood once the variance due to satisfaction with social support had been taken into account.

Two other pregnancy factors were significant predictors of depressed mood within one but not both of the pregnant groups, namely body image and antenatal attachment.

Anderson et al (1994) has previously reported that those women who have a more negative body image have higher levels of depressed mood during pregnancy. In the current study the results obtained with the P/N-D group replicate this finding as in this group body image was found to be significantly correlated with levels of depressed mood. In contrast, amongst the P/N-D women there was no significant correlation between body image and levels of depressed mood. This pattern of results is congruent with the results reported above on the relationship between somatic aspects of pregnancy and feelings about how difficult the pregnancy had been. It will be recalled that the P/N-D women who had been sicker or tireder rated the pregnancy as more difficult, whilst these somatic aspects of pregnancy did not have a comparable effect amongst the P/D women. Furthermore, it was suggested above that the two pregnant groups may have
differed in their threshold of what constitutes a 'difficult' pregnancy; given the every day demands of the self-care regimen and the need to optimize glycaemic control, feeling tired or sick may not have seemed so critical for the P/D women. In a similar way, it is possible that the bodily changes associated with pregnancy had less impact on emotional functioning, amongst the P/D women.

The final pregnancy related factor that was considered was antenatal attachment. Condon (1987) reported that depression during pregnancy was associated with lack of antenatal attachment to the baby. Similar results have also been reported by Zuckerman et al (1989). However, in this study whilst antenatal attachment was associated with depressed mood in the predicted direction amongst the P/D women these two factors were not significantly correlated amongst the P/N-D women. There is no clear explanation for this finding, but it is of note that the findings obtained with the P/D women are congruent with the those reported earlier, and it is actually those obtained with the P/N-D women that are not consistent with the findings of Condon (1987) and Zuckerman et al (1989).

10.5.3.3 Diabetes specific predictors of depressed mood

This study, by assessing a broad range of indices was able to examine the impact of diabetes specific factors on mood state including factors such as regimen adherence, attributions of control of diabetes and disease related stress.

The first issue to consider is the link between regimen adherence and depressed mood. Only one previous study, Barglow et al (1981) has addressed this question of the relationship between adherence and emotional functioning amongst pregnant diabetic women. Barglow et al reported that poor adherence was associated with a higher score on their psychiatric risk scale but not only was this finding derived from a heterogeneous group of pregnant diabetic patients (ie women with GD, NIDDM and IDDM were all included), but the index of adherence (a retrospective post-delivery assessment by the diabetologist) was also inadequate. It is therefore difficult to reach any firm conclusions about the relationship between depressed mood and regimen adherence during pregnancy on the basis of Barglow et al’s findings.

In the current study, the relationship between depressed mood and levels of blood glucose testing was examined within both of the diabetic groups. The relationship between mood state and the other two regimen areas could not be examined as there was almost no variability in adherence to the insulin regimen within either of the two groups, and the number of detailed dietary diaries were too small to permit statistical analyses.
The results obtained in this study indicated that within the N-P/D group depressed mood was unrelated to the number of weekly blood glucose tests. In terms of previous studies on this question, McCaul et al (1987) found no significant correlation between adherence to the blood glucose testing regimen and depression amongst a sample of adults with IDDM. Thus the results with the N-P/D group are compatible with McCaul et al's earlier findings.

A similar result was also obtained within the P/D group in that depressed mood was unrelated to either the number of weekly blood glucose tests or to the adherence measure (the proportion of recommended weekly blood glucose tests). Given that levels of blood glucose testing, and adherence to the regimen were uniformly high, ie there was little variability within the group, detecting a significant relationship between depressed mood and these behavioural measures would be unlikely. It is however possible that depressed mood was a contributory factor amongst the very small number of patients who experienced difficulty with carrying out blood glucose tests. However, as in this study the number of such women was very small (e.g. only 2 patients carried out less than 70% of the recommended number of weekly blood glucose tests), it would not be possible to investigate this possibility within the current study.

A second group of factors that earlier research had suggested might have a significant impact on mood state during pregnancy was that of locus of control attributions. Spirito et al's (1990) investigation of locus of control attributions found that the more women believed that medical control was related to chance, or the less they believed that it was related to the influence of powerful others the higher their levels of depressed mood during pregnancy. In contrast, in this study none of the diabetes specific locus of control scales (Bradley et al, 1984) were related to depressed mood in either of the two diabetic groups. The difference between this study and Spirito et al (1990) could be due to several factors. Firstly in Spirito et al's study, over 30% of the women had type II diabetes. It may be that the significant relationship between the locus of control scales and depression was predominantly due to these women with type II diabetes who would have developed diabetes relatively recently and who may have different attitudes about their disease, than those who have had the condition for many years.

The second explanation is that it was due to differences between the locus of control scales, ie differences between the MHLC scale and the diabetes specific measures used in this study. In general, disease specific measures are more powerful predictors of behaviour than generic scales (Bradley et al, 1984) and it is therefore surprising that the generic as opposed to the disease specific measure was found to be the significant predictor of emotional functioning. However, during the interview some women did report difficulty with the wording of the diabetes specific
measure, and this may have contributed to the pattern of results. Given that other studies have also reported an association between locus of control scales and depression amongst chronically ill patients (e.g. Crisson and Keefe, 1988) and thus it seems that the findings in this study are somewhat anomalous, it is more likely that difficulties with the diabetes scale contributed to the results, than differences between IDDM and NIDDM patients. However, without further analyses comparing IDDM with NIDDM women, it is not possible to analyze this question any further.

The third diabetic specific factor that was considered was diabetic related stress. Polonsky et al (1995) recently examined the relationship between diabetes related distress (using the Problem Areas in Diabetes Survey) and a measure of general emotional distress (The Brief Symptom Inventory, Derogatis and Melisaratos, 1983). These authors reported that diabetes related distress was positively associated with general emotional distress. In the current study, developing Dunn et al’s (1986) argument about the need to investigate the impact of diabetes specific adjustment scales, the association between the diabetic related stress scale (Dunn et al, 1986) and depressed mood was investigated. The results were comparable to those of Polonsky et al; within both of the diabetic groups, those women who experienced their diabetes as more stressful, also reported higher levels of depressed mood.

In line with the findings on the relationship between diabetes related stress and depressed mood, the univariate analyses also indicated that those women in both groups who perceived themselves to be more susceptible to diabetic related problems experienced higher levels of depressed mood as did those pregnant women who perceived themselves to be more susceptible to diabetes related pregnancy complications. The relationship between perceived susceptibility and the presence of complications is not straightforward, (Alogna, 1980), so the fact that women in this study who felt themselves to be more susceptible to diabetic problems experienced higher levels of depression does not mean that this relationship arose because of the medical problems themselves. Furthermore, other studies have indicated that complications of diabetes per se are not associated with the prevalence of depression amongst patients with diabetes (Lustman et al, 1988; Robinson et al, 1988).

In order to evaluate the relative contribution of these diabetic specific variables to the prediction of depressed mood scores, a stepwise multiple regression analysis was carried out. The two diabetes specific factors that had been found to be associated with depressed mood were entered into the equation (ie diabetic related stress and perceived susceptibility to complications) as was previous emotional history, satisfaction with social support and the pregnancy status of the individuals.
The results obtained (see Table 9.15) were consistent with the earlier analyses in that pregnancy was not found to be a significant factor. In addition, as with analyses carried out with the other subsets, previous emotional history exerted a significant effect. However, in contrast to the two earlier analyses (the one that compared all three groups, and the one that compared the two pregnant groups), satisfaction with social support did not contribute significantly to the model. What this finding suggests is that amongst the diabetic patients, once the variation in depressed mood scores that was due to the effect of previous emotional history and perceived susceptibility to diabetic problems was accounted for, social support did not exert an independent effect on the levels of depressed mood. However, it was still possible that social support had an indirect role, buffering the effect of perceived susceptibility to diabetic complications and/or previous emotional history. Littlefield et al (1994) has recently provided evidence that social support moderated depressed mood in the face of greater illness impairment from diabetes. Clearly, in a study with a larger number of patients, models exploring these more complex patterns could be explored.

10.6 CONCLUSIONS

In this study the psychological adjustment of pregnant diabetic women was assessed using a wide range of different indices. The findings consistently demonstrated that experiencing pregnancy complicated by diabetes did not impair the emotional functioning of the women, or impair their physical wellbeing. The combined impact of home-based self-monitoring of blood glucose, together with regular glycosylated haemoglobin tests have not only dramatically improved the prognosis for both mother and baby, but have also reduced the need for routine hospitalization during pregnancy.

The pregnant diabetic women in this study were in good physical health. They did not differ from the non-diabetic pregnant women in the frequency with which they had experienced illnesses other than diabetes, and with the exception of experiencing hypos, very few of the women had experienced serious complications of pregnancy. Levels of adherence to the blood glucose testing regimen were extremely high, as was the frequency with which the pregnant women tried to avoid high sugar foods. Blood glucose levels were kept within the limits advised by doctors and the majority of women reported that their diabetes was better controlled during pregnancy than it was six months prior to conception.

If the emotional adjustment of the women had been assessed without a concurrent assessment of their medical wellbeing, or if their health beliefs and anxieties had been analyzed without a rigorous assessment of regimen adherence, it would not have been possible to explain why the
pregnant diabetic women adjusted favourably to the demands of pregnancy. However by assessing all of these factors, in addition to a detailed examination of both pregnancy specific and diabetes specific emotional variables, it was possible to understand why pregnancy complicated by diabetes was not a risk factor for emotional distress.

The pregnant diabetic women interviewed as part of the study had a generally optimistic attitude towards their pregnancy. Amongst women who have not developed progressive microvascular damage (and that was all the women in the sample), with high levels of adherence to the regimen and the maintenance of good glycaemic control, the risks of damage to the baby are not significantly greater than those facing non-diabetic women. The women in the study were in good physical health and were able to maintain high levels of adherence and excellent glycaemic control. In general they accepted the optimistic prognosis given to them at the hospital, and similarly maintained an optimistic outlook themselves. The pregnant diabetic women also experienced greater continuity of antenatal care than the pregnant non-diabetic women, and linked to this, were more satisfied with their antenatal treatment. Follow-up of the outcome of the pregnancies indicated that this optimism was appropriate as there was no evidence that the rate of perinatal mortality or of congenital malformations was increased amongst the pregnant diabetic women.

There was no evidence of increased levels of depressed mood amongst the pregnant diabetic women. Somewhat paradoxically, the results of the study suggest that childlessness rather than pregnancy may be a risk factor for depression amongst diabetics. In the analyses identifying predictors of depressed mood, previous history of emotional problems and satisfaction with social support emerged as consistent predictors of mood state. Both these factors have been identified as significant predictors of depressed mood in the general population, amongst pregnant women and also amongst patients with diabetes. Thus there was no suggestion from the current study that the factors that impacted on the emotional functioning of the pregnant diabetic women were in any way unusual.

Other aspects of emotional functioning during pregnancy such as antenatal attachment and identification with the motherhood role were also unaffected by the diabetes, and the empirical basis for assuming that chronic illness impairs a woman’s ability to adapt to the emotional demands of pregnancy was questioned. There was also considerable overlap in the pattern of predictors of attachment between the two diabetic groups; another facet of the similarity in functioning between the diabetic and non-diabetic pregnant women.
The results of the study did suggest that the pregnant diabetic women may have differed in their tolerance of somatic aspects of pregnancy. Amongst the pregnant non-diabetic women, those who were tireder or more nauseous also felt that the pregnancy had been more difficult to manage, whilst amongst the pregnant diabetic women, these physical aspects of pregnancy were unrelated to how difficult the pregnancy was rated to be. In the context of having to perform numerous blood glucose tests every day in order to ensure the health of the baby, low level nausea or tiredness may have had a diminished impact. This compensatory adjustment to the demands of diabetic pregnancy has not been considered before by earlier studies.

There is in fact a sense in which the development of our understanding about psychological adjustment during pregnancy amongst diabetic women is following the path of developments in our general understanding of psychological adjustment to diabetes. Dunn and Turtle (1981) in their seminal review showed how earlier studies which made dramatic claims about extensive psychopathology were beset with methodological difficulties. Furthermore, such studies concentrated the search on a mythical 'diabetic personality', rather than trying to understand how different individuals adjust to the specific psychological stresses imposed by diabetes. In a similar way, earlier claims about extensive psychopathology amongst pregnant diabetic women have arisen from methodological flaws and a wider understanding of the issue has been hindered by the fact that earlier studies have tended to concentrate on a narrow range of mood state variables. This study has attempted to overcome some of the more glaring limitations of earlier work. In this way, it has become evident that the majority of women were able to manage the demands of the self-care regimen, remain optimistic and did not differ in their psychological adjustment from a group of non-diabetic pregnant women. Dunn and Turtle laid the myth of the diabetic personality to rest. This study has indicated that there is no basis for promulgating the myth of specific psychological problems occurring amongst pregnant diabetic women.

10.7 SUGGESTIONS FOR FUTURE RESEARCH

This study investigated whether levels of depressed mood were raised amongst pregnant women with IDDM. The results indicated that although pregnancy was associated with an increase in somatic symptoms, levels of depressed mood were not actually increased. However, the study did suggest that the proportion of women who had experienced previous emotional problems was significantly higher amongst the non-pregnant diabetic women than in the other two groups. Additional analyses indicated that this increased rate occurred amongst the non-pregnant diabetic women who had not yet had any children. It was not possible to investigate this point any further as the reasons why the non-pregnant diabetic control group had not yet had children were not included in the questions that these women were asked. However, the results of this study do
suggest that childlessness should be investigated as a potential risk factor for emotional problems amongst women with IDDM.

A second issue that emerged from the study was that of the different relationship between somatic symptoms and emotional adjustment in the two pregnant groups. The results of the study suggest that amongst pregnant diabetic women, the somatic changes associated with pregnancy do not impact on emotional adjustment in the same way as happens amongst non-diabetic pregnant women. Within the current study it was only possible to note significant correlational relationships between for example, tiredness and depressed mood amongst the non-diabetic pregnant women, but causal relationships could not be deduced. Further research first needs to clarify whether somatic symptoms have a causal impact on emotional aspects of pregnancy amongst non-diabetic pregnant women, secondly needs to confirm if this causal relationship is absent amongst diabetic pregnant women and finally, needs to explore whether the difference between the two pregnant groups is due to the fact that pregnant diabetic women have a greater tolerance for the somatic changes associated with pregnancy.

The third finding that needs to be investigated further is that of differences in the predictors of blood glucose testing amongst the pregnant as opposed to the non-pregnant diabetic women. The results of the finding suggest that amongst the non-pregnant diabetic women perceived barriers to blood glucose testing provided a significant predictor of the frequency with which blood glucose testing is performed. In contrast, amongst the pregnant diabetic women, it was not perceived barriers, but instead, perceived benefits of the regimen that provided the significant predictor of regimen adherence. If this result was replicated in future research, it would have implications for health education interventions that attempted to increase the frequency of blood glucose testing; amongst non-pregnant women interventions that targeted ways of reducing the perceived barriers would be more likely to have an impact on behaviour, but amongst pregnant diabetic women, reassuring women about the potential benefits of the regimen for their own health and for the health of the baby are more likely to be effective.

Another issue on blood glucose testing during pregnancy that needs to be examined is the extent to which patients are able to use results from blood glucose tests to change their insulin dose and/or dietary intake. Tattersal and Gale (1990) have argued that it is only by using blood glucose test results in this way that the impact of self-monitoring on glycaemic control can be maximized. Outside pregnancy, many patients have difficulties using blood glucose test results to modify other aspects of the self-care regimen (Mazze et al, 1985). Looking in detail at how patients used information derived from their blood glucose tests to effect changes in their diet or insulin dose would require a longer period of self-monitoring than was undertaken in this study.
Given that the pregnant patients maintained significantly lower blood sugar profiles during pregnancy than the non-pregnant patients, it is likely that they were more adept at using their blood glucose test results to modify other aspects of their regimen, than non-pregnant patients. However, this point has not yet been demonstrated empirically demonstrated, and further work on this issue is warranted.

An additional significant finding that warrants future research was the suggestion that different aspects of previous obstetric history may impact on the emotional wellbeing of the diabetic women during pregnancy. More specifically, in the current study previous terminations of pregnancy were found to be related to feeling that the pregnancy had been more difficult to manage and previous miscarriages were found to be related to increased levels of depressed mood. Stratham and Green (1994) have suggested that amongst non-diabetic pregnant women, prior termination and miscarriage may have an interactive effect on anxiety levels. This finding demonstrates that more complex patterns have to be considered when understanding factors contributing to emotional wellbeing during pregnancy. Future research using samples large enough to justify multivariate statistical procedures needs to consider whether previous obstetric events interact with the diabetic status to produce an effect on emotional wellbeing. Just as Stratham and Green found that miscarriage and terminations interacted together, so too, being diabetic may interact with a previous obstetric event such as miscarriage or termination, to increase the probability of an emotional problem.

The final issues to emerge from the study concerned the provision of care that the pregnant diabetic women were receiving during pregnancy. Although the pregnant diabetic women were found to be more satisfied with their antenatal care than the non-diabetic pregnant women, two aspects of their care did appear to be sub-optimal. Firstly the results of the study suggest that the provision of preconception counselling was poor; only 13 of the women reported having received such help from the clinic. Given that ideally women should begin intensive glucose monitoring prior to conception (Willhoite et al, 1993), the low proportion of women receiving preconception counselling, coupled with the high proportion of unplanned pregnancies is a matter of concern. The results of the study suggest that a priority for the clinics should be increasing the provision of such preconception advice, and also looking at strategies for decreasing the rate of unplanned pregnancies amongst women with IDDM.

The other area of care that was a cause for concern was the extent of help with dietary changes during pregnancy. Only 20% of the women actually reported receiving advice from the dietician during pregnancy. Although the available evidence suggests that the pregnant diabetic women reduced their sugar and alcohol intake, in respect of other dietary constituents such as protein and
saturated fatty acid intake, their diet was actually worse than the non-pregnant diabetic women. It is at least possible, that if more of the women had received dietary advice and had appreciated that an optimal diet necessitated moderating protein and fat intake during pregnancy, that more substantial shifts in dietary behaviour would have occurred. Clearly this is a practical issue that future research needs to address.
REFERENCES


APPENDIX A

CALCULATION TO DETERMINE SAMPLE SIZE

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.04</td>
<td>3.69</td>
</tr>
</tbody>
</table>

Beck Depression Inventory Scores of pregnant women (ref Huffman et al, 1990)

With effect size of 4 points, standardized difference = \( \frac{SD}{\text{Effect size}} = \frac{3.69}{4} = 1.08 \)

With reference to Altman's (1991) nomogram, with a standardized difference of 1.08 a sample size of 20 in each group would be able to detect a significant difference, with a power of 95%, and a significant level of 0.05.

Ref: Altman, DG (1991) Practical Statistics for Medical Research
London: Chapman & Hall
Diabetes in Pregnancy Project - Patient Information Sheet

In the past 20 years enormous improvements have been made in the care of insulin-dependent diabetic women during pregnancy. However, during pregnancy women may be placed on a demanding blood glucose monitoring regimen, as well as having to watch their diet carefully. We are therefore interested in finding out how insulin-dependent women are coping during pregnancy. In order to find out we are interviewing 3 groups of women: (a) a pregnant insulin-dependent diabetic group; and (b) a non-pregnant insulin-dependent group, and (c) a non-diabetic pregnant group.

The interview lasts about one and a half hours. During the interview you would be asked to fill in a number of questionnaires that ask you about the management of your diabetes, and also about your attitudes to diabetes. The results of the questionnaires are entirely confidential, and you are asked not to put your name on any of the questionnaires.

You would also be asked to keep a record of your blood glucose tests and insulin injections for one week, and to keep a food record for 4 days. These records are also entirely confidential. We would like to stress that even if you agree to take part in the study, you can still withdraw from the study at any time, and if there are particular questions that you do not want to answer, then you just inform the interviewer that you do not want to answer them. If you decide that you do not want to take part in the study, or that you want to stop the interview before you have completed all the questions, it will not in any way affect the treatment you receive at the hospital.

We realize that this is asking a lot of you. However, the results of the study will provide valuable information on how insulin-dependent women are coping during pregnancy, and will highlight any problems that women face during this period.

A Kurtz
Consultant Physician

C Elton
Research Assistant
DIABETES IN PREGNANCY PROJECT

Consent by Patient to participate in Research Project

1. I ________________________________ am happy to consent to be interviewed and have my medical records reviewed as part of the above project.

2. I have been given a full explanation of the purpose of the investigation by __________________________ and have received a written explanation of what I will be expected to do.

3. I note that I may withdraw my consent at any stage in the project, and that doing so will not in any way affect the medical treatment that I receive.

Signed ________________________________

Date ________________________________
The items in these questionnaires ask you about the management of your diabetes and of your pregnancy. It is very important that you answer these questions by thinking about how you feel now during this pregnancy, rather than thinking about how you would feel if you were not pregnant.

I hope you will find the questions interesting. It is possible that you may not have thought about some of these questions before. If you have any worries about any of these issues, please raise them with me, your doctor, nurse or midwife.

Caroline Elton
Research Assistant
Subject No ______ Date ______

Demog P

1. Date of Birth __________

2. How old were you when you were first diagnosed as having diabetes. __________

3(a) Do any members of your family have diabetes? Yes____ No____

3(b) If Yes, Who(m) ______ ______

3(c) If Yes, How has this effected you? ______________________________

4(a) Apart from diabetes did you have any other illness(es) in the last 6 months? Yes____ No____

4(b) If yes, what illness(es) did you have? ______________________________

5(a) Apart from diabetes have you got any other illness(es) at the moment? Yes____ No____

5(b) If yes, what illness(es) do you have? ______________________________

6. Are you (a) Married / Living as married (b) Single (c) Divorced (d) Separated (e) Widowed

7. If you are married or living as married, please describe your husband / partner's occupation. Try to be as specific as possible. If they are unemployed, please give their usual occupation.

8. Is your husband / partner (a) currently employed (b) currently unemployed. (c) Retired

9. How old were you when you left school or finished further education. ________

Appendix B4 Demographic background 311
10. Could you briefly list the jobs you have had since you finished your education


11. Are you in paid employment at the moment

If Yes What is your job

How many hours a week is it

12. Do you have any children? Yes/No

If Yes How many

What are their ages

13. Have you got any plans to have a child in the near future, eg to become pregnant in the next six months?

Yes_____ No____

14. Is your housing

(a) Owner occupied - Own House
(b) Owner occupied - Living with Others
(c) Rented - Council
(d) Rented - Private
(e) Sheltered / Institutional Accommodation
Beck Inventory

On this questionnaire are groups of statements. Please read each group carefully and then pick out the one statement from each group which best describes the way you have been feeling in the PAST WEEK, INCLUDING TODAY. Circle the number beside the statement you picked.

1. 0 I do not feel sad  
   1 I feel sad  
   2 I am sad all of the time and I can't snap out of it  
   3 I am so sad or unhappy that I can't stand it

2. 0 I am not particularly discouraged about the future  
   1 I feel discouraged about the future  
   2 I feel I have nothing to look forward to  
   3 I feel that the future is hopeless and things cannot improve

3. 0 I do not feel a failure  
   1 I feel I have failed more than the average person  
   2 As I look back on my life all I can see is a lot of failure  
   3 I feel I am a complete failure as a person

4. 0 I get as much satisfaction out of things as I used to  
   1 I don't enjoy things the way I used to  
   2 I don't get real satisfaction out of anything anymore  
   3 I am dissatisfied or bored with everything

5. 0 I don't feel particularly guilty  
   1 I feel guilty a good part of the time  
   2 I feel guilty most of the time  
   3 I feel guilty all of the time

6. 0 I don't feel I am being punished  
   1 I feel I may be punished  
   2 I expect to be punished  
   3 I feel I am being punished

7. 0 I don't feel disappointed in myself  
   1 I am disappointed in myself  
   2 I am disgusted with myself  
   3 I hate myself

Subject No ______ Date _______
<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. 0</td>
<td>I don't feel I am any worse than anybody else</td>
</tr>
<tr>
<td>1</td>
<td>I am critical of myself for my weaknesses or mistakes</td>
</tr>
<tr>
<td>2</td>
<td>I blame myself all the time for my faults</td>
</tr>
<tr>
<td>3</td>
<td>I blame myself for everything bad that happens</td>
</tr>
<tr>
<td>9. 0</td>
<td>I don't have any thoughts of killing myself</td>
</tr>
<tr>
<td>1</td>
<td>I have thoughts of killing myself but I would not carry them out</td>
</tr>
<tr>
<td>2</td>
<td>I would like to kill myself</td>
</tr>
<tr>
<td>3</td>
<td>I would kill myself if I had the chance</td>
</tr>
<tr>
<td>10. 0</td>
<td>I don't cry any more than usual</td>
</tr>
<tr>
<td>1</td>
<td>I cry more now than I used to</td>
</tr>
<tr>
<td>2</td>
<td>I cry all the time now</td>
</tr>
<tr>
<td>3</td>
<td>I used to be able to cry but I can't even though I want to</td>
</tr>
<tr>
<td>11. 0</td>
<td>I am no more irritated than I am normally</td>
</tr>
<tr>
<td>1</td>
<td>I get annoyed or irritated more easily now than I used to</td>
</tr>
<tr>
<td>2</td>
<td>I feel irritated all the time now</td>
</tr>
<tr>
<td>3</td>
<td>I don't get irritated at all by the things that used to irritate me</td>
</tr>
<tr>
<td>12. 0</td>
<td>I have not lost interest in other people</td>
</tr>
<tr>
<td>1</td>
<td>I am less interested in other people than I used to</td>
</tr>
<tr>
<td>2</td>
<td>I have lost most of my interest in other people</td>
</tr>
<tr>
<td>3</td>
<td>I have lost all of my interest in other people</td>
</tr>
<tr>
<td>13. 0</td>
<td>I make decisions as well as I ever could</td>
</tr>
<tr>
<td>1</td>
<td>I put off making decisions more than I used to</td>
</tr>
<tr>
<td>2</td>
<td>I have greater difficulty in making decisions than I used to</td>
</tr>
<tr>
<td>3</td>
<td>I can't make decisions at all anymore</td>
</tr>
<tr>
<td>14. 0</td>
<td>I don't feel I look any worse than I used to</td>
</tr>
<tr>
<td>1</td>
<td>I am worried that I am looking old or unattractive</td>
</tr>
<tr>
<td>2</td>
<td>I feel that there are permanent changes in my appearance that make me look unattractive</td>
</tr>
<tr>
<td>3</td>
<td>I believe I look ugly</td>
</tr>
<tr>
<td>15. 0</td>
<td>I can work about as well as before</td>
</tr>
<tr>
<td>1</td>
<td>It takes an extra effort to get started in the morning</td>
</tr>
<tr>
<td>2</td>
<td>I have to push myself very hard to do anything</td>
</tr>
<tr>
<td>3</td>
<td>I can't do any work at all</td>
</tr>
</tbody>
</table>
16. 0 I can sleep as well as usual
   1 I don't sleep as well as I used to
   2 I wake up 1 to 2 hours earlier than usual and find it hard to get back to sleep
   3 I wake several hours earlier than I used to and cannot go back to sleep

17. 0 I don't get more tired than I used to
   1 I get tired more easily than I used to
   2 I get tired from doing almost anything
   3 I am too tired to do anything

18. 0 My appetite is no worse than usual
   1 My appetite is not as good as it used to be
   2 My appetite is much worse now
   3 I have no appetite at all anymore

19. 0 I haven't lost much weight, if any, lately
   1 I have lost more than 5 lbs
   2 I have lost more than 10 lbs
   3 I have lost more than 15 lbs

20. 0 I am no more worried about my health than usual
   1 I am worried about physical problems such as aches, pain, upset stomach or constipation.
   2 I am very worried about physical problems and it is hard to think of much else
   3 I am so worried about my physical problems that I cannot think about anything else.

21. 0 I have not noticed any recent change in my interest in sex
   1 I am less interested in sex than I used to be
   2 I am much less interested in sex now
   3 I have lost interest in sex completely
1. Have you ever seen your GP for trouble with your "nerves"? (Other than during the first three months after having a baby)
   Yes____ No____

2. Has your doctor ever given you any tablets (or medicine) for "nerves", depression, anxiety or sleep? (Other than during the first three months after having a baby).
   Yes____ No____

3. Did your doctor arrange for you to see a specialist such as a psychiatrist, clinical psychologist, or community nurse?
   No____
   Yes, I saw a ______________ (please specify)
   IF YES
   (a) Was this as an outpatient ( )
       Was this in your own home ( )
       Was this as an inpatient ( )
   (b) Are you still receiving treatment
       Yes____
       No, I stopped going on _____ Month _____ Ye.

Appendix B6: Previous emotional history
PREV/PND

1. In the period after you have had a baby, did you ever see your GP for trouble with your 'nerves', depression, anxiety or sleep?

   Yes____   No____

2. In the period after you have had a baby did your doctor ever give you any tablets (or medicine) for trouble with your 'nerves', depression, anxiety or sleep?

   Yes____   No____

3. In the period after you have had a baby did your doctor arrange for you to see a specialist such as psychiatrist, clinical psychologist, or community nurse?

   No____

   Yes, I saw a ______________ (please specify)

   IF YES
   (a) Was this as an outpatient

   Was this in your own home

   Was this as an inpatient

   (b) Are you still receiving treatment

   Yes____

   No, I stopped going on _______ ______

   Month     Year
Below are a number of statements which people have used to describe themselves. Could you please read each statement and then circle the number that indicates how you feel AT THIS PRECISE MOMENT.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I feel calm.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>I feel secure</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>I am tense</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>I am regretful</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>I feel at ease</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>I feel upset</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7.</td>
<td>I am presently worrying over possible misfortune.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td>I feel rested.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>9.</td>
<td>I feel anxious.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>I feel comfortable.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>11.</td>
<td>I feel self-confident.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12.</td>
<td>I feel nervous.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>I am jittery.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>I feel &quot;highly strung&quot;.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15.</td>
<td>I am relaxed</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16.</td>
<td>I feel content.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>I am worried.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>I feel over-excited and rattled.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19.</td>
<td>I feel joyful.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20.</td>
<td>I feel pleasant.</td>
<td></td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

[Circle the appropriate number]
SSOSR
The following questions ask about people in your environment who provide you with help or support. Each question has two parts. For the first part list all the people you know, excluding yourself, whom you can count on for help or support on the manner described. Give the persons' initials, their relationship to you (see example). Do not list more than one person next to each of the numbers given beneath the question.

For the second part, circle how satisfied you are with the overall support you have.

If you have had no support for a question, tick the words "No one", but still rate your level of satisfaction.

Do not list more than nine people per question.

EXAMPLE

Who do you know whom you can trust with information that could get you in trouble?

No one (1) TN (brother) (4) LN (father) (7)
(2) LM (friend) (5) LM (employer) (8)
(3) RS (friend) (6) (9)

How satisfied are you with this support? (Ring the appropriate number)

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>very satisfied</td>
<td>fairly satisfied</td>
<td>a little satisfied</td>
<td>a little dissatisfied</td>
<td>fairly dissatisfied</td>
<td>very dissatisfied</td>
</tr>
</tbody>
</table>

1. Whom can you really count on to be dependable when you need help?

No one (1) (4) (7)
(2) (5) (8)
(3) (6) (9)

How satisfied are you with this support? (Ring the appropriate number)

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>very satisfied</td>
<td>fairly satisfied</td>
<td>a little satisfied</td>
<td>a little dissatisfied</td>
<td>fairly dissatisfied</td>
<td>very dissatisfied</td>
</tr>
</tbody>
</table>

2. Whom can you really count on to help you feel more relaxed when you are under pressure or tense?

No one (1) (4) (7)
(2) (5) (8)
(3) (6) (9)

How satisfied are you with this support? (Ring the appropriate number)

<table>
<thead>
<tr>
<th>6</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>very satisfied</td>
<td>fairly satisfied</td>
<td>a little satisfied</td>
<td>a little dissatisfied</td>
<td>fairly dissatisfied</td>
<td>very dissatisfied</td>
</tr>
</tbody>
</table>
3. Who accepts you totally, including both your worst and best points?

No one________  (1)  (2)  (3)  (4)  (5)  (6)  (7)  (8)  (9)

How satisfied are you with this support? (Ring the appropriate number)

very satisfied  5  4  3  2  1
fairly satisfied  6  5  4  3  2
a little satisfied  7  6  5  4  3
a little dissatisfied  8  7  6  5  4
fairly dissatisfied  9  8  7  6  5
very dissatisfied

4. Whom can you really count on to care about you, regardless of what is happening to you?

No one________  (1)  (2)  (3)  (4)  (5)  (6)  (7)  (8)  (9)

How satisfied are you with this support? (Ring the appropriate number)

very satisfied  5  4  3  2  1
fairly satisfied  6  5  4  3  2
a little satisfied  7  6  5  4  3
a little dissatisfied  8  7  6  5  4
fairly dissatisfied  9  8  7  6  5
very dissatisfied

5. Whom can you really count on to help you feel better when you are feeling generally down-in-the-dumps?

No one________  (1)  (2)  (3)  (4)  (5)  (6)  (7)  (8)  (9)

How satisfied are you with this support? (Ring the appropriate number)

very satisfied  5  4  3  2  1
fairly satisfied  6  5  4  3  2
a little satisfied  7  6  5  4  3
a little dissatisfied  8  7  6  5  4
fairly dissatisfied  9  8  7  6  5
very dissatisfied

6. Whom can you count on to console you when you are very upset?

No one________  (1)  (2)  (3)  (4)  (5)  (6)  (7)  (8)  (9)

How satisfied are you with this support? (Ring the appropriate number)

very satisfied  5  4  3  2  1
fairly satisfied  6  5  4  3  2
a little satisfied  7  6  5  4  3
a little dissatisfied  8  7  6  5  4
fairly dissatisfied  9  8  7  6  5
very dissatisfied
1. What is your expected date of delivery?______________________________

2. How many weeks pregnant were you when you first got in contact with a doctor (your GP, your diabetes doctor, or the antenatal clinic - whichever was first)_____________________

3. Some women with diabetes try to stabilize their blood glucose levels before they start trying to conceive a baby. Did you:
   a. Talk to your doctor / nurse about wanting to start a family and only stop using contraception when they had advised you to do so.
   b. Talk to your doctor / nurse about wanting to start a family, but stop using contraception before they had advised you to do so.
   c. Not talk to your doctor / nurse about wanting to start this pregnancy.
   d. Other (please specify)_______________________________________________

4. Was this pregnancy:
   a. Planned jointly by you and your husband / partner
   b. Planned by you alone
   c. Not planned.

5. Did you have any difficulty in getting pregnant? Yes____ No____
   If Yes: Had you been trying for: ( ) More than one year
            ( ) More than two years
            ( ) More than three years
   Did you have any treatment for infertility? Yes____ No____

6. During the first 12 weeks of this pregnancy did you:
   a. Feel sick all of the time
   b. Feel sick most of the time
   c. Feel sick some of the time
   d. Never feel sick
7. During the past week have you:
   a. Felt sick all of the time
   b. Felt sick most of the time
   c. Felt sick some of the time
   d. Never felt sick

8. During the first 12 weeks of this pregnancy did you:
   a. Feel tired all of the time
   b. Feel tired most of the time
   c. Feel tired some of the time
   d. Never feel tired

9. During the past week have you:
   a. Felt tired all of the time
   b. Felt tired most of the time
   c. Felt tired some of the time
   d. Never felt tired

10. Have you been hospitalized at any stage of this pregnancy?  Yes___  No___
    If Yes;  _____________________________________________________________
    When___________________________________________________________
    For how long_____________________________________________________
    Reason for hospitalization_________________________________________

11 Have you felt your baby move yet
( ) Definitely Yes
( ) I think I have - but I am not 100% sure
( ) Not yet

If you do think that you have felt your baby move - how many weeks pregnant were you when you first felt the baby move ___________ weeks

12 Have you had an ultrasound scan? Yes____ No____
If Yes: How many weeks pregnant were you when you had your first scan _______ weeks
Were you able to see the foetus on the scan
( ) Clearly
( ) A little bit
( ) Not at all

Was your husband / partner with you when you had this scan Yes____ No____

13 Have you had a second ultrasound scan? Yes____ No____
If Yes: How many weeks pregnant were you when you had your second scan _______ weeks
Were you able to see the foetus on the scan
( ) Clearly
( ) A little bit
( ) Not at all

Was your husband / partner with you when you had this scan Yes____ No____

14 Have you had an amniocentesis test in this pregnancy Yes____ No____
If Yes: Why did you decide to have this test __________________________________
                                      __________________________________
                                      __________________________________

Have you had the results of the test yet; Yes____ No____

15 Are you intending to have an amniocentesis test in this pregnancy Yes____ No____
If Yes: Why are you intending to have this test __________________________________
                                      __________________________________
16 Please tick whichever one of these statements is true for you for this pregnancy.

(a) I am attending / have attended childbirth preparation classes

(b) I am going to attend childbirth preparation classes but have not yet done so

(c) I have not attended any childbirth preparation classes yet but may still decide to do so

(d) I have not attended any childbirth preparation classes and am not intending to do so

If your answer is (d), please answer question (e)

(e) Why are you not intending to attend any childbirth preparation classes?

The last 2 questions (Qs 17 and 18) refer to before you had any thoughts of trying to conceive a baby.

17. Which statement best describes how you experienced your monthly period?

a. Every month I would experience some pain
b. Most months I would experience some pain
c. On the occasional month I would experience some pain
d. I would never experience pain

If you answered a, b or c to Question 17, then please answer Question 18.

18. Which statement best describes the pain that you experienced during your monthly period? Use the scale: 

<table>
<thead>
<tr>
<th>Very severe pain</th>
<th>Quite severe pain</th>
<th>Mild pain</th>
</tr>
</thead>
</table>

a. Variable - ranging from very severe to quite severe pain
b. Variable - ranging from very severe to mild pain
c. Variable - ranging from quite severe to mild pain
d. Always very severe pain
e. Always quite severe pain
f. Always mild pain
1. Over the past two weeks I have thought about, or been preoccupied with the baby inside me:

( ) almost all the time
( ) very frequently
( ) frequently
( ) occasionally
( ) not at all

2. Over the past two weeks when I have spoken about, or thought about the baby inside me I got emotional feelings which were:

( ) very weak or non-existent
( ) fairly weak
( ) in between strong and weak
( ) fairly strong
( ) very strong

3. Over the past two weeks my feelings about the baby inside me have been:

( ) very positive
( ) mainly positive
( ) mixed positive and negative
( ) mainly negative
( ) very negative
4. Over the past two weeks I have had the desire to read about or get information about the developing baby. This desire is:
   ( ) very weak or non-existant
   ( ) fairly weak
   ( ) neither strong nor weak
   ( ) moderately strong
   ( ) very strong

5. Over the past two weeks I have been trying to picture in my mind what the developing baby actually looks like in my womb:
   ( ) almost all the time
   ( ) very frequently
   ( ) frequently
   ( ) occasionally
   ( ) not at all

6. Over the past two weeks I think of the developing baby mostly as:
   ( ) a real little person inside me with special characteristics
   ( ) a baby like any other baby
   ( ) a human being
   ( ) a living thing
   ( ) a thing not yet really alive

7. Over the past two weeks I have felt that the baby inside me is dependent on me for its well-being:
   ( ) totally
   ( ) a great deal
   ( ) moderately
   ( ) slightly
   ( ) not at all
8. **Over the past** two weeks I have found myself talking to my baby when I am alone:
   ( ) not at all
   ( ) occasionally
   ( ) frequently
   ( ) very frequently
   ( ) almost all the time I am alone

9. **Over the past** two weeks when I think about (or talk to) my baby inside me, my thoughts:
   ( ) are always tender and loving
   ( ) are mostly tender and loving
   ( ) are a mixture of both tenderness and irritation
   ( ) contain a fair bit of irritation
   ( ) contain a lot of irritation

10. **The picture in my mind** of what the baby at this stage actually looks like inside the womb is:
    ( ) very clear
    ( ) fairly clear
    ( ) fairly vague
    ( ) very vague
    ( ) I have no idea at all

11. **Over the past** two weeks when I think about the baby inside me I get feelings which are:
    ( ) very sad
    ( ) moderately sad
    ( ) a mixture of happiness and sadness
    ( ) moderately happy
    ( ) very happy
12. Some pregnant women sometimes get so irritated by the baby inside them that they feel like they want to hurt it or punish it.

( ) I couldn't imagine I would ever feel like this
( ) I could imagine I might sometimes feel like this, but I never actually have
( ) I have felt like this once or twice myself
( ) I have occasionally felt like this myself
( ) I have often felt like this myself

13. Over the past two weeks I have felt:

( ) very emotionally distant from my baby
( ) moderately emotionally distant from my baby
( ) not particularly emotionally close to my baby
( ) moderately close emotionally to my baby
( ) very close emotionally to my baby

14. Over the past two weeks I have taken care with what I eat to make sure the baby gets a good diet:

( ) not at all
( ) once or twice when I ate
( ) occasionally when I ate
( ) quite often when I ate
( ) every time I ate anything

15. When I first see my baby after the birth I expect I will feel:

( ) intense affection
( ) mostly affection
( ) dislike about one or two aspects of the baby
( ) dislike about quite a few aspects of the baby
( ) mostly dislike
16. **When my baby is born I would like to hold the baby:**
   ( ) immediately
   ( ) after it has been wrapped in a blanket
   ( ) after it has been washed
   ( ) after I have had a rest for an hour or so
   ( ) the next day

17. **Over the past two weeks I have had dreams about the pregnancy or baby:**
   ( ) not at all
   ( ) occasionally
   ( ) frequently
   ( ) very frequently
   ( ) almost every night

18. **Over the past two weeks I have found myself feeling, or rubbing with my hand, the outside of my stomach where the baby is:**
   ( ) a lot of times each day
   ( ) at least once per day
   ( ) occasionally
   ( ) once only
   ( ) not at all

19. **If the pregnancy was lost at this time (due to miscarriage or other accidental event) without any pain or injury to myself, I expect I would feel:**
   ( ) very pleased
   ( ) moderately pleased
   ( ) neutral (ie neither sad nor pleased)
   ( ) moderately sad
   ( ) very sad

Appendix B10  cont/d
PRENATAL SELF-EVALUATION QUESTIONNAIRE

Directions
The statements below have been made by pregnant women to describe themselves. Read each statement and decide which response best describes your feelings. Then circle the appropriate letter next to each statement.

1. This is a good time for me to be pregnant.  
2. I like to watch other parents and children together.  
3. I can tolerate the discomforts that I've had during pregnancy.  
4. My partner and I talk about the coming baby.  
5. My partner has been critical of me during the pregnancy.  
6. I feel that rearing children is rewarding.  
7. I feel it is necessary to know a lot about labour.  
8. I can cope well with pain.  
9. It's hard for me to get used to the changes brought about by pregnancy.  
10. My partner is understanding (calms me) when I get upset.  
11. I can perform well under stress  
12. I think my labour and delivery will progress normally.  
13. There is little I can do to prepare for labour.  
14. My mother shows interest in the coming baby.  
15. I have confidence in my ability to keep calm in most situations.  
16. I am worried that the baby will not be normal.  
17. I think the worst whenever I get a pain.

Subject__________ Date__________

4 3 2 1
Very Much Moderately Somewhat Not at all
So So So So

Appendix B11  Prenatal self-evaluation questionnaire 330
<table>
<thead>
<tr>
<th>Question</th>
<th>4: Very Much</th>
<th>3: Moderately</th>
<th>2: Somewhat</th>
<th>1: Not at all</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Realizing that labour has to end will help me maintain control in labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>19. I look forward to caring for the baby.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>20. My mother is happy about my pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>21. My mother offers helpful suggestions.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>22. I have enjoyed this pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>23. My partner is interested in discussing the pregnancy with me.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>24. I have a good idea of what to expect during labour and delivery.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>25. I understand how to work with the contractions in labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>26. I look forward to childbirth.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>27. I suspect that doctors and nurses wont bother about my worries during labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>28. It's easy to talk to my mother about my problems.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>29. I have doubts about being a good mother.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>30. I keep on thinking about the problems the baby might have.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>31. My mother looks forward to this grandchild.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>32. I am glad I'm pregnant.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>33. I like having children around me.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>34. It will be hard for me to balance child care with all the other things I do.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>35. My partner helps me at home when I need it.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>36. I find it hard to talk to my partner about any changes in sex drive during this pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Item</td>
<td>Description</td>
<td>Score</td>
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<tr>
<td>37.</td>
<td>I feel good when I’m with my mother.</td>
<td>4</td>
<td></td>
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<tr>
<td>38.</td>
<td>I am preparing myself to do well in labour.</td>
<td>4</td>
<td></td>
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<tr>
<td>39.</td>
<td>I feel sure that I will lose control in labour.</td>
<td>4</td>
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<tr>
<td>40.</td>
<td>I can count on my partner’s support in labour.</td>
<td>4</td>
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<tr>
<td>41.</td>
<td>I am afraid that I will be harmed during delivery.</td>
<td>4</td>
<td></td>
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<tr>
<td>42.</td>
<td>I feel that babies aren’t much fun to care for.</td>
<td>4</td>
<td></td>
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<tr>
<td>43.</td>
<td>My partner feels I burden him with my feelings and problems.</td>
<td>4</td>
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<tr>
<td>44.</td>
<td>When we get together my mother and I tend to argue.</td>
<td>4</td>
<td></td>
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<tr>
<td>45.</td>
<td>It will be difficult for me to give enough attention to a baby.</td>
<td>4</td>
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<tr>
<td>46.</td>
<td>I think the baby will be a burden to me.</td>
<td>4</td>
<td></td>
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<tr>
<td>47.</td>
<td>I feel prepared for what happens in labour.</td>
<td>4</td>
<td></td>
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<tr>
<td>48.</td>
<td>I know some things I can do to help myself in labour.</td>
<td>4</td>
<td></td>
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<tr>
<td>49.</td>
<td>When the time comes in labour, I’ll be able to push even if it’s painful.</td>
<td>4</td>
<td></td>
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<tr>
<td>50.</td>
<td>I think about the kind of mother I want to be.</td>
<td>4</td>
<td></td>
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<tr>
<td>51.</td>
<td>I am anxious about complications occurring in labour.</td>
<td>4</td>
<td></td>
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<tr>
<td>52.</td>
<td>I feel that the stress of labour will be too much for me to handle.</td>
<td>4</td>
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<tr>
<td>53.</td>
<td>I think I can bear the discomfort of labour.</td>
<td>4</td>
<td></td>
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<tr>
<td>54.</td>
<td>I am concerned that caring for a baby will leave me little time for myself.</td>
<td>4</td>
<td></td>
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<tr>
<td>55.</td>
<td>My mother reassures me when I have doubts about myself.</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very Much</td>
<td>Moderately</td>
<td>Somewhat</td>
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</tr>
<tr>
<td>56.</td>
<td>I feel well informed about labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>57.</td>
<td>I am worried that something will go wrong during labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>58.</td>
<td>It's difficult for me to accept this pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>59.</td>
<td>My mother encourages me to do things in my own way.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>60.</td>
<td>I think my partner would say that our sex life has been OK during this pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>61.</td>
<td>This has been an easy pregnancy so far.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>62.</td>
<td>I wish I wasn't having the baby now.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>63.</td>
<td>I worry that I will lose the baby in labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>64.</td>
<td>If I lose control in labour, it will be hard for me to get it back again.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>65.</td>
<td>My mother criticizes my decisions.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>66.</td>
<td>I'm having a problem adjusting to this pregnancy.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>67.</td>
<td>I am worried that my baby may not like me.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>68.</td>
<td>I keep on thinking about all the terrible things that could happen in labour.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>69.</td>
<td>This pregnancy has been a source of frustration to me.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>70.</td>
<td>I can count on my partner to share in the care of the baby.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>71.</td>
<td>I am confident of having a normal childbirth.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>72.</td>
<td>I feel that childbirth is a natural, exciting thing.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>73.</td>
<td>I feel I already love the baby.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>74.</td>
<td>I have found this pregnancy rewarding.</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>75.</td>
<td>I believe I can be a good mother.</td>
<td>4</td>
<td>3</td>
<td>2</td>
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<tr>
<td></td>
<td>I have regrets about being pregnant at this time.</td>
<td></td>
<td>I find many things about pregnancy disagreeable.</td>
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<td>------------------------------------------------</td>
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<td>-------------------------------------------------</td>
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<tr>
<td></td>
<td>4 Very Much So</td>
<td>3</td>
<td>moderately So</td>
<td>2</td>
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<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
Using the scale / Strongly Agree / Agree / Uncertain / Disagree / Strongly Disagree / decide how much you agree or disagree with each statement.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. By attending antenatal classes taught by competent health professionals, I can greatly increase the odds of having a healthy normal baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Even if I take excellent care of myself when I am pregnant, fate will determine whether my child will be normal or abnormal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. My baby will be born healthy only if I do everything my doctor tells me to do during pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. If my baby is unhealthy or abnormal nature intended it to be that way.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. The care I receive from health professionals is what is responsible for the health of my unborn child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>6. My unborn child's health can be seriously affected by my dietary intake during pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Health professionals are responsible for the health of my unborn child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. If I get ill during pregnancy, consulting the doctor is the best thing I can do to protect the health of my unborn child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. No matter what I do when I am pregnant, the laws of nature determine whether or not my child will be normal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Doctors and nurses are the only ones who are competent to give me advice concerning my behaviour during pregnancy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
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</tr>
<tr>
<td>11</td>
<td>God will determine the health of my child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>12</td>
<td>Learning how to care for myself before I become pregnant helps my child to be born healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>13</td>
<td>My baby's health is in the hands of health professionals.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>14</td>
<td>Fate determines the health of my unborn child.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15</td>
<td>What I do right up to the time that my baby is born can affect my baby's health.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16</td>
<td>Having a miscarriage means to me that my baby was not destined to live.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17</td>
<td>Before becoming pregnant, I learnt what specific things I should do and not do during pregnancy in order to have a healthy normal baby.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18</td>
<td>Only qualified health professionals can tell me what I should and should not do when I am pregnant.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
IN THE PAST MONTH

1. Have you felt attractive?  
   Never  Rarely  Often  Very Often

2. Have you felt that your body smelt nice?  
   Never  Rarely  Often  Very Often

3. Have you liked the shape of your body?  
   Not at all  A little  A lot  Very Much

4. Have you felt that your face was attractive?  
   Not at all  A little  A lot  Very Much

5. Have you felt that you were too thin?  
   Very Much  A lot  A little  Not at all

6. Have you felt proud of your appearance?  
   Very Much  A lot  A little  Not at all

7. Have you felt that your body was soft and cuddly?  
   Very Much  A lot  A little  Not at all

8. Has your body felt awkward and ungainly?  
   Very Much  A lot  A little  Not at all

9. Have you felt that your complexion was poor?  
   Very Much  A lot  A little  Not at all

10. Have you felt that your breasts were attractive?  
    Not at all  A little  A lot  Very much

11. Have you felt that you were too fat?  
    Very Much  A lot  A little  Not at all
MEDICAL CARE SATISFACTION

This questionnaire concerns how satisfied you are with the medical care you are currently receiving for your pregnancy. This information is confidential and will NOT be shown to your doctor or nurse. We want you to answer the questions as honestly as you can.

The care you receive at the Antenatal Clinic
Using the scale below, rate how satisfied you are with the different aspects of the antenatal clinic.

<table>
<thead>
<tr>
<th></th>
<th>Extremely Dissatisfied</th>
<th>Somewhat Dissatisfied</th>
<th>Moderately Satisfied</th>
<th>Mostly Satisfied</th>
<th>Extremely Satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
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<td>4</td>
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<td>2</td>
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<td>7</td>
<td>1</td>
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<tr>
<td>8</td>
<td>1</td>
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<td>5</td>
</tr>
</tbody>
</table>

Appendix B14 Satisfaction with antenatal care
COC/P

Use the scale Always/Often/Sometimes/Occasionally/Never to answer the following questions.

1. When you attend the antenatal clinic for your appointments during this pregnancy, how often do you see the same doctor?
   
   1  2  3  4  5
   Always  Often  Sometimes  Occasionally  Never

2. When you attend the antenatal clinic for your appointments during this pregnancy, how often do you see the same nurse/midwife?
   
   1  2  3  4  5
   Always  Often  Sometimes  Occasionally  Never
1. In uncontrolled diabetes, the blood sugar is
   A. Normal
   B. Increased
   C. Decreased
   D. I don't know

2. Which one of the following is true?
   A. It does not matter if your diabetes is not fully controlled as long as you do not have a coma.
   B. It is best to show some sugar in the urine in order to avoid hypo's.
   C. Poor control of diabetes could result in a greater chance of complications later.
   D. I don't know

3. The normal range for blood glucose is:
   A. 4-8 mmol/L
   B. 7-15 mmol/L
   C. 2-10 mmol/L
   D. I don't know

4. Butter is mainly:
   A. Protein
   B. Carbohydrate
   C. Fat
   D. I don't know

5. Rice is mainly:
   A. Protein
   B. Carbohydrate
   C. Fat
   D. Mineral and Vitamin
   E. I don't know

6. The presence of ketones in the urine is:
   A. A good sign
   B. A bad sign
   C. A usual finding in diabetes
   D. I don't know
7. Which of the following possible complications is usually not associated with diabetes?
   A Changes in vision
   B Changes in the kidney
   C Changes in the lung
   D I don't know

8. When a diabetic on insulin becomes ill and unable to eat the prescribed diet
   A He should immediately stop taking his insulin
   B He must continue to take the insulin
   C He should use diabetic tablets instead of insulin
   D I don't know

9. If you feel the beginnings of a hypo reaction you should:
   A Immediately take some insulin
   B Immediately lie down and rest
   C Immediately eat or drink something sweet
   D I don't know

10. You can eat as much as you like of which one of the following foods:
    A Apples
    B Celery
    C Meat
    D Honey

11. A hypo is caused by:
    A Too much insulin
    B Too little insulin
    C Too little exercise
    D I don't know
ATT 39
Using the scale/Strongly Agree/Agree/Uncertain/Disagree/Strongly Disagree/ decide how much you agree or disagree with each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. If I did not have diabetes I think I would be a quite different person.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Diabetes has made no difference to my life at all.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. I dislike being referred to as &quot;A DIABETIC&quot;.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Diabetes is the worst thing that ever happened to me.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>5. I feel quite capable of looking after my diabetes with minimum outside help.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>6. I know as much as I need to know about diabetes.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
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<tr>
<td>7. I believe that research will discover a cure for diabetes before too long.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>8. Most people would find it difficult to adjust to having diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
<tr>
<td>9. I often feel embarrassed about having diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10 Most people would be a lot healthier if they followed a diabetic diet.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11 Talking to my doctor about my diabetes usually makes me feel better.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
<tr>
<td>12 There is not much I seem to be able to do to control my diabetes.</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>13 I like to be told when my diabetes has been well controlled.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14 There is little hope of leading a normal life with diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15 The proper control of diabetes involves a lot of sacrifice and inconvenience.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
</tbody>
</table>
16 Having diabetes means accepting responsibility for your own treatment.
17 The thought of giving myself an injection does not bother me.
18 Food is very important in my life.
19 I try not to let people know about my diabetes.
20 Being told you have diabetes is like being sentenced to a lifetime of illness.
21 Hypo's are not really as frightening as people think.
22 Most people do not understand the problems associated with having diabetes.
23 My diabetic diet does not really spoil my social life.
24 Weight control is not a problem for me.
25 In general, doctors need to be a lot more sympathetic in their treatment of people with diabetes.
26 Having diabetes over a long period changes the personality.
27 A person should learn to live with diabetes, without involving other members of the family.
28 I often find it difficult to decide whether I feel ill or well.
29 Most doctors really don't understand what it's like to have diabetes.
30 I often forget that I even have diabetes.
31 Diabetes is not really a problem because it can be controlled.
32 Sometimes I have used diabetes as an excuse to get my own way.
<table>
<thead>
<tr>
<th></th>
<th>1: Strongly Agree</th>
<th>2: Agree</th>
<th>3: Uncertain</th>
<th>4: Disagree</th>
<th>5: Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>33 I do not like being told what to eat, when to eat, and how much to eat.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>34 I think I have a good relationship with my doctor.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>35 There is really nothing much you can do if you have diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>36 I would like to be told if my diabetic control had been poor.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>37 There is really no one I feel I can talk to openly about my diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>38 I believe I have adjusted well to having diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>39 I often think it is unfair that I should have diabetes when other people are so healthy.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
</tbody>
</table>
We want to know how often family members do each of the following things. Just put down what usually happens at home - there are no right or wrong answers. First, choose the family member that you are most involved with. Then, write down one number from the scale below that best shows how often the person being rated does each of the following things.

Which member of your family have you chosen. ______________________

How often does this person:

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Praise you for following your diet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Nag you about testing your glucose level</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Suggest things that might help you take insulin on time</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Criticize you for not exercising regularly</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Help you decide if changes should be made based on glucose testing results</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. Nag you about following your diet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Argue with you about your diabetes self-care activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Encourage you to participate in sports activities</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Plan family activities so that they will fit in with your diabetes self-care schedule</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Congratulate you for sticking to your diabetes self-care schedule</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Criticize you for not recording the results of glucose tests</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>12. Eat at the same time that you do</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>Often</td>
<td>Sometimes</td>
<td>Occasionally</td>
<td>Never</td>
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<tr>
<td>13. Exercise with you</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>14. Let you sleep late rather than getting up to take your insulin</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>15. Buy you things containing sugar to carry with you in case of an insulin reaction</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>16. Eat foods that are not part of your diabetic diet</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
The following questions concern the causes of situations which you may have experienced recently.

While events may have many causes, we want you to pick only one - the major cause of the situation as you see it.

Please write this cause in the space provided after each event.

Next, we want you to answer some questions about the cause by circling the most appropriate number on a sliding scale from 6 to 0.
Imagine that you have recently experienced a hypo.
Write down the single most likely cause of the hypo in the space below.

Now rate this cause on the following scales:

1. To what extent was the cause due to something about you?
   Totally due to me 6 5 4 3 2 1 0 Not at all due to me

2. To what extent was the cause due to the treatment recommended by your doctor?
   Totally due to treatment recommended 6 5 4 3 2 1 0 Not at all due to treatment recommended

3. To what extent was the cause something to do with other people or circumstances?
   Totally due to other people or circumstances 6 5 4 3 2 1 0 Not at all due to other people or circumstances

4. To what extent was the cause due to chance?
   Totally due to chance 6 5 4 3 2 1 0 Not at all due to chance

5. To what extent was the cause controllable by you?
   Totally controllable by me 6 5 4 3 2 1 0 Not at all controllable by me

6. To what extent was the cause controllable by your doctor?
   Totally controllable by my doctor 6 5 4 3 2 1 0 Not at all controllable by my doctor

7. To what extent do you think you could have foreseen the cause of the hypo?
   Totally foreseeable by me 6 5 4 3 2 1 0 Totally unforeseeable by me
Imagine that for several days you have found high levels of sugar when you tested your blood or urine.

Write down the single most likely cause of the high sugar levels in the space below.

__________________________________________________________________________________________

Now rate this cause on the following scales:

1. To what extent was the cause due to something about you?
   Totally due to me  6  5  4  3  2  1  0  Not at all due to me

2. To what extent was the cause due to the treatment recommended by your doctor?
   Totally due to treatment recommended  6  5  4  3  2  1  0  Not at all due to treatment recommended

3. To what extent was the cause something to do with other people or circumstances?
   Totally due to other people or circumstances  6  5  4  3  2  1  0  Not at all due to other people or circumstances

4. To what extent was the cause due to chance?
   Totally due to chance  6  5  4  3  2  1  0  Not at all due to chance

5. To what extent was the cause controllable by you?
   Totally controllable by me  6  5  4  3  2  1  0  Not at all controllable by me

6. To what extent was the cause controllable by your doctor?
   Totally controllable by my doctor  6  5  4  3  2  1  0  Not at all controllable by my doctor

7. To what extent do you think you could have foreseen the cause of the high sugar levels?
   Totally foreseeable by me  6  5  4  3  2  1  0  Totally unforeseeable by me
Imagine that your diabetes has been well controlled for a period of several weeks during which time there has been little fluctuation in blood glucose, no reactions and you have felt fit and well.

Write down the single most likely cause of this period of good control in the space below.

Now rate this cause on the following scales:

1. To what extent was the cause due to something about you?
   Totally due to me 6 5 4 3 2 1 0 Not at all due to me

2. To what extent was the cause due to the treatment recommended by your doctor?
   Totally due to treatment recommended 6 5 4 3 2 1 0 Not at all due to treatment recommended

3. To what extent was the cause something to do with other people or circumstances?
   Totally due to other people or circumstances 6 5 4 3 2 1 0 Not at all due to other people or circumstances

4. To what extent was the cause due to chance?
   Totally due to chance 6 5 4 3 2 1 0 Not at all due to chance

5. To what extent was the cause controllable by you?
   Totally controllable by me 6 5 4 3 2 1 0 Not at all controllable by me

6. To what extent was the cause controllable by your doctor?
   Totally controllable by my doctor 6 5 4 3 2 1 0 Not at all controllable by my doctor

7. To what extent do you think you could have foreseen the cause of the period of good diabetes control?
   Totally foreseeable by me 6 5 4 3 2 1 0 Totally unforeseeable by me
Imagine that you have successfully avoided the complications of diabetes such as problems with your feet, kidneys or eyes.

Write down the single most likely cause of the successful avoidance of diabetic complications

Now rate this cause on the following scales:

1. To what extent was the cause due to something about you?
   - Totally due to me 6 5 4 3 2 1 0 Not at all due to me

2. To what extent was the cause due to the treatment recommended by your doctor?
   - Totally due to treatment recommended 6 5 4 3 2 1 0 Not at all due to treatment recommended

3. To what extent was the cause something to do with other people or circumstances?
   - Totally due to other people or circumstances 6 5 4 3 2 1 0 Not at all due to other people or circumstances

4. To what extent was the cause due to chance?
   - Totally due to chance 6 5 4 3 2 1 0 Not at all due to chance

5. To what extent was the cause controllable by you?
   - Totally controllable by me 6 5 4 3 2 1 0 Not at all controllable by me

6. To what extent was the cause controllable by your doctor?
   - Totally controllable by my doctor 6 5 4 3 2 1 0 Not at all controllable by my doctor

7. To what extent do you think you could have foreseen the cause of successfully avoiding complications?
   - Totally foreseeable by me 6 5 4 3 2 1 0 Totally unforeseeable by me
ACTIVITIES QUESTIONNAIRE

After considering the difficulty of each activity listed below, rate how certain you are that you realistically could perform each activity (if you decided to) over the next several months.

Use the following rating scale:

<table>
<thead>
<tr>
<th>Certainty Rating</th>
<th>1</th>
<th>4.5</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely certain that I could not</td>
<td>I could or could not</td>
<td>100% certain that I could</td>
<td></td>
</tr>
</tbody>
</table>

Glucose Testing

1. I could test my blood glucose level at least once a week over the next several months

2. I could test my glucose level at least every other day

3. I could test my glucose level at least once a day

4. I could test my glucose level at least twice a day

5. I could test my glucose levels as instructed by my doctor over the next several months

6. I could test my glucose levels regularly when I am at home

7. I could test my glucose levels regularly at work

8. I could test my glucose levels regularly while I am on trips away from home
Eating Habits

1. I could limit how many calories I eat as instructed by my doctor or dietician over the next several months

2. I could eat foods from the appropriate (exchange) food groups

3. I could limit how many cakes, biscuits, and sweets I eat

4. I could limit how many foods I eat that are high in fat and cholesterol

5. I could limit the number of alcoholic drinks I drink

6. I could follow my diet when away from home over the next several months (e.g., at friends, on holiday).

7. I could stick to my diet plan when at parties and social occasions

8. I could follow my diet plan when eating at restaurants

9. I could regularly eat foods high in fibre (e.g., wholemeal bread, brown rice, Weetabix)

Insulin Taking

1. I could regularly take my insulin as prescribed by my doctor over the next several months

2. I could take my insulin at the times I am supposed to over the next several months.

3. I could take my insulin regularly even when away from home

4. I could adjust my level of insulin to changes in my activity level
This questionnaire concerns how satisfied you are with the medical care you are currently receiving for your diabetes. This information is confidential and will NOT be shown to your doctor or nurse. We want you to answer the questions as honestly as you can.

The care you receive at the Diabetes Clinic -
Using the scale below, rate how satisfied you are with the different aspects of the diabetes clinic.

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<th>Somewhat Dissatisfied</th>
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<th>Extremely Satisfied</th>
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</table>

1. Your doctor's ability to adapt your regimen to keep your diabetes controlled during pregnancy.

2. Your doctor's knowledge about diabetes.

3. Your doctor's knowledge about diabetic pregnancy.

4. Your doctor's interest in you as a person.

5. The availability of your doctor to give advice on the telephone between appointments.

6. The availability of the diabetes specialist nurse to give advice on the telephone between appointments.

7. The willingness of your doctor to address your questions and concerns.

8. Your doctor's ability to talk to you in terms you can understand.

9. The ease of getting an appointment with your doctor at the time you need to see him/her.

10. The length of time you wait in the waiting area before getting in to see your doctor.
Use the scale/Always/Often/Sometimes/Occasionally/Never to answer the following questions.

1. How often had the diabetes doctor who is looking after you during this pregnancy, treated you before you became pregnant?
   - 1 Always
   - 2 Often
   - 3 Sometimes
   - 4 Occasionally
   - 5 Never

2. When you attend the diabetes clinic for your appointments during this pregnancy, how often do you see the same doctor?
   - 1 Always
   - 2 Often
   - 3 Sometimes
   - 4 Occasionally
   - 5 Never

Do you have contact with one of the specialist diabetes nurses at the diabetes clinic?

If yes, please answer question 4.

3. When you attend the diabetes clinic for your appointments during this pregnancy, how often do you see this specialist nurse?
   - 1 Always
   - 2 Often
   - 3 Sometimes
   - 4 Occasionally
   - 5 Never
HBM - C

Use the scale / Always/ Often / Sometimes / Occasionally / Never / to answer the following questions.

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<tbody>
<tr>
<td>Always</td>
<td>Often</td>
<td>Sometimes</td>
<td>Occasionally</td>
<td>Never</td>
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</tr>
</tbody>
</table>

1. How often do family members / close friends give you reminders that help you to stay on your diet.
   1 2 3 4 5

2. How often do family members / close friends give you reminders that help you to do your insulin injections on time.
   1 2 3 4 5

3. How often do family members / close friends give you reminders that help you to stick to the recommended number of blood glucose tests.
   1 2 3 4 5

4. How often do you use symptoms (how you are feeling) as signals that you should eat a meal / have a snack.
   1 2 3 4 5

5. How often do you use symptoms (how you are feeling) as signals that it is time for you to do your insulin injection.
   1 2 3 4 5

6. How often do you use symptoms (how you are feeling) as signals that you should carry out a blood glucose test.
   1 2 3 4 5

7. Some people are quite concerned about the chances of becoming ill whilst others are not. How often do you worry about whether you will become ill.
   1 2 3 4 5

TOTAL

Appendix B21a  Health belief model - cues to action and general health motivation 356
The following questions (Qs 1 - 25) ask you about your diabetes and about different aspects of your diabetic regimen. Using the scale / Strongly Agree / Agree / Uncertain / Disagree / Strongly Disagree / decide how much you agree or disagree with each statement.

<table>
<thead>
<tr>
<th></th>
<th>1 Strongly Agree</th>
<th>2 Agree</th>
<th>3 Uncertain</th>
<th>4 Disagree</th>
<th>5 Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sticking to the recommended diet can reduce my chances of developing diabetic complications.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. My doctor can help me if I develop or have eye disease related to my diabetes.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Sticking to the recommended diet can reduce the risk of my blood glucose level becoming high enough for me to experience symptoms such as thirst, sickness or tiredness.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. It hurts when I prick my finger in order to do a blood glucose test.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Sticking to the recommended diet can reduce the risk of me having a hypo.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. As long as I am feeling OK, it doesn't matter if I don't test my blood glucose level each day.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>7. Carrying out the recommended number of daily blood glucose tests interferes with my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>8. Sticking to the recommended diet interferes with my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. Carrying out the recommended number of daily blood glucose tests can reduce the risk of me having a hypo.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>10. Sticking to the recommended diet means I am still hungry at the end of a meal.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>11. Sticking to the recommended timing of my insulin injections interferes with my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1: Strongly Agree</td>
<td>2: Agree</td>
<td>3: Uncertain</td>
<td>4: Disagree</td>
<td>5: Strongly Disagree</td>
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</tr>
<tr>
<td>12</td>
<td>Carrying out the recommended number of daily blood glucose tests helps me to feel in control of my diabetes.</td>
<td>1 2 3 4 5</td>
<td></td>
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</tr>
<tr>
<td>13</td>
<td>Sticking to the recommended diet makes me feel physically better, on a day to day basis.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>14</td>
<td>My doctor can help me if I develop or have kidney disease related to my diabetes.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15</td>
<td>Sticking to the recommended timing of my insulin injections can reduce the risk of me having a hypo.</td>
<td>1 2 3 4 5</td>
<td></td>
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</tr>
<tr>
<td>16</td>
<td>Carrying out the recommended number of daily blood glucose tests can reduce the risk of my blood glucose level becoming high enough for me to experience symptoms such as thirst, sickness or tiredness.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>17</td>
<td>Sticking to the recommended timing of my insulin injections makes me feel physically better on a day to day basis.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>18</td>
<td>My doctor can help me to achieve a longer life span with my diabetes.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Carrying out the recommended number of daily blood glucose tests can reduce my chances of developing diabetic complications.</td>
<td>1 2 3 4 5</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>20</td>
<td>Carrying out the recommended number of daily blood glucose tests makes me feel physically better on a day to day basis.</td>
<td>1 2 3 4 5</td>
<td></td>
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<tr>
<td>21</td>
<td>Sticking to the recommended timing of my insulin injections can reduce the risk of my blood glucose level becoming high enough for me to experience symptoms such as thirst, sickness or tiredness.</td>
<td>1 2 3 4 5</td>
<td></td>
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</tbody>
</table>
22 Sticking to the recommended timing of my insulin injections can reduce my chances of developing diabetic complications.

23 I tend to run my blood sugar high in order to avoid having a hypo.

24 It hurts when I do my insulin injections.

25 By paying attention to how my body feels I can get a reasonable estimate of my blood glucose level.

Do you have to cook meals for your partner/other members of your family?

IF YES, then answer Question 26

26. Having to cook meals for my partner/family makes sticking to the recommended diet difficult.

Do you have domestic responsibilities (housework, shopping etc) for anyone else other than yourself?

IF YES, then answer Question 27

27 My domestic responsibilities mean that it is difficult for me to find time to do the recommended number of blood glucose tests.

Do you have a job (either full or part time)?

IF YES, then answer Question 28

28. Because I go out to work, it is difficult for me to find time to do the recommended number of blood glucose tests.
The following questions (Qs X-Y) ask you to consider how serious are the different medical problems related to diabetes. Using the scale /Strongly Agree/Agree/Uncertain/Disagree/Strongly Disagree/ rate your agreement to each of the statements.

1. Have you experienced any kidney problems related to your diabetes?

   IF YES: rate your agreement to Question 1a
   1a Having kidney disease is very serious
   1 2 3 4 5

   IF NO: rate your agreement to Question 1b
   1b Having kidney disease would be very serious.
   1 2 3 4 5

2. Have you experienced any eye problems related to your diabetes?

   IF YES: rate your agreement to Question 2a
   2a Having eye disease is very serious
   1 2 3 4 5

   IF NO: rate your agreement to Question 2b
   2b Having eye disease would be very serious.
   1 2 3 4 5

3. Are you ever unable to anticipate that you are going hypo?

   IF YES: rate your agreement to Question 3a
   3a. Being unable to anticipate that I am going hypo is very serious.
   1 2 3 4 5

   IF NO: rate your agreement to Question 3b
   3b. Being unable to anticipate that I am going hypo would be very serious.
   1 2 3 4 5
4. Have you ever had a bad hypo during the day?

IF YES: rate your agreement to Question 4a
4a. Having a bad hypo during the day is very serious

IF NO: rate your agreement to Question 4b
4b. Having a bad hypo during the day would be very serious.

5. Have you ever had a bad hypo during the night?

IF YES: rate your agreement to Question 5a
5a. Having a bad hypo during the night is very serious

IF NO: rate your agreement to Question 5b
5b. Having a bad hypo during the night would be very serious.

6. Has your blood glucose level ever been high enough for you to experience symptoms such as thirst, dry mouth, sickness or tiredness?

IF YES: rate your agreement to Question 6a
6a. Having a blood glucose level which is high enough for me to experience these symptoms is very serious.

IF NO: rate your agreement to Question 6b
6b. Having a blood glucose level which is high enough for me to experience these symptoms would be very serious.

Finally, please rate your agreement to Questions 7 and 8.

7. Diabetes is a very serious illness

8. My diabetes has got worse during this pregnancy than it was before I was pregnant. (Pregnant group only)
HBM - PSC/A

The following questions (Qs 1-6) ask you about how susceptible you feel to different problems related to your diabetes. Using the scale/Strongly Agree/Agree/Uncertain/Disagree/Strongly Disagree/ decide how much you agree or disagree with each statement.

You may have been told that the chance of developing complications is related to how closely you stick to the different aspects of your regimen. So, think about what you actually do in terms of your diet, insulin injections and blood glucose tests, whilst you are answering these questions.

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<tr>
<td>1</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

1. It is likely that I will get eye disease related to my diabetes, or have the condition worsen.

   1   2   3   4   5

2. It is likely that I will develop kidney disease, or have the condition worsen.

   1   2   3   4   5

3. It is likely that I will develop poor circulation, or have the condition worsen.

   1   2   3   4   5

4. Sometimes I am unable to anticipate when I am going hypo.

   1   2   3   4   5

5. It is likely that I would have bad hypos during the day

   1   2   3   4   5

6. It is likely that I would have bad hypos during the night

   1   2   3   4   5

7. My blood glucose level can become high enough for me to experience symptoms such as thirst, dry mouth sickness or tiredness.

   1   2   3   4   5

Appendix B21d   Health belief model - perceived susceptibility 362
Open Ended Items

Subject No __________ Date __________

1 What would you say are the major factors that motivate you to follow your regimen at the moment?

2 Now think back to before you were pregnant or trying to conceive this baby. What were the major factors that motivated you to follow your regimen then?

3 Is your diabetes different now from how it was before you were pregnant or trying to conceive this baby?

   Yes _____ Please go on to Question 4a

   No _____

   4(a) In what ways is your diabetes different now from how it was before you were pregnant or trying to conceive this baby?

6(b) What do you think has caused this difference?
The following questions ask you about your diabetes, about different aspects of your diabetic regimen, and about your pregnancy. Using the scale / Strongly Agree / Agree / Uncertain / Disagree / Strongly Disagree / decide how much you agree or disagree with each statement.

1. Sticking to the recommended diet during pregnancy helps me to feel less nauseous.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

2. I don't have enough energy to carry out the recommended number of daily blood glucose tests during this pregnancy.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

3. Sticking to the recommended diet helps me to feel in control of this pregnancy.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

4. I don't have enough energy to stick to the recommended diet during this pregnancy.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

5. Carrying out the recommended number of daily blood glucose tests helps me to feel in control of this pregnancy.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

6. Sticking to the recommended timing of my insulin injections helps me feel less nauseous.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

7. Sticking to the recommended diet during pregnancy can help me to have a healthy baby.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

8. Sticking to the recommended timing of my insulin injections helps me to feel in control of this pregnancy.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

9. Sticking to the recommended timing of my insulin injections during pregnancy can help me to have a healthy baby.
   - 1: Strongly Agree
   - 2: Agree
   - 3: Uncertain
   - 4: Disagree
   - 5: Strongly Disagree

10. I don't have enough energy to stick to the recommended timing of my insulin injections during this pregnancy.
    - 1: Strongly Agree
    - 2: Agree
    - 3: Uncertain
    - 4: Disagree
    - 5: Strongly Disagree

11. Carrying out the recommended number of daily blood glucose tests during pregnancy can help me to have a healthy baby.
    - 1: Strongly Agree
    - 2: Agree
    - 3: Uncertain
    - 4: Disagree
    - 5: Strongly Disagree

Appendix B2a: Health beliefs about diabetic pregnancy - perceived benefits and barriers

364
The following questions ask you to consider how serious are different problems related to pregnancy.

<table>
<thead>
<tr>
<th></th>
<th>1 Strongly Agree</th>
<th>2 Agree</th>
<th>3 Uncertain</th>
<th>4 Disagree</th>
<th>5 Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Having a premature baby would be very serious.</td>
<td>1</td>
<td>2</td>
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</tr>
<tr>
<td>2</td>
<td>Having a baby that was born very heavy would be very serious.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>3</td>
<td>Having a baby that was born very small would be very serious.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Having a baby born with a birth defect would be very serious.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Having to have a caesarean would be very serious.</td>
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<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
The following questions ask you about how susceptible you feel to different problems related to your pregnancy. Using the scale /Strongly Agree/ /Agree/ /Uncertain/ /Disagree/ /Strongly Disagree/ decide how much you agree or disagree with each statement.

All pregnant women think about their health in pregnancy, how the labour will turn out, and whether the baby will have problems. You may also have been told that the likelihood of having complications in pregnancy is related to how closely you stick to the different aspects of your regimen. So, think about what you actually do in terms of your diet, insulin injections and blood glucose tests, and then answer these questions.

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<thead>
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<tbody>
<tr>
<td></td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>1.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>1.</td>
<td>1</td>
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<tr>
<td>2.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
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<td>2.</td>
<td>1</td>
<td>2</td>
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<td>4</td>
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<tr>
<td>3.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>3.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>4.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5.</td>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Uncertain</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
<tr>
<td>5.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Appendix B23c  Health beliefs about diabetic pregnancy - perceived susceptibility 366
The following questions ask you about diabetes during pregnancy:

12. Glycosylated haemoglobin levels are drawn about once per month during pregnancy. Why are these levels taken?
   A. They measure previous blood sugar control
   B. They measure the amount of iron in your blood
   C. They measure how helpful your diet is in controlling your blood sugar.
   D. I don't know.

13. Which blood sugar (glucose) range are you aiming to keep your blood in during pregnancy?
   A. 3.0 - 6.5 mmol/L
   B. 2.5 - 8.0 mmol/L
   C. 1.5 - 4.5 mmol/L
   D. 4.0 - 9.0 mmol/L

14. Which one of the following statements about blood sugar control in pregnancy is true?
   A. Having low blood sugar could effect the development of the baby as much as having high blood sugar.
   B. My baby is not effected by my blood sugar level.
   C. Low blood sugar levels do not effect the development of the baby as much as high blood sugar levels.
   D. I don't know.
SELF-MONITORING OF DIET, INSULIN INJECTIONS AND BLOOD GLUCOSE TESTS

Thank you for agreeing to take part in this study.

The most important point to stress is that you must try, as far as possible, NOT to change your behaviour because you are filling in these forms. Do what you would normally be doing. If you change your routine this week BECAUSE you are filling in these forms - then the information on the forms is not helpful to us.

Diet:

Please see separate instruction sheet, and sample page.

Insulin Injections:

Please fill out the form for a week. One sheet for each day of the week.

Blood Glucose Tests:

Please fill out the form for a week. One sheet for each day of the week. On each day - if you have not performed a blood test on that day - please leave it blank.

Please remember two things:

1. Don't change your behaviour because you are filling out these forms.

2. These forms are entirely confidential, and will not be shown to any of the medical team who are caring for you during your pregnancy. Do not put your name on any of the forms.
Subject No______  (1 sheet out of 7 day booklet)

BLOOD GLUCOSE TESTING RESULTS

Day____  Today's Date_______

<table>
<thead>
<tr>
<th>Time Of Day</th>
<th>Type of Test</th>
<th>Test Result</th>
<th>When was your last meal or snack?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
Subject No:__ Date:____

S - C

The questions below ask you what you have done about different aspects of your diabetes regimen during the last 7 days. (If you have been unwell during the last 7 days, please think back to the last 7 days that you were not unwell).

<table>
<thead>
<tr>
<th></th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Over the last 7 days how often did you follow your doctor/nurse's recommendations for controlling your diabetes?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Over the last 7 days how often did you spread out your intake of starchy (carbohydrate) foods over the day?</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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<tr>
<td>3. Over the last 7 days how often did you limit your intake of fatty foods (foods such as butter, potato crisps, fried foods and fatty meat)?</td>
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<td>4. Except for the special case where you were eating sweet things in order to get over being hypo, in the last 7 days how often did you avoid sweet foods and drinks, such as chocolate, sweets, ordinary fizzy drinks, etc.</td>
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<td>5</td>
</tr>
<tr>
<td>5. Over the last 7 days how often did you eat only moderate amounts of protein foods (foods such as meat, fish, eggs and chicken).</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<tr>
<td>6. Over the last 7 days how often did you make sure that you had enough fibre in your diet.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
</tr>
</tbody>
</table>
7. On how many of the last 7 days did you test your blood sugar level?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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8. How many of your blood test results did you write down?

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<td>All of them</td>
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</table>

9. How many of your insulin injections did you take when you were supposed to? (Not more than 30 minutes early or late).

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10. How many of your insulin injections did you measure the way you were supposed to?

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<td>Some of them</td>
<td>None of them</td>
<td>I do not take insulin</td>
</tr>
</tbody>
</table>
We would like to know about the different parts of your diabetes self-care regimen. The following questions are about what you are supposed to be doing according to the doctors and nurses who treat you. This may or may not be the same as what you are doing.

**REG CHARACTS BGT /P**

1. How often was it recommended that you test your blood for glucose (sugar) during this pregnancy?

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 times a day</td>
<td>1__</td>
</tr>
<tr>
<td>3 times a day</td>
<td>2__</td>
</tr>
<tr>
<td>2 times a day</td>
<td>3__</td>
</tr>
<tr>
<td>1 time a day</td>
<td>4__</td>
</tr>
<tr>
<td>every other day</td>
<td>5__</td>
</tr>
<tr>
<td>2 times a month</td>
<td>6__</td>
</tr>
<tr>
<td>3 times a month</td>
<td>7__</td>
</tr>
<tr>
<td>2 times a month</td>
<td>8__</td>
</tr>
<tr>
<td>1 time a month</td>
<td>9__</td>
</tr>
<tr>
<td>1 time a month</td>
<td>10__</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>11__</td>
</tr>
</tbody>
</table>

2. What time of day were you told to test your blood for glucose (sugar) during this pregnancy?

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>before every meal and at bedtime</td>
<td>1__</td>
</tr>
<tr>
<td>after meals only</td>
<td>2__</td>
</tr>
<tr>
<td>before breakfast only</td>
<td>3__</td>
</tr>
<tr>
<td>before and after dinner</td>
<td>4__</td>
</tr>
<tr>
<td>not told a specific time</td>
<td>5__</td>
</tr>
<tr>
<td>other (please specify)</td>
<td>6__</td>
</tr>
</tbody>
</table>

3. What materials were you told to use in testing your blood sugar during this pregnancy? (Please read all choices before making your decision).

<table>
<thead>
<tr>
<th>Materials</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>BM sticks with meter</td>
<td>1__</td>
</tr>
<tr>
<td>BM sticks without meter</td>
<td>2__</td>
</tr>
<tr>
<td>Glucostix with meter</td>
<td>3__</td>
</tr>
<tr>
<td>Glucostix without meter</td>
<td>4__</td>
</tr>
<tr>
<td>Dextrostix with meter</td>
<td>5__</td>
</tr>
<tr>
<td>Exactech meter</td>
<td>6__</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>7__</td>
</tr>
</tbody>
</table>

4. Mark all the people that provided you with formal instructions about how to test your blood for sugar at any stage

<table>
<thead>
<tr>
<th>Person</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctor</td>
<td>1__</td>
</tr>
<tr>
<td>Nurse</td>
<td>2__</td>
</tr>
<tr>
<td>Dietician</td>
<td>3__</td>
</tr>
<tr>
<td>Read in book or article</td>
<td>4__</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>5__</td>
</tr>
</tbody>
</table>
5. Please describe your instructions that you were given about blood glucose testing before you were pregnant and before you had any thoughts of trying to conceive a baby?

(a) How often were you supposed to do home blood glucose testing?

(b) When were you supposed to do home blood glucose testing?

(c) What materials did you use for home blood glucose testing?

(d) Please describe any other differences between the instructions you had then for home blood glucose testing and the instructions you have been given now for home blood glucose testing during pregnancy?
<table>
<thead>
<tr>
<th>Time</th>
<th>Type of Insulin</th>
<th>Number of Units</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Subject No__________  Today's Date__________
Day__________

I shook out of 7 day booklet.
Please answer these questions, describing the insulin injections that you are using now during pregnancy, not the injections that you used before you became pregnant.

FOR INSULIN USERS WHO TAKE ONLY ONE INSULIN INJECTION PER DAY (You may want to get your insulin bottles)

1. What type of SHORT ACTING INSULIN do you use?

   SHORT ACTING INSULIN TYPES

   1. Soluble
   2. Actrapid (human)
   3. Velosulin (human/pork)
   4. Humulin S (human)
   5. Other (please specify)__________________________
   6. I do not use short acting insulin

2. What type of longer acting or mixture insulin do you use?

   LONGER ACTING AND MIXTURE INSULIN TYPES

   1. Humulin I
   2. Lente
   3. Isophane
   4. Monotard
   5. Lentard
   6. Mixtard
   7. Insulatard
   8. Protaphane
   9. Actraphane
   10. Ultralente
   11. Ultratard
   12. Other (please specify)__________________________
   13. I do not use a longer acting or mixture type

3. How many units of soluble insulin do you take each day?

   _____ units

4. How many units of longer acting or mixture insulin do you take each day?

   _____ units

5. When do you take your insulin injection?

   1. morning
   2. afternoon
   3. evening
   4. bedtime
   5. Other (please specify)__________________________
FOR INSULIN USERS WHO TAKE MORE THAN ONE INSULIN INJECTION PER DAY
(You may want to get your insulin bottles)

1. What type of SHORT ACTING INSULIN do you use?

SHORT ACTING INSULIN TYPES

1. Soluble
2. Actrapid (human)
3. Velosulin (human/pork)
4. Humulin S (human)
5. Other (please specify)
6. I do not use short acting insulin

2. What type of longer acting or mixture insulin do you use?

LONGER ACTING AND MIXTURE INSULIN TYPES

1. Humulin I
2. Lente
3. Isophane
4. Monotard
5. Lentard
6. Mixtard
7. Insulatard
8. Protaphane
9. Actraphane
10. Ultralente
11. Ultratard
12. Other (please specify)
13. I do not use a longer acting or mixture type

3. Do you have usually have an injection in the morning?

If Yes: If No, please go onto Question 4.

(a) What is your usual time for breakfast?

(b) How long before / after breakfast are you supposed to have your morning injection?

(c) What are the number of insulin units, and insulin type of this first injection?
4. Do you have usually have an injection at lunchtime?
   If Yes: If No, please go onto Question 5
   (a) What is your usual time for lunch? _________________
   (b) How long before / after lunch are you supposed to have your morning injection?
   (c) What are the number of insulin units, and insulin type of this lunchtime injection?

5. Do you have usually have an injection at the time of your evening meal?
   If Yes: If No, please go onto Question 6
   (a) What is your usual time for your evening meal? _________________
   (b) How long before / after your evening meal are you supposed to have your injection?
   (c) What are the number of insulin units, and insulin type of this injection?

6. Do you have usually have an injection at bedtime?
   If Yes: If No, please go onto Question 7
   (a) What is your usual bedtime? _________________
   (b) How long before bedtime are you supposed to have your injection?
   (c) What are the number of insulin units, and insulin type of this injection?

7. Do you have any other insulin injections during the day?
   If Yes:
   (a) At what time of the day ______________________________
   (b) What are the number of insulin units and insulin type of this injection?
8. Please describe your insulin injections schedule that you used before you became pregnant or started trying to conceive a baby.

(a) Number of injections per day

(b) Timing and number of units of first injection

(c) Timing and number of units of second injection

(d) Timing and number of units of third injection

(e) Please describe any other ways in which this insulin schedule differed from the one that you are using now that you are pregnant.
FOOD RECORD

This record is trying to get accurate information about the type and amount of food that you eat. Read through the instructions and look at the example food record before you start.

We would like you to record, as accurately as possible, what you eat and drink for 4 days. Choose 4 days out of a 7 day period. Two of the days must be week-end days (ie Saturday and Sunday), but for the other 2 days choose any out of Monday, Tuesday, Wednesday, Thursday or Friday.

Please do not change what you eat just because you are filling in this record. Instead, eat what you would normally eat, and just fill it in on the record. The record is entirely confidential and will not be shown to any of the doctors or nurses that are involved in caring for you.

Please record ALL food and drink that you have had - that includes all meals and all snacks, but also tea, coffee, "nibbles", sweets, chocolates, crisps, etc. It is best if you record at the time of eating and NOT from memory at the end of the day, when everybody tends to forget some of the things that they have eaten during the day. In order to do this, try to keep this record sheet with you throughout the day.

When you are recording food eaten at meals, please include any sauces, dressings or extras, eg gravy, salad dressing and pickles, as well as the main food.

If you do not eat a particular meal or snack, simply draw a line across the page at this point.

Guidelines for describing food and drink

1. Please give details of the method of cooking, eg grilled, boiled, roasted, raw.

2. Give as many details as possible about the type of food you eat
   a. State the brand name if known
      For example: John West Sardines in Tomato Sauce
                   Sainsbury's Half Fat Edam Cheese
   b. Name the type of biscuit, cake or cereal
      For example: Rich Tea, Digestives, Madeira, Corn Flakes, etc
   c. Name the type of cheese, fish or meat
      For example: Cheddar Cheese, Edam Cheese, Cod Fillet, Pork Chop.
3. Suggestions for recording quantity of food and drink

a. For many foods such as vegetables, cereals and some fruit a household measure is good enough - so you can describe the amount of food that you ate in terms of teaspoonfuls (tsp), tablespoonfuls (tbsp) or cups. You need to record the number of teaspoons, tablespoons or cups that you have used, and also whether they were level, rounded or heaped.

b. All convenience foods have their weight on the packaging, so use this in your food record.
   For example: 150g carton Edan Vale Low Fat Strawberry Yoghurt
               Half of 15 oz can Tesco Baked Beans

c. For bread, fruit loaves etc., you need to record both the size of the loaf and the thickness of the slice.
   For example: 1 thick slice from a large granary bread loaf.

d. Cheese, fish, meat. Try to describe the amount as well as you can.
   For example: 2 small lamb chops
                2 large thin slices of ham
                Cube of cheddar cheese the size of a matchbox
                Medium fillet of cod

THANK YOU VERY MUCH FOR ALL YOUR HELP

HAPPY EATING!
Record All food and drink that you have had during the day including snacks, nibbles, sauces and dressings.

Record the method of cooking eg boiled spaghetti
the type of food eg boiled wholemeal spaghetti
the quantity of food eg 6 Tbs of boiled wholemeal spaghetti

Day of the Week________ Date_____

<table>
<thead>
<tr>
<th>MEAL OR SNACK</th>
<th>QUANTITY EATEN</th>
<th>DETAILS OF FOOD AND DRINK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Morning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During Morning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEAL OR SNACK</td>
<td>QUANTITY EATEN</td>
<td>DETAILS OF FOOD AND DRINK</td>
</tr>
<tr>
<td>---------------</td>
<td>----------------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>During Afternoon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evening Meal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>During Evening and Bedtime Snack</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REG CHARACTS D/P

1a. Have you at any time been recommended to spread out your intake of starchy (carbohydrate) foods over the day?
   Yes  No

If your answer to Question 1a is Yes, please answer the rest of Question 1

1b. Had this advice ever been given to you before you were pregnant or trying to conceive a baby?
   Yes  No

1c. Has this advice been given to you during pregnancy?
   Yes  No

2a. Have you at any time been recommended to increase the amount of foods that are high in fibre?
   Yes  No

If your answer to Question 2a is Yes, please answer the rest of Question 2

2b. Had this advice ever been given to you before you were pregnant or trying to conceive a baby?
   Yes  No

2c. Has this advice been given to you during pregnancy?
   Yes  No

3a. Have you at any time been recommended that it is particularly important to increase your intake of soluble fibre (found in foods such as beans, peas and lentils), rather than increasing your intake of insoluble fibre (found in foods such as wholemeal bread and high fibre cereals)?
   Yes  No

If your answer to Question 3a is Yes, please answer the rest of Question 3

3b. Had this advice ever been given to you before you were pregnant or trying to conceive a baby?
   Yes  No

3c. Has this advice been given to you during pregnancy?
   Yes  No
4a. Have you at any time been recommended to decrease the amount of foods that are high in fat (for example butter, fried foods, potato crisps, fatty meat?)

Yes ___ No ___

If your answer to Question 4a is Yes, please answer the rest of Question 4

4b Had this advice ever been given to you before you were pregnant or trying to conceive a baby?

Yes ___ No ___

4c Has this advice been given to you during pregnancy?

Yes ___ No ___

5a. Has the importance of decreasing the amount of alcohol that you drink each day been discussed with you at any time? (Please answer YES or NO regardless of whether you drink or not).

Yes ___ No ___

If your answer to Question 5a is Yes, please answer the rest of Question 5

5b Had this advice ever been given to you before you were pregnant or trying to conceive a baby?

Yes ___ No ___

5c Has this advice been given to you during pregnancy?

Yes ___ No ___

6. Have you at any time been recommended to avoid sweet foods and drinks, (for example cakes, sweets chocolates, ordinary squashes and fizzy drinks)?

Yes ___ No ___

If your answer to Question 6a is Yes, please answer the rest of Question 6

6b Had this advice ever been given to you before you were pregnant or trying to conceive a baby?

Yes ___ No ___

6c Has this advice been given to you during pregnancy?

Yes ___ No ___

Appendix C9 cont/d
7. Have you at any time been recommended to eat only moderate amounts of protein foods (for example meat, fish, eggs, chicken).
   Yes____  No____

If your answer to Question 7a is Yes, please answer the rest of Question 7

7b Had this advice ever been given to you before you were pregnant or trying to conceive a baby?
   Yes____  No____

7c Has this advice been given to you during pregnancy?
   Yes____  No____

8. Have you at any time been recommended to drink only small amounts of fruit juice?
   Yes____  No____

If your answer to Question 8a is Yes, please answer the rest of Question 8

8b Had this advice ever been given to you before you were pregnant or trying to conceive a baby?
   Yes____  No____

8c Has this advice been given to you during pregnancy?
   Yes____  No____

9. For the diet you are on now during pregnancy WHO provided your diet instructions?
   4. Read in book or article  5. Other (Please specify who)_________
   6. I am not on any particular diet

10(a) Has anyone in the medical team who is looking after your diabetes during pregnancy (ie your doctor nurse or dietician) talked to you during this pregnancy about your diet?
   Yes____  No____

If your answer to Question 10(a) is Yes, who has talked to you during this pregnancy about your diet?
Earlier on you answered some questions about what you did about your regimen in the last seven days. This time try to think about how you would have answered these questions before you were pregnant or trying to conceive a baby.

**REMEMBER!**
**PLEASE THINK BACK TO BEFORE YOU WERE PREGNANT OR TRYING TO CONCEIVE A BABY.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Occasionally</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In an average week how often would you follow your doctor/nurse's recommendations for controlling your diabetes?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. In an average week how often would you spread out your intake of starchy (carbohydrate) foods over the day?</td>
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<td>3. In an average week how often would you limit your intake of fatty foods (foods such as butter, potato crisps, fried foods and fatty meat)?</td>
<td>1</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>4. Except for the special case where you were eating sweet things in order to get over being hypo, in an average week how often would you avoid sweet foods and drinks, such as chocolate, sweets, ordinary fizzy drinks, etc.</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>5</td>
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<tr>
<td>5. In an average week how often would you eat only moderate amounts of protein foods (foods such as meat, fish, eggs and chicken).</td>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. In an average week how often would you make sure that you had enough fibre in your diet.</td>
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<td>2</td>
<td>3</td>
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<td>5</td>
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</table>
7. In an average week how often would you test your blood sugar level?

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8. In an average week how many of these blood test results would you write down?

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<td>Some of them</td>
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<td>I do not test my blood</td>
</tr>
</tbody>
</table>

9. In an average week how many of your insulin injections would you take when you were supposed to? (Not more than 30 minutes early or late).

<table>
<thead>
<tr>
<th></th>
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</tr>
</tbody>
</table>

10. In an average week how many of your insulin injections would you measure the way you were supposed to?

<table>
<thead>
<tr>
<th></th>
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