

**FACTORS AFFECTING TOOTH CLEANING
PATTERN, STRUCTURE AND PERFORMANCE IN
BRAZILIAN ADULTS**

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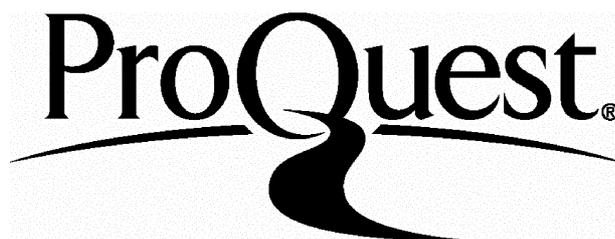
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ABSTRACT

Tooth cleaning behaviour can be divided into pattern (frequency of tooth cleaning), performance (relative effectiveness of tooth cleaning), and structure (range of items used in tooth cleaning). The main aim of this programme of research was to assess whether those three dimensions were associated with routines of daily activities, flexibility of daily activities and flexibility of working time schedule (job personal schedule freedom).

The hypothesis is that tooth cleaning behaviour is affected by the level of routines and flexibility of daily activities, as well as the level of flexibility of the working time schedule. It is hypothesized that subjects who enjoy higher rather than lower levels of routines in daily activities are more likely to clean their teeth less frequently and have worse cleaning performance, use fewer oral hygiene aids, and have more bleeding gums. In addition, subjects who have higher levels of flexibility in daily activities, compared to those with lower levels of flexibility, tend to clean their teeth more frequently, have better cleaning performance, make use of more oral hygiene aids, and have fewer teeth with gums bleeding after probing.

Furthermore, it is also hypothesised that subjects who have higher levels of flexibility of working time schedule are predisposed to have higher tooth cleaning frequency, better cleaning performance and less

gums bleeding after probing, as well as employ more oral hygiene items, as opposed to those who have lower levels of flexibility of working time schedule.

The study was conducted on a sample of 471 Brazilian adults, 234 women and 237 men, from two social classes. The age range was 24 to 44 years. Behaviourial socio-economic and clinical data was collected through structured interviews and clinical examinations. Data were analysed by means of logistic regression analysis.

There was a highly significant relationship between routines of daily activities and pattern of tooth cleaning behaviour. There was no significant association between routines of daily activities and tooth cleaning performance, structure and gums bleeding. A significant relationship was observed between pattern, performance and less gums bleeding after probing, and flexibility of daily activities.

Flexibility of working time schedule was significantly associated with tooth cleaning pattern, performance and structure.

It was concluded that routines of daily activities was strongly associated with tooth cleaning pattern and that flexibility of daily activities is an important correlate of tooth cleaning pattern, performance and gums bleeding. In addition, flexibility of working time schedule influences tooth cleaning pattern, performance and structure.

To my parents, Celmira and Waldomiro

To my friend Claudia (in memoriam)

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CHAPTER 1
INTRODUCTION
AND LITERATURE REVIEW

1.1 Introduction

Toothbrushing is the most common way to clean teeth, and is accepted as a universal social behaviour in industrialized countries. However, daily tooth cleaning, as practised by the majority of people, is frequently considered not to be good enough, if the aim is to control dental plaque (Frandsen, 1986).

Many dental health education attempts to enhance dental health behaviour to date have revealed that health education has not been very successful. Planned dental health education programmes have revealed a short-term effect on gingival health status, but few long-term gains in dental health have been demonstrated because of the tendency for these programmes to focus on knowledge and behaviour, rather than on values and needs (Schou 1985, Kiyak and Mulligan, 1986). Methods of health education which assume a straight-line relationship between educators' inputs of information and movements of the person receiving the information towards changed beliefs and practices are still frequently used in dentistry (Young, 1970; Locker, 1989; Sheiham and Croucher, 1992; Souza, 1993). A growing body of research has been devoted to the understanding of the major shortcomings of dental health education.

Increased knowledge is a necessary but not sufficient condition for more stable and long-term changes in dental health (Kiyak and Mulligan, 1986).

It is generally accepted that prevention must begin in childhood, because it is at this time that health routines, of which oral hygiene practices is one, are acquired, and patterns of health behaviour are established (Baric, Blinkhorn and MacArthur, 1974). However, the question that remains is: how to motivate adults to enhance their oral health behaviours to bring about better mouth cleanliness? Dental advice given by dental staff is seen as difficult to follow, demanding too much time and interfering in individuals' daily routines. In addition, for many people, daily life is characterized by high levels of routines and little flexibility, offering scant opportunity for change. Moreover, oral hygiene activities are the least flexible in terms of changing the times and location where they are carried out (Croucher, 1989a, 1989b; Cullen and Phelps, 1975). It is argued that people may have good logical reasons for not complying entirely with dental health behaviours (Sheiham and Croucher, 1992). It seems that most dental professionals have not paid enough attention to these reasons.

Many individuals do not clean their teeth well enough to remove sufficient plaque to prevent periodontal disease. A better understanding of the factors that are preventing people from improving their oral hygiene

behaviours is required. Sections 1.2 and 1.3 offer an overview of the literature on oral hygiene practices and on the factors affecting the adoption of preventive oral health measures. The subsequent section presents the rationale of the present programme of research, while Section 1.5 states its aim, objectives and hypothesis.

1.2 Oral Hygiene Practices: An Overview

1.2.1 Toothbrushing Patterns

Gift (1986) reviewed studies on oral hygiene practices from several industrialized countries, from the early 1940's to the 1980's. The most common patterns of toothbrushing described in these studies were one to two times per day for most of the subjects interviewed. Women brushed more regularly than men, irrespective of age, type of patient, or culture. Toothbrushing frequency decreased with age, increased with income and was related to other oral hygiene activities (Gift, 1986).

In Finland, several studies on oral hygiene behaviours have been conducted over a number of years. One study done in the 1970's and covering the total Finnish population aged 15 and over showed the following toothbrushing frequencies: less than once a day, 35%, once a

day, 25%, and more than once a day, 43% (Murtomaa, 1979). In a later study, where the oral hygiene behaviour of Nordic schoolchildren was measured, daily brushing was practised by a majority in all countries. The highest proportion of daily brushers was among Swedish and Norwegian girls, whereas the proportion reporting the least daily brushing was lowest among Finnish boys (Rise et al., 1991a). From the data collected, it was reported that female teenagers of upper socio-economic status (based on education of head of household) living in urban areas report brushing more frequently than teenagers with lower socio-economic status or who reside in non-urban areas (Murtomaa, 1979; Nyysönen and Honkala, 1984a).

Honkala and Freeman (1988), in a study on oral hygiene behaviour in European adolescents, evidenced that an improvement in toothbrushing behaviour and a decrease in plaque and gingivitis scores has occurred in Denmark, Finland, Germany and the United Kingdom over the past 20 years.

The 1988 UK Adult Dental Health Survey (Todd and Lader, 1991) showed that two thirds of dentate adults claimed to clean their teeth twice or more a day, a quarter cleaned them once a day, and only 6% said they cleaned their teeth less than once a day. The number of those who

reported cleaning their teeth at least twice a day has slightly risen in the past 10 years from 64% to 67%.

Women were more likely than men to say they cleaned their teeth at least twice a day (76% for women, 58% for men). The proportion of dentate adults who cleaned their teeth twice a day or more was highest among those aged 45-54 (70%), and lowest among those aged 75 and over (59%). Data from Brazil revealed that tooth cleaning frequency was high. Men reported brushing their teeth, on average, 2.7 times a day, whilst with women the frequency was greater: on average, 3.1 times per day. In addition, few subjects reported doing so less than once a day (Marcenes, 1990).

1.2.2 Use of Dental Floss

Regular use of dental floss is not a commonly reported behaviour. It is practised by a relatively small proportion of the population, varying with demographic and socio-economic status (Gift, 1986). Data from the U.S.A. in the 1970s revealed that about 40% of the people reported using dental floss. Ten per cent reported daily use, with another 10% reported using it once or twice per week.

Studies on Finnish adolescents have shown that dental floss was used daily by only 1%, and 10% reported using it only sporadically. Girls

were more likely to use it daily than boys. The percentage of adolescents who used dental floss on a daily basis did not change over the four years period of 1977-81. Nonetheless, the proportion of sporadic users increased by 11% over the same period (Honkala et al., 1981).

From a study of dental health behaviours of Nordic schoolchildren, it has emerged that the highest proportion of daily users of dental floss was in Norwegian girls, whilst the lowest figures were registered among Finnish boys (Rise, et al., 1991a).

The U.S.A. Family Toothbrushing Survey from the 1980s found that flossing was more frequent among upper-income educated women in urban areas. The use of dental floss on a daily basis was reported by 20% of the women, and 12% of the men and its use peaks in the 25 to 44 year old age group (Gift, 1986).

The Adult Dental Health Survey (Todd and Lader, 1991) provides information on the use of dental floss in the United Kingdom. Twenty percent of the adults interviewed reported using dental floss; this represented an increase of 12% over the previous 10 years. Women were significantly more likely users than men (26% and 15% respectively). In addition, subjects belonging to higher socio-economic groups were more probable users of it.

Evidence from the studies reviewed suggests that most of the population of industrialized countries clean their teeth once to twice per day. However, oral hygiene practices of most of these people have not been sufficiently effective in removing dental plaque, as periodontal disease is still prevalent in industrialized countries (Pilot and Miyazaki, 1991; Miyazaki et al., 1991; Sheiham, 1979). An average daily cleaning of two minutes in duration will remove about half of the plaque, leaving the other half to promote regrowth (Frandsen, 1986).

Studies done by Rugg-Gunn and Macgregor (1978), who observed and videotaped brushing behaviours of three age groups (5, 11, and 18-22 years old), showed that of a total of 16 selected teeth areas, the percentage of areas brushed in the oral cavity increased with age, reaching at most 67% of the teeth areas in the young adult group. The upper teeth received more attention than the lower ones. The amount of time spent on brushing was reported as less than one minute for the young adult group, and less than 10% of the time was spent brushing lingual areas (Rugg-Gunn and Macgregor, 1978). Similar findings were reported in an American study of children's toothbrushing, when less than one minute was spent on brushing. In addition, the findings were that the buccal surface received more attention (88%) than the lingual surface (14%) (Gift, 1986).

In conclusion, the results of the reviewed studies demonstrated that, although improvements in oral hygiene practices have occurred, the dental health behaviour of people has much room for improvement.

Moreover, in "The Performance Gap", Croucher (1989b) highlighted some of the major problems of the health education approach, showing the impact on people's daily lives caused by dental advice received from hygienists and dental practitioners. Dental advice on brushing and flossing was seen by the patients as disrupting an existing routine of tooth cleaning, implying a difficult change in behaviour and routines. The general feeling was that it was not easy to follow the hygienists' advice, because in their daily activities there were competing demands of lifestyle, such as getting the family ready to go to school, catching a bus to go to work, and getting to work on time. Clearly, this indicates that the dental team failed to take into consideration patients' daily lives, and the social context in which oral hygiene behaviours are happening.

1.3 Factors Influencing the Adoption of Personal Oral Hygiene

Measures

There are a variety of factors which might influence the adoption of personal oral hygiene by individuals and groups. A summary of the main factors will be presented in what follows of this section. As stated earlier, there are differences in dental hygiene practices between social classes, and sexes (Gift, 1986; Honkala et al., 1981, 1984; Murtomaa, 1979; Honkala and Freeman, 1988; Todd and Lader, 1991).

Research to date has evidenced that preventive health behaviours tend to be more common among females than males. This may be explained in terms of social role obligations, socio-cultural and socio-psychological factors (Kandrack, 1991). It is also argued that society puts social pressure upon girls to make themselves sexually attractive, therefore they become more concerned about their appearance than boys, including concern for having white teeth (Hodge, 1979).

1.3.1 "Intra Individual Determinants"

Numerous models have been formulated to explain preventive dental health practices considering individuals health beliefs or their perception of control over health outcomes.

1.3.1.1 The Health Belief Model

The Health Belief Model (Haefner, 1974; Janz and Becker, 1984) posits that individuals will adopt a preventive behaviour if they feel susceptible to the disease, if the disease is identified as severe enough to affect some aspect of their lifestyle, and if they believe their action will help in overcoming the disease and outweigh any costs involved in it. The cue for action can be provoked by an individual's private perception or by reading about health matters (Mullen, et al., 1987). Haefner (1974), in a review of studies done on the Health Belief Model and preventive dental behaviours, concluded that for each of the health beliefs there is evidence from some studies that the belief is related to preventive dental behaviour. On the other hand, he also pointed out that for each health belief there is another study or studies that have not obtained the expected relationship. Consider, for instance, that the Health Belief Model has not proved to predict children's dental health behaviour in terms of dental visits (Kegeles, 1963), participation in a preventive programme (Weisenberg et al., 1980), or adherence to at-home mouthrinsing (Kegeles and Lund, 1978, 1982, 1984).

It appears that health related behaviours, such as toothbrushing and flossing, are not a function of health beliefs. It might be that these habitual behaviours are so automatic that rational considerations of threats and cost/benefits do not modify the behaviour (Inglehart and Tedesco, 1995).

1.3.1.2 Health Locus of Control

The Health Locus of Control derives from the locus of control concept of Rotter's social learning theory (Rotter et al., 1972). It refers to the extent to which individuals perceive the events that happen to them as being dependent on their own effort and ability, or else as a result of external factors, such as luck, chance, or fate. Individuals who believe that they have control over what happens to them are called "internals", while those who believe that events are largely a matter of chance or fate and do not perceive themselves as having control over what happens to them are termed "externals". The external factors have been divided into two dimensions: "powerful others control", which relates to influential people, and "chance control", which relates to random factors (Sogaard, 1993).

Internal locus of control has been associated with the use of contraceptives (Lundy, 1972) and the use of seat belts (Williams, 1972). External locus of control has been more associated with ill health (Croucher, 1989a).

Kent et al., (1984), when evaluating the oral health status of a group of 30 patients, observed that those classified as having good oral health were more likely to have an internal locus of control than those whose oral health status was classified as moderate or poor. Odman et al. (1984) have found no significant relationship between locus of control and improvement in oral hygiene skill or plaque reduction. A study (Galgut et al., 1987) investigating whether locus of control could serve to anticipate the response of subjects to a plaque control programme concluded that subjects could be classified in two groups. The first included those individuals who perceive their susceptibility to disease as influenced by powerful external factors or who believed that susceptibility can be controlled by their own actions, while the second consisted of those who considered that susceptibility to disease is influenced by chance. The important point to be stressed is that only members of the first group have more positive response to the plaque control regime. The application of locus of control construct in dental research has been limited, nor does it appear to be adequate to explain the adoption of oral hygiene behaviours (Gift, 1986; Kiyak and Mulligan, 1986; Croucher, 1989a).

Croucher (1989a), when reviewing the use of the Health Belief Model and Health Locus of Control in dental research, summarized the main criticisms of these two models by saying that they are individually oriented and have paid little attention to aspects such as habitual behaviours, the cost of behaviour and accessibility to physical resources

like clinics or bathrooms. The emphasis has been on the use of services, such as dental visiting, rather than those of self-care, such as toothbrushing.

1.3.1.3 Theory of Reasoned Action

The Theory of Reasoned Action developed by Fishbein and Ajzen (1977) postulates that behaviour is predicted by one's intention to perform or not the behaviour. Behavioural intention is a function of two major factors: subjective norm and attitude toward that behaviour. Subjective norm means that individuals perceive other people's desire of them to behave in a specific way. Attitude is a function of beliefs about the consequences of the behaviour, together with an evaluation of the importance of those consequences (Sogaard, 1993).

Several applications of this model to health related behaviours have been made in family planning, weight loss, physical exercise, patient satisfaction, immunization and hypertension. Such studies found that behavioural intention often predicts behaviour, especially when the time frame is short and the intention is clearly defined (Mullen et al., 1987).

In dentistry, the Theory of Reasoned Action has been tested to predict toothbrushing behaviour, intentions to floss (Bateman, 1985; McCaul et al., 1988), and demand for dental care (Hoogstraten, et al., 1985). In one study, the Theory of Reasoned Action did not predict toothbrushing behaviour (Bateman, 1985). In the other study, the model

was found, however, to be associated with intentions to brush and floss, as well as with self-monitoring records of brushing and flossing (McCaul et al., 1988). Besides, the model did not predict demand for dental care (Hogstraten et al., 1985). In fact, the Theory of Reasoned Action has been criticized for assuming a simple causal structure, intention predicting behaviour, with attitudes mediating completely the effects of cognitions on intention (Sogaard, 1993).

1.3.1.4 Self-efficacy

Self-efficacy was first defined by Bandura (1977, 1986), and has since been employed in numerous studies on health related behaviours. It can be understood as the confidence that a desired behaviour can be carried out and that individuals can evaluate the extent to which they can control their own behaviour given particular situations (Ogden, 1995).

Self-efficacy sees behaviour change as dependent on a person's perceived capability to cope with stress and boredom and to mobilize one's resources and courses of action necessary to meet the situational demand. It affects the intention to change risk behaviour, the effort made to accomplish this purpose, and the determination to carry on trying despite barriers which may undermine motivation (Schwarzer, 1992).

Schwarzer (1992), in a review on health behaviours, demonstrated that self-efficacy was a good predictor of behavioural intentions and behavioural change for many behaviours, such as

- 1) intention to floss and the actual flossing behaviour,
- 2) intention to engage in preventing the consequences of breast cancer and breast self-examination, and
- 3) intention and use of contraceptives.

Because many studies have revealed the relationship of self-efficacy and health behaviour, this concept has recently become more salient in health promotion research (Sogaard, 1993).

1.3.1.5 Fear Arousal

Fear arousal relies on intrinsic motivation and attempts to scare individuals into preventive oral health behaviours by emphasizing the consequences of failing to maintain high levels of oral hygiene. This type of determinant of the adoption of oral hygiene measures has been forwarded by some authors (Locker, 1989). Silversen and Kornacki (1984) reviewed the role of fear arousal in preventive dental health behaviours and concluded that "the role of fear arousal in motivating preventive dental behaviour remains inconclusive."

1.3.2 Socialization

Socialization is the process of transmission of culturally valued norms, such as knowledge, values, attitudes and routines, considered of high value by a community or society (Tones, 1979). It is an ongoing

experience which continues throughout life. Socialization is usually divided into primary socialization and secondary socialization.

Primary socialization occurs in early childhood and is rated most highly, since it incorporates the fundamental norms and values of society. The influence of mothers is considered the strongest on an individual's attitudes, beliefs and behaviour (Blinkhorn, 1976). The process of primary socialization operates via a system of reward and punishment and involves role modelling. Children identify with parental behaviour and, through modelling themselves on the parents, they internalize forms of behaviour which become generalized and embedded in routines (Baric, Blinkhorn and MacArthur, 1974).

Blinkhorn (1976) showed that mothers played the central role in teaching toothbrushing to young children, along with washing their faces as part of "cleanliness" behaviour. Rayner and Cohen (1974) also described mothers' oral hygiene practices as the prominent influence on their children's oral hygiene practices. Children copied their mother, and by copying them, a value was acquired. By reinforcement, this value then became a habit.

Secondary socialization occurs after primary socialization, being the period when behaviours developed as a result of primary socialization are influenced and modified by individuals and institutions, such as schools, the media, peers and significant others (Tones, 1979).

Bateman (1985) summarized factors that influence children's dental health behaviour during secondary socialization:

- 1) The continuing influence of parents at home,
- 2) Role modelling, especially of media stars,
- 3) Peer pressure to be clean and attractive,
- 4) Media advertising of dental health products, and
- 5) School health education and dental health education by members of the dental team in a clinical setting.

Peer groups are believed to act as strong forces or as strong barriers to preventive behaviours. Hodge et al. (1982) revealed that adolescents toothbrushing behaviour was more responsive to peer groups and family influences than the influence of dental professionals. They also showed that toothbrushing was related to grooming and cleanliness.

Plamping (1986) demonstrated how peer pressure can be put into practice by health educators using children as the teachers. Beliefs, attitudes and behaviours which are conducive to health, learnt in early life, are important in that they relate to health behaviours in later life. In addition, as these behaviours are learnt in early life, they are deeply ingrained and resistant to change (Baric, Blinkhorn and MacArthur, 1974).

1.3.3 Cultural Values and Social Environment

The dental health behaviour of an individual is also affected by cultural and societal forces. A person tends to see himself or herself as belonging to a specific social class, and this is very much dependent on social factors, such as occupation, education, income, ethnic origin and race. Nonetheless, there may be inconsistencies among these factors. When inconsistencies exist between attributed status and achieved status, a person will choose that aspect of his or her status which will give him or her the highest prestige. Once individuals have defined a social status for themselves, they behave in terms of their position in the social structure and in the environment in which they live. They are influenced by values and social pressures perceived specifically by them as being characteristic of their social class (Rayner and Cohen, 1974; Jacob and Plamping, 1986).

Baric, Blinkhorn and MacArthur (1974) suggested that a dominant role for behaviour will be played by social norms, which are defined as the shared-beliefs within a group community or a subculture. These social norms are assumed to define expected behaviour, prescribing a certain type of behaviour and proscribing any other form, in a certain situation.

It is recognized that in Western nations and newly industrialized countries adolescents (especially girls) are highly concerned with the image they project. Concern with general appearance and facial attractiveness suggests this factor as a strong motivator for adopting and

maintaining preventive oral health practices. Studies done in America and Israel demonstrated that adult people regarded appearance of teeth as important in making friends and in dating. In addition, two thirds of the Americans interviewed thought that dental appearance was a central factor in getting a job (Silversen and Kornacki, 1984).

1.3.4 Rewards and Self-Reinforcement

One of the most common behavioural strategies for promoting behaviour change is that of reinforcement. Reinforcement strategies are based upon the belief that rewarding immediately following a behaviour tends to strengthen an individual's commitment to that behaviour (Locker, 1989). Some studies have found that positive reinforcement resulted in improvements in oral hygiene, but usually in the short term. However, other studies have observed that compliance in oral hygiene practices declined when rewards were withdrawn (Silversen and Kornacki, 1984; Locker, 1989).

Self-management strategies mean that patients may reward themselves (or the parents reward their children), as well as monitor and regulate their behaviour. It is suggested that this approach could be applied to promote oral hygiene practices. However, very little research has been done on the application of self-management strategies in preventive dental practices (Silversen and Kornacki, 1984).

1.3.5 Enabling Factors: Information, Skill, Resources and the Environment

Knowledge: an individual must have correct information about the efficacy of toothbrushing and flossing, and about the consequences of inadequate behaviour.

Skill and resources: in addition to knowledge, it is vital that individuals have the skills and resources to perform the appropriate behaviours adequately.

Environment: the environment in which an individual lives facilitates or hampers the adoption and maintenance of oral hygiene behaviours. Modifying the environment by introducing external control (e.g., restricting the availability of sugar-rich food in school canteens) should be considered and better evaluated in relation to health behaviour (Silversen and Kornacki, 1984; Gift, 1986).

Research to date has shown that neither knowledge alone nor information plus the teaching of oral hygiene skills improve long-term compliance with dental health behaviour for the majority. What is established is that knowledge, skills, resources and the environment can be considered as enablers and facilitators of the adoption of oral hygiene behaviours (Silversen and Kornacki, 1984; Gift, 1986).

1.4 The Rationale of the Present Study

The review of factors affecting oral hygiene behaviours showed that several factors, such as socio-demographic and psychological factors, are associated with oral health behaviours. It appears, however, that these factors do not provide an adequate explanation for oral health behaviour, particularly in adults. More decisively, they seem not to close the gap between available preventive dental measures and their adoption by individuals (Silversen and Kornacki, 1984).

Hunt and Macleod (1987) suggested that planned health education and health promotion programmes have not been very successful in changing people's behaviour, by placing insufficient emphasis on the context in which health related behaviours occur. These programmes failed to pay enough attention to the social, economic and structural constraints of people's daily lives. Hunt and Macleod (1987) also suggested that health related behaviours are built into everyday activities in a routine way. That is to say that they are habitually performed, and for most of the time higher level cognitive processing is unnecessary. Many studies of these behaviours have demonstrated that, by virtue of their routine nature, they tend to fall into predictable and relatively stable individual patterns (Hunt and Martin, 1988).

Health related behaviours are largely built into the flow of daily life, in a way which is not vulnerable to "health messages". These

behaviours are "integrated into the social relationships and adaptive processes which are part of the meaning system of an individual's life" (Hunt and Macleod, 1978). Self-initiated behavioural change often occurs when formerly routine activities are brought into awareness for a prolonged period of time, such that it becomes salient or problematic (Hunt and Martin, 1988).

Croucher (1989b) demonstrated that tooth cleaning was perceived by patients as part of routines which were placed in a sequence of activities, timings and location. These routines were based on two features:

- 1) primary socialization: what was learnt as a child. If people had learnt to clean their teeth at a certain time and in a certain place, in association with other activities, such as washing, then this learning would often be readily retained into adulthood (Croucher, 1994), and
- 2) lifestyle, tooth cleaning fitted into the daily activities of people: where there are competing demands placed upon their time, and a set of social constraints related to limits of time, energy and finance are interfering in tooth cleaning reducing its effectiveness.

Croucher (1989b) also explained that there was a gap between what the dentists and the hygienists were teaching in terms of oral health care, and what patients were doing in their everyday lives. The patients were not following the advice they received from the dental professionals. Patients considered unrealistic what they were asked to do by the

hygienists and the dentists. Complying with dental advice was seen as conflicting with what they had learnt as children and impacting on daily family life (Sheiham and Croucher, 1992). Croucher (1989a, 1989b) noted that the advice received from the dental professionals was more easily understood and put into practice by the patients in terms of pattern and structure. Pattern refers to the frequency and location of tooth cleaning in the daily routines. Structure is defined as the range of items used in tooth cleaning.

Moreover, Croucher also noticed that pattern and structure of tooth cleaning were similar to pattern and structure of the food system of British families as described by Douglas (1982). She developed a model to describe the food system of a group of British families. She noted that, family meals were taken on a regular basis at different times of the day obeying a pattern, which could vary from weekdays to weekends. In addition, Douglas also noted that a structure of the food system could be observed, which might vary according with criteria of ranking (depending on whether it was a major or a minor meal). A major meal has more structure, that is, this meal is more plentiful and more ceremonious, whilst a minor meal has less structure, is less plentiful, consisting of fewer items, and is less ceremonious.

Croucher (1989a) identified similar rules of pattern and structure in tooth cleaning. Tooth cleaning behaviour was carried out at a certain time of the day, forming a regular pattern, where different structures could be

observed. He also described criteria for ranking of tooth cleaning patterns. There was a primary and a secondary event. The primary event took place either in the evening or morning, the former being more likely. The secondary event usually occurred at the opposing time, that is to say, morning or evening. In addition, a third tooth cleaning event could also occur, to which no specific timing was attached (Croucher, 1989a). Depending upon the ranking of the tooth cleaning event, its structure varied. A primary event had more structure than a secondary, and so on. Possibly, in a primary event, more than simply a toothbrush and paste were used (e.g., floss, mouthwash or single-tufted interdental brush), whilst a tertiary event had less structure, as only toothbrush and toothpaste were used.

Croucher (1989a) argued that, for the purpose of education, tooth cleaning might be considered in its three dimensions: pattern, structure and performance. Performance is about the effectiveness of cleaning resulting from structure and pattern (Sheiham and Croucher, 1992). As Hunt and Macleod (1987), Douglas (1982) and Croucher (1989a, 1989b) have highlighted, the way people order their daily lives is important for understanding routines and control over their activities.

Cullen and Phelps (1975) studied the way urban working class households working day was structured. Findings in relation to routines were similar to Croucher's (1989a, 1989b). They found that most of the activities performed on a day to day level were inflexible routines.

Seventy percent of the day (excluding sleep) was described as routine, and 90% was characterised as lacking any real choice. The scenario described by the subjects was a dominant and inflexible pattern of routinized paid work, as well as domestic activities, punctuated by equally inflexible and routinized meals and personal chores. Activities associated with getting up and going to bed were both the least activity flexible (that is, not capable of replacement by other activities) and the least location flexible (i.e., not capable of being performed elsewhere).

Cullen and Phelps (1975) suggested that the extent to which one's day was routinized was more responsive to situational rather than to cultural factors. One of the main situational factors increasing or decreasing the flexibility of the lifestyle of the people was paid work, as most of the individuals faced inflexible working hours. That did not leave them a great deal of flexibility in their working day schedule. In addition to the working day schedule, three other situational factors intervened in the amount of flexibility of lifestyle:

- 1) type of transport used for work trips. Those whose work trips are dependent upon public transport may have a less flexible lifestyle,
- 2) marital status: whether a person was married or not, and

3) size of the household¹: small households were less difficult to manage. Generating less time-consuming domestic routines increases the flexibility of the lifestyles of household members. On the other hand, larger households routines were more rigid and inflexible, decreasing the flexibility of the lifestyles of those who are members of them.

Cullen and Phelps (1975) highlighted the fact that the level of routines and flexibility of daily activities may be different from one group to another. A significant difference in the degree of routines and flexibility of daily activities was discovered when comparing the findings of the study with working class families and an earlier study done by Cullen and Godson (1975), where the structure of the day of academic staff and students was analysed. The level of routinization amongst working class people was much higher than that of the academic staff and students.

The issue concerning routines was also discussed by Graham (1984), in her study of British families. She found that mothers described most of their daily activities as routines. Considering a context where there are conflicting pressures and shortage of resources, family welfare may depend on routines in which individual health is shaped. Graham

¹Households are groups of individuals who live at the same address and share their living accommodation (Graham, 1986).

argues that, for many families, routines may be considered the health choices which keep the family going.

The studies described above are similar, as regards the issue of routines, flexibility and health behaviour. The hypothesis to be tested in this thesis is that those issues were linked and could be applied to tooth cleaning behaviour. For improvements in the effectiveness of tooth cleaning behaviour to occur, a better understanding is needed of everyday social routines and the way people fit tooth cleaning into daily activities.

1.5 Aim, Objectives and Hypothesis

1.5.1 Aim

The central purpose of this study is to explore how tooth cleaning behaviour is integrated into the daily activities of a group of adult Brazilians.

1.5.2 Objectives

The main objectives of the study were:

- 1) to investigate the level of routines and flexibility of people's daily activities and to identify how tooth cleaning is fitted into these activities,

- 2) to evaluate the impact of different levels of routines in daily living on pattern (frequency of tooth cleaning), structure (range of items used in tooth cleaning), performance (relative effectiveness of tooth cleaning), and the outcome of performance (i.e., gums bleeding on probing) in tooth cleaning behaviour,
- 3) to assess the effect of different levels of flexibility in daily activities on pattern, structure, performance and the outcome of performance (gums bleeding after probing) in tooth cleaning behaviour, and
- 4) to appraise the effect of different levels of flexibility of working time schedule on pattern, structure, performance and the outcome of performance (gums bleeding on probing).

1.5.3 Hypothesis

The hypothesis is that tooth cleaning behaviour is affected by the level of routines and flexibility of daily activities, as well as the level of flexibility of the working time schedule. Subjects who have higher rather than lower levels of routines in daily activities are more likely to clean their teeth less frequently, have worse cleaning performance, use fewer oral hygiene aids and have more gums bleeding after probing. In addition, subjects who have higher levels of flexibility in daily activities, compared to those with lower levels of flexibility, tend to clean their teeth more

frequently, have better cleaning performance, use more oral hygiene aids, and have fewer teeth with gums bleeding on probing.

Furthermore, it is also hypothesised that subjects with higher levels of flexibility of their working time are predisposed to have higher tooth cleaning pattern, better cleaning performance, and less gums bleeding, as well as use more oral hygiene items to clean their teeth, as opposed to those who have lower levels of flexibility of the working time.

CHAPTER 2
METHODOLOGY

2.1 Introduction

This is a case study on dental health behaviour. A questionnaire covering topics related to the structure of people's working day, time schedule of paid working hours and dental health behaviour was developed. Clinical oral cleanliness was assessed so that reported behavioural data could be related to oral cleanliness. The method was tested in Brazil on a sample of 471 people, aged 25 to 44 years old, of two social classes, both sexes, and with different levels of routines and flexibility in their working day. The research instrument was developed and tested in two pre-pilot studies (Appendices 1, 2, 3; 3.1, 3.2; 4, 4.1, 4.2).

2.2 Study Location

The study was conducted in the city of Porto Alegre. With its 1.3 million inhabitants, this is one of the largest Brazilian cities. Founded in 1772, it is the capital and the most important economic and political centre of Rio Grande do Sul, the Southernmost Brazilian state. Both city and state are middle income economies, the latter presenting, in 1992, a

per capita Gross Domestic Product of about US\$ 3900, greater than the Brazilian per capita Gross Domestic Product of US\$ 3000.

2.3 Development of Research Instrument - Behavioural Data ×

2.3.1 The Pre-Pilot Studies

The development of the main questionnaire initially involved two pre-pilot studies. These were exploratory in nature and were primarily concerned with the conceptualization of the research problem (Oppenheim, 1992).

The first pre-pilot study was conducted in Oxford and London. As the instrument was going to be tested in Brazil, a group of Brazilian and Portuguese adults were interviewed over a period of two months.

Interviews were held and oral health behaviour topics explored. The interview method was chosen because it was believed to be the most useful way to gather people's views and to help in the development of new ideas for the main study. According to Oppenheim (1992), a useful set of exploratory interviews can greatly broaden and deepen the original plan of the study.

The questions for the research instrument were based on items from "The Performance Gap", a study by Croucher (1989b), and on the

"Adult Survey - Adult Dental Health" (Todd and Lader, 1991),
(Appendices 3.1, 3.2).

The second pre-pilot study was carried out over a period of two months in Porto Alegre. A self-administered questionnaire was applied and interviews were carried out. The research instrument for this research programme was based on the previous study and on the Health Survey - Whitehall II study (Marmot, M.G. et al., 1991). The topics covered were on dental health behaviour, structure of working day and working characteristics (Appendix 4; 4.1, 4.2).

2.3.2 Main Questionnaire

The main research instrument consisted of 36 questions, covering three main topics: the structure of the working day, paid working hours characteristics and dental health behaviour (Appendix 5.1, 5.2). The questions used were based on the two pre-pilot studies and on the following studies: "Open Learning for Dental Health" (Croucher, 1989a), "The Performance Gap" (Croucher, 1989b), "Adult Survey - Adult Dental Health" (Todd and Lader, 1991), "Job Decision Latitude, Job Demands, and Cardiovascular Disease: A Prospective Study of Swedish Men" (Karasek et al., 1981), "Understanding and Predicting Toothbrushing

Behaviour in Adolescents" (Bateman, 1985), and "Diary Techniques and the problems of Urban Life" (Cullen and Phelps, 1975).

2.4 Pilot Study

2.4.1 Description

Prior to the main study, a pilot study was conducted in order to assess the techniques developed for the principal study (structured interviews and clinical examination). The pilot study also aimed to determine different levels of flexibility in the working day of 60 people (women and men) from two social classes (high social class and low social class).

Four companies were contacted: BANRISUL (Bank of the State of Rio Grande do Sul), CIENTEC (Foundation of Science and Technology), Ferramentas Gerais (Trading Company), and Trevo (Public Transport Company). The places contacted were easily accessible to the researcher.

After permission was obtained, a meeting was held with the head of the Department of Human Resources, when the research was explained. Because individuals with different levels of flexibility in their working hours were required, this matter was discussed. Based on the information

obtained from the head of the Department of Human Resources, people with different functions and posts in the company, and from different social classes, were selected. Workers were approached in their workplaces, and given some explanation about the research. Four main points were emphasised. First, the confidentiality of the research. Second, the fact that the interview was not a test, and therefore there would be no wrong or right answers to the questions asked. Third, all the questions posed referred to a typical working day. The fourth point stressed was concerning the sterilization of the instruments used in clinical examination.

Interviews and clinical examination were conducted by the researcher. The purpose of the structured interviews was to collect economic, social and behavioural data. Throughout the interviews, understanding, phrasing and sequence of questions were checked. After the first six people (four from lower social class and two from higher social class), minor changes in the wording were made and checked in the next 54 interviews. Information about their socio-economic status was obtained through questions on socio-economic indicators (ABA-ABIPEME, 1978, Appendices 6.1, 6.2, 6.3). The interviews took an average of 30 minutes. Optimum procedures had been established for field work control and organization.

Clinical examinations were conducted to assess oral cleanliness.

The amount of plaque was the indicator of present oral cleanliness while gingival bleeding was the indicator of current brushing effectiveness. The Plaque Index (Silness and Løe, 1964) was adopted for the assessment of plaque.

The assessment of presence or absence of teeth with gums bleeding after probing was done using the first indicator of periodontal status of the Periodontal Index of Treatment Needs (CPITN; WHO, 1987). For the purpose of this study, all teeth present in the mouth were examined and recorded.

Clinical examinations had been recorded and afterwards transcribed to a clinical form (Appendix 7). It had been decided not to use a dental chair to do the clinical examinations, to allow more freedom to the researcher to go to places where there were no dental offices. Clinical examinations took an average of eight minutes.

2.4.2 Response rate

Of the 71 people contacted 60 agreed and 11 declined to participate. Of those 60 who accepted to participate, 31 were women, 16 from lower social class and 14 from higher social class. The 29 men were

15 lower social class and 14 higher social class. After the first six interviews, some small changes were made to the questionnaire (Appendix 8.1).

2.4.3 Discussion

On the whole, the research design proved to be satisfactory. However, a few minor adjustments had to be made. These adjustments will be discussed now.

2.4.3.1 Clinical examination

The clinical examination did not need any modification, since the clinical criteria, adapted from WHO (1987) and Silness and Løe (1964), proved to be applicable to the purpose of the study. A complete description of the clinical examination is presented in Appendix 9.

2.4.3.2 Questionnaire

In the questionnaire, some minor alterations in some words were made, in order to improve understanding mostly to the people of low social class. In addition, some questions had been re-ordered. After these improvements the other interviews were successful.

2.4.3.3 Companies acceptance

The four companies contacted accepted to participate in the study.

The reason for some people to decline was because, at the period of interviews, they had no spare time.

2.5 Main Study

2.5.1 Main Study Population

The chief purpose of the present study was to explore how tooth cleaning behaviour is integrated into the daily activities of a group of Brazilians from two different social classes, with different levels of routines and flexibility in their daily activities. In addition, the study aimed to investigate the effects of different levels of routines and flexibility on tooth cleaning behaviour.

Furthermore the study intended to appraise the effect of different levels of flexibility in working hours on tooth cleaning behaviour.

The present research did not aim to be representative of the population, yet the study aimed to develop a case study on dental health behaviour. A convenience sample involving both sexes, with a specific age range, different social conditions, and with different levels of

flexibility and routines in daily activities was selected. As suggested by WHO (1987), the population of this study was drawn from organized groups, such as factories, offices, banks, shops and hospitals.

As oral health behaviour is related to sex (Silversin and Kornacki, 1984; Gift, 1986), the sample included both sexes.

2.5.1.1 Age

The people who took part in this research aged from 25 to 44. This study is concerned with dental health behaviour in adults. As there is no standard group to investigate dental health behaviour in adults, the selected age range was considered appropriate for the purpose of the study.

2.5.1.2 Social class

Since socio-economic factors play an important role in oral health behaviour, the subjects of the study were divided into two socio-economic groups, namely, higher and lower social class, based on ABA-ABIPEME (1978) social criteria (Appendix 6). The ABA-ABIPEME criterion of socio-economic classification is based on a group of specific socio-economic indicators. These indicators can be divided into two categories: resources and educational level. Tables 6.1 and 6.2 of

Appendix 6 show, respectively, the indicators of resources and education employed, and the number of points assigned to each. For resources, points are assigned according to the number of each of the seven resources available at home. For education levels, points are given according to the number of schooling years of the head of the family.

The points obtained in each category are then summed up and a final score, which defines the socio-economic group, is given. Socio-economic groups definition and the score given to each of the five socio-economic groups are described in Table 6.3 (Appendix 6). The distribution of the five socio-economic groups in the two largest Brazilian cities, Sao Paulo and Rio de Janeiro, is presented in Table 6.4 (Appendix 6). Those with the highest socio-economic status were coded as class A followed by classes B, C, D and E, which were those with the lowest socio-economic status. In this study, higher social class included, according to ABA-ABIPEME, people classified as A and B. The lower social class included people classified as C and D. Class E of the ABA-ABIPEME classification was not included, since they are not an easy group to contact. They are mainly composed of homeless people and usually have at most temporary jobs.

2.5.1.3 Sample representativeness

In order to test the hypothesis that tooth cleaning behaviour is affected by the level of routines and flexibility of people's daily activities, an attempt was made to have a sample composed of eight categories as shown in Figure 1.

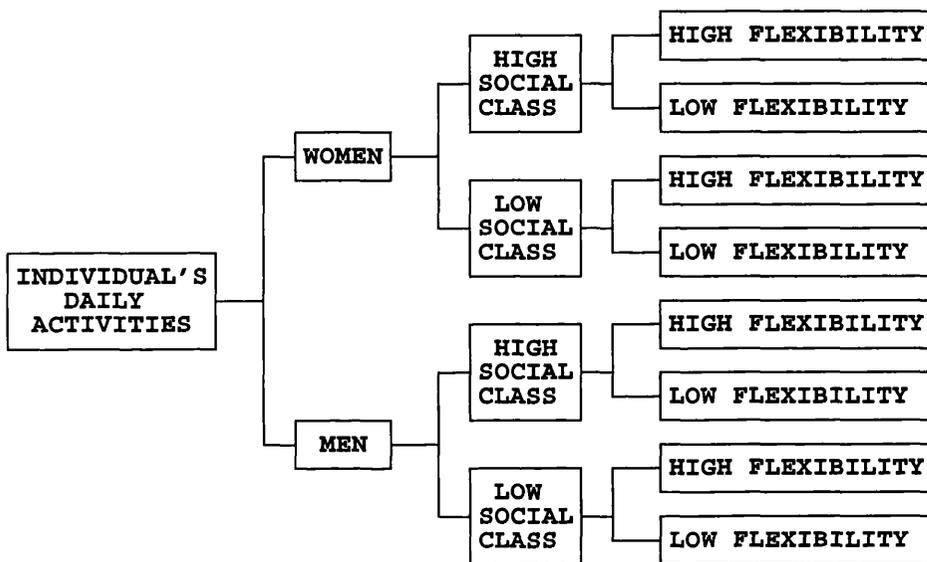


Figure 1 - Sample Representativeness

Each of the eight groups was composed of at least 50 volunteers.

There are two main reasons for selecting this sample size. Firstly, the minimum acceptable number of units per cell for an adequate statistical analysis is 30 units in each cell (Bland, 1987). Therefore, the number of 50 units per cell was an adequate number for statistical purposes.

Secondly, because the researcher had twelve months to complete the field work (contact of companies, offices, etc., permission to carry out the study, development of the pilot study and main study), and all the data

were collected by the researcher, time had to be allowed for the interviewing and examination of about 500 people.

The present study aims to describe a case study of dental health behaviour. The sample is not random, any findings should be taken as suggestive, not as definitive and cannot be extrapolated to cover the general population.

2.5.2 Methods of Sample Selection

Initially, there was a thought of dealing with a random sample. Because specific groups of people with specific characteristics, such as age range, social class and different levels of flexibility in their working day were looked for, a convenience sample was chosen instead. To gather the adequate number of participants several workplaces had to be visited. These included factories, banks, hospitals, health centres and offices (Appendix 10).

The first contact with the companies, banks, hospitals and factories was usually by telephone. Whenever the contact was successful, an appointment was made with the head of the Department of Human Resources. Explanations regarding the objectives of the study and the way the interviews and clinical examinations would be done in the company were given. As in the pilot study, information on the level of flexibility of

the working hours of the subjects was obtained. If there was a medical department in the company, its staff was contacted through the head of the Department of Human Resources, and sometimes they would be in charge of assisting the researcher to select and invite people to participate. In some companies, invitations to take part were set out by a departmental head or by the researcher herself.

The majority of the interviews and examinations were conducted during working hours, in specially allocated rooms, in refectories, workrooms, and kitchens. Some interviews were conducted in the presence of other people, but most were carried out in private.

2.5.3 Response Rate

A number of 518 subjects were invited to take part in the main study. Of these, 478 accepted to be interviewed and to have the clinical examination, a 92.5% response rate. Seven were excluded from the study. The reason was that two were younger than 25 years old, three were older than 44 and two were totally edentulous. Thus the main study included 471 subjects; 91% of the sample population (Table 2, Appendix 8).

2.5.4 Data Collection

The data collected were of three types: clinical, socio- economic and behavioural. They were collected using clinical examinations combined with structured interviews. The following three sub-sections will describe the process of data collection.

2.5.4.1 Behaviourial data

Data on behaviour were collected through structured interviews (Appendix 5.1). The reason for employing this method of interview was twofold: some open-ended questions were asked, and it was possible to include illiterate people in the study.

All interviews were preceded by explanations about the research, as outlined in section 2.4.1. Interviews were conducted by the researcher.

People were questioned on activities of a typical working day, followed by questions on work characteristics and dental health behaviour. Interviews took an average of 30 minutes. Interviews with lower social-class people took longer than the higher social class people. Reliability of the structured interviews was assessed by re-interviewing every tenth subject.

2.5.4.2 Clinical data

The oral examination was conducted to assess oral cleanliness.

Dental plaque and bleeding were measured. The reliability of exams was assessed throughout the field work. Every tenth subject was re-examined to assess intra-examiner consistency.

The Plaque Index devised by Silness and Løe (1964) was adopted for the assessment of the amount of plaque. The assessment of teeth with gums bleeding after probing was done using bleeding criterion of the Periodontal Index of Treatment Needs (CPITN) (WHO, 1987).

Clinical examinations were tape recorded and later transcribed on to a special form (Appendix 7). Each examination took an average of eight minutes.

2.5.4.3 Socio-economic status

Data on socio-economic status were obtained through the structured interview. Confidentiality was emphasised and necessary explanations were presented on how to answer the questions. Classification questions were asked. These were concerned with age, marital status, size of the household, profession, and socio-economic indicators (Appendices 5.1, 6.1, 6.2).

2.6 Data Analysis

Data from interviews and clinical examination were coded and entered into a computer. Analysis was carried out using the Statistical Package for Social Sciences (SPSS/PC for Windows, version 6, 1993) program.

Only the variables related to the hypotheses of the study were selected to be entered into data analysis. This procedure provided four outcome variables, 9 explanatory variables, and three socio-demographic variables which were entered into the data analysis (Table 1).

Table 1 Original Set of Variables to be Used in the Data Analysis

Outcome	Explanatory	Socio-demographic
Tooth cleaning frequency	Social class	Social class
Level of dental plaque	Marital status	Sex
Teeth with gums bleeding after probing	Routines of daily activities	Age
Range of oral hygiene aids used	Flexibility of daily activities	
	Size of household	
	Number of people per bathroom	
	Flexibility of the working time schedule	
	Flexibility of routine activities in terms of timing and location	
	Mode of transport	

Initially, a descriptive analysis was undertaken to assess the general characteristics of the sample. Subsequently, univariate relationships between each of the four outcome variables and both the explanatory and

socio-demographic variables were examined, using the Chi-Square test.

All explanatory variables which were found to have no statistical association with any of the outcome variables were then excluded from further analysis. Explanatory variables featuring in further analysis were: social class, marital status, routines of daily activities, flexibility of daily activities, flexibility of the working time schedule, size of household and number of people per bathroom. Clearly, a number of outcome variables of interest are not continuous. As the intention was to measure the presence or absence of a particular condition in the assessment of the relationship between explanatory variables and outcome variables, logistic regression analysis was preferred (Altman, 1991).

Statistical significance was considered when $p < 0.05$, and confidence limits for relative risks were determined at the 95% level, if not otherwise stated.

2.7 Construction of the Measurements

One of the aims was to investigate whether the level of routines and flexibility of daily activities affected tooth cleaning behaviour.

To measure the structure of the day and the amount of flexibility perceived by people, Cullen and Phelps (1975) used a diary technique where the respondents were asked to record all the activities of a working day and the level of premeditation involved in each activity. According to Oppenheim (1992), the diary technique is expensive, difficult to design and to analyse. Therefore it should only be applied when the necessary estimates cannot be obtained in any other way. Considering that the sample population was large, and there were financial constraints as well as limits of time, it was decided not to adopt a diary technique.

To measure the flexibility of daily activities and routines of daily activities, a rating scale was used. The rating scale is one of the most common formats for questions employed in social sciences surveys. Its function is to ask respondents to make a judgement in terms of a set of ordered categories. The response categories, or quantifiers, will reflect the intensity of the particular judgement involved. The numerical codes that accompany these categories will represent the intensity of the response categories (Frankfort-Nachmias and Nachmias, 1992).

The following question, or rating scale, was utilised to measure routines of daily activities: "In general, thinking about all your daily activities, (all the things you do from when you first get up, until you go to bed), how routinized do you think your daily activities are?" Each

routine category was given a numerical code which would represent the intensity of the response category:

- 1) very routinized: coded 5,
- 2) routinized: coded 4,
- 3) quite routinized: coded 3,
- 4) not very routinized: coded 2, and
- 5) not at all routinized: coded 1.

A high score on the scale would mean higher routines, down to the lowest score, which would mean lower routines. It does not matter whether it is decided that a high score will mean an unfavourable attitude or a favourable attitude, as long as the scoring procedure remains consistent (Oppenheim, 1992). Therefore, based on the answers given by the respondents, routines of daily activities was stratified into three categories, as follows:

- 1) high routines: response 5,
- 2) moderate routines: responses 3 and 4, and
- 3) low routines: responses 1 and 2.

Later, it was decided that the variable would be dichotomized, to obtain the odds ratio of those who had the highest score versus the remainder with lower score. The final stratification of the categories was:

- 1) high routines: response 5, and

2) low routines: responses 1, 2, 3 and 4.

The question that purports to measure flexibility of daily activities was: "In general, thinking about all your daily activities (all the things you do from when you first get up, until you go to bed), to what degree are your daily activities flexible in terms of timing?" A numerical code would represent the intensity of the response given by the subjects:

- 1) very flexible: coded 1,
- 2) flexible: coded 2,
- 3) quite flexible: coded 3,
- 4) not very flexible: coded 4, and
- 5) not at all flexible: coded 5.

In order to calculate the flexibility of daily activities, a high score on the scale would mean lower flexibility, down to the lowest score, which would mean higher flexibility. Thus, according to the answers of the subjects under study, flexibility of daily activities was stratified into the following three categories:

- 1) high flexibility: responses 1 and 2,
- 2) moderate flexibility: response 3, and
- 3) low flexibility: responses 4 and 5

In due time, this variable was also dichotomized, the odds ratio was calculated for subjects who had the highest score, versus the remainder with lower score. The final stratification of the categories was:

- 1) low flexibility: responses 4 and 5, and
- 2) high flexibility: responses 1, 2 and 3.

In order to provide additional information on routines and flexibility of daily activities, a pre-established record of daily activities was used (Appendix 5.1). This record of daily activities acted as an aid-memoir to help the respondents to think over a typical working day and to recall everything they had done. Subsequently, they were asked about the level of premeditation and the degree of flexibility in terms of timing and location of the activities¹.

The level of premeditation of the activities was measured in the following question: "For this activity you mentioned you did, could you please tell me, if it was?" The possibilities of answers were:

- 1) arranged to do with others,
- 2) planned to do,
- 3) part of a normal routine,
- 4) unexpected,

¹These questions were adapted from "Diary Techniques and the Problems of Urban Life" (Cullen and Phellps, 1975).

- 5) on the spur of the moment, and
- 6) just for filling in time.

This question was followed by another that aimed to measure the degree of flexibility of the activity in terms of timing in the working day:

"If, for any reason, you were unable to carry out the activity you have just mentioned you did, at the usual time, how much would it have mattered?" After this question, a similar question aimed at measuring the degree of flexibility of the activity in terms of its location in the working day was asked: "If, for any reason you were unable to carry out the activity you have just mentioned you did at the usual location, how much would it have mattered?" The possibilities of answer for these questions were:

- 1) very much,
- 2) moderately,
- 3) not too much, and
- 4) not at all.

Because the aim of the record of daily activities was to reveal the activities considered as routines by the respondents, only the following set of activities were selected:

- 1) getting up,
- 2) cleaning your teeth,

- 3) having a shower,
- 4) washing your face,
- 5) having breakfast,
- 6) having lunch,
- 7) having dinner, and
- 8) going to bed.

These activities above were regarded as routines by all the subjects.

To calculate the degree of flexibility of the activities in terms of timing and location, a numerical value was attributed to the categories of the two variables.

- 1) very much: coded 4,
- 2) moderately: coded 3,
- 3) not too much: coded 2, and
- 4) not at all: coded 1.

The category values were summed. Score both of flexibility of timing and of flexibility of location of the activities were calculated. The score of flexibility of timing of activities ranged from 18 to 28, and the score of flexibility of location of activities ranged from 16 to 28. Based on these scores, and dividing them into tertiles, each variable was stratified into three groups. Flexibility of timing had:

- 1) high flexibility of timing of activities: ≤ 25 ,

- 2) moderate flexibility of timing of activities: > 25 and ≤ 27 , and
- 3) low flexibility of timing of activities: > 27 .

In its turn, flexibility of location had:

- 1) high flexibility of location of activities: ≤ 26 ,
- 2) moderate flexibility of location of activities: > 26 and ≤ 27 , and
- 3) low flexibility of location of activities: > 27 .

The association of these two variables with the outcome variables was tested separately. Afterwards, the two were combined into one single variable. A score was calculated, ranging from 36 to 56. Based on this score, the new variable, flexibility of activities in terms of timing and location, was stratified into three groups:

- 1) high flexibility of activities in terms of timing and location: ≤ 51 ,
- 2) moderate flexibility of activities in terms of timing and location: > 51 and ≤ 54 , and
- 3) low flexibility of activities in terms of timing and location: > 54 .

To measure the flexibility of the working time schedule, the indicator of personal schedule freedom from the job strain model was used (Karasek et al., 1981). This model is composed of two dimensions: demands and decision. The "job demands" dimension reflects the psychological stressors related to work load, unexpected tasks and personal conflict, but not physical stressors. The "job decision" dimension

includes two indicators, which have different goals. The first is intellectual discretion, defined as the intellectual possibility of developing work; while the second is personal schedule freedom, defined as control over time, reflecting the individual's control over his or her time schedule of participation in the work process (Marcenes and Sheiham, 1992).

The questions used to measure the flexibility of the working time schedule were¹: "Which of the following statements best describes your feelings about your work:"

- 1) I can make at least one private telephone call during regular working hours,
- 2) I can receive a private visitor for ten minutes during regular working hours, and
- 3) I can leave my job for half-an-hour for private errands during working hours without telling my supervisor. The possibilities of answer were:
 often
 sometimes
 seldom
 never/almost never.

The categories of the questions were coded, and the numeric code represented the value of each quantifier:

¹These questions have been used in a Brazilian population by Marcenes (1990).

- 1) often: coded 1,
- 2) sometimes: coded 2,
- 3) seldom: coded 3, and
- 4) never/almost never: coded 4.

The category values of the questions were summed and a score was calculated. The flexibility of the working time schedule score ranged from 3 to 12. Based on this score, and dividing it into tertiles, job personal schedule freedom was stratified into three groups as follows:

- 1) high flexibility of the working time schedule: ≤ 6 ,
- 2) moderate flexibility of the working time schedule: > 6 and ≤ 8 , and
- 3) low flexibility of the working time schedule: > 8 .

As for the rating scales used to measure the level of routines and flexibility of daily activities, flexibility of the working time schedule was also stratified into two groups to calculate the odds ratio. Those who had the highest score versus the remainder who had lower score. The final stratification of the variable was:

- 1) high flexibility of the working time schedule: ≤ 8 , and
- 2) low flexibility of the working time schedule: > 8 .

To provide additional information on the flexibility of the working hours, the following question was also included¹: My working time can be flexible:

- () often
- () sometimes
- () seldom
- () never/almost never.

The categories of this question were coded in the same way as for the questions on job personal schedule freedom. As for the other rating scales used, this variable was stratified into three categories as follows:

- 1) high working hours flexibility: responses 1 and 2,
- 2) moderate working hours flexibility: response 3, and
- 3) low working hours flexibility: response 4.

In addition to the questions already outlined, the subjects were also questioned about their mode of transport to work trips, the size of the household they were living in and their marital status (Appendix 5.1). These questions would also provide information on the level of flexibility of the working day. For the purpose of statistical analysis these variables were dichotomized as follows: first, subjects who used public transport and subjects who did not use public transport, and second, subjects who

¹Adapted from Whitehall II Study of the British Civil Servants (Marmot et al., 1991).

lived in larger households and subjects who lived in smaller households.

The variable size of the household was also stratified into two categories.

To check which would be the best cut-off point of the variable, it was stratified in five different categories:

- 1) households composed of one person versus the remainder,
- 2) households composed of two people versus the remainder,
- 3) households composed of three people versus the remainder,
- 4) households composed of four people versus the remainder, and
- 5) households composed of five people versus the remainder.

The frequency distribution of these five household types is shown in Table 1, Appendix 11. The association between each of these household types and the outcome variables was tested. Statistical significance between size of the household and the outcome variables was found for the first three compositions.

Thus, taking into consideration the fact that there was no statistical significance between size of the household and the outcome variables after composition number 3, as well as the median of the variable, (which was 3), the variable was stratified into two categories as follows: households composed of three or less people and households composed of more than three people.

It was then decided to measure whether crowding, that is, the number of people living in a household, would affect tooth cleaning behaviour in terms of pattern, structure and performance. It is well known that there is a large variation in the number of bathrooms per household in Brazil, which is used as one of the indicators in the measurement of social class. Therefore, the relationship between the ratio of the number of people of the household by the number of bathrooms of the household and the outcome variables was measured. The frequency distribution of the number of people per bathroom is shown in Table 1, Appendix 12.

For the purpose of statistical analysis the variable number of people per bathroom was stratified into five categories as described below:

- 1) 1 per bathroom,
- 2) 2 per bathroom,
- 3) 2.5 to 3.5 per bathroom,
- 4) 4 per bathroom, and
- 5) 5 or more people per bathroom.

Subsequently, the variable was dichotomized, combining groups 1, 2, and 3, representing the majority who had lower number of people per bathroom, versus group 4 and 5, representing the lowest percentage,

where the number of people per bathroom was higher. The final stratification of the variable was:

- 1) 1 to 3.5 people per bathroom: low number of people per bathroom, and
- 2) 4 or more people per bathroom: high number of people per bathroom.

To conclude, marital status was dichotomized into married and not married people. Because the study is chiefly concerned with dental health behaviour, specific questions related to dental health behaviour were asked (Appendix 5.1).

2.8 Outcome Variables

Regarding tooth cleaning behaviour, the study set out to assess the association between social and behavioural factors and pattern, structure, performance and teeth with gums bleeding.

Clinical examinations, toothbrushing frequency and the range of items used in tooth cleaning provided data for developing the measurements used as the outcome variables. A description of the construction of the outcome variables is presented below.

2.8.1 Tooth Cleaning Pattern

Tooth cleaning pattern refers to the frequency of toothbrushing within daily activities. To measure pattern, the subjects were asked how often they cleaned their teeth. Toothbrushing frequency was stratified into five categories as follows:

- 1) more than three times a day,
- 2) three times a day,
- 3) two times a day,
- 4) once a day, and
- 5) less than once a day.

The frequency distribution of these five categories is shown in Table 1, Appendix 13.

Since the tooth cleaning frequency was high, median and mode equal to 3, the variable was divided into two groups: those with tooth cleaning frequency ≤ 2 , below the median and those with tooth cleaning frequency ≥ 3 equal and above the median. For the purpose of logistic regression analysis, the variable was coded 0 for those subjects who had tooth cleaning frequency ≥ 3 and 1 for those who had a tooth cleaning frequency < 3 .

2.8.2 Tooth Cleaning Structure

Tooth cleaning structure was measured asking respondents about the range of oral hygiene aids they used to clean their teeth. The question that aimed to measure tooth cleaning structure was "Could you tell me what items you use to clean your teeth?", and the possible answers were:

- () tooth brush,
- () dental paste,
- () dental floss,
- () wood stick, and
- () mouthwash.

To analyse the structure of tooth cleaning behaviour, the categories of the variable were combined into four groups, as follows:

- 1) individuals who only used tooth brush and paste,
- 2) individuals who used brush, paste and floss,
- 3) individuals who used brush, paste and toothpick, and
- 4) individuals who used brush, paste, floss and toothpick (Table 1, Appendix 14).

As only a few subjects (9.3%), reported using a mouthwash, it was not included in the analysis.

The use of toothpicks was markedly high, with 54.6% of the subjects reporting to use them. However, using toothpicks was not always

aimed at cleaning teeth. It is very much part of the Brazilian culture, a social behaviour, which is performed everywhere. Toothpicks are used in a quick manner to remove food, especially meat.

On the other hand, dental floss was clearly used to clean the teeth by 67.5% of the subjects, so that there was a difference between the goals associated with using toothpick and dental floss. Considering that using dental floss required an appropriate place and spending more time, its use was, therefore, identified as the item that would differentiate the groups, as regards structure in tooth cleaning behaviour.

Taking these facts into consideration to perform logistic regression analysis, structure of tooth cleaning behaviour was dichotomized into two groups as described below:

- 1) less structure: combining groups 1 and 3 - coded 1, and
- 2) more structure: combining groups 2 and 4 - coded 0.

2.8.3 Tooth Cleaning Performance

The Plaque Index (Silness and Løe, 1964) was employed in the assessment of tooth cleaning performance. Because it was not the intention to have a precise measurement of plaque levels, rather a measurement of performance in tooth cleaning behaviour, some minor changes were made to the Plaque Index.

For the purpose of the present study, buccal and lingual gingival areas of each tooth (instead of four areas) were given a score ranging from 0 to 3, composing the Plaque Index for the area. The scores from the two areas of the tooth were added and then divided by 2, to give the Plaque Index for the tooth. By adding the indexes for the individual teeth and dividing by the number of teeth examined, the Plaque Index for the subject is obtained.

The Plaque Index Score is not a continuous measurement. Therefore, it was not considered convenient to use the mean as a measure of central tendency. The cut-off points of the variable were made at levels of plaque 1, 2 and 3: Since there were no subjects with level of plaque 0, and only seven subjects with level of plaque 1, it was decided to group these two categories with the level of dental plaque 2, forming a single category (Table 1, Appendix 15). Thus, the variable was dichotomized into two categories: low level of dental plaque (level of plaque 0, 1 and 2), and high level of dental plaque (dental plaque higher than 2 and equal to 3). For the purpose of logistic regression, this outcome variable was dichotomized and coded 0 for those individuals who had low level of dental plaque, and coded 1 for subjects who had high level.

2.8.4 Outcome of Tooth Cleaning Performance

The presence or absence of teeth with gums bleeding after probing was adopted as the indicator of the outcome of tooth cleaning performance. Individuals who had teeth with gums bleeding after probing were scored 1 and individuals who did not have teeth with gums bleeding after probing were coded 0.

2.9 Confounding variables

In a study of the association between exposure to a risk factor and the occurrence of disease, confounding can occur when another exposure exists in the study population and is associated both with the disease and the exposure being studied. Confounding occurs when the effects of two risk factors have not been separated and it is therefore incorrectly concluded that the effect is due to one rather than the other variable (Beaglehole, Bonita and Kjellström, 1993). Multivariate analyses are recommended to take into account the effects of other variables when assessing the "independent" contribution of a specific determinant to the outcome.

Three factors generally accepted as influencing tooth cleaning behaviour were selected as confounding variables to be included. These factors were sex, age and socio-economic status. The identification and classification questionnaire (Appendices 5.1, 6.1, 6.2, 6.3) provided the data for developing measurements of the relevant variables.

2.10 Reliability of the Structured Interview

Intra-examiner reliability of the structured interviews was assessed by re-interviewing every tenth subject. Forty eight subjects were re-interviewed. Test-retest reliability was done on 60 basic questions. The correlation between the two sets of observations was computed using Spearman's correlation coefficient. The correlation coefficient ranged from 0.84 to 1.00, showing a strong correlation between the two sets of measurements.

2.11 Consistency of Clinical Examinations

Consistency of examination was assessed throughout the field work. Every tenth subject had a duplicate examination. A total of 48 people were re-examined. Cohen's Unweighed Kappa Coefficient of Agreement

was used in this study (Burt and Eklund, 1992). For the interpretation of the Kappa values, Landis and Koch (1977) proposed a six-point scale:

- 1) Kappa < 0: poor agreement,
- 2) Kappa between 0.0 - 0.20: slight agreement,
- 3) Kappa between 0.21 - 0.40: fair agreement,
- 4) Kappa between 0.41 - 0.60: moderate agreement,
- 5) Kappa between 0.61 - 0.80: substantial agreement, and
- 6) Kappa of 0.81 and above: almost perfect agreement.

The Kappa value for the two clinical examinations was high. It ranged from 0.95 to 1.00, for the presence or absence of bleeding gums, and from 0.90 to 1.00 for the presence or absence of dental plaque, indicating an almost perfectly consistent examination.

CHAPTER 3

RESULTS

3.1 Introduction

This chapter displays the findings of the research programme. In Section 3.2, a descriptive summary of the data is presented. Sections 3.3 to 3.6 represent the core of the study. They are intended to describe, through the use of logistic regressions, the effect of a set of explanatory and socio-demographic variables upon four outcome variables (one at a time), as shown in Table 1. Section 3.7 describes the relationship between selected pairs of the outcome variables: a) tooth cleaning pattern and performance, b) tooth cleaning pattern and structure, and c) tooth cleaning performance and structure. Section 3.8 presents a summary of the results found in the previous sections and a summary table of the relationship between tooth cleaning behaviour and the explanatory variables.

Table 1 Final Set of Variables Used in the Data Analysis

Outcome	Explanatory	Socio-demographic
Tooth cleaning frequency	Social class	Social class
Level of dental plaque	Marital status	Sex
Teeth with gums bleeding after probing	Routines of daily activities	Age
Range of oral hygiene aids used	Flexibility of daily activities	
	Flexibility of the working time schedule	
	Size of the household	
	Number of people per bathroom	

3.2 Descriptive Data

A group of 471 people of both sexes were personally interviewed and clinically examined. The sample was composed of 237 men and 234 women (Table 2). The age range varied from 24 to 44 years, with a mean age of 34 years (Table 3).

The subjects were grouped into two socio-economic groups: high social class and low social class. The high social class group was composed of 240 subjects, and low social class of 231 subjects. Of the people interviewed and examined, 65.8% were married and 34.2% were not married (Table 2).

The range of people composing the household varied from one person to 14 people, including adults and children. The most common composition of the households was three people (Table 3). Almost 300 subjects (59.9%) lived in smaller households and 189 (40.1%) lived in larger households. In addition, the majority of the sample population (69%) dwelled in households where the number of people per bathroom was lower, whilst 31% lived in households where the number of people per bathroom was higher.

All of the subjects of the study were employed, by virtue of the very contours of the research. The amount of time spent on paid work

ranged from four to 18 hours per day. The mean amount of time of paid working hours was 8h30min (Table 3).

A score of the work characteristics of the subjects concerned with the flexibility of the working time schedule was calculated, ranging from 3 to 12. Nearly 70% of the subjects had a high flexibility of the working time schedule, and 30.8% had low flexibility.

The level of flexibility and routines of daily activities was also calculated. Nearly 45% of the sample population had high level of flexibility of daily activities and 55.2% had low level of flexibility. The level of routines of daily activities was high for 16.1% and low for 83.9%. The majority of the sample subjects relied on public transport as the mode of transport of working trips (59.9%), while 40.1% made their work trips by other means (Table 2).

Daily toothbrushing frequency was high. The median and mode were 3. Of the subjects interviewed, 23.1% reported cleaning their teeth more than three times per day, 45.0% three times per day, 25.9% two times per day, and 5.1% cleaned their teeth once a day. Less than 1.0% did not clean their teeth on a regular basis (Table 4).

Women reported cleaning their teeth more frequently than men. Nearly 30% of women reported cleaning their teeth more than three times per day, compared to 16.9% of men. On the other hand, 30.8% of men

cleaned their teeth twice per day, compared to 21.8% of the women.

There was no large difference between men and woman in the percentage who cleaned their teeth three times per day; 45.7% for women and 44.3% for men (Table 4). Although only a small number of people reported cleaning them once a day (5.1%), there was a significant difference between the sexes in the proportion that cleaned their teeth once per day; 2.9% of women compared to 8.0% of men (Table 4).

Dental floss was the most common dental aid used by the subjects studied, 67.5% reported using it. Women (70.9%) were more likely to use dental floss than men (64.1%) (Table 5). The use of toothpick was high: 54.6% used them. Men (61.6%) were more likely to use toothpick than women (47.4%) (Table 5).

Of the subjects studied, only 1.5% had a mean plaque score of 1. The majority (62.6%) presented a score between 1 and 2, and 35.9% had plaque score more than 2 (Table 6).

The sample population presented a moderate proportion of teeth with gums bleeding on probing. The mean proportion of teeth with gums bleeding was 0.15. Men had a higher proportion of teeth with gums bleeding on probing than women: 0.16 compared to 0.13 for women (Table 7).

These were the main results concerned with descriptive data. To assess the relative contribution of the significant explanatory variables for each of the four outcome variables several different sets of multiple regression analysis were carried out, as presented in Sections 3.3 to 3.6 below.

3.3 Explaining Tooth Cleaning Frequency

The first stage in the assessment of the relationship between social class, marital status, routines of daily activities, flexibility of daily activities, flexibility of working time schedule, size of the household and number of people per bathrooms against tooth cleaning frequency was to perform a logistic regression analysis with each explanatory variable unadjusted. The results of the simple logistic regression presented the following significance levels:

- 1) marital status: $p= 0.0853$,
- 2) social class: $p= 0.0001$,
- 3) routines of daily activities: $p= 0.0018$,
- 4) flexibility of daily activities: $p= 0.0014$,
- 5) flexibility of working time schedule: $p= 0.0000$,
- 6) size of the household: $p= 0.0296$, and

7) number of people per bathroom: $p = 0.004$.

All variables except marital status were highly significant. Marital status was not significant at the 5% level. However, considering that it was significant at a level far below 20%, it was decided to retain this variable in the model¹.

The next step was to carry out a logistic regression where the results were adjusted by age, sex, social class and marital status. For this procedure, a set of six multiple logistic regression analyses was performed, as shown below.

- 1) Model 1: age, sex, social class, marital status by tooth cleaning frequency,
- 2) Model 2: age, sex, social class, marital status, routines of daily activities by tooth cleaning frequency,
- 3) Model 3: age, sex, social class, marital status, flexibility of daily activities by tooth cleaning frequency,
- 4) Model 4: age, sex, social class, marital status, size of the household by tooth cleaning frequency,
- 5) Model 5: age, sex, social class, marital status, number of people per bathroom by tooth cleaning frequency, and
- 6) Model 6: age, sex, social class, marital status, flexibility of working time schedule by tooth cleaning frequency.

¹In this particular case, the procedure recommended by Altman (1991) of including variables whose $p \leq 0.2$, or "even higher", was adopted.

It is well known that, when two explanatory variables are highly correlated, there is no advantage in adding the two variables in the model at the same time, as they explain much the same variability of the outcome variable. In fact the effect of one variable may obscure the effect of the other one, which could lead to a misleading finding (Altman, 1991).

In the present study, high associations ($p < 0.0001$) were found between:

- 1) routines of daily activities and flexibility of daily activities
- 2) routines of daily activities and flexibility of working time schedule
- 3) flexibility of daily activities and flexibility of working time schedule, and
- 4) size of the household and number of people per bathroom.

Therefore, these pairs of variables were not entered into the model at the same time.

The results of the logistic regression showed a highly significant relationship between social class and tooth cleaning frequency ($p < 0.001$), after taking age, sex, and marital status into account. Subjects of low social class were 2.2 times (OR=2.2, 95% CI=1.51-3.39) more likely to clean their teeth two or less times per day, compared to those belonging to high social class (Table 8).

The effects of routines of daily activities ($p < 0.01$), as well as flexibility of working time schedule ($p < 0.01$), on the frequency of tooth cleaning behaviour, remained highly significant after adjusting for age, sex and social class. In addition, the effect of flexibility of daily activities ($p < 0.05$) and size of the household ($p < 0.05$) remained significant after adjusting for age, sex and social class.

Subjects with high routines of daily activities were 2.3 times (OR= 2.3, 95% CI=1.34-3.92) more likely to clean their teeth two or less times per day compared to subjects with low routines of daily activities (Table 9).

The probability of subjects with low flexibility in daily activities to clean their teeth two or less times per day was not as high as those with high routines of daily activities (OR= 1.7 95% CI=1.10-2.57). Yet, people with low flexibility in daily activities had a lower frequency of tooth cleaning compared to subjects with high flexibility in their daily activities (Table 9).

Flexibility of working time schedule remained highly significantly associated with tooth cleaning frequency, after taking into account age, sex, marital status and social class. Subjects with low flexibility of working time schedule were 2.2 times (OR= 2.2 95% CI=1.35-3.63)

more likely to clean their teeth two or less times per day, compared to subjects with high flexibility of working time schedule (Table 9).

Living in larger households (3 people or more) was associated with a lower frequency of tooth cleaning. The probability of cleaning the teeth two or less times per day was 1.5 times (OR= 1.5, 95% CI=1.01-2.36) higher for people who lived in larger households, compared to people who lived in smaller households (Table 8).

When number of people per bathroom was adjusted by age, sex, social class and marital status, there was only a borderline statistical significant relationship. The odds ratio was 1.8 and, after adjustment, fell to 1.5. This indicates that number of people per bathroom may be confounded by sex, social class and marital status (Table 8).

The next stage of this set of analysis was to run four separate models, to adjust:

- 1) size of the household for routines of daily activities and for flexibility of daily activities, and
- 2) number of people per bathroom for routines of daily activities and for flexibility of daily activities.

These models have as outcome variable tooth cleaning frequency and as explanatory variables:

- 1) Model 7: age, sex, social class, marital status, size of the household and routines of daily activities,

- 2) Model 8: age, sex, social class, marital status, size of the household and flexibility of daily activities,
- 3) Model 9: age, sex, social class, marital status, number of people per bathroom and routines of daily activities, and
- 4) Model 10: age, sex, social class, marital status, number of people per bathroom and flexibility of daily activities.

The logistic regression analysis provided two main results. First, the effect of the size of the household on tooth cleaning frequency did not remain significant after taking routines of daily activities and flexibility of daily activities into account (Tables 10, 11). Second, the effect of the number of people per bathroom did not remain significant after adjusting for routines of daily activities and flexibility of daily activities (Tables 12, 13).

The final step in the data analysis was to check for interaction among variables which could distort the results. The interaction between two variables is examined by creating a new variable which is their product and including this into the model. The new variable makes the contribution of each variable to the prediction dependent upon the value of the other variables (Altman, 1992). Interaction was checked for the following pairs of variables:

- 1) size of the household and number of people per bathroom,
- 2) routines of daily activities and flexibility of daily activities,

3) flexibility of working time schedule and flexibility of daily activities,
and

4) flexibility of working time schedule and routines of daily activities.

The method adopted was to carry out a logistic regression including both the initial and the new variables in the model. The results suggested that there was no significant interaction among variables ($p < 0.05$).

3.4 Explaining Levels of Dental Plaque

To examine the relationship between social class, marital status, routines of daily activities, flexibility of daily activities, flexibility of working time schedule, size of the household, and number of people per bathroom against level of dental plaque, the same type of procedures used to analyse the relationship of the explanatory variables and tooth cleaning frequency were adopted.

As shown in Table 14, when social class was adjusted by age, sex and marital status, the association with level of dental plaque remained statistically significant, and the odds ratio was almost the same. Social class was therefore not confounded by sex and marital status indicating that it was an independent factor related to level of dental plaque. The

probability of having higher level of dental plaque was 3.2 higher (OR=3.2, 95% CI=2.15-4.78) for subjects belonging to low social class (Table 14).

After adjusting for age, sex and social class, there was a borderline significance between marital status and level of dental plaque. Married subjects were 1.5 times (OR= 1.5, 95% CI=0.98-2.37) more likely to have higher level of dental plaque compared to single subjects (Table 14).

There was no significant relationship between routines of daily activities and level of dental plaque. However, flexibility of daily activities remained highly significant ($p < 0.001$), after taking age, sex, social class and marital status into account. The odds ratio did not reduce greatly, falling from 3 to 2.7. Flexibility of daily activities was therefore not confounded by sex, social class or marital status. Subjects with low flexibility in their daily activities were 2.7 times (OR= 2.7, 95% CI=1.77-4.14) more likely to have higher level of dental plaque (Table 15).

When flexibility of working time schedule was adjusted by age, sex, social class and marital status statistical, significance at the pre-established levels remained ($p < 0.01$). The level of dental plaque was estimated to increase twofold (OR= 2.0, 95% CI=1.24-3.26) for subjects

with low flexibility of working time schedule, when compared to subjects with high flexibility of working time schedule (Table 15).

When the size of the household was adjusted by sex, social class and marital status, statistical significance remained and the odds ratio had a slight increase after adjustment (from 1.6 to 1.7). Size of the household was therefore not confounded by sex, social class and marital status. Inhabitants of larger households were estimated to be more likely to have higher level of dental plaque. The probability of having higher level of dental plaque was 1.7 times (OR= 1.7, 95% CI=1.09-2.62) more for people who lived in larger households compared to those who lived in smaller households (Table 14).

After number of people per bathroom was adjusted by sex, social class and marital status, statistical significance remained and the odds ratio again did not reduce greatly, falling only from 2.4 to 2.3, after adjustment. The probability of having higher level of dental plaque was higher for subjects living in households where the number of people per bathroom was high. Those subjects were two times (OR=2.3 , 95% CI=1.33-3.12) more likely to have higher level of dental plaque, compared to subjects living in households where the number of people per bathroom was low (Table 14).

The final stage of this set of procedures was to carry out a logistic regression analysis to adjust both the size of the household for flexibility of daily activities, and the number of people per bathroom for flexibility of daily activities. It was decided to run three separate final models. The first adjusted the size of the household by age, sex, social class, marital status and flexibility of daily activities. The second adjusted the number of people per bathroom by age, sex, social class, marital status and flexibility of daily activities. The third adjusted marital status by age, sex, social class and flexibility of daily activities.

Marital status did not remain significantly associated with level of dental plaque when flexibility of daily activities was included in the model (Table 16). However, as shown in Table 17, when the size of the household was adjusted by flexibility of daily activities, the association remained statistically significant and the odds ratio remained the same. Therefore, size of the household was not confounded by flexibility of daily activities. The effect of the number of people per bathroom on level of dental plaque also remained significant when flexibility of daily activities was included in the model (Table 18).

3.5 Explaining Gums Bleeding after Probing

The following variables were expected to explain the bleeding of gums after probing: social class, marital status, routines of daily activities, flexibility of daily activities, flexibility of working time schedule, size of the household, and the number of people per bathroom. For explaining the number of teeth with gums bleeding after probing, a two-stage logistic regression analysis was performed. Firstly, with each explanatory variable unadjusted. Secondly, with each explanatory variable adjusted by age, sex, social class and marital status.

The results of the logistic regression showed a highly significant relationship between social class and the prevalence of teeth with gums bleeding after probing ($p < 0.001$). When social class was adjusted by age, sex and marital status, statistical significance remained and the odds ratio did not reduce, remaining at 3.5. Thus, social class was not confounded by age, sex or marital status, suggesting that it was an independent factor related to teeth with gums bleeding after probing (Table 19).

Marital status and routines of daily activities were not significantly associated with number of teeth with gums bleeding after probing. As

shown in Table 20, the relationship between flexibility of daily activities and teeth with gums bleeding after probing remained significant ($p < 0.01$), after taking into account age, sex, social class and marital status. The odds ratio did not alter greatly, reducing only from a value of 2.4 to 2.3 after the adjustment. This suggests that flexibility of daily activities was not confounded by age, sex, social class and marital status. People with low flexibility in their daily activities were 2.3 times (OR= 2.3, 95% CI=1.31-3.18) more likely to have teeth with gums bleeding after probing, when compared to those with high flexibility in daily activities (Table 20).

After adjustment by age, sex, social class and marital status, flexibility of working time schedule did not remain statistically significantly related to the outcome variable. The odds ratio after adjustment was also reduced fairly substantially (from 3 to 1.7), therefore suggesting that flexibility of working time schedule was confounded by age, sex, social class or marital status (Table 20).

There was no significant association between size of the household and number of teeth with gums bleeding after probing. When number of people per bathroom was adjusted by age, sex, social class and marital status, statistical significance did not remain. This indicates that number

of people per bathroom was confounded by social class, sex, age or marital status (Table 19).

3.6 Explaining the Range of Oral Hygiene Aids Used to Clean the Teeth

To explain the relationship between the explanatory variables social class, marital status, routines of daily activities, flexibility of daily activities, flexibility of working time schedule size of the household, number of people per bathroom and range of oral hygiene aids used to clean the teeth, a two-stage logistic regression analysis was performed. The first stage ran with each explanatory variable unadjusted. The second ran with each explanatory variable adjusted by sex, age, social class and marital status.

The results of logistic regression with sex, age, marital status and social class in the model showed that social class remained highly statistically significant ($p < 0.001$) after taking sex, age and marital status into account. The odds ratio remained at the 4 times level, i.e. subjects belonging to low social class were 4 times (OR = 4.0, 95% CI

=2.68-6.25) more likely to use fewer oral hygiene aids to clean their teeth than people from high social class (Table 21).

Marital status was not significantly associated with range of oral hygiene aids used to clean the teeth. There was only a borderline statistical significant association between routines of daily activities and range of items used to clean the teeth. After adjustment by age, sex, social class and marital status, routines of daily activities did not remain significantly related to the outcome variable.

When adjusted by age, sex, social class and marital status, flexibility of daily activities did not remain significantly associated with the outcome variable. The effect of flexibility of working time schedule on the range of items used to clean the teeth remained highly statistically significant after adjusting for age, sex, marital status and social class ($p < 0.001$). Subjects who experienced low flexibility of working time schedule were almost three times (OR = 2.8, 95% CI = 1.75-4.51) more likely to use fewer oral hygiene aids to clean their teeth, compared to subjects who experienced high flexibility of working time schedule (Table 22).

3.7 Relationship between Selected Outcome Variables

To assess the relationship between tooth cleaning frequency and level of dental plaque, tooth cleaning frequency and range of items used to clean the teeth, and range of items used to clean the teeth and level of dental plaque, two-stage logistic regression analysis was run. After a simple logistic regression was performed, results were adjusted for sex, age and social class

3.7.1 Relationship between Tooth Cleaning Frequency and Level of Dental Plaque

There was a highly significant association between tooth cleaning frequency and level of dental plaque ($p < 0.001$). This relationship remained significant after adjusting for age, sex, and social class. Subjects who cleaned their teeth less frequently were 2.3 times (OR = 2.3, 95% CI = 1.46-3.41) more likely to have high level of dental plaque compared to those who cleaned their teeth three or more times per day (Table 23).

3.7.2 Relationship between Tooth Cleaning Frequency and the Range of Items Used to Clean the Teeth

Tooth cleaning frequency was highly significantly associated with the range of items used to clean the teeth ($p < 0.001$). This statistical significance remained when tooth cleaning frequency was adjusted by age, sex and social class. Subjects who cleaned their teeth less frequently were 2.7 times (OR = 2.7, 95% CI = 1.75-4.18) more likely to use fewer oral hygiene aids, compared to those who cleaned their teeth more frequently, after taking into account age, sex and social class (Table 24).

3.7.3 Relationship between Range of Items Used to Clean the Teeth and Level of Dental Plaque

The association between the range of items used to clean the teeth and level of dental plaque was highly statistically significant ($p < 0.001$). The results remained significant after taking into account age, sex, social class and tooth cleaning frequency. The level of dental plaque was estimated to increase almost twofold (OR = 1.9, 95% CI = 1.23-2.97) for people who used fewer oral hygiene aids, compared to those who used more oral hygiene aids (Table 25).

3.8 Summary

3.8.1 Tooth Cleaning Frequency

Routines of daily activities ($p < 0.01$), flexibility of working time schedule ($p < 0.01$), and social class ($p < 0.001$) were the best correlates of tooth cleaning frequency. This was shown by the difference in the tooth cleaning frequency of subjects who had high routines in daily activities, as opposed to those whose routines of daily activities were low. In addition, the tooth cleaning frequency of subjects who experienced low flexibility of working time schedule was different from the tooth cleaning frequency of subjects who had high flexibility of working time schedule. Moreover, subjects of lower social class were more likely to have lower tooth cleaning frequency, compared to people of higher social class.

The effect of flexibility of daily activities was also statistically significant. Those subjects who had low flexibility in daily activities were 1.6 times more likely to clean their teeth two or less times per day compared to those with high flexibility in daily activities. Moreover, size of the household and number of people per bathroom were significantly associated with tooth cleaning frequency after adjusting for age, sex, marital status and social class.

Finally, size of the household and number of people per bathroom were not significantly associated with tooth cleaning behaviour when routines of daily activities and flexibility of daily activities were taken into account.

In conclusion, routines of daily activities, flexibility of working time schedule, social class and flexibility of daily activities were all associated with tooth cleaning frequency.

3.8.2 Levels of Dental Plaque

There was a highly significant relationship between flexibility of daily activities, social class and level of dental plaque. Social class and flexibility of daily activities were the strongest correlates of level of dental plaque, as shown by the difference in the level of dental plaque of subjects belonging to low social class compared to those belonging to high social class. People of lower social class were 3.2 times more likely to have higher level of dental plaque compared to people of high social class. Those with low flexibility in daily activities were at greater risk of having higher levels of dental plaque. Subjects with low flexibility in daily activities were 2.3 times more likely to have higher level of dental plaque compared to those with high flexibility in daily activities.

Flexibility of working time schedule was also a significant correlate of

level of dental plaque. Subjects with low flexibility of working time schedule were two times more likely to have higher level of dental plaque than subjects with high flexibility of working time schedule.

Size of household and number of people per bathroom were also correlates of level of dental plaque. Subjects living in larger households were more likely to have higher level of dental plaque. In addition, subjects living in households where the number of people per bathroom was high were more likely to have higher level of dental plaque than those living in households where the number of people per bathroom was low.

In conclusion, social class, flexibility of daily activities, flexibility of working time schedule, size of the household and number of people per bathroom were associated with levels of dental plaque.

3.8.3 Bleeding on Probing

The relationship between social class, flexibility of daily activities and teeth with gums bleeding after probing was highly significant. There were differences in the prevalence of teeth with gums bleeding after probing between people belonging to low and high social classes. There was also a difference in the prevalence of teeth with gums bleeding after

probing between people with low and high flexibility in their daily activities.

Subjects in low social classes were 3.5 times more at risk of having teeth with gums bleeding after probing compared to those belonging to high social class. Moreover, subjects with low flexibility in daily activities were 2.4 times more likely to have teeth with gums bleeding after probing, compared to subjects with high flexibility in their daily activities.

In conclusion, social class and flexibility of daily activities were significantly associated with teeth with gums bleeding after probing.

3.8.4 Range of Items Used to Clean the Teeth

Flexibility of working time schedule and social class were strongly associated with a range of items used to clean the teeth.

3.8.5 Relationship between Selected Outcome Variables

Tooth cleaning frequency was associated with level of dental plaque. The higher the tooth cleaning frequency the lower the level of dental plaque. In addition, there was an association between tooth cleaning frequency and the use of oral hygiene aids. Those who had higher tooth cleaning frequency were more likely to use more oral

hygiene aids, as opposed to those who had lower tooth cleaning frequency who were more likely to use fewer oral hygiene aids.

Furthermore, the range of items used to clean the teeth was associated with level of dental plaque. Subjects who used more oral hygiene aids were more likely to have lower level of dental plaque and subjects who used fewer oral hygiene aids were more likely to have higher level of dental plaque.

3.8.6 Summary Table

Table 26 presents a summary of the relationships between Tooth Cleaning Behaviour and the explanatory variables dealt with.

Table 2 Frequency Distribution of Sex, Social Class, Marital Status and Mode of Transport in Sample: 471 Adults.

Variable	Frequency	Relative Frequency (Per Cent)
Sex		
Male	237	50.3
Female	234	49.7
Social Class		
High	240	51.0
Low	231	49.0
Marital Status		
Single	161	34.2
Married	310	65.8
Mode of Transport		
Public Transport	282	59.9
Others	189	40.1

Table 3 Mean, Minimum, Quartiles and Maximum Values of Age, Size of Household, Number of Working Hours in Sample: 471 Adults.

Variable	Mean (SD)		Minimum	Maximum	Quartiles		
					25	50	75
Age	34	(5.94)	24	44	29	34	39
Size of Household	3	(0.85)	1	14	2	3	4
Number of Working Hours	8h30min	(1.44)	4	18	8h	8h45min	9h

Table 4 Frequency Distribution of Tooth cleaning by Sex: 471 Adults.

Variable Tooth Cleaning Frequency	Less than once a day	Once a day	Two times a day	Three times a day	More than three times a day	Total
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Women	2 (0.9)	5 (2.1)	51 (21.8)	107 (45.7)	69 (29.5)	234 (100)
Men	2 (0.8)	19 (8.0)	71 (30.0)	105 (44.3)	40 (16.9)	237 (100)
All Adults	4 (0.8)	24 (5.1)	122 (25.9)	212 (45.0)	109 (23.1)	471 (100)

Table 5 Frequency Distribution of Use of Dental Floss and Toothpick by Sex: 471 Adults, 234 Women, 237 Men.

Variables Dental Floss Toothpick	Use Dental Floss n (%)	Do not use Dental Floss n (%)	Use Toothpick n (%)	Do not use Toothpick n (%)
Women	166 (70.9)	68 (29.1)	111 (47.4)	123 (52.6)
Men	152 (64.1)	85 (35.9)	146 (61.6)	91 (38.4)
All Adults	318 (67.5)	153 (32.5)	257 (54.6)	214 (45.4)

Table 6 Frequency Distribution of Plaque Scores by Sex: 471 Adults, 234 Women, 237 Men.

Variable Mean Plaque Score	Plaque Score 1 (mean score 1) n (%)	Plaque Score 2 (mean score more than 1 and equal to 2) n (%)	Plaque Score 3 (mean score more than 2) n (%)	Total n (%)
Women	5 (2.1)	153 (65.4)	76 (32.5)	234 (100)
Men	2 (.8)	142 (59.9)	93 (39.2)	237 (100)
All Adults	7 (1.5)	295 (62.6)	169 (35.9)	471 (100)

Table 7 Mean, Minimum, Maximum and Quartiles of Bleeding in Sample: 471 Adults.

Variable Bleeding	Mean		Minimum	Maximum	Quartiles		
	(SD)				25	50	75
Women	0.13	(0.16)	0	0.83	0.00	0.07	0.20
Men	0.16	(0.17)	0	1.00	0.01	0.10	0.23
Total	0.15	(0.17)	0	1.00	0.02	0.08	0.21

Table 8 Distribution of Tooth Cleaning Frequency, according to Social Class, Marital Status, Size of Household and Number of People per Bathroom in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	94 (40.7)	137 (59.3)	2.2 (1.51-3.36)	2.2 (1.51-3.39)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	107 (34.5)	203 (65.5)	1.4 (0.95-2.20)	1.8 (0.95-2.34)
Not Married	43 (26.7)	118 (73.3)		
Size of the Household				
Large	71 (37.6)	118 (62.4)	1.5 (1.01-2.29)	1.5 (1.01-2.36)
Small	79 (28.0)	203 (72.0)		
Number of People per Bathroom				
High	60 (41.1)	86 (58.9)	1.8 (1.21-2.74)	1.5 (0.99-2.36)
Low	90 (27.7)	235 (72.3)		

* Adjusted for age, sex, social class and marital status

Table 9 Distribution of Tooth Cleaning Frequency, according to Routines of Daily Activities, Flexibility of Daily Activities and Flexibility of Working Time Schedule in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Routines of Daily Activities				
High	36 (47.4)	40 (52.6)	2.2 (1.35-3.66)	2.3 (1.34-3.92)
Low	114 (28.9)	281 (71.1)		
Flexibility of Daily Activities				
Low	99 (38.1)	161 (61.9)	1.9 (1.29-2.89)	1.7 (1.10-2.57)
High	51 (24.2)	160 (75.8)		
Flexibility of Working Time Schedule				
Low	68 (46.9)	77 (53.1)	2.6 (1.74-3.96)	2.2 (1.35-3.63)
High	82 (25.2)	244 (74.8)		

* Adjusted for age, sex, social class and marital status

Table 10 Distribution of Tooth Cleaning Frequency, according to Social Class, Marital Status, Size of Household and Routines of Daily Activities in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	94 (40.7)	137 (59.3)	2.25 (1.51-3.36)	2 (1.37-3.13)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	107 (34.5)	203 (65.5)	1.4 (0.95-2.20)	1.3 (0.83-2.09)
Not Married	43 (26.7)	118 (73.3)		
Size of the Household				
Large	71 (37.6)	118 (62.4)	1.5 (1.01-2.29)	1.4 (0.91-2.16)
Small	79 (28.0)	203 (72.0)		
Routines of Daily Activities				
High	36 (47.4)	40 (52.6)	2.2 (1.35-3.66)	2.13 (1.23-3.68)
Low	114 (28.9)	281 (71.1)		

* Adjusted for age, sex, social class, marital status and routines of daily activities

Table 11 Distribution of Tooth Cleaning Frequency, according to Social Class, Marital Status, Size of the Household and Flexibility of Daily Activities in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	94 (40.7)	137 (59.3)	2.25 (1.51-3.36)	2 (1.37-3.14)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	107 (34.5)	203 (65.5)	1.4 (0.95-2.20)	1.4 (0.87-2.18)
Not Married	43 (26.7)	118 (73.3)		
Size of the Household				
Large	71 (37.6)	118 (62.4)	1.5 (1.01-2.29)	1.5 (0.98-2.29)
Low	79 (28.0)	203 (72.0)		
Flexibility of Daily Activities				
Low	99 (38.1)	161 (61.9)	1.9 (1.29-2.89)	1.6 (1.07-2.50)
High	51 (24.2)	160 (75.8)		

* Adjusted for age, sex, social class, marital status and flexibility of daily activities

Table 12 Distribution of Tooth Cleaning Frequency, according to Social Class, Marital Status, Number of People per Bathroom and Routines of Daily Activities in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	94 (40.7)	137 (59.3)	2.25 (1.51-3.36)	1.9 (1.28-2.97)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	107 (34.5)	203 (65.5)	1.4 (0.95-2.20)	1.3 (0.83-2.08)
Not Married	43 (26.7)	118 (73.3)		
Number of People per Bathroom				
High	60 (41.1)	86 (58.9)	1.8 (1.21-2.74)	1.4 (0.90-2.18)
Low	90 (27.7)	235 (72.3)		
Routines of Daily Activities				
High	36 (47.4)	40 (52.6)	2.2 (1.35-3.66)	2.1 (1.25-3.72)
Low	114 (28.9)	281 (71.1)		

* Adjusted for age, sex, social class, marital status and routines of daily activities

Table 13 Distribution of Tooth Cleaning Frequency, according to Social Class, Marital Status, Number of People per Bathroom and Flexibility of Daily Activities in Sample: 471 Adults.

Variable	Low Tooth Cleaning Frequency ≤ 2 n (%)	High Tooth Cleaning Frequency ≥ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	94 (40.7)	137 (59.3)	2.25 (1.51-3.36)	1.9 (1.28-2.96)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	107 (34.5)	203 (65.5)	1.4 (0.95-2.20)	1.4 (0.87-2.18)
Not Married	43 (26.7)	118 (73.3)		
Number of People per Bathroom				
High	60 (41.1)	86 (58.9)	1.8 (1.21-2.74)	1.5 (0.94-2.27)
Low	90 (27.7)	235 (72.3)		
Flexibility of Daily Activities				
Low	99 (38.1)	161 (61.9)	1.9 (1.29-2.89)	1.6 (1.07-2.49)
High	51 (24.2)	160 (75.8)		

* Adjusted for age, sex, social class, marital status and flexibility of daily activities

Table 14 Distribution of Level of Dental Plaque, according to Social Class, Marital Status, Size of Household and Number of People per Bathroom in Sample: 471 Adults.

Variable	Low Level of Dental Plaque ≤ 2 n (%)	High Level of Dental Plaque > 2, ≤ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	113 (48.9)	118 (51.1)	3.1 (2.12-4.67)	3.2 (2.15-4.78)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	191 (61.6)	119 (38.4)	1.3 (0.92-2.07)	1.5 (0.98-2.37)
Not Married	111 (68.9)	50 (31.1)		
Size of the Household				
Large	108 (57.1)	81 (42.9)	1.6 (1.13-2.42)	1.7 (1.09-2.62)
Small	194 (68.8)	88 (31.2)		
Number of People per Bathroom				
High	72 (49.3)	74 (50.7)	2.4 (1.66-3.72)	2.3 (1.33-3.12)
Low	230 (70.8)	95 (29.2)		

* Adjusted for age, sex, social class and marital status

Table 15 Distribution of Level of Dental Plaque, according to Routines of Daily Activities, Flexibility of Daily Activities and Flexibility of Working Time Schedule in Sample.

Variable	Low Level of Dental Plaque ≤ 2 n (%)	High Level of Dental Plaque > 2 ≤ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Routines of Daily Activities				
High	44 (57.9)	32 (42.1)	1.4 (0.83-2.26)	1.1 (0.64-1.89)
Low	258 (65.3)	137 (34.7)		
Flexibility of Daily Activities				
Low	138 (53.1)	122 (46.9)	3.0 (2.04-4.60)	2.7 (1.77-4.14)
High	164 (77.7)	47 (22.3)		
Flexibility of Working Time Schedule				
Low	67 (46.2)	78 (53.8)	3.0 (2.00-4.51)	2 (1.24-3.26)
High	235 (72.1)	91 (27.9)		

* Adjusted for age, sex, social class and marital status

Table 16 Distribution of Level of Dental Plaque, according to Social Class, Marital Status and Flexibility of Daily Activities in Sample: 471 Adults.

Variable	Low Level of Dental Plaque ≤ 2 n (%)	High Level of Dental Plaque $>2 \leq 3$ n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	113 (48.9)	118 (51.1)	3.1 (2.12-4.67)	2.8 (1.89-4.29)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	191 (61.6)	119 (38.4)	1.3 (0.92-2.07)	1.4 (0.91-2.23)
Not Married	111 (68.9)	50 (31.1)		
Flexibility of Daily Activities				
Low	138 (53.1)	122 (46.9)	3 (2.04-4.60)	2.7 (1.77-4.14)
High	164 (77.7)	47 (22.3)		

* Adjusted for age, sex, social class, marital status and flexibility of daily activities

Table 17 Distribution of Level of Dental Plaque, according to Social Class, Marital Status, Size of Household and Flexibility of Daily Activities in Sample: 471 Adults.

Variable	Low Level of Dental Plaque ≤ 2 n (%)	High Level of Dental Plaque >2 ≤ 3 n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	113 (48.9)	118 (51.1)	3.1 (2.12-4.67)	2.8 (1.88-4.29)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	191 (61.6)	119 (38.4)	1.3 (0.92-2.07)	1.3 (0.86-2.13)
Not Married	111 (68.9)	50 (31.1)		
Size of the Household				
Large	108 (57.1)	81 (42.9)	1.6 (1.13-2.42)	1.6 (1.09-2.62)
Small	194 (68.8)	88 (31.2)		
Flexibility of Daily Activities				
Low	138 (53.1)	122 (46.9)	3 (2.04-4.60)	2.3 (1.33-3.12)
High	164 (77.7)	47 (22.3)		

* Adjusted for age, sex, social class, marital status and flexibility of daily activities

Table 18 Distribution of Level of Dental Plaque, according to Social Class, Marital Status, Number of People per Bathroom and Flexibility of Daily Activities in Sample: 471 Adults.

Variable	Low Level of Dental Plaque ≤ 2 n (%)	High Level of Dental Plaque $>2 \leq 3$ n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	113 (48.9)	118 (51.1)	3.1 (2.12-4.67)	2.5 (1.68-3.87)
High	56 (23.3)	184 (76.7)		
Marital Status				
Married	191 (61.6)	119 (38.4)	1.3 (0.92-2.07)	1.3 (0.84-2.09)
Not Married	111 (68.9)	50 (31.1)		
Number of People per Bathroom				
High	72 (49.3)	74 (50.7)	2.4 (1.66-3.72)	1.9 (1.22-2.95)
Low	230 (70.8)	95 (29.2)		
Flexibility of Daily Activities				
Low	138 (53.1)	122 (46.9)	3 (2.04-4.60)	2.6 (1.69-3.98)
High	164 (77.7)	47 (22.3)		

* Adjusted for age, sex, social class, marital status and flexibility of daily activities

Table 19 Distribution of Teeth with Gums Bleeding after probing, according to Social Class, Marital Status, Size of Household and Number of People per Bathroom in Sample: 471 Adults.

Variable	No Bleeding n (%)	Bleeding n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	33 (14.3)	198 (85.7)	3.5 (2.21-5.46)	3.5 (2.23-5.58)
High	88 (36.7)	152 (63.3)		
Marital Status				
Married	75 (24.2)	235 (75.8)	1.2 (0.82-1.93)	1.5 (0.96-2.44)
Not Married	46 (28.6)	115 (71.4)		
Size of the Household				
Large	43 (22.8)	146 (77.2)	1.3 (0.85-1.99)	1.3 (0.88-2.23)
Small	78 (27.7)	204 (72.3)		
Number of People per Bathroom				
High	26 (17.8)	120 (82.2)	1.9 (1.17-3.10)	1.5 (0.92-2.55)
Low	95 (29.2)	230 (70.8)		

* Adjusted for age, sex, social class and marital status

Table 20 Distribution of Teeth with Gums Bleeding after probing, According to Routines of Daily Activities, Flexibility of Daily Activities and Flexibility of Working Time Schedule in Sample: 471 Adults.

Variable	No Bleeding n (%)	Bleeding n (%)	Odds Ratio Unadjusted (95% C.I.)	Odds Ratio Adjusted* (95% C.I.)
Routines of Daily Activities				
High	21 (27.6)	55 (72.4)	0.9(0.51-1.54)	0.6(0.33-1.17)
Low	100 (25.3)	295 (74.7)		
Flex. of Daily Activities				
High	74 (35.1)	137 (64.9)	2.4(1.60-3.74)	2.3(1.31-3.18)
Low	47 (18.1)	213 (81.9)		
Flexibility of Working Time Schedule				
High	102 (31.3)	224 (68.9)	3.0(1.76-5.16)	1.7(0.97-3.19)
Low	19 (13.1)	126 (86.8)		

* Adjusted for Age, Sex and Social Class

Table 21 Distribution of Oral Hygiene Aids used, according to Social Class, Marital Status, Size of the Household and Number of People per Bathroom in Sample: 471 Adults.

Variable	Fewer Oral Hygiene Aids n (%)	More Oral Hygiene Aids n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Social Class				
Low	109 (47.2)	122 (52.8)	4.0 (2.62-6.04)	4.0 (2.68-6.25)
High	44 (18.3)	196 (81.7)		
Marital Status				
Married	106 (34.2)	204 (65.8)	1.2 (0.83-1.90)	1.3 (0.87-2.03)
Not Married	47 (29.2)	114 (70.8)		
Size of the Household				
Large	70 (37.0)	119 (63.0)	1.4 (0.95-2.08)	1.3 (0.88-2.08)
Small	83 (29.4)	119 (63.0)		
Number of People per Bathroom				
High	63 (41.2)	83 (26.1)	1.9 (1.32-2.98)	1.4 (0.96-2.31)
Low	90 (58.8)	235 (73.9)		

* Adjusted for age, sex, social class and marital status

Table 22 Distribution of Oral Hygiene Aids used, according to Routines of Daily Activities, Flexibility of Daily Activities and Flexibility of Working Time Schedule in Sample: 471 Adults.

Variable	Fewer Oral Hygiene Aids n (%)	More Oral Hygiene Aids n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Routines of Daily Activities				
High	32 (42.1)	44 (57.9)	1.6 (1.00-2.72)	1.3 (0.78-2.35)
Low	121 (30.6)	274 (69.4)		
Flexibility of Daily Activities				
Low	98 (37.7)	162 (62.3)	1.7 (1.15-2.55)	1.4 (0.92-2.17)
High	55 (26.1)	156 (73.9)		
Flexibility of Working Time Schedule				
Low	79 (54.5)	66 (45.5)	4.0 (2.69-6.19)	2.8 (1.75-4.51)
High	74 (22.7)	252 (77.3)		

* Adjusted for age, sex, social class and marital status

Table 23 Distribution of Level of Dental Plaque, according to Tooth Cleaning Frequency.

Variable Tooth Cleaning Frequency	Low Level of Dental Plaque n (%)	High Level of Dental Plaque n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Low	72 (48.0)	78 (52.0)	2.7 (1.83-4.09)	2.3 (1.46-3.41)
High	230 (71.7)	91 (28.3)		

* Adjusted for age, sex and social class

Table 24 Distribution of Oral of Oral Hygiene Aids used, according to Tooth Cleaning Frequency.

Variable Tooth Cleaning Frequency	Fewer Oral Hygiene Aids n (%)	More Oral Hygiene Aids n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Low	76 (50.7)	74 (49.3)	3.2 (2.16-4.90)	2.7 (1.75-4.18)
High	77 (24.0)	244 (76.0)		

* Adjusted for age, sex and social class

Table 25 Distribution of Level of Dental Plaque According to Oral Hygiene Aids Used in Sample: 471 Adults.

Variable	Low Level of Dental Plaque n (%)	High Level of Dental Plaque n (%)	Odds Ratio Unadjusted (95% CI)	Odds Ratio Adjusted* (95% CI)
Oral Hygiene Aids				
Fewer Oral Hygiene Aids	72 (47.1)	81 (52.9)	2.9 (1.97-4.39)	1.9(1.23-2.97)
More Oral Hygiene Aids	230 (72.3)	88 (27.7)		

* Adjusted for age, sex, social class and tooth cleaning frequency

Table 26 Relationship between Tooth Cleaning Behaviour and Explanatory Variables in Sample: 471 Adults.

Variable Tooth Cleaning Behaviour	Social Class	Marital Status	Routines of Daily Activities	Flexibility of Daily Activities	Flexibility of the Working Time Schedule	Size of the Household	Number of People per Bathroom
Pattern	***	*	***	**	***	*	*
Performance	***	*	*	***	***	**	***
Structure	***	*	*	*	***	*	*
Teeth with Gums Bleeding After Probing	***	*	*	***	*	*	*

* no relationship
 ** moderate relationship ($p < 0.05$)
 *** high relationship ($p < 0.01$)

CHAPTER 4
DISCUSSION AND CONCLUSION

4.1 Introduction

This programme of research set out to increase the understanding of the factors which influence the pattern of tooth cleaning, the use of oral hygiene aids and how well people clean their teeth. In particular, it aimed to assess previously unexplored associations between routines of daily activities, flexibility of daily activities and flexibility of the working time schedule, and tooth cleaning pattern, structure, performance and the outcome of performance (i.e, gums bleeding after probing).

4.2 Discussion

4.2.1 Tooth Cleaning Pattern

It is well known that social class affects tooth cleaning behaviour. Several studies reported the association of tooth cleaning frequency and social class, as well as the association of social class and tooth cleaning effectiveness (Murtooma, 1979; Honkala et al., 1981; Sheiham, 1969; Addy et al., 1990). However, despite the relationship between toothbrushing pattern and social class, the results in this programme of research provided strong evidence for a relationship existing between

routines of daily activities, flexibility of the working time schedule and flexibility of daily activities, and toothbrushing pattern.

There was a strong relationship between routines of daily activities and tooth cleaning pattern. This relationship remained after taking into account other well established demographic and socio-economic factors. Other studies have also linked health related behaviours to daily routines. Graham (1984) showed that for many people, on a day to day level, much health related behaviour exists at a routines level. Croucher (1989a, 1989b) postulated that Graham's finding could be applied to tooth cleaning pattern. In his study, tooth cleaning was part of routines which were placed in a sequence of activities, timings and location (Croucher, 1994). In addition, Croucher demonstrated that tooth cleaning pattern formed "a stable and tightly organized system", and had to be fitted into daily activities, where there are competing demands derived from different lifestyles.

Very little research has been conducted to assess the effects of daily routines and flexibility on health related behaviours, particularly tooth cleaning behaviour. Tooth cleaning behaviour has been associated with socialization, where the strongest influence is that of the mothers (Rayner and Cohen, 1971; Blinkhorn, 1976). As children grow up, their tooth cleaning behaviour is influenced more by peer groups (Hodge, 1982). The

importance of learning and forming health related behaviours at an early age has been illustrated in this study when subjects reported reverting to "old habits", after following the dentist's advice on tooth cleaning for a time. Subjects described this in the two following ways: "Cleaning your teeth is very much a matter of habit, you have old habits, they are difficult to change, you may change for a while, then you go back to your own way" and "When I have just come from the dentist, I do it the way he asked me to do, but after some days I go back to my old habit".

During the process of socialization, children learn and internalize forms of behaviour which become a habit. If this habit fits into their daily routines, it will be preserved for a long time. The results of the present research programme indicate that subjects who did not have high routines in carrying out their daily activities had higher tooth cleaning frequencies than those who had high routines. It might be suggested that those subjects who have a more routinized day are more likely to revert to their old pattern of tooth cleaning, after attempts to change to recommendations of the dental professionals. This highlights the importance of educating people in terms of oral hygiene practices at an early age.

The finding that subjects had different levels of routines in daily activities as well as presenting a variation in their tooth cleaning frequency, shows that the organization of everyday life plays an important

role in pattern of tooth cleaning behaviour. Health related behaviours are built into everyday activities in a routine way and tend to fall into predictable and relatively stable patterns (Hunt and Macleod, 1978; Hunt and Martin, 1988). This study suggests that what applies to other health related behaviours also applies to tooth cleaning behaviour.

There is little flexibility in the daily routines of many families (Cullen and Phelps, 1975; Graham, 1984), a finding corroborated by this research. In fact, flexibility, affected the pattern of tooth cleaning behaviour. Subjects who had low flexibility of daily activities had also lower frequency of tooth cleaning, as opposed to those who had high flexibility in daily activities and higher tooth cleaning frequency.

The present research programme has shown the link between social variables like routines of daily activities, flexibility of daily activities and tooth cleaning frequency. Cullen and Phelps (1975) have argued that the size of the household had an effect on the level of routines and flexibility of daily activities. In addition, Croucher (1989a) noted that, between family members, there was indirect negotiation in relation to priorities about access to taps and lavatories, when issues related to tooth cleaning were discussed. Therefore, here the effect of size of the household and number of people per bathroom on tooth cleaning pattern was measured. Although these two variables remained significant after controlling for

other factors associated with tooth cleaning pattern, such as sex and socio-economic status, their effect did not remain significant when adjusting for routines of daily activities and flexibility of daily activities. What matters in terms of tooth cleaning frequency is the level of routines and flexibility of daily activities. If the number of people per bathroom is high and the size of the household is larger but routines are low and flexibility is high, the frequency of tooth cleaning is not affected. This finding again highlights the importance of the level of routines and flexibility of daily activities on pattern of tooth cleaning.

As stated earlier, this study measured the effects of flexibility of the working time schedule on tooth cleaning behaviour. Considerable epidemiological research demonstrates an association between control over working time and health (Karasek at al., 1981; Marmot and Theorell, 1988). In terms of behaviour, there is a substantial body of evidence supporting the association between control over working time and smoking behaviour: the lower the control over working time, the higher the proportion of smokers (Marmot and Theorell, 1988). In addition, work control has been associated with dietary habits, where healthy diets are associated with higher control over working time, and unhealthy diets are associated with lower control over working time hours (Cooper, 1995).

The present research was a case study on behaviour, namely tooth cleaning behaviour, which could lead to disease, done on a smaller population than the studies mentioned above. Nevertheless similar results have emerged. Flexibility of working time schedule was highly associated with tooth cleaning pattern. Subjects with high flexibility of working time schedule had higher tooth cleaning frequency, when compared to those who had low flexibility of working time schedule and lower tooth cleaning frequency.

4.2.2 Performance of Tooth Cleaning Behaviour

The highly significant association between flexibility of daily activities and performance of tooth cleaning suggested that flexibility of daily activities is an important determinant of how well people clean their teeth. As pointed out before, on a day to day level, there is little flexibility in the activities of many people (Cullen and Phelps, 1975; Graham, 1984). There are different levels of flexibility in people's daily activities, and these levels clearly affected tooth cleaning performance. People who recorded a high level of flexibility in daily activities had a better cleaning performance (as measured by levels of dental plaque) than those who had a low level of flexibility. Routines of daily activities was not associated with tooth cleaning performance, possibly because of the

high correlations between routines and tooth cleaning pattern and between the two explanatory variables, namely, tooth cleaning pattern and performance.

The impact of situational factors (like marital status or living in smaller or larger households) on routines and flexibility of daily activities has been described by Cullen and Phelps (1975). In this study, size of the household and number of people per bathroom were significantly associated with tooth cleaning performance, even if the daily activities were flexible and the level of routines were low. If the size of the household is larger or the number of people per bathroom is higher, tooth cleaning frequency is not affected, but the cleaning performance is worse.

There are different definitions of tooth cleaning pattern (Croucher 1989a). Tooth cleaning pattern was classified into: a "tooth cleaning event", a "structured event", a "proper clean" and a "quick scrub". A tooth cleaning event was described as any occasion when the teeth are cleaned. A structured event was described as a social event which is organised according to rules prescribing time, place and sequence. According to Croucher (1989a), if teeth are cleaned as part of the structured event, then a "proper clean" occurs. A "quick scrub" was an unstructured tooth cleaning, where there are no rules of sequencing and no rules to prescribe which items appear together.

Considering that there was a high relationship between number of people per bathroom and cleaning performance, and no relationship between number of people per bathroom and tooth cleaning pattern, some of the definitions of tooth cleaning pattern described can be identified in this study. It seems that subjects living in households where the number of people per bathroom is low are more likely to have more "proper clean", resulting in better cleaning performance. On the other hand, those who live in households where the number of people per bathroom is high are more likely to have more "quick scrubs", which are less effective in removing plaque.

Cullen and Phelps (1975) claim that small households are less difficult to manage, generate less time-consuming domestic routines, and increase the flexibility of the lifestyles of their members. On the other hand, in larger households, routines are more rigid and inflexible. Croucher (1989b) described the constraints of situational factors on following dental advice on oral hygiene practices to improve performance. This study supports and enlarges on these findings. Occupants of smaller households had better cleaning performance than those of larger households. In addition, occupying households where the number of people per bathroom is low had better cleaning performance

than those living in households where the number of people per bathroom is high.

When the flexibility of daily activities is high, it does not matter whether people are single or married, as regards tooth cleaning performance. Although there was an association between marital status and tooth cleaning performance, it did not persist, when controlled for flexibility of daily activities. The important determinant of cleaning performance is the level of flexibility of daily activities.

As for tooth cleaning pattern, flexibility of working time schedule was an important determinant of tooth cleaning performance. Those who have more flexible working hours cleaned their teeth more frequently and effectively.

Frandsen (1986) emphasized the importance of understanding the conditions which determine individual tooth cleaning performance. Croucher (1989b) showed that there is a "Performance Gap". Why is there a "Performance Gap"? The results of this research suggest that it is because some people have low flexibility in their daily activities, low flexibility of working time schedule, live in larger households and share a bathroom with a larger number of people.

4.2.3 The Outcome of Tooth Cleaning Performance (Gums

Bleeding after Probing)

Tooth cleaning performance affects the number of teeth with gums that bleed on probing. Therefore it was not surprising to find that the flexibility of daily activities was significantly associated with teeth with gums bleeding on probing. This is a finding consistent with the other measured dimensions of tooth cleaning behaviour, namely pattern and performance. It suggests that flexibility of daily activities is an important indicator of tooth cleaning behaviour, as the association remained after taking into consideration known risk-related factors, such as sex, age and socio-economic status.

Despite the difference in the number of teeth with gums bleeding on probing in subjects with high and low flexibility of working time schedule, the association was not statistically significant. Marcenes (1990), using a composite measurement of periodontal diseases, reported similar findings. Moreover, there was no significant association between routines of daily activities, size of the household, number of people per bathroom and teeth with gums bleeding after probing. The lack of association may be explained by the presence of uncontrolled factors, such as calculus, defective dental restorations, prosthetic appliances and

tobacco smoking (Sheiham, 1988, 1991), which may affect gums bleeding.

In addition to flexibility of daily activities, a significant association between gums bleeding after probing and social class was found. This finding corroborated previous research which has reported a significant relationship between social class and periodontal diseases (Sheiham, 1969; Cushing and Sheiham, 1985; Petersen, 1990).

4.2.4 Structure of Tooth Cleaning Behaviour

An important new finding reported here was the highly significant relationship between flexibility of the working time schedule and tooth cleaning structure. Flexibility of the working time schedule was the most important variable to explain the variation of use of dental floss among the population, when compared with other established risk-related factors, such as socio-economic status and sex. It is apparent that people flossed at work, and that the flexibility of the working hours is determining the structure of tooth cleaning behaviour.

It is well known that the use of dental floss varies with demographic factors and socio-economic status (Gift, 1986; Todd and Lader, 1991). Women and persons from upper socio-economic status are more likely to use dental floss. This is a finding supported by the present

study, where women and subjects from higher social classes were more likely to use dental floss than men and subjects from lower social class.

4.2.5 Tooth Cleaning Pattern and Performance, and Tooth Cleaning Pattern and Structure

Several epidemiological studies have demonstrated that less plaque occurs as toothbrushing frequency increases (Lang et al., 1973; Ainamo and Parvainen, 1973; Lavstedt et al., 1982). However, some studies have shown that amount of plaque and brushing frequency were not clearly correlated (Nyyssonen and Honkala, 1984b; Honkala et al., 1986). Some authors have emphasized the length of time spent on toothbrushing as more closely related to the effectiveness of plaque removal than frequency (Nyyssonen and Honkala, 1984b; Honkala et al., 1986; Honkala, 1993). In addition, Frandsen (1986) concluded that there were no significant gains to be achieved in terms of plaque removal, by an increase of toothbrushing beyond twice a day.

In the present study, there was a highly significant association between tooth cleaning pattern and performance, supporting the findings that less plaque occurs as toothbrushing increases. Moreover, there was a highly significant relationship between tooth cleaning pattern and structure. The use of dental floss was estimated to increase almost

threefold for people who had higher tooth cleaning frequency, compared to those who had lower tooth cleaning frequency.

4.2.6 Tooth Cleaning Performance and Structure

Findings on the relationship between the use of dental floss and level of dental plaque have not been consistent. Studies on use of dental floss and plaque removal found no additional benefits of flossing and brushing over brushing alone (Frandsen, 1986). However, from some studies significant association has emerged between flossing, in addition to brushing, and amount of plaque (Lobene et al., 1982; Lang et al., 1994).

Because toothbrushing does not clean interproximal areas effectively, the recommendation on interdental cleaning is that "the use of dental floss, sticks and similar aids is clearly of value in individual cases and should be a fundamental part of personal oral hygiene" (Levine 1991; Honkala, 1993). This recommendation was supported by the findings of this study, which noted a strong association between tooth cleaning structure and cleaning performance. This association remained after entering social class and toothbrushing frequency into the model. Subjects who used more oral hygiene aids to clean their teeth had better cleaning performance compared to those who used less oral hygiene aids. This

finding supports the recommendation to use dental floss as part of oral hygiene.

4.3 Conclusion

4.3.1 Pattern, Structure and Performance

The main conclusion of the present research programme is that its results provided strong evidence to support the hypothesis that people who have a less routinized and more flexible day, as well as a more flexible working time schedule, have higher tooth cleaning frequency than those who have a less flexible and more routinized day, and have less control over their working time schedule. In addition, there is evidence to substantiate the hypothesis that people who have a more flexible day and have more control over their working time schedule clean their teeth more effectively than those who have a less flexible day and lower control over their working time schedule. Moreover, the findings reported here also sustain the hypothesis that people who have a more flexible working day use more oral hygiene items to clean their teeth, compared to those who have less flexibility in their working time schedule. There is also strong indication that subjects whose daily activities are more flexible have fewer

teeth with gums bleeding on probing, as opposed to those who have less flexibility in daily activities, who have more teeth with gums bleeding after probing.

It was also concluded that:

- 1) social class was highly associated with tooth cleaning pattern. People of high social class had higher tooth cleaning frequency than those of low social class,
- 2) tooth cleaning pattern was not associated with marital status, size of the household and number of people per bathroom,
- 3) living in smaller households was associated with cleaning the teeth more effectively and living in larger households was associated with cleaning the teeth less effectively,
- 4) number of people per bathroom was highly associated with tooth cleaning performance. Sharing a bathroom with a larger number of people was associated with worse cleaning performance, whilst sharing a bathroom with fewer people was associated with better cleaning performance,
- 5) the relationship between social class and cleaning effectiveness was very high. Belonging to high social class was associated with cleaning the teeth more effectively, whilst belonging to low social class was associated with cleaning the teeth less effectively,
- 6) level of routines of daily activities and marital status were not associated with tooth cleaning performance,

7) social class was associated with the use of oral hygiene aids. Belonging to higher social class was associated with more oral hygiene aids, whilst belonging to lower social class was associated with fewer oral hygiene aids,

8) the level of routines of daily activities, the flexibility of daily activities, the size of the household, and the number of people per bathroom were not associated with the use of oral hygiene aids,

9) the association between social class and teeth with gums bleeding was highly significant. Belonging to a high social class was associated with having fewer teeth with gums bleeding after probing, whilst low social class people had more teeth with gums bleeding after probing,

10) tooth cleaning pattern was highly associated with cleaning performance. Subjects who had higher tooth cleaning frequency had better cleaning performance than those who had lower tooth cleaning frequency,

11) tooth cleaning pattern was highly associated with tooth cleaning structure. People who had higher tooth cleaning frequency were more likely to use more oral hygiene aids than those who had lower tooth cleaning frequency, and

12) tooth cleaning structure was highly associated with cleaning performance. Subjects who used more oral hygiene aids cleaned their teeth more effectively than those who used less oral hygiene aids.

4.3.2 Implications for Dental Health Education

The present study is the first in linking routines and flexibility of daily activities, as well as the flexibility of the working time schedule to tooth cleaning behaviour. The results showed the importance of these variables on tooth cleaning behaviour. Therefore, they should be taken into consideration by health educators when planning dental health education.

Clearly, the level of routines and flexibility of people's day, as well as the control they have over their working time, depends on a wider social context, which cannot be easily altered. Bearing this in mind, it is the task of health educators and health professionals to reduce these constraints by making dental health behaviour easier. There are practical ways to do this. The scrub technique of toothbrushing is effective in plaque removal and easier to carry out. For this reason it should be the method of choice (Levine, 1991). It has also been proved as the most popular method of toothbrushing. This might demonstrate that the public wants a simple, quick and effective way of cleaning their teeth. However, some dental health professionals still recommend the roll method and other more complicated techniques which are generally difficult to follow and are not carried out effectively, resulting in poorer tooth cleaning performance. In fact, it is the task of health educators and dental health

professionals to respond to increased evidence of the fact that the public cannot be expected to carry out difficult and time consuming recommended oral hygiene methods.

4.3.3 Implications for Further Research

The present study was a case study on dental health behaviour. Further research could investigate the relationships found in this study in other population groups, as well as exploring how these variables affect other health behaviours.

APPENDICES

APPENDIX 1

Pre-Pilot Study Number 1

1. Introduction

This pre-pilot study had an exploratory character. The main purpose for carrying it out was to develop ideas which would help in the conceptualization of the research problem.

Several studies on the reasons and motivations for cleaning the teeth are reported in the literature. However, few of these focus in depth on the reasons why people clean their teeth well or badly. This pilot study aimed to explore this issue and other issues related to tooth cleaning behaviour. In addition, it also aimed to explore the concepts of pattern and structure described by Croucher (1989a,b).

A research instrument was developed based mainly on the "Performance Gap", a study carried out by Croucher (1989b), and on the "Adult Survey - Adult Dental Health" (Todd and Lader, 1991). The final content of the research instrument were 26 questions, covering topics related to oral health behaviour.

A group of 21 Brazilian and Portuguese adults, living in London and Oxford, were informally interviewed over a period of two months. The structured interviews were held at subjects' houses or their working places. All interviews were tape recorded and took an average of 20 to 30 minutes.

2. Description of the Data Collected

All dentate adults were asked whether they clean their teeth, when they clean them and the reasons for doing so at a certain time of the day. All of the people interviewed responded affirmatively that they clean their teeth, and they said that this is a part of daily routines: something which is done automatically, without thinking. It was described as part of an habit, performed since early childhood. As one respondent said: "It's part of my daily routines, it's part of my body hygiene. You grew up with the idea of having a shower, combing your hair and cleaning your teeth".

Morning and evening were the times of the day people were more likely to clean their teeth. Morning brushing was more associated with the idea of cleanliness, whilst evening brushing was described as a time when teeth had to be cleaned, because they could decay. Subjects reported limits of time and tiredness as intervening in their tooth cleaning behaviour.

All the interviewees looked after their teeth by brushing them more than once a day. Of the 21 dentate adults that were interviewed, 18 claimed to clean their teeth twice or more a day. Women were more likely than men to say they cleaned their teeth more than twice a day.

The most common time of the day for them to clean their teeth was before going to bed. Twenty persons, out of the 21 actually interviewed, said that they cleaned their teeth in the evening. Sixteen people said that they cleaned them in the morning. Half of them mentioned cleaning their teeth before breakfast and the other, half after breakfast.

Subjects were asked whether they had a particular way of cleaning their teeth. The majority said that they have their own way, which is used every time tooth cleaning is performed.

When people were invited to describe the way they cleaned their teeth, usually they said that up and down was done in addition to their "own way" of cleaning. One subject described it in the following way: "I know that cleaning up and down is the correct way, but sometimes I am in a hurry or too tired, and I just clean in my own way."

Respondents said that they set themselves a certain standard when they were cleaning their teeth. Reaching this standard gave them a feeling of cleanliness and a perception of well-being.

Respondents were requested to describe a situation when they might not clean their teeth as well as they normally do. Some people mentioned tiredness, anything that changes the routine, coming back late from a party, being on holidays, or being depressed. Asked about what reasons that would make people change the way they cleaned their teeth, they

informed that, if they were given a very good reason to change, they would do so if they had more time, and if they changed their life-style to a more flexible one.

On being asked what time of the day they spent longest cleaning their teeth, the majority answered that it was in the evening. At this time, as well as spending more time in tooth cleaning, they also said to be more likely to use aids in addition to brush and toothpaste for their oral hygiene.

The most common oral hygiene aid was dental floss or tape. A few mentioned using a mouthwash. The majority of the people regarded dental floss and mouthwash as items which were not always included in their daily routines of mouth cleaning.

All of the dentate adults who were interviewed mentioned using brush and toothpaste in the morning and evening to clean their teeth.

3. Conclusions

From the data collected, a pattern of tooth cleaning was identified. As well as pattern, there was a structure in tooth cleaning behaviour. The

identification of pattern and structure in tooth cleaning, the identification of tooth cleaning as part of daily routines, and the discussion of reasons that are interfering in people's tooth cleaning behaviour provided an important tool for further investigations into the issues underlying these practices.

APPENDIX 2

Pre-Pilot Study Number 2

1 Introduction

This exploratory pilot study was carried out in Porto Alegre, Brazil. Forty one people were interviewed as regards their daily routines, their tooth cleaning behaviour, other health related behaviours and related questions.

The pilot study was conducted over a period of two months, February-March 1992. The chief purpose here was to explore people's daily routines and to see how tooth cleaning behaviour was incorporated into this routine. The objective was to gather people's views on tooth cleaning and to raise questions that would be useful for the main study. A questionnaire was designed based mainly on the following studies: "The Performance Gap" (Croucher, 1989b); "Understanding and Predicting Toothbrushing Behaviour in Adolescents" (Bateman, 1985); and "Health Survey - Whitehall II study" (Marmot et al., 1991).

The final content of the research instrument was 46 questions, of which 16 were open ended, and 30 were close ended questions. Fifty individuals from different social classes and sex, aged eighteen and older, were invited to take part in the project. Of those 50 contacted, 41 agreed to participate. There were 20 women, with the following occupations: seven were civil-servants with high level of education (had a University

degree), seven were shop assistants with medium level of education (completed secondary school), and six were of working-class with low level of education (primary school). Of the 21 men who took part in the study, seven were civil servants with high level of education, seven were shop-assistants with medium level of education, and seven were working class people, with low level of education (primary school).

People were approached in their work places, and were given a brief explanation of the research. Subsequently, interviews were conducted and recorded. The interviews took an average of 15 to 20 minutes.

2 Results and Conclusions

2.1 The structure of the day

Civil servants on average wake-up at 8:00 a.m., and work on average seven and a half hours per day. They start their working day at 9:00 a.m.

Shop-assistants wake-up on average 7:00 a.m., work on average eight and half hours per day, and start their working day at 8:30.

Working-class people wake-up on average at 6:00 a.m., work on average 8:45 per day, and start their working day at 8:00 a.m.

When people were asked how easy it would be for them to do an activity which they usually do not do, during their working day the answer given was as follows:

- 1) quite easy: 47%,
- 2) not very easy: 29%, and
- 3) not at all easy: 24%.

This means that 53% of the respondents felt that it is not easy to include an extra activity into their daily working day. In addition, the majority mentioned their job, and being at work on time as the most important activities of their day.

Civil servants were more likely to say that it would be quite easy to fit in an extra activity with the other usual activities of their working days.

2.2 Control over the daily work of the respondents

The following figures describe the degree of control of the respondents over their working days:

- 1) 41.5% did not have a flexible working time. The answer was never/almost never,

- 2) 36.6% answered that sometimes they had a flexible working time, and just 9.8% said that it was often,
- 3) 48.8% almost never can take their holidays more or less when they wish, and 29.3% can do it often,
- 4) 39% felt that they can plan parts of their daily work,
- 5) 34% felt that their job does not allow them to plan their daily work, and
- 6) 26.8% felt that their job allows them to plan most of their daily work.

When considering control over the working day, civil servants and shop-assistants were more likely to say that they can plan part of their daily work.

Of the 26.8% who said that they can plan most of their daily work, the majority were civil servants. And of the 34% who said that they cannot plan their daily work the majority were manual workers.

2.3 General cleanliness, patterns of eating and exercises

A high proportion of the respondents (73.2%) said that it was essential for them to have a clean house, and the majority (53.7%) also said that it was highly necessary for them to have things in their house in a certain order, displayed in a certain way.

More than half of the interviewees (53.7%) did not regularly do exercises. 73.2% had fixed times to have lunch, and 51.2% had fixed times to have breakfast.

A very high proportion of people (87.8%) said that it was very important for them to have a shower every day. Morning and evening were the most common times.

2.4 Dental hygiene

70.7% of the respondents claimed to clean their teeth three times per day. 26.8% did it twice a day, and only 2.5% clean their teeth once a day. Times of the day when people were more likely to clean their teeth were as follows:

- 1) morning: before breakfast (68.3%), after breakfast (34.1%),
- 2) lunch: after lunch (68.3%),
- 3) dinner: after dinner (56.1%), and
- 4) last thing at night: (40.8%).

The two most common reasons mentioned for tooth cleaning were to avoid dental decay and to freshen up breath and mouth, followed by the wish to prevent staining of teeth and to have a nice smile. The reason least often mentioned was to avoid gum bleeding.

All respondents were asked how long their tooth cleaning takes. On average, the answer was two minutes. There was a consensus among people that it is difficult to say how long tooth cleaning takes.

All the interviewees reported using toothbrush and toothpaste every time tooth cleaning was performed. The most common oral hygiene aid mentioned was dental floss, as a high proportion (61.0%) claimed to use it. A few (7.3%) said they use mouthwash for their oral hygiene. The majority of people regarded dental floss and mouthwash as items which were not always included in their daily tooth cleaning. Reasons given for not using dental floss every day were finance and difficulty to add a new item to an established habit. When mentioning mouthwash most people said they do not believe that mouthwash would improve their oral hygiene. In addition, financial constraints, and difficulty to add a new item to their mouth cleaning were mentioned.

All dentate adults were asked if they had ever forgotten to clean their teeth. The most common answers were: seldom (39%) and very rarely (34%). Some people described their forgetfulness in the following way: "If I forget to clean my teeth in the morning, I certainly will clean them after lunch, because I start to feel a bad taste in my mouth." Others said that it happened in the evening: "It is difficult, you know, working

from 8 a.m. to 6 p.m., and then going to school. I arrive at home around midnight, I just feel very tired and go straight to bed."

Overall, the majority claimed that they had never spent a whole day without cleaning their teeth. The 41 interviewees were asked if there was anything which limits the amount of time they can spend on their tooth cleaning. Limits of time were frequently mentioned, mainly in the morning. As one individual said: "I always wake-up later than I should, then I have to rush, to have a shower, clean my teeth, get dressed and catch the bus. Sometimes, I do not have time to have breakfast." Another mentioned that "It is the way that life is, I feel like always being in a hurry, I think that I do not have enough discipline".

In the evening, the most common reason cited was tiredness, although many people reported to spend more time cleaning their teeth in the evening than in the morning. One of the respondents made the point that the limit of time is made by the habit itself. As he said: "The limit of time is made by the habit, I am used to do it in a certain way and I do it quickly, without thinking, sometimes I can think about what I am doing, then I try to spend more time and to do it better". One woman said that around the time tooth cleaning is performed, she is always busy: "It is a busy time; in the morning I have to wake-up too early, I have all my hygiene matters to do, and preparing breakfast, doing the washing-up,

and running not to miss the bus. Lunch-time is short, and in the evening I arrive late at home, and I have lots of things to do, household jobs like cooking, ironing."

The majority of the respondents (87.8%) mentioned their mother as the person who first told them to clean their teeth. When dentate adults were asked if they had ever been given a demonstration of tooth cleaning, the majority answered yes (87.8%).

A strong association between tooth cleaning and hygiene, as well as grooming was found. 73.2% reported cleaning their teeth around the time they shower, and 75.6% reported cleaning their teeth around the time they are washing their face and brushing their hair.

A mixture of health related and health directed reasons were identified as an explanation for tooth cleaning. The beliefs that cleaning the teeth will give one fresh breath and will make one feel clean was held by the majority of the people (92.7%). In addition, they also held the beliefs that cleaning the teeth will help to avoid dental decay, and to avoid gingival problems. 90.3% mentioned the former, while 85.3%, mentioned the latter. 70.7% regarded evening time as the most important: "... in the morning you have just get up... but in the evening I think that's when they could decay... if you have been eating all day".

The idea that tooth cleaning is part of daily routines, "something that you do automatically", was confirmed by almost all the interviewees (95.1%). Three quarters mentioned lifestyle as a constraint, reducing cleaning effectiveness.

Respondents were asked if they had a particular way of cleaning their teeth. The majority answered that they feel that they have their own way of cleaning their teeth, a way that is used every time tooth cleaning is performed. Changing their particular approach was seen as something difficult. It would require concentration, implying more time expenditure. Some subjects reported that they were given advice about their tooth cleaning method and dental floss use by the dentist. That advice was described as something followed just for a few weeks after the visit to the dentist, then they went back to their old habits.

As one man said: "Last time I went to the dentist she gave me many instructions on how to brush my teeth and how to use dental floss. I did it for some days, then I went back to the way I always did it, it's the habit, it's stronger. Anyway, I did not take her very seriously, I think dentists ask you to do too many things".

If changes on tooth cleaning were reported by the respondents, they were described as something that was integrated into an old habit. An example was given by one of the interviewees: "I always brushed my

teeth doing horizontal movements, then the dentist ask me to brush them up and down, now my brushing is a mixture of the two."

The majority of the interviewees described adolescence as the time when changes in tooth cleaning had happened. People described it as the time when they started to pay more attention to their teeth. Some said that it happened because they wanted to look clean and attractive, others said that it was because they started to pay more attention to their whole appearance.

Overall, people described themselves as satisfied with their tooth cleaning. They did not feel that there was any reason to change the way they were cleaning their teeth.

In conclusion, people's general attitudes towards tooth cleaning were positive. Some results of this investigation confirm findings in relation to tooth cleaning behaviour already mentioned in the literature. In addition, they provide us with important information that will be useful when assessing the hypothesis under scrutiny.

APPENDIX 3

Pre-Pilot Study Number 1

Questionnaires

3.1 Questionnaire in English

3.2 Questionnaire in Portuguese

3.1 Questionnaire in English

Subject number:

Sex:

Age:

Occupation:

1) Just to start off, could you please tell me, if you have some of your natural teeth?

About how many do you have?

2) Have you had toothache at all in the last four weeks?

3) Do you think any of your teeth are decayed at the moment?

some decayed

not decayed

do not know

4) Have your gums bled at all in the last four weeks, for example when you brush them?

Now, I would like to talk about your tooth cleaning.

5) Thinking back over all that happened yesterday and all the things you did from when you first got up until you went to bed last night, out of all the things you did, which are the most important in the sense of having to be done at a fixed time or place around which your day was organized, for example getting to work on time, watching a TV programme, collecting the children from school. Thinking back over yesterday, did you clean your teeth? When did you clean your teeth?

6) Was that the usual time you clean your teeth? Why is that?

() part of a particular routine

() something you do on the spur of the moment

() something to fill in time

6.1 I am interested in this. Can you say why cleaning your teeth was done as routine?

6.2 How long does this routine take?

6.3 Are there any circumstances which suggest this routine has to be done at this particular time in the day?

6.4 Is there anything which limits the amount of time you can spend on this routine?

6.5 If yes, have you ever tried to do anything about this, I am thinking of things like, for example, put other things elsewhere, extend it at all?

6.6 If yes, what?

6.7 With what success?

6.8 If no, why not?

7) Just to check, could you tell me what you do to look after your teeth and gums?

8) Would you say that you have a particular way of cleaning your teeth?

9) Can you describe it to me? How long do you think it takes?

10) Is it important that you keep to this way of cleaning your teeth? Why do you think it is important/not important?

11) Have you always had this way of cleaning your teeth?

12) What sort of things would make you change the way you clean your teeth?

13) Can you describe a situation where you might omit to clean your teeth as well as you normally do?

14) Could you tell me what items you use to clean your teeth?

15) If not, can you describe a situation where you might omit one of the items?

16) Do you set yourself a certain standard when you are cleaning your teeth?

17) If yes, how do you feel when you have got your mouth to your usual standard?

18) How do you feel when you have not got your mouth up to the usual standard?

19) What sort of things would make you change your standards?

20) Just to finish, could you tell me if a dentist or any of the dental staff has demonstrated to you how to clean your teeth?

Thank you for your collaboration.

3.2 Questionnaire in Portuguese

Entrevistado número:

Sexo:

Idade:

Profissão:

1) Para iniciarmos a entrevista, por favor, você poderia responder-me se possui pelo menos alguns de seus dentes naturais? Mais ou menos quantos você possui?

2) Você sentiu dor de dente nas últimas quatro semanas?

3) Você acha que algum dos seus dentes, está cariado neste momento?

algum cariado

nenhum cariado

não sei

4) Você teve sangramento gengival nas últimas quatro semanas, por exemplo, quando estava limpando suas gengivas?

Agora, eu gostaria de falar sobre sua limpeza dos dentes.

5) Relembrando o que aconteceu ontem, e todas as coisas que você fez, desde que levantou, até a hora de ir dormir, quais são as mais importantes, no sentido de terem que ser feitas na hora certa ou no local certo. Fale sobre como seu tempo foi organizado: por exemplo, chegar ao trabalho na hora certa, assistir a algum programa na televisão, buscar as

crianças na escola. Relembrando estas coisas, você limpou seus dentes?
quando você limpou seus dentes?

6) Esta é a hora em que você usualmente lava seus dentes? Por que isto é assim?

- faz parte de uma determinada rotina
- algo que você faz na pressa do momento
- algo que você faz para preencher seu tempo

6.1 Eu estou interessada nisto. Você poderia explicar por que limpar seus dentes foi feito como parte da rotina, quanto tempo esta rotina leva?

6.2 Existe alguma circunstância sugerindo que esta rotina precisa ser feita numa determinada hora do dia?

6.3 Existe alguma coisa, algum motivo, que limita o tempo que você pode gastar nesta rotina?

6.4 Se sua resposta é sim, você já tentou fazer algo a respeito disso?
Estou pensando em, por exemplo, deixar de fazer outras coisas, e gastar mais tempo nesta rotina de limpar os dentes.

6.5 Se a sua resposta é sim, o que você tentou?

6.6 Com que sucesso?

6.7 Se não, por que não?

7) Você poderia me dizer, o que faz para cuidar de seus dentes e gengivas?

8) Você diria que possui um jeito particular para limpar seus dentes?

- 9) Voce poderia descrever esse jeito para mim? Quanto tempo voce acha que leva para limpar seus dentes?
- 10) E importante para você manter sempre este mesmo jeito de limpar seus dentes? Por que você pensa que é importante/ nao é importante?
- 11) Você sempre teve esta técnica para limpar seus dentes?
- 12) Que razoes, poderiam fazer você mudar sua técnica de limpar seus dentes?
- 13) Você poderia descrever uma situação, na qual você não escova seus dentes tao bem, como usualmente escova?
- 14) Que objetos você usa para limpar seus dentes?
- 15) Você poderia descrever uma situação em que você não usa algum dos objetos descritos acima?
- 16) Você se estabelece um certo critério quando escova seus dentes?
- 17) Se a sua resposta é sim, como você se sente quando sua boca esta limpa, de acordo com seu criterio de limpeza?
- 18) Como você se sente quando sua boca não está limpa, de acordo com seu critério de limpeza?
- 19) Que razões poderiam fazer você mudar seu critério de limpeza, quando limpa seus dentes?
- 20) Para finalizar, você poderia dizer-me se alguma vez o dentista ou o auxiliar odontologico mostrou para você como limpar os dentes?

APPENDIX 4

Pre-Pilot Study Number 2

Questionnaires

4.1 Questionnaire in English

4.2 Questionnaire in Portuguese

4.1 Questionnaire in English

Q.1 What time of day do you normally wake up?

Q.2 How many hours per week do you normally work?

Q.3 What time of day do you normally start working?

Q.4 How do you normally travel to work?

- bus
- car
- bicycle
- motorbike
- walk
- others

Q.5 Do you have a fixed time to have:

1) breakfast

- yes
- no

2) lunch

- yes
- no

3) dinner

- yes
- no

Q.6 Which of the following household jobs do you normally do each day?

- cleaning
- cooking
- washing up

- laundry
- ironing
- child care
- maintenance of house

Q.7 Do you regularly take some kind of exercise, for example gym, jogging, walking, playing football, tennis?

- yes
- no

If yes, how many times per week?

Q.8 If you had to do an activity that you usually don't do, for example taking your car to a garage, taking the children to the doctor, do you think that it would be easy for you to arrange or to fit in this activity with the other usual activities of the day?

- yes
- no

How easy would it be?

- very easy
- quite easy
- not very easy
- not at all easy

Why?

Q.9 Do you think that you have control over the days work? Why?

- yes
- no

Q.10 The following statements are about your work. For each please circle the answer that best describes your job.

1) My working time can be flexible

- often
- sometimes
- seldom
- never/almost never

2) I can take my holidays more or less when I wish

- often
- sometimes
- seldom
- never/almost never

3) I can decide when to take a break

- often
- sometimes
- seldom
- never/almost never

4) I have a choice in deciding how to do my work

- often
- sometimes
- seldom
- never/almost never

5) I have a choice in deciding what I do at work

- often
- sometimes
- seldom
- never/almost never

Q.11 Which of the following statements concerning your work is most true?

Please tick one box only

- my job allows me to design or plan most of my daily work
- my job allows me to design or plan parts of my daily work
- my job does not really allow me to design or plan my daily work

Q.12 Think back over what happened yesterday and all the things you did from when you first got up in the morning until you went to bed last night. Out of all the things you did, which were the two or three activities *around which other activities had to be organized or fitted in?* (Prompt if necessary with examples - getting to work on time, collecting children from the school, watching T.V. programme, shopping, meeting friends, going to the cinema, cooking a meal, etc.).

Q.13 Now which of these that you have mentioned (repeat them) did you find most difficult *to arrange or fit in with other activities?*

Q.14 Is it important for you to have a clean house? How important?

- very important
- important
- not important
- can't say

Q.15 Is it important for you to have things in your house in a certain order, to be displayed in a certain way? How important?

- very important
- important
- not important
- can't say

Q.16 Do you like eating always at the same time?

Q.17 How does it vary on week-ends?

Q.18 Is it important for you to have a shower every day? How important?

- very important
- important
- not important
- can't say

Q.19 Do you like having your shower at a certain time of the day? What time?

Q.20 Around the time you shower, what else do you do? for example, do you clean your teeth?

- yes
- no

Q.21 Around the time you are brushing your hair or washing your face, what else do you do for example, do you clean your teeth?

- yes
- no

Q.22 If you clean your teeth, place a circle around the answer that best tells how often you clean them.

- three or more times a day
- two times a day
- once a day
- less than once a day

Q.23 If you clean your teeth, at what times of the day do you usually do it?

- before breakfast
- after breakfast

- after lunch
- after evening meal
- after snacks
- last thing at night
- when going out
- occasionally

Q.24 How strongly do you agree with the following statements?

1) Cleaning your teeth in the morning will give you fresh breath

- strongly agree
- agree
- disagree
- strongly disagree

2) Cleaning your teeth in the morning will make you feel clean

- strongly agree
- agree
- disagree
- strongly disagree

3) Cleaning your teeth in the morning will make you look clean

- strongly agree
- agree
- disagree
- strongly disagree

4) Cleaning your teeth in the morning will make you attractive

- strongly agree
- agree
- disagree
- strongly disagree

5) Cleaning your teeth in the morning will help you avoid needing dental treatment

- strongly agree
- agree
- disagree
- strongly disagree

6) Cleaning your teeth in the morning will help you avoid gingival problems

- strongly agree
- agree
- disagree
- strongly disagree

7) Cleaning your teeth in the morning will help you to avoid dental decay

- strongly agree
- agree
- disagree
- strongly disagree

8) Cleaning your teeth in the evening will give you fresh breath

- strongly agree
- agree
- disagree
- strongly disagree

9) Cleaning your teeth in the evening will make you feel clean

- strongly agree
- agree
- disagree
- strongly disagree

10) Cleaning your teeth in the evening will make you look clean

- strongly agree
- agree
- disagree
- strongly disagree

11) Cleaning your teeth in the evening will make you attractive

- strongly agree
- agree
- disagree
- strongly disagree

12) Cleaning your teeth in the evening will help you avoid needing dental treatment

- strongly agree
- agree
- disagree
- strongly disagree

13) Cleaning your teeth in the evening will help you avoid gingival problems

- strongly agree
- agree
- disagree
- strongly disagree

14) Cleaning your teeth in the evening will help you to avoid dental decay

- strongly agree
- agree
- disagree
- strongly disagree

Q.25 If you answered that you clean your teeth, how long does it take?

Q.26 Is there anything which limits the amount of time you can spend on your tooth cleaning?

Q.27 Around the time you are cleaning your teeth, which other activities do you usually do?

Q.28 Have you ever forgotten to clean your teeth? How often?

- often
- very often
- seldom
- very rarely
- never

Q.29 If yes, how did you feel about it ? Did you think about it?

Q.30 In a study that was done before, some people gave the following reasons why they clean their teeth. Could you please choose your reasons, and list them in order of preference from 1 to 8

- to freshen up the mouth
- to freshen up the breath
- to have a nice smile
- to prevent staining of teeth
- to avoid gum bleeding
- to prevent dental decay
- to reduce need of dental service
- habit
- others (state which)

Q.31 Please place a circle around the person who first told you to clean your teeth:

- mother
- father
- teacher
- friend
- brother
- sister
- dentist
- someone on television
- no one
- others (state who)

Q.32 Would you say that you have a particular way of cleaning your teeth?

Q.33 Have you always had this way of cleaning your teeth?

- yes
- no

If you changed the way of cleaning your teeth, when did it happen?

Q.34 What sort of things would make you change the way you clean your teeth?

Q.35 Could you tell me what items you use to clean your teeth?

- tooth brush
- dental paste
- dental floss
- wood stick
- mouthwash

Q.36 Has a dentist or any of the dental staff demonstrated to you how to clean your teeth?

yes

no

Q.37 About how long ago was the last demonstration?

less than three months ago

between three and six months ago

more than six months ago

Q.38 In a study that was done before, some people made the following statements when they were asked about their tooth cleaning. I would like to ask you how strongly you agree with the statements they made.

1) "I think it's a routine, it's a thing you've been brought up to do... you do it automatically, you go in and brush your teeth. I think in the morning you get washed, you comb your hair and feel that's the final part of things to do to make you ready for the day."

strongly agree

agree

disagree

strongly disagree

2) "I clean my teeth a lot better at the weekends, when I have got time, take a more leisurely pace."

strongly agree

agree

disagree

strongly disagree

3) "The evening is more important because if you've been eating all day, in the morning you've just got up... but in the evening I think that's when they could decay."

strongly agree

agree

- disagree
- strongly disagree

4) "I couldn't walk out of my front door if I haven't cleaned my teeth, I suppose you feel dirty"

- strongly agree
- agree
- disagree
- strongly disagree

5) "I think you are told to do it from an early age - brush your teeth twice a day, and it's just one of those things, I don't suppose you think about it, like getting dressed in the morning it's a thing you have always done."

- strongly agree
- agree
- disagree
- strongly disagree

6) "It's a habit, you have old habits, habits come back, they are very difficult to change, then you are taught something simple and a few days later you have forgotten it, going back to old habits."

- strongly agree
- agree
- disagree
- strongly disagree

7) "It's the lifestyle we lead, if you want to get out in the traffic in the morning, it's a compromise between cleaning your teeth and thinking, My God, if I leave it another ten minutes it's going to take me another 25 minutes to get to the office... so I clean my teeth but not to the degree that my dentist would like"

- strongly agree
- agree
- disagree
- strongly disagree

4.2 Questionnaire in Portuguese

Entrevistado número:

Sexo:

Idade:

Profissao:

Q.1 A que horas do dia você costuma acordar?

Q.2 Quantas horas por dia você costuma trabalhar?

Q.3 A que horas você normalmente começa a trabalhar?

Q.4 Qual o meio de transporte que você normalmente usa para ir trabalhar?

ônibus

carro

bicicleta

motocicleta

a pé

outros

Q.5 No seu dia a dia, você tem horário fixo para:

1) tomar café da manhã

sim

nao

2) almoçar

sim

não

3) fazer lanche

sim

não

4) jantar

sim

não

Q.6 Quais dos seguintes trabalhos caseiros você realiza diariamente?

limpar a casa

cozinhar

lavar a louça

lavar a roupa

passar a roupa

cuidar de criança

manutenção da casa

manutenção de veículo

Q.7 Você pratica algum tipo de exercício com regularidade, por exemplo ginástica, corrida, caminhada, joga futebol, tennis?

sim

não

Se a sua resposta foi sim, quantas vezes por semana?

Q.8 Se você tivesse que desenvolver uma atividade que você normalmente não faz, como por exemplo, levar seu carro ao mecânico ou levar seu filho ao médico, você acha que seria fácil para você acrescentar ou ajustar esta atividade com as outras atividades que você faz diariamente?

sim

não

Quão fácil você acha que seria?

muito fácil

relativamente fácil

- não muito fácil
- nada fácil

Por que?

Q.9 Você acha que tem algum controle sobre seu dia de trabalho?

- sim
- não

Q.10 As seguintes proposições procuram caracterizar seu trabalho. Para cada uma delas, por favor, escolha aquela que melhor descreve seu trabalho.

1) Meu horário de trabalho pode ser flexível

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

2) Eu posso tirar férias mais ou menos quando eu quero

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

3) Eu posso decidir quando quero fazer uma pausa durante meu trabalho

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

4) Eu tenho a possibilidade de escolher como fazer meu trabalho

- com frequência

- algumas vezes
- raramente
- nunca/quase nunca

5 Eu tenho possibilidade de escolher que atividades fazer no meu trabalho

- rom frequência
- algumas vezes
- raramente
- nunca/quase nunca

Q.11 Qual das seguintes declarações sobre seu trabalho é a mais verdadeira? Por favor, assinale apenas uma resposta.

- meu trabalho permite que eu planeje a maior parte das atividades que preciso cumprir diariamente
- meu trabalho permite que eu planeje parte das atividades que preciso cumprir diariamente
- meu trabalho não permite que eu planeje meu dia de trabalho

Q.12 Relembrando o que aconteceu ontem, e todas as coisas que você fez, desde que levantou, até a hora de dormir. De todas as coisas que você lembrou, quais foram as duas ou três atividades principais em torno das quais você teve que organizar ou incluir suas outras atividades? Por exemplo: chegar ao trabalho na hora certa, buscar ou levar as crianças na escola, fazer compras no supermercado etc.

Q.13 Das atividades recém mencionadas, qual foi a mais difícil de incluir ou organizar com as outras atividades do seu dia?

Q.14 E importante para você ter uma casa limpa? Quão importante?

- muito importante
- importante
- não é importante

não sei dizer

Q.15 É importante para você que as coisas na sua casa estejam organizadas em uma certa ordem, que elas estejam sempre no mesmo lugar? Quão importante?

muito importante

importante

não é importante

não sei dizer

Q.16 Você gosta de fazer as refeições sempre a mesma hora?

Q.17 Como é que isso varia nos fins de semana?

Q.18 É importante para você tomar banho todos os dias?

muito importante

importante

não é importante

não sei dizer

Q.19 Você gosta de tomar banho sempre à mesma hora do dia? A que hora?

Q.20 Em torno de seu horário de seu banho, você desenvolve alguma outra atividade de higiene, como, por exemplo, lavar os dentes?

sim

não

Q.21 Em torno da hora em que você escova/penteia seus cabelos, ou lava o rosto, você desenvolve alguma outra atividade de limpeza, como, por exemplo, lavar os dentes?

sim

não

Q.22 Se você lava seus dentes, assinale a resposta que melhor indica quantas vezes você lava seus dentes

três vezes ou mais por dia

duas vezes ao dia

uma vez por dia

menos de uma vez por dia

Q.23 Se sua resposta anterior menciona que você lava os dentes, a que horas do dia você normalmente o faz?

antes do café da manhã

depois do café da manhã

depois do almoço

depois do jantar

depois de fazer um lanche

última coisa antes de dormir

antes de sair de casa

ocasionalmente

Q.24 Por favor, leia atentamente cada uma das seguintes declarações e assinale aquela que melhor descreve o que você pensa

1) Limpar seus dentes pela manhã vai dar-lhe hálito agradável

concordo totalmente

concordo

discordo

discordo totalmente

2) Limpar seus dentes pela manhã vai fazer você se sentir limpo

concordo totalmente

concordo

- discordo
- discordo totalmente

3) Limpar seus dentes pela manhã vai fazer você parecer limpo

- concordo totalmente
- concordo
- discordo
- discordo totalmente

4) Limpar seus dentes pela manhã vai fazer você parecer atraente

- concordo totalmente
- concordo
- discordo
- discordo totalmente

5) Limpar seus dentes pela manhã vai ajudar você a evitar tratamento odontológico

- concordo totalmente
- concordo
- discordo
- discordo totalmente

6) Limpar seus dentes pela manhã vai ajudar você a evitar problemas de gengiva

- concordo totalmente
- concordo
- discordo
- discordo totalmente

7) Limpar seus dentes pela manhã vai ajudar você a evitar a cárie dentária

- concordo totalmente
- concordo

- discordo
- discordo totalmente

8) Limpar seus dentes à noite vai dar-lhe hálito agradável

- concordo totalmente
- concordo
- discordo
- discordo totalmente

9) Limpar seus dentes à noite vai fazer você se sentir limpo

- concordo totalmente
- concordo
- discordo
- discordo totalmente

10) Limpar seus dentes à noite vai fazer você parecer limpo

- concordo totalmente
- concordo
- discordo
- discordo totalmente

11) Limpar seus dentes à noite vai fazer você parecer atraente

- concordo totalmente
- concordo
- discordo
- discordo totalmente

12) Limpar seus dentes à noite vai ajudar você a evitar tratamento odontológico

- concordo totalmente
- concordo
- discordo

discordo totalmente

13) Limpar seus dentes à noite vai ajudar você a evitar problemas de gengiva

concordo totalmente

concordo

discordo

discordo totalmente

14) Limpar seus dentes à noite vai ajudar você a evitar a cárie dentária

concordo totalmente

concordo

discordo

discordo totalmente

Q.25 Se você limpa seus dentes, quanto tempo você leva para fazê-lo?

Q.26 Existe alguma coisa, algum motivo, que limita o tempo que você pode gastar para limpar seus dentes?

Q.27 Em torno do horário que você limpa seus dentes, que outras atividades você normalmente precisa fazer?

Q.28 Alguma vez você já esqueceu de limpar seus dentes?

nunca

frequentemente

com muita frequência

raramente

muito raramente

Q.29 Se a sua resposta foi sim, como é que você se sentiu, você pensou sobre isto durante o dia?

Q.30 Algumas pessoas deram vários motivos pelos quais limpam os dentes. Você poderia, a partir da lista abaixo, enumerar de 1 a 8, por ordem de importância os seus motivos?

- para deixar minha boca refrescante
- para evitar mau hálito
- para ter um sorriso bonito
- para evitar que meus dentes fiquem manchados
- para evitar que minha gengiva sangre
- para evitar que meus dentes se estraguem
- para evitar ir ao dentista
- por uma questão de hábito
- outros (diga quais)

Q.31 Qual das pessoas citadas abaixo foi a que lhe deu as primeiras instruções sobre a necessidade de limpar seus dentes?

- mãe
- pai
- professor (a)
- amigo
- irmão
- irmã
- dentista
- alguém na televisão
- ninguém
- outros

Q.32 Você diria que possui um jeito particular para limpar os dentes?

Q.33 Você sempre teve esse jeito de limpar os dentes?

- sim
- não

Se mudou o jeito de limpar, quando se deu esta mudança?

Q.34 Que razões poderiam fazer você mudar seu jeito de limpar os dentes?

Q.35 Quais dos itens citados abaixo você utiliza para limpar seus dentes?
Escolha uma ou mais opções.

- escova de dentes
- pasta de dentes
- fio dental
- palito
- líquido para fazer bochechos

Q.36 Você poderia dizer-me se alguma vez o dentista, ou o auxiliar odontológico, mostrou para você como limpar os dentes?

- sim
- não

Q.37 Quanto tempo atrás deu-se a última demonstração?

- mais de três meses atrás
- entre três e seis meses atrás
- mais de seis meses atrás

Q.38 Num estudo que foi feito anteriormente, algumas pessoas fizeram as seguintes declarações quando lhe perguntaram sobre a limpeza de seus dentes. Por favor leia atentamente cada uma das declarações abaixo, e assinale a alternativa que melhor descreve o que você pensa.

1) "Eu acho que é uma rotina, é uma coisa que você cresceu fazendo... você faz automaticamente, você vai ao banheiro escova seus dentes. Eu acho que pela manhã, você se lava, escova seu cabelo e sente que a

limpeza dos dentes é a parte final a fazer para deixar-lhe pronto para o dia."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

2) "Eu limpo melhor meus dentes nos fins-de-semana, quando tenho mais tempo."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

3) "A limpeza da noite é mais importante, porque se você esteve comendo todo o dia, pela manhã você recém levantou... mas à noite eu acho que é quando os dentes podem estragar."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

4) "Eu não poderia sair de casa se não tivesse escovado meus dentes, eu suponho que a gente se sente sujo."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

5) "Eu acho que lhe dizem que você deve limpar seus dentes desde a mais tenra idade - limpe seus dentes duas vezes ao dia, é só mais uma das

coisas que lhe dizem, eu acho que você não pensa sobre a limpeza dos dentes, é como se vestir pela manhã, é uma coisa que você sempre fez."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

6) "É um hábito, todos temos hábitos antigos, hábitos sempre voltam, são muito difíceis de se mudar, mesmo que lhe ensinem algo simples em alguns dias você esquece, voltando ao seu velho hábito."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

7) "É o estilo de vida que nós levamos, se você precisa sair no trânsito de manhã cedo, as vezes você se vê escolhendo entre limpar seus dentes e pensar: Meu Deus, se eu perder mais 10 minutos, vou demorar mais ainda para chegar ao trabalho...assim sendo, eu limpo meus dentes mas acho que não tão bem como o dentista gostaria que eu limpasse."

- concordo totalmente
- concordo
- discordo
- discordo totalmente

Muito Obrigada!

APPENDIX 5

Main Study Questionnaires

5.1 Questionnaire in English

5.2 Questionnaire in Portuguese

5.1 Questionnaire in English

Q.1 Could you tell me whether you still have some of your natural teeth?

Q.2 If you still have some of your teeth how many have you got?

- fewer than 10
- between 10 and 19
- 20 or more

Q.3 If you had any removable dentures or false teeth, which is it?

- lower
- upper

Now I would like to ask you some questions about your working week.

Q.4 How many hours per day do you normally work?

Q.5 How do you normally travel to work?

- public transport
- car
- bicycle
- motorbike
- walk
- others

Q.6 What are the advantages or disadvantages of using the type of transport you said you use?

Q.7 Thinking back over all that happened yesterday and all the things you did from when you first got up until you went to bed last night, which of the following activities did you do on a typical working day? Could you tell me, did you do the following?

1) domestic work

- preparation and cooking of food/drinks
- washing up and putting away the dishes
- home maintenance and repair
- washing clothes, ironing
- other

2) child care

- personal care to children
- educational care to children
- medical care to children
- general supervision of children
- others

3) purchasing of goods and services

- purchasing of everyday consumer goods
- receiving personal care (e.g. hairdressing)
- receiving medical care (e.g. visits to or from a GP)
- repair and other services
- others

4) private needs

- getting up
- cleaning your teeth
- having a shower
- washing your face
- having breakfast
- having lunch
- having dinner
- going to bed

5) adult education and collective participation activities

- full time attendance at classes
- part time attendance at professional or special training courses
- attendance at occasional lectures or talks
- private study
- others

6) social activities

- social chats and discussions, including casual meetings in the street, telephone conversation
- social drinking (pubs, or friends' homes)
- social meals
- waiting connected with social activities
- others

7) active leisure

- sports and physical exercise
- pleasure trips
- hobbies
- dancing, night clubs
- others

8) passive leisure

- attending a sport events
- theatre, concert, cinema
- listening to the radio, watching tv
- reading books, newspapers
- others

Q.8 For this activity you answered you did, could you tell me if it was

- arranged to do with others
- planned to do
- part of a normal routine

- unexpected
- on the spur of the moment
- just for filling in time

Q.9 If, for any reason, you were unable to carry out the activity you have just mentioned you did at the usual time, how much would it have mattered?

- very much
- moderately
- not too much
- not at all

Q.10 If, for any reason, you were unable to carry out the activity you have just mentioned you did at the usual location, how much would it have mattered?

- very much
- moderately
- not too much
- not at all

Q.11 In general, thinking about all your daily activities (all the things you do from when you first get up, until you go to bed), how routinized do you think your daily activities are?

- very routinized
- quite routinized
- routinized
- not very routinized
- not at all routinized

Q.12 In general, thinking about all your daily activities (all the things you do from when you first get up, until you go to bed), to what degree are your daily activities flexible in terms of timing?

- very flexible
- flexible
- quite flexible
- not very flexible
- not at all flexible

Thinking about your paid work...

Q.13 Which of the following statements best describes your feelings about your work? Please choose one answer only.

1) I can make at least one private telephone call during regular working hours

- often
- sometimes
- seldom
- never/almost never

2) I can receive a private visitor for ten minutes during regular working time

- often
- sometimes
- seldom
- never/almost never

3) I can leave my job for half-an-hour for private errands during working hours without telling my supervisor

- often
- sometimes
- seldom
- never/almost never

4) In general, my working time can be flexible

- often
- sometimes
- seldom
- never/almost never

Now, could you please answer some questions about your tooth cleaning habits.

Q.14 Do you clean your teeth?

- yes
- no

Q.15 If yes, how often you do you clean them.

- more than three times a day
- three times a day
- two times a day
- once a day
- less than once a day

Q.16 Can you tell me at what times of the day do you usually clean your teeth?

- before breakfast
- after breakfast
- after lunch
- after evening meal
- after snacks
- last thing at night
- when going out
- occasionally

Q.17 How easy would it be for you to change the times of the day you clean your teeth.

- very easy
- quite easy
- easy
- not very easy
- not at all easy

Q.18 How easy would it be for you to change the frequency you clean your teeth.

- very easy
- quite easy
- easy
- not very easy
- not at all easy

Q.19 Is there anything which limits the amount of time you can spend on your toothcleaning?

- yes
- no

If yes, please choose the answers that best describe your feelings about what limits the amount of time you can spend on your tooth cleaning.

- tiredness
- catching a bus to go to work
- everyday problems
- lifestyle
- lack of discipline
- others (state which)

Q.20 People have given me many different reasons to describe how they judge whether they have cleaned their teeth well enough. How do you judge whether you have cleaned your teeth well enough?

- to pass the tongue around the teeth, to feel if they are smooth

- if you feel a better taste in your mouth
- look at the mirror to see if they are clean
- if you feel that they are clean
- others (state which)

Q.21 Now, could you please tell me how satisfied are you with the way you clean your teeth?

- very satisfied
- satisfied
- dissatisfied
- neither satisfied nor dissatisfied
- very dissatisfied

Q.22 Can you tell me who was the person who first told you about cleaning your teeth:

- mother
- father
- teacher
- friend
- brother
- sister
- dentist
- someone on television
- others (state who)

Q.23 Could you tell me what items do you use to clean your teeth?

- tooth brush
- dental paste
- dental floss
- wood stick
- mouthwash

Q. 24 If you answered that you use a tooth brush to clean your teeth, how often do you use it?

- daily
- weekly
- seldom

Q.25 If you answered that you use dental paste to clean your teeth, how often do you use it?

- daily
- weekly
- seldom

Q.26 If you answered that you use dental floss to clean your teeth, how often do you use it?

- daily
- weekly
- seldom

Q. 27 If you answered that you use toothpicks to clean your teeth, how often do you use them?

- daily
- weekly
- seldom

Q. 28 If you answered that you use mouthwash to clean your teeth, how often do you use it?

- daily
- weekly
- seldom

Q.29 Would you say that you have a particular way of cleaning your teeth?

- yes
- no

Q.30 Have you always had this way of cleaning your teeth?

- yes
- no

If no, why did you change? Please choose the answers that best describe why you changed the way you clean you teeth

- to set an example to children
- marriage
- because of your job
- professional advice
- smelling of the mouth
- because of adolescence
- others (state which)

Q.31 If you answered that you changed the way you clean your teeth, could you tell me what did you change?

1) The frequency

- yes
- no

If yes, can you describe how frequently you changed to? If yes, how difficult was it?

- very difficult
- quite difficult
- difficult
- not difficult
- not at all difficult

2) The times of the day

yes

no

If yes, can you describe it to me? Still if yes, how difficult was it?

very difficult

quite difficult

difficult

not difficult

not at all difficult

3) The items

yes

no

If yes, can you describe it to me? If yes, how difficult was it?

very difficult

quite difficult

difficult

not difficult

not at all difficult

4) The method

yes

no

If yes, can you describe it to me? If yes, how difficult was it?

very difficult

quite difficult

difficult

not difficult

not at all difficult

Q.32 What sort of things would make you change the way you clean your teeth? Please, choose all the answers you think describe the sort of reasons which would make you change the way you clean your teeth.

- personal problems
- changes in social circumstances (time, money)
- dental problems
- new information
- no reason
- other reasons (state which)

Q.33 Do you ever use items such as dental floss at occasions different from a tooth cleaning occasion?

- yes
- no

If yes, when? What?

Q.34 In general do you go to the dentist for:

- a regular chek-up
- an occasional chek-up
- only when you are having trouble with your teeth

Q.35 Over the whole of your lifetime, right from the first time you went to the dentist, including when you were a child, have you ever had treatment for gum disease?

- yes
- no

Q.36 Has a dentist or any of the dental staff demonstrated to you how to clean your teeth?

- yes
- no.

General Information:

Name:

Date of birth:

Marital Status:

Residential Address:

Occupation:

Number of people living in the household:

adults

children

Educational Level

What is your educational level?

none (cannot read or write)

none (can read and write)

primary school (4 years)

primary school (8 years)

secondary school (3 years)

university

post-graduate

Finally, would you please answer the following questions. How many TV sets do you have at home? And

radios

bathrooms

motorcars

maides

vacuum cleaners

washing machines.

5.2 Questionnaire in Portuguese

Q.1 Para começarmos, você poderia dizer-me se ainda possui alguns dos seus dentes naturais?

sim

não

Q.2 Se você ainda possui alguns dos seus dentes naturais, quantos você possui?

menos de 10

entre 10 e 19

20 ou mais

Q.3 Se você possui alguma dentadura removível, qual é removível?

superior

inferior

Agora eu gostaria de lhe fazer algumas perguntas sobre sua semana de trabalho.

Q.4 Quantas horas por dia você costuma trabalhar?

Q.5 Qual o meio de transporte que você normalmente usa para ir trabalhar?

ônibus

carro

bicicleta

motocicleta

a pé

outros

Q.6 Quais as vantagens e desvantagens em usar o tipo de meio de transporte que você usa para trabalhar?

Q.7 Relembrando o que acontece num típico dia de trabalho, todas as coisas que você faz, desde que levanta, até a hora de dormir. Quais das seguintes atividades você desenvolve num típico dia de trabalho?

1) trabalho fora de casa

sim

não

2) trabalhos domésticos

preparo e cozimento de alimentos

lavar a louça

manutenção e reparo da casa

lavar roupa, passar roupa

alguma outra coisa (diga o que)

3) cuidar de crianças

cuidar pessoalmente de criança

cuidar da educação de criança

dar cuidados médicos para crianças

dar algum tipo de cuidados para crianças

alguma outra coisa (diga o que)

4) compra de produtos de consumo diário e serviços

compra de produtos de consumo diário

cuidados pessoais (por exemplo, cabeleireiro)

receber cuidados médicos, por exemplo, ir ao médico

reparos e algum outro tipo de serviço

alguma outra coisa (diga o que)

5) necessidades particulares

- levantar da cama
- limpar seus dentes
- tomar banho
- lavar o rosto
- tomar café
- almoçar
- jantar
- dormir

6) educação para adultos e participação em alguma atividade coletiva

- ir para a escola, faculdade
- algum tipo de curso ou treinamento
- assistir a palestras ou seminários
- estudar em casa
- alguma outra coisa (diga o que)

7) atividades sociais

- bate papo e conversas, incluindo encontros casuais na rua, falar ao telefone
- beber socialmente (com amigos, em bares ou em casa)
- jantar com amigos
- esperar devido a alguma atividade social
- alguma outra coisa (diga o que)

8) participar de atividades esportivas e de lazer

- praticar esportes e exercícios físicos
- passeios
- hobbies
- dançar, ir a boates
- alguma outra coisa (diga o que)

9) atividades de lazer

- ir ao jogo de futebol, vôlei
- ir ao cinema, teatro, concerto
- escutar rádio, assistir televisão
- ler jornal, livros
- alguma outra coisa (diga o que)

Q.8 Para esta atividade que você respondeu que desenvolveu, você poderia dizer-me se ela foi uma atividade:

- combinada com antecedência com outras pessoas
- planejada
- parte da rotina normal
- inesperada
- uma decisão momentânea
- apenas para passar o tempo
- não se aplica

Q.9 Se por algum motivo você não tivesse sido capaz de desenvolver a atividade que você mencionou, na hora usual, quanto isto teria importado?

- muito
- moderadamente
- não muito
- não teria importado nada
- não se aplica

Q.10 Se por algum motivo você não tivesse sido capaz de desenvolver a atividade que você mencionou, no local usual, quanto isto teria importado?

- muito
- moderadamente
- não muito
- não teria importado nada

não se aplica

Q.11 Relembrando o que acontece num típico dia de trabalho, todas as coisas que você faz, desde que levanta, até a hora de dormir, quão rotinizadas você acha que essas atividades são?

- muito rotinizadas
- rotinizadas
- relativamente rotinizadas
- não muito rotinizadas
- nada rotinizadas

Q.12 Relembrando o que acontece num típico dia de trabalho, todas as coisas que você faz, desde que levanta, até a hora de dormir, quão flexíveis você acha que essas atividades são em termos de horário?

- muito flexíveis
- flexíveis
- relativamente flexíveis
- não muito flexíveis
- nada flexíveis

Considerando seu trabalho fora de casa...

Q.13 As seguintes declarações procuram caracterizar seu trabalho. Para cada uma delas, por favor, escolha aquela que melhor descreve seu trabalho.

1) Eu posso dar pelo menos um telefonema particular durante meu horário de trabalho.

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

2) Eu posso receber uma visita particular por dez minutos durante meu horário de trabalho

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

3) Eu posso sair durante o expediente por meia hora, para tratar de assuntos particulares, sem avisar meu chefe

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

4) De modo geral, meu horário de trabalho pode ser flexível

- com frequência
- algumas vezes
- raramente
- nunca/quase nunca

Na seção seguinte deste questionário eu gostaria de lhe fazer algumas perguntas sobre os seus hábitos de limpeza dos dentes.

Q.14 Você limpa seus dentes?

- sim
- não

Q.15 Se você limpa seus dentes, assinale a resposta que melhor indica quantas vezes você limpa seus dentes

- mais de três vezes por dia
- três vezes
- duas vezes ao dia

- uma vez por dia
- menos de uma vez por dia
- nunca

Q.16 Se sua resposta anterior menciona que você limpa seus dentes, a que horas do dia você normalmente o faz?

- antes do café da manhã
- depois do café da manhã
- depois do almoço
- depois do jantar
- depois de fazer um lanche
- Última coisa antes de dormir
- antes de sair de casa
- ocasionalmente
- nunca

Q.17 Você acha que seria fácil mudar seus horários de limpeza dos dentes, quão fácil você acha que seria?

- muito fácil
- relativamente fácil
- fácil
- não muito fácil
- nada fácil

Q.18 Você acha que seria fácil para você mudar a frequência com que você limpa seus dentes, quão fácil você acha que seria?

- muito fácil
- relativament fácil
- fácil
- não muito fácil
- nada fácil

Q.19 Você acha que existem razões limitando o tempo que você pode gastar para limpar seus dentes?

- sim
- não

Se a sua resposta foi sim, por favor escolha as respostas que melhor descrevem as razões que você acha que estão limitando o tempo que você pode gastar na limpeza dos seus dentes.

- cansaço
- pegar o ônibus para ir trabalhar
- correria do dia a dia
- estilo de vida
- falta de disciplina
- outros (diga quais)

Q.20 Algumas pessoas deram diferentes motivos que descrevem como eles julgam se limpam bem o suficiente seus dentes. Como é que você julga se limpou os seus dentes, bem o suficiente?

- passando a língua nos dentes, para sentir se eles estão limpos
- se você sente um gosto bom na sua boca
- olhar no espelho para ver se eles estão limpos
- se você sentir que eles estão limpos
- outros (diga quais)

Q.21 Você tem estado satisfeito com a sua limpeza dos dentes, quão satisfeito você tem estado?

- muito satisfeito
- satisfeito
- insatisfeito
- nem satisfeito nem insatisfeito
- muito insatisfeito

Q.22 Qual das pessoas citadas abaixo foi a que lhe deu as primeiras instruções sobre a necessidade de limpar seus dentes?

- mãe
- pai
- professor(a)
- amigo
- irmão
- irmã
- dentista
- alguém na televisão
- ninguém
- outros diga quem

Q.23 Por favor, você poderia dezer-me o que você usa para limpar os dentes?

- escova de dentes
- pasta de dentes
- fio dental
- palito
- líquido para fazer bochechos

Q.24 Se você respondeu que você usa escova de dentes para limpar seus dentes, com que frequência você a usa?

- todas as vezes que limpa os dentes
- diariamente
- semanalmente
- raramente

Q.25 Se você respondeu que usa pasta de dentes para limpar seus dentes, com que frequência você a usa?

- todas as vezes que limpa os dentes
- diariamente

semanalmente

raramente

Q. 26 Se você respondeu que usa fio dental para limpar os dentes, com que frequência você os usa?

todas as vezes que limpa os dentes

diariamente

semanalmente

raramente

Q. 27 Se você respondeu que você usa palito para limpar seus dentes, com que frequência você o usa?

todas as vezes que limpa os dentes

diariamente

semanalmente

raramente

Q. 28 Se você respondeu que usa líquido para fazer bochechos, para limpar seus dentes, com que frequência você o usa?

todas as vezes que limpa os dentes

diariamente

semanalmente

raramente

Q.29 Você diria que possui um jeito seu de limpar seus dentes?

sim

não

Q.30 Você sempre teve esse jeito de limpar seus dentes?

sim

não

Se a sua resposta foi não, por que você mudou? Por favor, escolha as respostas que melhor descrevem porque você mudou seu jeito de limpar os dentes

- para dar um exemplo as crianças
- casamento
- por causa do seu trabalho
- porque o dentista falou
- durante a adolescência
- mau hálito
- outros (diga quais)

Q.31 Se você respondeu que mudou seu jeito de limpar os dentes, você poderia dizer-me o que foi que você mudou?

1) mudou a frequência

- sim
- não

Se a sua resposta foi sim você poderia descrever esta mudança de frequência?

Esta mudança de frequência foi difícil, quão difícil ela foi?

- muito difícil
- relativamente difícil
- difícil
- não muito difícil
- nada difícil

2) mudou os horários de limpeza dos dentes

- sim
- não

Se a sua resposta foi sim, você poderia descrever esta mudança de horários?

Esta mudança de horários foi difícil, quão difícil ela foi?

- muito difícil
- relativamente difícil
- difícil
- não muito difícil
- nada difícil

3) mudou o que você usa para limpar os dentes.

- sim
- não

Se a sua resposta foi sim, você poderia descrever esta mudança?

Esta mudança foi difícil, quão difícil ela foi?

- muito difícil
- relativamente difícil
- difícil
- não muito difícil
- nada difícil

4) mudou o método

- sim
- não

Se a sua resposta foi sim, você poderia descrever esta mudança de método?

Esta mudança do método foi difícil, quão difícil ela foi?

- muito difícil
- relativamente difícil

- difícil
- não muito difícil
- nada difícil

Q.32 Que razões poderiam fazer você mudar seu jeito de limpar seus dentes? Por favor, escolha todas as respostas que você acha que descrevem as razões que fariam você mudar seu jeito de limpar os dentes.

- problemas pessoais
- mudança de circunstâncias, dinheiro, tempo
- problemas dentários
- novas informações
- outras razões (diga quais)

Q.33 Você usa objetos tais quais fio dental, em ocasiões diferentes das da limpeza dental?

- sim
- não

Quando? O que?

Q.34 Em geral você vai ao dentista para:

- Regularmente fazer um chek-up
- Ocasionalmente fazer um chek-up
- Somente quando está tendo problemas com seus dentes

Q.35 Você alguma vez fez tratamento para doença de gengiva?

- sim
- não

Q.36 Você poderia dizer-me se alguma vez o dentista, ou o auxiliar odontológico, mostrou para você como limpar os dentes?

- sim
- não.

Identificacao

Para finalizar, por favor, algumas informações gerais:

Nome:

Data de nascimento:

Estado civil:

Endereço Residencial:

Dados Familiares:

Por favor, você poderia dizer-me quantas pessoas, (adultos e crianças), moram na sua casa

adultos

crianças

Escolaridade:

Qual é o seu nível de escolaridade?

nenhum (não sabe ler, nem escrever)

nenhum (sabe ler e escrever)

grupo escolar

ginásio

segundo grau

superior (universidade)

pos-graduação (especialização, mestrado ou doutorado)

Para finalizar, você poderia me responder quantos televisores voce tem em sua casa? E

rádios

- banheiros
- automóveis
- empregadas
- aspiradores de pó
- máquinas de lavar

APPENDIX 6

ABA-ABIPEME Classification

Table A.6.1 Economic Indicators Used and Number of Points Assigned to Each Indicator

Table A.6.2 Level of Education Indicators Used and the Number of Points Assigned to Each Indicator

Table A.6.3 Socio-economic Groups Definition and the Final Score Assigned to Each of Them

ABA-ABIPEME Classification

The socio-economic classification of this study is based on the ABA-ABIPEME (1978) criteria. These criteria comprises eight socio-economic indicators, which cover economic information and educational level. A set of points is given to each indicator and a final score to determine the household's social class is obtained.

Higher social class people were those from class A and B, and lower social class people were those from class C and D.

The following tables show the indicators used, the number of points assigned to each of them, and the total score which determine each socio-economic group.

Table A.6.1 Economic Indicators used and number of points assigned to each indicator.

Indicators	Number of Points							
	none	1	2	3	4	5	6	
T. V.	0	2	4	6	8	10	12	
Radio	0	1	2	3	4	5	6	
Bathroom	0	2	4	6	8	10	12	
Motorcar	0	4	8	12	16	16	16	
Maid	0	6	12	18	24	24	24	
Vacuum Cleaner	0	5	5	5	5	5	5	
Washing Machine	0	2	2	2	2	2	2	

Table A.6.2 Level of Education Indicators used and the number of points assigned to each indicator

Level of Education Indicator	Number of Points
None	0
Primary School (4 years)	1
Primary School (8 years)	3
Secondary School (12 years)	5
University	10

Table A.6.3 Socio-economic Groups Definition and the Final Score Assigned to each of them

Socio-economic Groups	Final Score (in points)
A	more than 34
B	21 - 34
C	10 - 20
D	5 - 9
E	0 - 4

Table A.6.4 Socio-economic Groups Distribution in the Cities of Sao Paulo and Rio de Janeiro

City	Socio-economic Groups				
	A	B	C	D	E
Sao Paulo	8%	21%	32%	34%	5%
Rio de Janeiro	5%	14%	34%	43%	6%

APPENDIX 7

Clinical Form

Clinical Form

Clinical form used to assess tooth cleaning performance and the outcome of performance teeth with gums bleeding after probing.

Name:

Subject no.

Age:

B	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
P	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
B	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
L	48	47	46	45	44	43	42	41	31	32	33	34	35	36	36	38

Dental plaque

1 no plaque observed in situ by the unaided eye, but plaque is made visible on the point of the probe after the probe has been moved over the tooth surface at the entrance of the gingival crevice

2 gingival area covered by a thin to moderately thick layer of plaque visible to the naked eye

3 heavy accumulation of soft matter, the thickness of which fills the crevice produced by the gingival margin and the tooth surface

9 missing

Bleeding

Name:

Subject no.

Age:

B	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
P	18	17	16	15	14	13	12	11	21	22	23	24	25	26	27	28
B	48	47	46	45	44	43	42	41	31	32	33	34	35	36	37	38
L	48	47	46	45	44	43	42	41	31	32	33	34	35	36	36	38

0 no bleeding

1 bleeding

9 missing

APPENDIX 8

Response Rate

of the Pilot and the Main Studies

Table A.8.1 Response rate of the pilot study

Table A.8.2 Response rate of the main study

Table A.8.1 Response rate of the pilot study

Individuals	Contacted	Not Accepted	Accepted	First Interviews	Following Interviews
	71	11	60	6	44
Men	35	5	29	3	26
High Social Class	17	3	14	1	13
Low Social Class	16	2	15	2	13
Women	36	6	31	3	28
High Social Class	18	3	14	1	13
Low Social Class	18	3	16	2	14

Table A.8.2 Response rate of the main study

Individuals	Contacted	Not Accepted	Accepted	Excluded	Participated
	518	40	478	7	471
Men	259	21	241	4	237
High Social Class	129	10	119	2	117
Low Social Class	130	11	122	2	120
Women	259	19	237	3	234
High Social Class	128	10	124	1	123
Low Social Class	131	9	113	2	111

APPENDIX 9
Clinical Examination

CLINICAL EXAMINATION: Criteria and Scoring Systems Used to Assess Tooth Cleaning Performance

Level of dental plaque and number of teeth with gums bleeding after probing were assessed. Examinations took place at the participant's work place, taking an average of 10 minutes. Examinations were conducted using a head-lamp to provide standard illumination. Examinations were all carried out with the examiner positioned in front of the subject, who was seated in a chair, and using No. 4 plain moth mirrors and a lightweight probe with a rounded tip. The instruments were sterilised in a dry-heat oven at 160°C for 90 minutes.

Dental Plaque

Plaque is a soft almost invisible layer of bacteria which forms on the teeth and is present in all mouths (Levine, 1992). The Plaque Index devised by Silness and Løe (1964) was adopted for the assessment of the amount of plaque. This method relies on estimated measurements of plaque and may be used on a whole mouth or selected mouth basis. In this study all teeth present in the mouth were examined.

In this scoring method, each of the four gingival areas of the tooth is given a score from 0-3; this is the plaque index for the area. The

scores from the four areas of the tooth will be added and then divided by four to give the Plaque Index for the tooth. By adding the indexes for the individual teeth and dividing by the number of teeth examined, the Plaque Index for the individual is obtained.

Each gingival area is scored as follows:

- 1) score 0: gingival area of tooth free of plaque, the surface is tested by running a probe across the tooth surface; if no soft material adheres, then the area is considered plaque free,
- 2) score 1: no plaque observed in situ by the unaided eye, but plaque is made visible on the point of the probe after the probe has been moved over the tooth surface at the entrance of the gingival crevice,
- 3) score 2: gingival area covered by a thin to moderately thick layer of visible plaque to the naked eye, and
- 4) score 3: heavy accumulation of soft matter, the thickness of which fills the crevice produced by the gingival margin and the tooth surface.

For the purpose of the present study, two gingival areas of the tooth (buccal and lingual) were given a score from 0-3; this was the Plaque Index for the area. The scores from the two areas of the tooth were added and then divided by two, to give the Plaque Index for the tooth. By adding the indexes for the individual teeth and dividing by the number of teeth examined, the Plaque Index for the individual was

obtained.

This plaque index score considers only differences in the thickness of the soft deposit on gingival area of the tooth surfaces with no attention paid to the coronal extension of the plaque. The assessment of plaque is made on top of calculus deposits, fillings and crowns (Fischman, 1986).

Bleeding

The criteria used was based on WHO (1987). Both surfaces, buccal and lingual, of all teeth in the mouth were recorded according to the following scoring system:

- 1) no bleeding: code 0,
- 2) bleeding: code 1, and
- 3) 9 missing: code 9.

APPENDIX 10

Workplaces Visited for the Main Study

Workplaces Visited for the Main Study

BANRISUL (Bank of the State of Rio Grande do Sul),
Cambará (Public Transport Company),
Centro de Saúde Vila Floresta (Health Centre),
CIENTEC (Foundation of Science and Technology),
DHB (Manufacturers of Industrial Equipment),
EBCT (Brazilian Post Office),
FEE (Foundation of Economics and Statistics),
Ferramentas Gerais (Trading Company),
Hospital da PUC (Hospital of the Catholic University),
Hospital de Clínicas de Porto Alegre (Clinical Hospital),
Instituto de Cardiologia de Porto Alegre (Clinic of Cardiology)
Narcosul (Medical Equipment Sales),
Policlínica Central (Health Clinic),
Rainha das Noivas (Apparel Company),
RBS (Radio, Television and Newspaper Company),
SESI (Social Service for Industrial Workers),
Tintas Renner (Painting Products Industry), and
Trevo (Public Transport Company).

APPENDIX 11

Frequency Distribution of Household Types

Table A.11.1 Frequency Distribution of Types of Size of Household: 471 Adults

Variable	Frequency	Relative Frequency (Per Cent)	Relative Cumulative Frequency (Per Cent)
Composition of Types of Household			
House1	43	9.1	9.1
House2	156	33.1	33.1
House3	282	59.9	59.9
House4	398	84.5	84.5
House5	443	94.1	94.1
House6	459	97.5	97.5
House7	466	98.9	98.9
House8	469	99.6	99.6

APPENDIX 12

Frequency Distribution

of Number of People per Bathroom

Table A.12.1 - Frequency Distribution of Number of People per Bathroom: 471 Adults.

Variable Number of People per Bathroom	Frequency	Relative Frequency (Per Cent)	Relative Cumulative Frequency (Per Cent)
0.40	1	0.2	0.2
0.50	1	0.2	0.4
0.67	2	0.4	0.8
0.75	1	0.2	1.1
0.80	1	0.2	1.3
1.00	53	11.3	12.5
1.17	1	0.2	12.7
1.20	1	0.2	13.0
1.25	1	0.2	13.2
1.33	11	2.3	15.5
1.50	20	4.2	19.7
1.67	3	0.6	20.4
2.00	121	25.7	46.1
2.50	4	0.8	46.9
3.00	103	21.9	68.8
3.50	1	0.2	69.0
4.00	88	18.7	87.7
5.00	36	7.6	95.3

Table A.12.1 - Frequency Distribution of Number of People per Bathroom: 471 Adults (Conclusion).

6	13	2.8	98.1
7	5	1.1	99.2
8	3	0.6	99.8
14	1	0.2	100.0

APPENDIX 13

**Frequency Distribution
of Tooth Cleaning Pattern**

Table A.13.1 Frequency Distribution of Pattern of Tooth Cleaning Behaviour in Sample: 471 Adults.

Variable	Frequency	Relative Frequency (Per Cent)	Relative Cumulative Frequency (Per Cent)
Less than once a day	4	0.8	0.8
Once a day	24	5.1	5.9
Twice a day	122	25.9	31.8
Three times a day	212	45.0	76.9
More than three times a day	109	23.1	100.0

APPENDIX 14

Frequency Distribution
of Tooth Cleaning Structure

Table A.14.1 Frequency Distribution of Structure of Tooth Cleaning Behaviour in Sample: 471 Adults.

Variable	Frequency	Relative Frequency (Per Cent)	Relative Cumulative Frequency (Per Cent)
Group 1	58	12.3	12.3
Group 2	156	33.1	45.4
Group 3	95	20.2	65.6
Group 4	162	34.4	100.0

Group 1: individuals who only used tooth brush and paste to clean their teeth

Group 2: individuals who used brush, paste and floss to clean their teeth

Group 3: individuals who used brush, paste and toothpick to clean their teeth

Group 4: individuals who used brush, paste, floss and toothpick to clean their teeth

APPENDIX 15

Frequency Distribution

of Tooth Cleaning Performance

Table A.15.1 Frequency Distribution of Performance of Tooth Cleaning Behaviour in Sample: 471 Adults.

Variable	Frequency	Relative Frequency (Per Cent)	Relative Cumulative Frequency (Per Cent)
Plaque Score 1	7	1.5	1.5
Plaque Score 2	295	62.6	64.1
Plaque Score 3	169	35.9	100.0

Plaque Score 1: Mean score equal to 1

Plaque Score 2: Mean score more than 1 and equal to 2

Plaque Score 3: Mean score more than 2

REFERENCES

ABA-ABIPEME (1978). Critério de classificação sócio-econômica. *ABA*, Rio de Janeiro, 25 de julho de 1978.

Addy, M., Dummer, P.M., Hunter, M.L., Kingdon, A. and Shaw, W.C. (1990). The effect of toothbrushing frequency, toothbrushing hand, sex and social class on the incidence of plaque, gingivitis and pocketing in adolescents; a longitudinal cohort study. *Community Dental Health*, 7: 237-47.

Ainamo, J. and Parvianen, K. (1973). Occurrence of plaque, gingivitis and caries as related to self reported frequency of toothbrushing in fluoride areas in Finland. *Community Dentistry and Oral Epidemiology*, 7: 142-146.

Altman, D.G. (1991). *Practical statistics for medical research*. London: Chapman & Hall.

Ajzen, I. and Fischbein, M. (1977). Attitude-behavior relations: a theoretical analysis and review of empirical research. *Psychological Bulletin*, 84: 888-918.

Bandura, A. (1977). Self efficacy: towards a unifying theory of behaviour change. *Psychological Review*, 84: 191-215.

Bandura, A. (1986). *Social foundations of thought and action*. Englewood Cliffs: Prentice Hall.

Baric, L., Blinkhorn, S.A. and MacArthur (1974). A health education approach to nutrition and dental health education. *Health Education Journal*, 33: 79-90.

Bateman, P. (1985). *Understanding and predicting toothbrushing behaviour in adolescents*. MSc. Thesis, Department of Community Dental Health, London Hospital Medical College.

Beaglehole, R., Bonita, R. and Kjellström, T. (1993). *Basic epidemiology*. Geneva: WHO.

Bland, M. (1987). *An introduction to medical statistics*. Oxford: Oxford University.

Blinkhorn, S.A. (1976). *Toothbrushing as part of primary socialization*. PhD Thesis, Manchester, Department of Preventive Dentistry, University of Manchester.

- Blinkhorn, S.A. (1980). Factors influencing the transmission of the toothbrushing routine by mothers to their pre-school children. *Journal of Dentistry*, 8: 307-311.
- Burt, B.A. and Eklund, S.A. (1992). *Dentistry, dental practice and the community*. 4ed. Philadelphia: W. B. Saunders.
- Cooper, C. (1995). *Psychosocial and economic determinants of healthy/unhealthy dietary patterns in the Whitehall II study*. Unpublished.
- Croucher, R. (1989a). *Open learning for dental health*. Ph.D. Thesis, Department of Health and Welfare Studies, University of London.
- Croucher, R. (1989b). *The performance gap*. Health Education Authority Report 23. London: Health Education Authority.
- Croucher, R. (1994). Lay perspectives on oral hygiene performance: their use in hypothesis development. *Community Dental Health*, 11: 105-110.
- Cullen, I.G. and Godson, V. (1975). *The structure of activity patterns*. Oxford: Pergamon.
- Cullen, I.G. and Phelps, E. (1975). *Diary techniques and problems of urban life*. Joint Unit for Planning Research, University College London.
- Cushing, A.M. and Sheiham, A. (1985). Assessing periodontal treatment needs and periodontal status in a study of adults in North-West England. *Community Dental Health*, 2: 187-194.
- Douglas, M. (1982). *In the active voice*. London: Routledge and Kegan Paul.
- Fischman, S.L. (1986). Current status of indices of plaque. *Journal of Clinical Periodontology*, 13: 371-374.
- Frandsen A. (1986). Mechanical oral hygiene practices: state-of-the-science-review. In: Løe, H. and Kleinman D.V. (eds.). *Dental plaque control measures and oral hygiene practices*. Oxford: IRL. p.93-116.
- Frankfort-Nachmias, C. and Nachmias, D. (1992). *Research methods in the social sciences*. 4ed. London: Edward Arnold.

- Galgut, P.N., Waite, I.M. Todd-Pokropek, A. and Barnby, G.J. (1987). The relationship between the multidimensional health locus of control and the performance of subjects on a preventive peridontal programme. *Journal of Clinical Periodontology*, 14: 171-176.
- Gift, H.C. (1986). Current utilization patterns of oral hygiene practices: state-of-the-science review. In Loe, H. and Kleinman, D.V.(eds.). *Dental plaque control measures and oral hygiene practices*. Oxford: IRL. p.39-71.
- Graham, H. (1984). *Women, health and the family*. Brighton: Harvester.
- Haefner, D.P. (1974). The health belief model and preventive dental behaviour. In: Becker, M. (ed.). *The health belief model and personal health behaviour*. Thorofare: Charles B. Slack.
- Hodge, H.C., Holloway, P.J., Bell, C.R. (1982). Factors associated with toothbrushing behaviour in adolescents. *British Dental Journal*, 152: 49-51.
- Hoogstraten, J., De Haan, W. and Ter Horst, G. (1985). Stimulating the demand for dental care: an application of Azjen and Fishbein's theory of reasoned action. *European Journal of Social Psychology*, 15: 401-414.
- Honkala, E. (1993). Oral health promotion with children and adolescents. In: Schou, L. and Blinkhorn, A. (eds.). *Oral health promotion*. Oxford: Oxford University.
- Honkala, E. and Freeman, R. (1988). Oral hygiene behaviour and periodontal status in European adolescents: an overview. *Community Dentistry and Oral Epidemiology*, 16: 194-8.
- Honkala, E., Rajala, M. and Rimpela, M. (1981). Oral hygiene habits among adolescents in Finland. *Community Dentistry and Oral Epidemiology*, 9: 61-68.
- Honkala, E., Rimpela, M. and Pasanen, M. (1984). Trends in the development of oral hygiene habits in Finnish adolescents from 1977-1981. *Community Dentistry and Oral Epidemiology*, 12: 72-77.
- Honkala, E., Nyssonen, V. Knuutila, M. and Markkanen, H. (1986). Effectiveness of children's habitual toothbrushing. *Journal of Clinical Periodontology*, 13: 81-85.

Hunt, M.S. and Macleod, M. (1987). Health and behavioural change: some lay perspectives. *Community Medicine*, 9, 68-76.

Hunt, M. S. and Martin, C.J. (1988). Health-related behavioural change - a test of a new model. *Psychology and Health*, 2: 209-230.

Ingleheart, M.S. and Tedesco, L.A. (1995). The role of the family in preventing oral diseases. In: Cohen, L.K. and Gift, H.C. (eds.) *Disease Prevention and Oral Health Promotion*. Copenhagen: Munksgaard. p.271-292.

Jacob, M.C., and Plamping, D. (1989). *The practice of primary dental care*. London: Wright.

Janz, N.K. and Becker, M.H. (1984). The Health Belief Model: a decade later. *Health Education Quarterly*, 11: 1-47.

Kandrack, M.A. (1991). Gender differences in health related behaviour: some unanswered questions. *Social Science and Medicine*, 32: 579-590.

Karasek, R., Baker, D., Marxer, F., Ahlbom, A. and Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease: A prospective study of Swedish men. *American Journal of Public Health*, 71: 694-705.

Kegeles, S. (1963). Why people seek dental care: a test of a conceptual formulation. *Journal of Human Behavior*, 4: 166-173.

Kegeles, S., and Lund, A.K. (1978). Acceptance by children of a daily home mouthrinse program. *Social Science and Medicine*, 12, 199-210,

Kegeles, S. and Lund, A.K. (1982). Adolescents' health beliefs and acceptance of a novel preventive dental activity: replication and extension. *Health Education Quarterly*, 98: 192-208.

Kegeles, S., and Lund, A.K. (1984). Adolescents' health beliefs and acceptance of a novel preventive dental activity: a further note. *Social Science and Medicine*, 19, 978-982.

Kiyak, H.A., and Mulligan, K. (1986). Behavioural research related to oral hygiene practices: state-of-the-science review. In: Loe, H. and Kleinman, D.V. (eds.). *Dental Plaque Control Measures and Oral Hygiene Practices*. Oxford:

IRL. p.225-237.

Landis, J.R. and Koch, G.G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33: 159-174.

Lang, N.P., Cumming, B.R. and Löe, H. (1973). Toothbrushing frequency as it relates to plaque development and gingival health. *Journal of Periodontology*, 44: 396-405.

Lavstedt, S., Modeer, T. and Welander, E. (1982). Plaque and gingivitis in a group of Swedish schoolchildren, with special reference to toothbrushing habits. *Acta Odontologica Scandinava*, 40: 307-311.

Levine, R. (1991). *The scientific basis of dental health education*. 3 ed. London: Health Education Authority.

Locker, D. (1989). *Behavioural science in dentistry*. London: Routledge and Kegan Paul.

Lobene, R.R., Soparkar, P.M. and Newman, M.B. (1982). Use of dental floss; effect on plaque and gingivitis. *Clinical Preventive Dentistry*, 4: 5-8.

Lundy, J.R. (1972). Some personality correlates of contraceptive use among unmarried female college students. *Journal of Personality*, 80: 9-14.

McCaul, K.D., O'Neill, H.K. and Glasgow, R.E. (1988). Predicting the performance of dental hygiene behaviours: an examination of the Fishbein and Ajzen model and self-efficacy expectations. *Journal of Applied Social Psychology*, 18: 114-128.

Marcenes, W.S. (1990). *The relationship between oral health status, marital quality and work stress*. Ph.D. Thesis, Department of Epidemiology and Public Health, University College London.

Marcenes, W.S. and Sheiham, A. (1992). The relationship between work stress and oral health status. *Social Science and Medicine*, 35: 1511-1520.

Marmot, M. and Theorell, T. (1988). Social class and cardiovascular disease: the contribution of work. *International Journal of Health Services*, 18: 659-674.

- Marmot, M., Smith, G.D., Stansfeld, S., Patel, C., North, F., Head, J., White, I., Brunner, E. and Feeney, A. (1991). Health inequalities among British civil servants: the Whitehall study. *Lancet*, 337: 1387-93.
- Miyazaki, H., Pilot, T., Leclercq, M.H. and Barmes, D.E. (1991). Profiles of periodontal conditions in adults measured by CPITN. *International Dental Journal*, 41: 74-80.
- Mullen, P.D., Hersey, J.C. and Iverson, D.C. (1987). Health behavioural models compared. *Social Science and Medicine*, 24: 973-981.
- Murtuomaa, H. (1979). Toothbrushing in Finland. *Community Dentistry and Oral Epidemiology*, 7: 185-190.
- Nyyssonen, V. and Honkala, E. (1984a). Toothbrushing frequency in four consecutive studies of Finnish adolescents. *Journal of Clinical Periodontology*, 11: 682-688.
- Nyyssonen, V. and Honkala, E. (1984b). Oral hygiene status and habitual toothbrushing in children. *Journal of Dentistry for Children*, 4: 285-288.
- Odman, P.A., Lange, A.L., Bakdash, M.B. (1984). Utilization of locus of control in the predictions of patient's oral hygiene performance. *Journal of Clinical Periodontology*, 11, 367-372.
- Ogden, J. (1995). Psychosocial theory and the creation of the risky self. *Social Science and Medicine*, 40: 409-415.
- Oppenheim, A.N. (1992). *Questionnaire design, interviewing and attitude measurement*. 2ed. London: St.Martins Press.
- Petersen, P.E. (1990). Social inequalities in dental health: towards a theoretical explanation. *Community Dentistry and Oral Epidemiology*, 18: 153-158.
- Pilot, T. and Miyazaki, H. (1991). Periodontal conditions in Europe. *Journal of Clinical Periodontology*, 18: 353-7.
- Plamping, D. (1986). Learning from children learning: peer tutoring in health education. *Radical Community Medicine*, V.27 Summer p.31-40.

- Rayner, J.F. and Cohen, L.K. (1974). A position on school dental health education. *Journal of Preventive Dentistry*, 1: 11-23.
- Rise J., Haugejorden, O., Wold, B. and Aarö, L.E. (1991a). Distribution of dental health behaviours in Nordic schoolchildren. *Community Dentistry and Oral Epidemiology*, 19: 9-13.
- Rise, J. and Aarö, L.E. (1991b). Determinants of dental health behaviours in Nordic schoolchildren. *Community Dentistry and Oral Epidemiology*, 19: 14-9.
- Rotter, J.B., Chance, J. and Phares, E.J. (1972). *Applications of a social-learning theory*. New York: Holt, Rinehart and Wiston.
- Rugg-Gunn, A.J., Macgregor, I.D.M. (1978). A survey of toothbrushing behaviour in children and young adults. *Journal Periodontal Research*, 13: 382-389.
- Schwarzer, R. (1992). Self efficacy in the adoption and maintenance of health behaviours: theoretical approaches and a new model. In: Schwarzer, R. (ed.) *Self efficacy: thought control of action*. Washington: Hemisphere. p.217-243.
- Schou, L. (1985). Active-involvement principle in dental health education. *Community Dentistry and Oral Epidemiology*, 13: 128-32.
- Sheiham, A. (1969). The prevalence and severity of periodontal disease in British populations. Dental surveys of employed populations in Great Britain. *British Dental Journal*, 126: 115-122.
- Sheiham, A. (1979). The epidemiology of dental caries and periodontal disease. *Journal of Clinical Periodontology*. 6: 7-15.
- Sheiham, A. (1988). The epidemiology, etiology, and public health aspects of periodontal disease. In: Grant, D.A., Stern, I.B and Listgarten. M.A. *Periodontics in the tradition of Gottlieb and Orban*. St.Louis: C.V.Mosby. p.216-251.
- Sheiham, A. (1991). Public health aspects of periodontal diseases in Europe. *Journal of Clinical Periodontology*, 18: 362-369.
- Sheiham, A.& Croucher, R. (1992). *Barriers to improving periodontal health -*

professional and lay perspectives. (Revised version of a paper presented at British Society of Periodontology, in September, 1989). Unpublished.

Silness, J. and Løe, H. (1964). Periodontal disease in pregnancy II - Correlation between oral hygiene and periodontal conditions. *Acta Odontologica Scandinava*. V.22 p.121-135.

Silversin, J. and Kornacki, M.J. (1984). Controlling dental disease through prevention: individual, institutional and community dimensions. In: Cohen, L.K. and Bryant, P.S: (eds.) *Social Sciences and Dentistry. A Critical Bibliography*. V.II. London: Quintessence. p.145-201.

Søgaard, A.J. (1993). Theories and models of health behaviour. In: Schou, L. and Blinkhorn, A.S. (eds.) *Oral health promotion*. Oxford: Oxford University. p.25-64.

Souza, M.B.D. (1993). Dental health education. In: Jong, A.W. (ed.) *Community dental health*. St.Louis: C.V.Mosby.

Todd, J., and Lader, D. (1991). *Adult dental health-dental 1988: United Kingdom*. London: HMSO.

Tones, B.K. (1979). Socialization, health career and the health education of the schoolchild. *Journal of the Institute of Health Education*, 17: 23-28.

Weisenberg, M, Kegeles, S. and Lünd, A. (1980). Children's health beliefs and acceptance of a dental preventive activity. *Journal of Health and Social Behavior*. 21: 59-74.

WHO (1987). *Oral health surveys. Basic Methods*. 3ed. Geneva: WHO.

Williams, A.F. (1972). Factors associated with seat belt use in families. *Journal of Safety Research*, 4: 133-138.

Young, A.C. (1970). Dental Health Education: an overview of selected concepts and principles relevant to programme planning. *International Journal of Public Health*, 14: 171-176.

Hodge, H.C. (1979). *Factors associated with toothbrushing behaviour in adolescents*. Ph.D. Thesis, Department of Child Dental Health. University of Manchester.

Kent, G.G., Matthews R.M., White, F.H. (1984). Locus of Control and Oral Health. *Journal of American Dental Association*, 109: 67-69.