Parenting stress, anxiety and depression in mothers of one- and two-year-old children with visual impairment: cross-sectional and longitudinal cohort analysis.

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Abstract

Aims

This study examined cross-sectional and longitudinal patterns of parenting stress, adult anxiety and depression in mothers of children with profound or severe visual impairment (PVI, SVI) at one and two years of age.

Methods

Mothers of a national cohort (OPTIMUM) of infants with congenital disorders of the peripheral visual system and PVI (light perception at best) or SVI (basic 'form' vision of non-light reflecting objects) participated. Infant age at baseline (T1), was 8-16 months. Mothers completed the Parenting Stress Index-Short Form and the Hospital Anxiety and Depression Scale at T1 (n=79) and at follow-up 12 months later (T2), (n=73).

Results

Mothers of the total group had higher parenting stress levels (34.6% in clinical range) than community normative data at T1 (p=.02); PVI subgroup was elevated at T1 and T2 (p=.01). The PVI subgroup was also elevated in the Difficult Child subscale at T2 (p=.001). Within-sample differences in parenting stress between the VI subgroups were found at T2 only; PVI subgroup scored higher than SVI subgroup (p=.03). Adult anxiety and depression in the total group were not elevated compared to community normative data at T1 and T2; however higher parenting stress was related to raised adult anxiety and depression levels at T1 and T2 (p=.001). Regression analysis found parenting stress and lower child vision level (T1) predicted parenting stress (T2) (p=.001: 42% variance).

Interpretation

Mothers of one-year-old infants with VI showed raised risk for parenting stress, which continued to be elevated for children with PVI and those perceived as 'difficult' at two years. This was also a psychological risk with greater adult anxiety and depression in those parents with raised parenting stress. The clinical significance is that identification of parenting stress and targeted parenting and behavioural support of the child in the first years of life is highly indicated.

What this research adds:

- Mothers of infants with VI are at increased risk of experiencing parenting stress.
- Parenting stress was higher in mothers of children with profound VI than in mothers with severe VI.
- Parenting stress and infant vision level at one year predicted parenting stress at two years.

Chronic congenital visual impairment (VI) affects early development and behaviour.[1] Infant disability is a risk factor for elevated parenting stress, depression and anxiety.[2-4] Risk factors associated with poor parental wellbeing are common in children with VI e.g., intellectual disability, behaviour difficulties, communication problems and autism spectrum disorder (ASD).[3-4] Children with VI show developmental delays from infancy and have a high risk of 'developmental setback' and socio-communicative difficulties, particularly those with profound VI.[1,5-6] In light of these potential risk factors, parenting stress and psychological wellbeing in mothers of children with VI were examined from the first to second years of life.

Previous research investigating the wellbeing of parents with children with VI mainly comprises descriptive studies with small and poorly controlled heterogeneous samples. Studies have identified various stressors including long-term concerns (e.g. the child's future) and current needs (e.g. child-rearing demands, access to healthcare and community services).[2,7-8] Tröster found higher parenting stress in mothers of children with VI than in mothers of typically developing children.[8] However the age range, vision levels and abilities of children were broad. Parenting stress over time was not investigated.

Sola-Carmona and colleagues investigated anxiety in parents of children with VI, exploring parental adjustment to child disability.[2] Their findings suggested higher anxiety and lower subjective wellbeing in parents compared to normative data. To our knowledge, depression rates in parents have not been investigated. However, in a systematic review of caregivers (spouses, family, close friends) of adults with VI, elevated depression levels and a high burden of care were reported.[9] It is not known whether there is a relationship between the child's severity of VI and parenting stress, and whether greater parenting stress results in elevated anxiety and depression in the

parent. As lower parental wellbeing and increased parenting stress may impact on child development and behavioural functioning,[10-12] we investigated these factors in mothers of children with VI during the first two years of life. It was appropriate to consider this longitudinally as parenting stress associated with raising a child with a medical condition has been shown to be elevated across the first years of life.[13] As it is not known whether mothers or fathers have similar or different reactions on these psychological measures, only mothers were included in our study.

This study is part of a national longitudinal cohort study (OPTIMUM Project)[14], which set out to investigate the factors influencing early development in infants with VI. As planned at outset, maternal measures of parenting stress and adult anxiety and depression were collected at the first two time points of the study (T1 or baseline and T2). The aims of this specific study were to investigate 1) cross-sectional patterns and associations of maternal parenting stress, anxiety and depression at T1 and T2 including comparisons with normative community population data; 2) longitudinal associations including factors predicting parenting stress at T2. This was undertaken for the total sample and for the subgroups of mothers whose children had profound VI (PVI) or severe VI (SVI).

For typically developing children, parenting stress is associated with depression and anxiety in the parent.[4, 5, 12, 15-16] We anticipated that parenting stress, adult anxiety and depression would be elevated and positively associated with each other in this clinical cohort. There is also a prediction from low birth-weight infants[16] that parenting stress may decrease during the second year as mothers become adapted to their role as parents and have a better understanding of their child's needs. Tröster found severe VI to be linked with worse maternal wellbeing.[8] We therefore

anticipated that greater severity of VI would negatively influence maternal wellbeing, with higher levels of parenting stress across both time points.

Methods

Design

Longitudinal observational design with national cohort of infants with visual impairment and their parents (OPTIMUM Project)[14], with data collected at the first study time point (baseline T1) and at the second time point 12 months later (T2).

Setting

Testing took place at a hospital research site, participant homes, or both (n=61, 25, 4 respectively); entry to study 2011-2014. Ethical approval was obtained from the Health Ethics Committee (Bloomsbury NHS REC no. 10/H0713/46), and met the standards of the Social Research Association. Written informed consent was obtained from parents.

Participants

The study involved a single specialist hospital research site, which undertook direct recruitment using national open enrolment. Thirty-one NHS hospitals across England with local collaborators from paediatric ophthalmology joined as Patient Identification Centres (UK CRN portfolio no. 55126). Participants were also identified through health visiting/early years' services, specialist educational VI services, voluntary organizations and self-referral.

Mothers of infants aged 8-16 months with chronic VI (estimated vision approximately 1.0 logMAR or worse at entry[14]) took part. Infants with congenital

disorders of the peripheral visual system (CDPVS, i.e. ophthalmological disorders of the globe, retina and optic nerve anterior to the optic chiasm) with ('complex') or without ('simple') a known central nervous system disorder in the paediatric diagnosis were eligible. All had a classifiable vision disorder (ICD-10) according to medical diagnosis through ophthalmology departments. Infants with clinically diagnosed neurological, motor or hearing impairment or retinopathy of prematurity and mothers who did not speak sufficient English to complete questionnaires were excluded. Ninety infants and their mothers participated at T1. Child ophthalmological and vision characteristics and maternal demographics at T1 are reported in Table 1 and in further detail in Dale et al.[14]

Measures

Functional vision. Infant vision level was measured by a trained assessor with the Near Detection Scale (NDS),[17] a 10-point scale ranging from no light perception (0) to detection of diminishing sized 'lures' to 0.1 cm 'lure' (9) at a standard 30 cm distance. On the NDS, PVI was points 0-1 (light perception at best) and SVI was points 2-9 (varying levels of non-light reflecting 'form' vision). At T1, 52% of children with SVI had grating acuity measured (Keeler Acuity Cards).

Parenting Stress Index-Short Form. The Parenting Stress Index-Short Form (PSI-SF) 3rd Edition is a 36-item self-report questionnaire developed for use with parents of children aged 1 month-12 years, derived from the full Parenting Stress Index.[18] The items on the PSI-SF are identical to the full version of the Parenting Stress Index and were derived through factor analysis. As such, the PSI-SF has comparable validity to subscales in the full-length questionnaire.[18] The PSI-SF comprises three subscales

(each containing 12 items) and a Total Stress score (PSI-TS) giving an overall indication of parenting stress. The Parental Distress subscale (PSI-PD) measures parenting-related factors contributing to the parental experience of distress. The Parent-Child Dysfunctional Interaction subscale (PSI-PCDI) measures the parent's perception of the parent-child relationship and the child not meeting parental expectations. The Difficult Child subscale (PSI-DC) measures child behavioural characteristics that may be difficult to manage.[18] Items are rated on a 5-point Likert scale, with higher scores indicating higher stress. Percentile scores of 1-80 are in the 'normal' range, 81-84 in the 'subclinical' range and 85+ are considered 'clinically elevated'.[18] The PSI-SF also contains a measure of Defensive Responding (DR), and scores below the 10th percentile indicate that the parent may be responding in a defensive manner or true low parenting stress. At T1 and T2, 11% of participants scored low on Defensive Responding (DR). All participants were included in analyses as it is not known whether low DR scores reflect intending to present a favourable impression or true low stress levels,[18] and removing the lowest-scoring participants would risk artificially elevating questionnaire scores. PSI scores from our sample were compared to data from the original Abidin sample used to validate the PSI-SF (N=800) (Psychological Assessment Resources, Inc., personal communication).

Hospital Anxiety and Depression Scale (HADS). The Hospital Anxiety and Depression Scale **(**HADS) measures adult anxiety and depression.[19] The HADS is used in community samples and research studies, showing good validity and sensitivity.[20] Raw scores of 0-7 are in the 'normal' range, 8-11 in the 'mild' range, 12-14 in the 'moderate' range, and 15-21 in the 'severe' range. HADS data in this

study were compared to community normative data from a recent study with a large sample of UK female respondents (N=3503).[21]

Procedure

Participants completed a half-day assessment at home or the research laboratory at each time point. The full infant assessment consisted of a developmental and play-based assessment and the functional vision assessment. Mothers completed the questionnaires during the T1 and T2 assessments, or at home within four weeks of assessment.

Statistical analyses

All computations were undertaken with raw scores on the PSI-SF and HADS with the exception of the clinical classification analysis, which was undertaken with percentiles according to the HADS and PSI manuals.[18-19] Histograms, Q-Q plots, skewness/standard error (<1.96) ratio, and Kolmogorov-Smirnov tests were used to assess the normality of distributions of the raw scores. For normally distributed data, we used parametric statistics (one-sample/independent samples/paired samples t-tests/ Pearson correlations). For non-normally distributed data we used non-parametric statistics (Mann-Whitney-U tests/Wilcoxon signed-rank tests/Spearman rank correlations). When we carried out between-samples comparisons for the PVI and SVI groups, non-parametric tests were used due to the uneven group sizes. Analyses were conducted on PSI-TS and individual subscales and HADS scores between the subgroup with (Complex) or without additional known central nervous system disorder (Simple). No significant differences were found within the PSI-SF subscales between the two subgroups, except for the PSI-PCDI subscale at T1 with a

significantly higher score in the Complex subgroup (U=334.50, p=.04). This was only found at T1 but not at T2, so we proceeded to carry out the main analyses of PSI-TS with the total sample not divided according to Simple and Complex. One-sample t-tests compared the sample means of PSI-SF, HADS Depression and HADS Anxiety to community population normative means (Psychological Assessment Resources Inc., personal communication).[21] Subgroup analyses comparing mothers of infants with SVI and PVI were conducted. Reported-values (alpha <0.05) were two-tailed, and where appropriate we used the Holm-Bonferroni method to control for the family-wise error rate of multiple comparisons.

To examine which factors at T1 predicted parenting stress at T2, we carried out a hierarchical multiple regression analysis in the total sample. Parenting stress and vision level NDS (T1) were the first predictors and HADS Anxiety and Depression at T1, and number of mother's other children and maternal education were the second predictors. All variables were treated as continuous variables. Forced entry 'Enter' was used in SPSS version 22.0.

Results

Participants

Of the total sample (n=90), 79 (88%) completed the PSI-SF and HADS at T1 (n=1 partial completion; n=11 non-responders). At T2, 71 (79%) completed the PSI-SF (n=8 non-responders) and 73 (81%) completed the HADS (n=6 non-responders). Of the original 90 participants, 11 were lost to follow up at T2 for a variety of reasons (e.g. parental commitments, number of child's medical appointments). Non-responding was often attributed to lack of time. Because of missing data, full datasets

at both time points were available for 67 (74%) participants for the PSI-SF and 68 (76%) for the HADS. Table 1 presents comparisons between responders and non-responders on various demographic, maternal and child variables. The results suggest no significant differences between the two groups in child age, birth-weight, gestation, gender, vision (PVI/SVI), vision (NDS), and number of siblings at T1 and T2. However, although no significant differences were found in education level between responders and non-responders at T1, mothers lost to follow up or non-responding rate (T2) was higher in those with lower education level.

At T1 21 (27%) of the children had PVI and 58 (73%) had SVI. In children with SVI and with whom we were able to gain an acuity measure using preferential looking (Keeler Cards), all except three had an acuity of logMAR 1.0 or worse at T1. The estimated vision level in 34 (43%) of the cohort would meet the WHO definition of 'Blindness' (visual acuity less than 1.3 logMAR in the better eye). At T2, 17 (23%) of children had PVI and 56 (77%) had SVI. One child moved from PVI to SVI from T1 to T2.

Internal Consistency of PSI-SF and HADS with VI sample.

In order to determine the internal consistency of the PSI-SF with our population of mothers of children with VI, we carried out a Cronbach's alpha analysis on the PSI-TS Scale and the three PSI-SF subscales at both time points. The results suggest good internal consistency (>.78) and alpha values were comparable to the PSI-SF Abidin.[18] For T1/T2 and the normative Abidin sample[18] respectively, PSI-TS: .91/.90/.91; PSI-PD: .85/.88/.87; PSI-PCDI: .82/.78/.80; and PSI-DC: .85/.84/.85. HADS data were compared to the Bjelland et al (2002) review. For T1/T2 and Bjelland review respectively, HADS Anxiety: .88/.86/.83; HADS Depression:

.68/.81/.82. Our results were comparable to HADS normative data[20] except perhaps for T1 Depression, which appeared lower. However, this was still within the range reported by the Bjelland et al (2002) review (Cronbach's alpha range of .67-.90).

Cross-sectional patterns and associations of Parenting Stress, Anxiety and Depression (T1 and T2)

For PSI-TS at T1, mothers' percentile scores ranged in the 'normal' (60.3%) 'subclinical' (5.1%) and 'clinical'(34.6%) range. At T1, HADS Anxiety scores ranged in the 'normal' (55.7%), 'mild' (21.5%), 'moderate' (15.2%) and 'severe' (7.6%) range; HADS Depression scores ranged in the 'normal' (79.5%), 'mild' (16.7%), and 'moderate' (3.8%) range. At T2, PSI-TS percentile scores ranged in the 'normal' (67.6%), 'subclinical' (4.2%) and 'clinical' (28.2%) range. HADS Anxiety scores ranged in the 'normal' (63.0%), 'mild' (19.2%), 'moderate' (13.7%) and 'severe' (4.1%) range and HADS Depression scores in the 'normal' (82.2%), 'mild' (9.6%), 'moderate' (6.9%) and 'severe' (1.4%) range.

Tables 2 and 3 present means and standard deviations for the raw scores of the PSI-TS and subscales, HADS Anxiety and Depression at T1 and T2 and community normative data. One-sample t-tests revealed significantly higher mean PSI-TS scores and PSI-PCDI raw scores than community normative data in the total sample ($t(77)=2.44$, $p=.02$, $d=0.30$), ($t(78)=3.71$, $p=.001$, $d=0.47$) respectively (T1). No significant differences were found at T2. When examining the PVI and SVI groups separately, mothers of children with PVI scored significantly higher means than normative data on PSI-TS at T1 ($t(20)=2.70$, $p=.01$, $d=0.61$) and T2 ($t(17)=2.93$, $p=.01$, $d=0.76$), PSI-PCDI at T1 ($t(20)=3.60$, $p=.01$, $d=0.85$), and PSI-DC at T2

(t(17)=4.03, p=.001, d=0.96). Mothers in the SVI group scored significantly higher means only in PSI-PCDI at T1 (t(57)=2.35, p=.02, d=0.35) and had similar scores to normative data on PSI-TS and subscales at T2.

Independent-sample Mann-Whitney U analyses compared PSI-SF mean ranks of scores between the PVI and SVI groups in our sample. At T1, PSI-TS and PSI-SF subscale scores did not differ significantly between mothers in the PVI and SVI groups. At T2, mothers of children with PVI had significantly higher PSI-TS and PSI-DC scores than mothers of children with SVI (U=311.50, p=.03, d=0.50; U=229.00, p=.001, d=0.51 respectively).

HADS Anxiety and Depression mean scores for the total sample and the PVI and SVI subgroups separately did not differ significantly from normative data at T1 or T2. Independent-sample Mann-Whitney U analyses compared HADS Anxiety and Depression scores between the PVI and SVI subgroups; there were no differences between the PVI and SVI groups at T1 or T2.

Following assessment of normality, parametric Pearson correlation coefficients (r) were used for normally distributed data, and Spearman rank correlation coefficients (rho) for non-normally distributed data. Analyses revealed significant relationships between PSI-TS and HADS Anxiety (r=.35, p=.001) and HADS Depression (r=.59, p=.001) at T1, and between PSI-TS and HADS Anxiety (r=.52, p=.001) and HADS Depression (ρ=.62, p=.001) at T2. Correlations investigating vision level (NDS T1) showed significant relations with PSI-TS (ρ=-.32, p=.01), PSI-PCDI (ρ=-.34, p=.01) and PSI-DC (ρ=-.41, p=.001) at T2 only, but not at T1. Vision level was not significantly related to HADS Anxiety or Depression at either time point.

Longitudinal patterns of Parenting Stress, Anxiety and Depression (T1-T2).

Parametric paired-sample t-tests and nonparametric Wilcoxon signed-rank tests examined differences in parenting stress between T1 and T2. No significant differences were found in PSI-TS or subscales between T1 and T2 for the total group or within the PVI and SVI subgroups. For HADS Anxiety and Depression, there were no significant differences in scores between T1 and T2. There were also no significant differences in HADS Anxiety or Depression scores for mothers in the SVI group and for HADS Depression in the PVI group between T1 and T2. However, HADS Anxiety scores in the PVI group decreased significantly between T1 and T2, $t(15)=2.73$, $p=.02$, $d=0.48$.

To examine which factors at T1 predicted parenting stress (PSI-TS) at T2, we carried out a hierarchical multiple regression analysis with PSI-TS at T1 and vision level (NDS T1) as first predictor variables, and HADS Anxiety and Depression T1 and number of mother's other children and maternal education as second predictors. The first step of the model was significant, $F(2, 63)=14.12$; $p=.001$ and PSI-TS (T1) and vision level NDS (T1) explained 31% of the PSI-TS variance at T2. Entering the remaining predictors in Step 2 significantly explained an additional 11% variance ($F(4, 59)=2.71$; $p=.04$) , with all predictors together explaining 42% of the variance in PSI-TS at T2 $F(6, 59)=7.05$; $p=.001$ (Table 4).

Discussion

This study investigated parenting-related stress in a relatively large representative cohort of mothers whose children have rare heterogeneous congenital disorders of the peripheral visual system with or without an additional known central nervous system disorder, and severe or profound VI. To our knowledge this is the first

study to cross-sectionally and longitudinally investigate patterns of maternal anxiety, depression and parenting stress across early childhood with this population.

Findings suggest that by the end of the first year, a significant proportion of mothers of children with VI showed elevated parenting stress, with approximately a third reporting parenting stress in the clinical range. Mothers in our sample had significantly higher mean scores in Total Stress (PSI-TS) scale and Parent-Child Dysfunctional Interaction (PSI-PCDI) subscale than parents in the PSI-SF community population normative data at T1. This parallels findings in other child disability research, where mothers often experience high psychological distress and poorer mental health in the first year of life due to concerns regarding their infant's diagnosed medical condition, prognosis and future.[3, 5, 8]

By two years, nearly a third of mothers were still in the clinical or subclinical range for Total parenting stress, highlighting poorer mental health. Parenting stress associated with perception of the child as 'difficult' (PSI-DC), was elevated for mothers in the PVI group. Studies of children with VI report risks of early childhood behavioural problems, challenging behaviours including self-directed behaviours, social communicative difficulties and developmental setback, particularly in the PVI subgroup,[1, 5-6] which may negatively influence the parent's wellbeing and level of parenting stress and might also impact on the parent-infant and toddler interactions at this young age. Studies with other clinical populations support the proposition that child behavioural difficulties impact on parenting stress[3-4, 16]

At T1, mothers in both the SVI and PVI groups showed significantly elevated parenting stress compared to normative community population data.[18] However in the second year, mothers of children with PVI remained significantly higher in parenting stress compared to both the SVI group and normative population, whereas the SVI

group no longer showed significantly elevated stress. In the literature children with SVI show improving levels of vision during the second year of life[1] and related advances in cognitive function compared to children with PVI.[1, 14, 17] These positive changes are potentially protective and may have helped mothers come to terms with their child's disability and to adapt more easily to their role as a parent of a young child with VI.[16] This may potentially account for the vision level group differences in parenting stress. Lack of improvement in vision and other potential developmental challenges in the PVI group may have contributed to the continuing parenting stress in their mothers.

The Difficult Child subscale (PSI-DC) specifically displayed significantly elevated scores in the PVI group across the two time points. This result may highlight the considerable behavioural challenges and unmet expectations that mothers of young children with PVI reported to be experiencing in relation to their young child who lacks any vision. Studies on mother-child interactions with children with PVI have identified observable two-way difficulties in synchrony and coordination of communication and play with potentially more challenging and less rewarding experiences for mothers[15, 22].

Interestingly, adult anxiety and depression levels for the total sample and subgroup of mothers of children with SVI were comparable to normative community data at both time points. Unlike parenting stress, only a small proportion of mothers scored within the severe range for anxiety and depression. These results suggest that overall the mothers were similar in anxiety levels and mood to and representative of the general population. However, adult anxiety and depression levels and total parenting stress were significantly correlated at both time points. This suggests an important relationship between broader psychological wellbeing and parenting stress,

with worse mental health in those with highest parenting stress, which is of potential clinical significance.

The hierarchical regression analysis showed that total parenting stress and vision level at T1 accounted for 31% of the variance in parenting stress at T2. All predictors together accounted for 42% of the variance at T2. Child vision level and parenting stress at T1 significantly predicted parenting stress at T2, with lower vision level and higher stress at T1 predicting higher stress at T2. This suggests that profound VI contributes to continuing parenting stress in the early years and highlights an ongoing vulnerability for young children with PVI and their mothers. The second risk factor was that those mothers who were more stressed at T1 were likely to be more stressed at T2 regardless of their child's degree of VI, maternal education, number of other children or adult anxiety/depression. Other unidentified factors such as parental cognitions, coping strategies and other familial socioeconomic resources[23] may further contribute to parenting stress. In addition, by two years of age, some children may be starting to exhibit more challenging behaviors.[5, 22] Mothers already experiencing higher levels of parenting stress who perceive their child to be more 'difficult' may find challenging behaviours particularly stressful.

A number of potential limitations may affect the generalizability of this study. The PSI-SF and HADS have not been validated with mothers of children with VI, however our Cronbach's alpha results show strong internal consistency comparable to the PSI manual and HADS review.[18, 20] As the PSI-SF and HADS are both parent-report measures, it is possible that mothers wished to give a positive impression to the researchers leading to under-reported parenting stress and adult mental health risk. However only a small proportion of mothers reached levels of 'defensive responding' on the PSI-SF, suggesting that positive presentation was not a main issue.

Further research directions include analysis of the possible association between parenting stress and child behavioural problems (undertaken as part of the OPTIMUM Project[14]), as these results indicated that mothers with higher parenting stress perceived their children to have behaviours that are difficult to manage. Child internalizing and externalizing behaviours can affect parental stress and vice versa,[23, 24] and we plan to examine whether such problems influence the cross-sectional and longitudinal parent-child relationship and contribute to parenting stress. A further analysis currently being undertaken in the project is the comparative effectiveness of different methods of early childhood intervention and parenting stress as a final outcome variable at mean age three years of the longitudinal study.

The results of this study suggest that mothers of children with VI are at risk of high parenting stress at the end of infancy and in the second year of childhood. Moreover, those mothers who found parenting their child with VI a more stressful experience at one year were more likely to remain stressed when their child was two years, regardless of their anxiety/depression and maternal demographic factors, especially if their child had more profound VI. The evidence strongly suggests that *parenting stress* rather than general adult mental health may be the issue, highlighting the importance of direct specialized support for parents in early handling of and interactions with their infant and young child. In particular, continuing experience of the young child as 'difficult' to interact with appears to be a main stressor for mothers, especially those with children with PVI, and provides the case for early behavioural intervention with parents of young children showing behaviour difficulties. Therefore, mothers may need additional targeted support to ensure that their psychological wellbeing is enhanced and that the behavioural and developmental potential of the child is maximized.

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Appendix

Table 1. Child and mother characteristics for responders and non-responders at T1 and T2.

Child / Maternal Characteristics	**T1**			**T2**		
	Responders N=79	**Non-responders N=11**	**Comparison**	**Responders N=73**	**Non-responders and drop-out N=17**	**Comparison**
Age						
Months (Median)	13.38	11.48	U=335.50, *p*=.22	26.10	27.66	U=148.00, *p*=.19
Range	7.48 -17.25	7.80-15.93		20.33-32.00	24.56 – 31.87	
Birth Weight						
Kilograms (Median)	3.31	3.60	U=154.50, *p*=.45	3.35	3.28	U=308.50, *p*=.24
Range	1.82 – 4.32	2.02 - 4.08		1.82 – 4.32	2.02 - 3.90	
Gestation						
Weeks (Median)	40.00	40.00	U=168.00, *p*=.65	40.00	39.00	U=281.50 *p*=.13
Range	32 – 43	38 – 42		32 - 43	*36-41*	
Gender						
Female (N)	37	4	$\chi^2(1)$=.43, *p*=.51	34	7	$\chi^2(1)$=.16, *p*=.69
Male (N)	42	7		39	10	
Ratio	1:1.1	1:1.8		1:1.1	1:1.4	
Vision level T1						
PVI (N)	21	4	$\chi^2(1)$= .46, *p*=.50	18	7	$\chi^2(1)$=1.88, *p*=.17
SVI (N)	58	7		55	10	
Ratio	1:2.8	1:1.8		1:3.1	1:1.4	
Near Detection Scale T1						
Median	7	5	U=394.50, *p*=.62	7	5	U=490.00, *p*=.17

Range	0 - 9	0 - 9		0 - 9	0 - 9	
Maternal Education N. (%)						
No qualifications / level 1+2						
Secondary School (no A-level)	18 (23)	3 (37.5)	$\chi^2(2)= 5.16$, $p=.08$	13 (18)	8 (62)	$\chi^2(2)= 12.35$, $p=.01$
Level 3						
A levels/final year examinations/some higher education	18 (23)	4 (50)		19 (26)	3 (23)	
Level 4						
University graduate/ higher degree/ professional postgraduate	42 (54)	1 (12.5)		41 (56)	2 (15)	
Number of mother's other children						
N. (%)						
None	46 (59.7)	5(83.5)	$\chi^2(1)= 1.31$, $p=.25$	45 (62.0)	6 (60)	$\chi^2(1)= .01$, $p=.92$
One or more	31 (40.3)	1 (16.7)		28 (38.0)	4 (40)	
Range	0 - 4	0 - 1		0 - 4	0 - 3	

Table 2. *Means (SDs) for VI PSI-SF and Abidin PSI-SF comparisons*

		T1			T2			
		VI (N=79)	**PVI (N=21)**	**SVI (N=58)**	**VI (N=71)**	**PVI (N=18)**	**SVI (N=53)**	**PSI-SF Abidin Scores (N=800)**
PSI-PD	Mean *(SD)*	28.63 *(8.27)*	29.14 *(7.90)*	28.44 *(8.47)*	27.76 *(9.09)*	29.44 *(11.13)*	27.19 *(8.33)*	26.40 *(7.20)*
	Comparison	*t(77)=2.38, p=.02*↑	*t(20)=1.59, p=.13*	*t(56)=1.82, p=.07*	*t(70)=1.26, p=.21*	*t(17)=1.16, p=.26*	*t(52)=.69, p=.49*	
PSI-PCDI	Mean *(SD)*	21.35 *(6.35)*	23.14*(5.65)*	20.71*(6.51)*	19.99 *(5.93)*	22.17 *(6.37)*	19.25 *(5.64)*	18.70 *(4.80)*
	Comparison	*t(78)=3.71, p=.001*	*t(20)=3.60, p=.01*	*t(57)=2.35, p=.02*	*t(70)=1.82, p=.07*	*t(17)=2.31, p=.03*↑	*t(52)=.70, p=.49*	
PSI-DC	Mean *(SD)*	26.11 *(8.11)*	28.38 *(7.45)*	25.29 *(8.24)*	27.06 *(8.08)*	32.50 *(6.84)*	25.21 *(7.68)*	26.00 *(6.70)*
	Comparison	*t(78)=.13, p=.90*	*t(20)=1.46, p=.16*	*t(57)=-.65, p=.52*	*t(70)=1.10, p=.28*	*t(17)=4.03, p=.001*	*t(52)=-.75, p=.46*	
PSI-TS	Mean *(SD)*	76.09 *(18.44)*	80.67 *(16.41)*	74.40 *(18.99)*	74.80 *(18.38)*	84.11 *(18.96)*	71.64 *(17.23)*	71.00 *(15.40)*
	Comparison	*t(77)=2.44, p=.02*	*t(20)=2.70, p=.01*	*t(56)=1.35, p=.18*	*t(70)=1.74, p=.09*	*t(17)=2.93, p=.01*	*t(52)=.27, p=.79*	

↑=Finding not significant following Holm-Bonferroni correction. N=1 partial completion of PSI-SF at T1 (SVI)

Table 3. *Means (SDs) for VI HADS and Breeman HADS comparisons*

		T1			T2			
		VI (N=79)	**PVI (N=21)**	**SVI (N=58)**	**VI (N=73)**	**PVI (N=18)**	**SVI (N=55)**	**HADS Breeman Scores (Anxiety N=3491) Depression N=3503)**
Anxiety	Mean *(SD)*	7.23 *(4.31)*	8.24 *(3.39)*	6.86 *(4.58)*	6.66 *(4.08)*	6.44 *(4.11)*	6.73 *(4.10)*	6.78 (4.23)
	Comparison	*t(78) =.92, p=.36*	*t(20) =1.97, p=.06*	*t(57) =.14, p=.89*	*t(71) =-.26, p=.79*	*t(17) =-.35, p=.73*	*t(53) =-.10, p=.92*	
Depression	Mean *(SD)*	4.72 *(2.98)*	5.45 *(2.44)*	4.47 *(3.13)*	4.92 *(3.52)*	5.11 *(3.09)*	*4.85 (3.67)*	4.12 (3.78)
	Comparison	*t(77) =1.77, p=.08*	*t(19) =2.44, p=.03*↑	*t(57) =.84, p=.40*	*t(71) =1.98, p=.052*	*t(17) =1.36, p=.19*	*t(53) =1.53, p=.13*	

↑=Finding not significant following Holm-Bonferroni correction. N=1 partial completion of HADS at T1 (PVI)

Table 4. *Regression prediction for PSI-TS T2 (outcome)*

Predictor	***Unstandardized B coefficient***	***SE B***	***Standardised B coefficient***	***Lower Bound 95% CI***	***Upper Bound 95% CI***
Step 1					
Constant	43.32	8.80		25.72	60.91
PSI-TS T1	.49	.11	.49***	.28	.70
Child Vision NDS T1	-1.23	.54	-.24*	-2.32	-.150
Step 2					
Constant	34.21	9.67		14.86	53.55
PSI-TS T1	.36	.12	.35**	.11	.60
Child Vision NDS T1	-1.25	.54	-.24*	-2.33	-.17
HADS Anxiety T1	.91	.49	.22	-.06	1.89
HADS Depression T1	.56	.80	.10	-1.03	2.16
Number of mother's other children	1.01	1.89	.06	-2.77	4.79
Maternal Education	2.94	1.76	.19	-.57	6.45

Note: R^2 = .31 for Step 1, ΔR^2 = .11 for Step 2 (p<.05) **p<.05, **p<.01, ***p<.001*