

Medway Perinatal Support Service Evaluation May 2018 Technical Appendix: Further details about data analysis.

Quantitative Data

Missing data

As indicated in the main report, there was a significant amount of missing data. Missing value analysis was conducted to determine the percentage of missing data. Missing value analysis was performed on both data sets with Little's MCAR test ($p > .05$) supporting the data being missing completely at random (MCAR) [65]. As more than 5% of data is missing at random multiple imputation is appropriate.

MPSS attrition was 19.5%, this is the maximum recommend level to impute missing values, any higher than the estimation of MPSS would not be accurate [65]. A sensitivity analysis was conducted comparing per protocol and multiple imputation with the intention to treat (ITT) analysis to test the validity of findings [66].

Quantitative Data Analysis

As discussed in the main report, data was divided into two sets.

Data set one analysis

A Shapiro-Wilk normality test was performed as appropriate for a small sample size. A normal distribution can be assumed ($p > .05$) with data set one measures except for the Mother Objects Relation Scale [59] post ($p < .05$). Nonparametric testing (Wilcoxon signed rank pairs) was applied to allow for this. Paired sample t-tests were performed on the Hospital Anxiety & Depression Scale [60] and Warwick-Edinburgh Mental Wellbeing Scale [61] using both listwise (complete cases) and analysis-by-analysis (cases with valid data). A Wilcoxon signed ranks test was applied to the Mother Objects Relation Scale [59] as this did not meet the parametric assumption of normality distribution. Associations between changes in pre-post measures and support were explored. On examination of scatterplots Kendall tau were conducted due to outliers.

A per protocol analysis reported the same statistically significant results as ITT. Multiple imputation was conducted in SPSS using the automatic imputation method using a linear regression model for scale variables. Paired t-tests were then conducted. The results reported statistically significant mean differences in Hospital Anxiety & Depression Scale [60], Warwick-Edinburgh Mental Wellbeing Scale [61] and Mother Objects Relation Scale [59] sub scale warmth. A non-significant finding was reported for Mother Objects Relation Scale [59] sub scale invasiveness. These findings provide support for the statistically significant results in this data set.

Data set two analysis

Due to high levels of missing data measures were analysed individually. Generalised Anxiety Disorder Assessment [63], Patient Health Questionnaire [64] and Maternal Postnatal Attachment Scale [62] scores had normal distribution as assessed by Shapiro-Wilk's test ($p > .05$). Pair sample t-tests were conducted on all data set two measures to compare means using both listwise (complete cases) and analysis-by-analysis (cases with valid data). Relationships between change scores of outcome measures and service duration were explored using regression analysis.

A per protocol analysis reported the same statistically significant results as ITT. Multiple imputation was conducted in SPSS using the automatic imputation method using a linear regression model for scale variables. Paired t-tests were then conducted. The results supported the ITT findings in some models, however the pooled model reported statistically significant results for Maternal Postnatal Attachment Scale total, attachment and hostility scores. Caution is required as the sample sizes were small so at increased risk of type one errors (false positive).

Description of Outcome Measures

1.1.1 Description of outcome measures

The outcome measures in Table 1 are described below:

1.1.1.1 Data set one measures

- Mothers' Objects Relation Scale (MORS) [59]: This is a 14-item screening scale to identify potential problems in parent-infant relationship. The scale measures a parent's perceptions of their infant's emotional warmth and invasiveness towards them. A higher score on warmth indicates a perceived higher level of warmth of the infant towards parent. Whereas a higher score on invasiveness indicates perceived invasiveness of infant towards parent. There are no guidelines to indicate problematic attachment [59].
- Hospital Anxiety and Depression scale (HADS) [60]: This is a 14-item self-report questionnaire with seven questions each for anxiety and depression. Scores range from 0 to 21, with up to 7 normal, 8-10 mild, 11-14 moderate and 15-21 severe [60].
- Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) [61]: This is a 14-item self-report Likert scale to measure mental wellbeing. The minimum score is 14 and maximum is 70. The population mean score is 50.7. Higher scores indicate greater mental health wellbeing.

2.3.2.2 Data set two measures

- Maternal Postnatal Attachment Scale (MPAS) [62]: This is a 19-item questionnaire, scored on a five-point Likert scale, of thoughts and feelings towards baby. Items are comprised of three subscales; quality of attachment (enjoyment, pride of infant) score range 9 to 45, absence of hostility (feelings of irritation, resentment) score range 5 to 25, and pleasure in interaction (playing, reunited) score range 5 to 25. Overall scores range from 19 – 95. Higher scores indicate higher maternal attachment.
- Generalised Anxiety Disorder Assessment -7 (GAD-7) [63]: This is a self-report seven item questionnaire to assess anxiety. Scores range from 0 to 21 with higher scores indicating increased anxiety. Scores represent; 0-5 mild, 6-10 moderate, 11-15 moderately severe and 15-21 severe anxiety. Further clinician evaluation is advised for scores over 10.
- Patient Health Questionnaire (PHQ-9)[64]: This is a self-report nine item questionnaire to assess depression. Scores range 0 to 27 with higher scores denoting greater depression. Scores represent; 0-4 minimal, 5-9 mild, 10-14 moderate, 15-19

moderately severe and 20-27 severe depression. Clinician advice is recommended for scores greater than 10.

Qualitative Analysis

We used Framework Analysis for the qualitative data. This process began with familiarisation with the data, then we developed a thematic framework which we used for indexing the data [67]. This was followed by charting the data and then mapping and interpretation which allowed us to develop descriptive and explanatory findings [67]. These were illustrated using various anonymised quotations.