Arch Womens Ment Health (2007) 10: 171–175
DOI 10.1007/s00737-007-0191-y
Printed in The Netherlands

Archives of
Women's
Mental Health

Original contribution

An evaluation of two bonding questionnaires: a comparison of the Mother-to-Infant Bonding Scale with the Postpartum Bonding Questionnaire in a sample of primiparous mothers

A. Wittkowski[1,2], **A. Wieck**[2], **S. Mann**[3]

[1] Division of Clinical Psychology, School of Psychological Sciences, University of Manchester, Manchester, UK
[2] Manchester Mental Health and Social Care Trust, Wythenshawe Hospital, Manchester, UK
[3] Edenfield Centre, Prestwich, Manchester, UK

Received 26 July 2006; Accepted 4 June 2007; Published online 4 July 2007

Summary

The emotions and attitudes of mothers towards their infants are crucial for the child's well-being and development. Some mothers experience a delay in the onset of maternal affection after childbirth and occasionally a longer lasting failure to bond will ensue. Little is known about the precise prevalence of these difficulties, how they relate to maternal mental health, how they develop over time and what their biological and psychosocial correlates are. In research studies the mother–infant relationship has traditionally been assessed using observational methods but these are time consuming and not suited for screening in clinical practice. Two self-rating instruments have recently been developed to assess maternal bonding. Both can be used in large samples of recently delivered mothers including those suspected to be at high risk of bonding disorders. In this study, the psychometric properties of the 8-item Mother-to-Infant Bonding Scale (MIB) and the 25-item screening questionnaire for mother–infant bonding disorders, namely the Postpartum Bonding Questionnaire (PBQ), were examined in a sample of first-time mothers in order to establish their reliability and validity. Ninety-six women completed the MIB, PBQ and the Kennerley Blues Scale on day 2–4 postpartum. Both bonding instruments demonstrated acceptable reliability and reasonable validity, with the exception of the PBQ subscale of risk of abuse.

Keywords: Mother–infant bonding; postpartum bonding; construct validation; questionnaires

Correspondence: Dr. Anja Wittkowski, Division of Clinical Psychology, School of Psychological Sciences, University of Manchester, 2nd Floor Zochonis Building, Brunswick Street, Manchester M13 9PL, UK
e-mail: Anja.wittkowski@manchester.ac.uk

Introduction

A mother's response to her offspring is of crucial importance for the infant's development from early on after birth (Bowlby 1958). The detrimental impact of maternal bonding difficulties on the emotional and cognitive development of the child and the quality of the mother–infant relationship has been well documented in the literature (Crittenden and Ainsworth 1989; Murray et al. 1996; Kumar 1997; Brockington 2004; Deale 2005). In his books (Brockington and Kumar 1982; Kumar and Brockington 1988; Brockington 1996) Brockington provides a good overview of the range of psychological issues impacting on motherhood and maternal mental illness, ranging from postpartum disorders (Brockington 1996) to their effects on early maternal attachment (Robson and Powell 1982; Brockington 1996).

This paper addresses the mother–infant relationship, not the infant–mother attachment. When asked when they first felt love with their babies, 41% of mothers reported this to be whilst pregnant, 24% at birth, 27% during the first week of their child's life and 8% reported to feel affection for their newborn after the first week (MacFarlane et al. 1978). Robson and Kumar (1980) also noted that 40% of primiparous mothers reported feelings of indifference upon first holding their babies. It is therefore relevant to examine early maternal attitudes and feelings, which influence her bond with her child.

The term *bonding* has been used as a synonym for attachment but also to denote the development of parental feelings towards the infant, which occurs within the first few hours after the baby's birth (Reber 1985). Taylor et al. (2005) defined *bonding* as the mother's feelings towards her child and differentiated this process from observable attachment behaviours (Taylor et al. 2005). Attachment behaviours are typically assessed using observational methods, such as the CARE Index (see Crittenden 2001) or the Strange Situation Test (Ainsworth et al. 1978). Bonding can be assessed by asking the mother through interview or questionnaire methods. Taylor et al. (2005) devised the Mother-to-Infant Bonding Scale (MIB) to screen the general population for postnatal difficulties in relation to maternal emotions towards her baby. Taylor et al. (2005) observed the MIB to have good internal consistency but no data relating to the internal consistency of the scale and its convergent validity were reported. When the women in Taylor's study completed the MIB with a view to how they felt in the first few weeks postpartum, the MIB correlated positively only with the Edinburgh Postnatal Depression Scale (EPDS) (Cox et al. 1997) ($\rho = 0.31$, $p < 0.01$) but not with the Kennerley Blues Scale (Kennerley and Garth 1989) or the Highs Scale (Glover et al. 1994). In addition, no significant associations were observed for completion at day 3 postpartum or at week 12 between the MIB and the Kennerley Blues Scale or the Highs Scale (see Taylor et al. 2005).

Another participant-rated instrument assessing the mother–infant relationship is the Postpartum Bonding Questionnaire (PBQ), which was devised by Brockington et al. (2001) as a screening instrument to detect bonding problems in obstetric and primary care services. This measure was completed by 218 women, some of which experienced depression or an impaired mother–infant relationship. This measure was compared to interviews of 51 mothers who were asked about their pregnancy, delivery and pueriperium period. The authors used principal component analysis to examine the structure of the questionnaire. They also present scores obtained by non-depressed and depressed mothers as well as mothers identified to have mild or severe bonding disorders, such as postpartum depression, mild impairment of the mother–infant relationship, maternal rejection or anger (Brockington et al. 2001). However, data on the PBQ's internal consistency, convergent or construct validity was not presented. Furthermore, although 218 questionnaires were available for analysis, a sample size of 49 women was presented and described in the text as subjects (Brockington et al. 2001). It seems unclear how many completed questionnaires were available for the principal component analysis. Consequently, the PBQs subscale structure warrants further validation.

The aim of the current study was to examine the reliability and validity of the MIB and PBQ and their relationship to maternal mood in a sample of first-time mothers.

Methodology

Participants

Primiparous mothers aged between 18 and 35 subsequently admitted to the postnatal wards of Wythenshawe Hospital in Manchester and Stepping Hill Hospital in Stockport were asked to participate in the study, which was approved by the local Research Ethics Committees. Exclusion criteria were a premature delivery, a previous miscarriage after the second trimester or stillbirth, a positive lifetime history of psychiatric disorder, separation from the infant for more than 4 h after delivery, a birth weight of less than 2500 g and an apgar score of six or less at 1 min after birth.

Assessment

Participants completed three self-rated questionnaires between day 2 and 4 post-partum. The Postpartum Bonding Questionnaire (PBQ) (Brockington et al. 2001) is a 25-item scale reflecting a mother's feelings or attitudes towards her baby (e.g. "I feel close to my baby", "My baby irritates me"). Participants rated how often they agreed with these statements on a 6-point Likert scale ranging from always (score = 0) to never (score = 5) with low scores denoting good bonding. The PBQ has four subscales which reflect *impaired bonding* (Scale 1) (12 items, ranging from 0 to 60), *rejection and anger* (Scale 2) (7 items, scores ranging from 0 to 35), *anxiety about care* (Scale 3) (4 items, scores ranging from 0 to 20) and *risk of abuse* (Scale 4) (2 items, scores ranging from 0 to 10). Brockington et al. (2001) suggest cut-off scores to identify problematic bonding of 12 for Scale 1, 17 for Scale 2, 10 for Scale 3 and 3 for Scale 4. For statistical analysis both total and subscale scores were used.

The Mother-to-Infant Bonding Scale (MIB) (Taylor et al. 2005) was scored twice, once to cover how the mother felt immediately after childbirth (Time 1) and once how she had felt since then (Time 2). The MIB consists of 8 statements describing an emotional response, such as "loving" or "disappointed", which are rated on a 4-point Likert scale from very much (score = 0) to not at all (score = 3). Five items describe negative emotional responses and are reverse scored. Low scores denote good bonding. Scores can range from 0 to 24. Taylor et al. (2005) report good internal reliability (Cronbach alpha of 0.71) and a positive correlation with the EPDS ($\rho = 0.31$, $p < 0.01$) during the first 12 weeks postpartum.

The Kennerley Blues Scale (Kennerley and Gath 1989) asks participants to indicate whether they are experiencing any of a list of 28 emotions (e.g. "tearful", "happy", "restless") on that day using a yes/no format. They then rate each emotion on a

5-point scale according to how different they feel today compared to usual.

Statistical analysis

Data were analysed using SPSS (Windows 11.5). Data were tested for normal distribution before and after transformation and parametric or non-parametric tests were used accordingly. Sample characteristics were determined using descriptive statistics. Spearman correlation coefficients were calculated to examine associations between the questionnaires and to determine convergent and concurrent validity. Internal consistency was established using Cronbach alpha coefficients, which measure the reliability of a scale (Streiner and Norman 1995).

Results

Ninety-six mothers gave birth to a single child. Their babies (44 boys and 52 girls) had a mean birth weight of 3514 g (SD 449.26). Forty-one mothers had vaginal deliveries, 24 had an elective and 31 had an emergency Caesarean section. The mothers had a mean age of 28.79 years (SD 5.07). Eighty-four percent of mothers were married or living with their partner and 86.5% indicated to have been pleased about being pregnant. All mothers indicated they had bonded well with their babies and felt emotionally stable as indicated by the low scores on the PBQ, MIB and Blues scales (Table 1). On the MIB, mothers reported to have significantly more positive feelings towards their baby at day 2–4 postpartum (Time 2) than immediately after birth (Time 1) (Wilcoxon Signed Ranks Test, $z = -5.25$, $p < 0.001$).

Internal consistency

The internal consistency of all scales was assessed using Cronbach's alpha. For the total PBQ scale Cronbach's alpha was acceptable at 0.76. Cronbach's alphas for subscales 1, 2 and 3 were 0.79, 0.63 and 0.63, respectively. Due to zero variance in the two items of the risk abuse scale, the internal consistency of Scale 4 could not be determined. When these items were omitted from the total PBQ scale, Cronbach's alpha was 0.77.

Table 1. Medians and ranges for bonding and mood scales statistics

$n = 96$	Median	Range
MIB at Time 1	1	0–10
MIB at Time 2	0	0–5
PBQ Impaired bonding	2	0–16
PBQ Rejection and anger	1	0–14
PBQ Anxiety about care	3	0–13
PBQ Risk of abuse	0.1	0–2
PBQ Total Score	7	0–40
Kennerley Blues Score	8	0–42

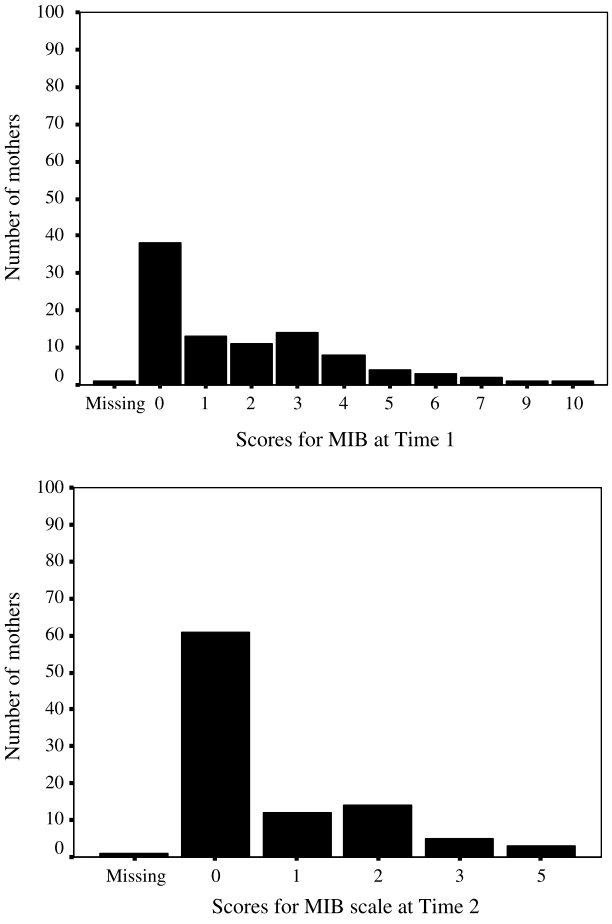

Fig. 1. Distribution of MIB scores at Time 1 and 2

The internal consistency of the MIB scale at Time 1 was acceptable at 0.55, while the MIB scale at Time 2 demonstrated a similar internal consistency with a Cronbach's alpha of 0.49. Figure 1 shows the distribution of both MIB scores. In addition, some MIB items were almost never endorsed by our group of mothers, namely feeling "resentful", "dislike" or "aggressive". Further analyses revealed that in relation to immediate bonding, 7 mothers (7.4%) felt a little disappointed, 1 (1.1%) disliked her child a little, 2 (2.1%) felt a little aggressive while 1 (1.1%) felt quite aggressive towards her infant. Six mothers (6.3%) admitted to feeling a little indifferent, 6 (6.3%) felt quite indifferent and 1 (1.1%) reported to feel very much indifferent towards her infant. None of the mothers felt resentful. Interestingly, one mother (1.1%) admitted to not feeling loving towards her child at all, with 9 other mothers (9.4%) feeling only slightly loving towards their children. Maternal affection appeared to improve at 2–4 days postpartum (i.e. at Time 2), with no mothers endorsing dislike or

Table 2. Spearman's correlations for PBQ, MIB and Blues Scores

	MIB at Time 1	PBQ Total	PBQ Impaired bonding	PBQ Rejection and anger	PBQ Anxiety about care	PBQ Risk of abuse	Kennerley Blues Scale
MIB at Time 1	0.505**	0.378**	0.377**	0.287**	0.213*	−0.011	0.357**
MIB at Time 2		0.300**	0.361**	0.335**	0.001	−0.072	0.335**
PBQ Total			0.853**	0.715**	0.725**	0.108	0.457**
PBQ Impaired bonding				0.529**	0.442**	0.064	0.445**
PBQ Rejection and anger					0.311**	0.047	0.354**
PBQ Anxiety about care						−0.009	0.262*
PBQ Risk of abuse							−0.009

** Correlations significant at 0.01 level (2-tailed).
* Correlations significant at 0.05 level (2-tailed).

feelings of aggression. Four (4.2%) felt a little disappointed and resentful, while only 5 (5.3%) felt slightly indifferent.

Convergent and concurrent validity

Spearman's rho correlations were undertaken to examine the significance of the magnitude of associations between the MIB scale, PBQ and Blues scale (Table 2). MIB scores at Time 1 and 2 were significantly associated with each other ($\rho = 0.505$, $p < 0.01$, 2-tailed), sharing 25.5% of variance. Significant positive correlations were also observed between PBQ and MIB scores at Time 1 ($\rho = 0.378$, $p < 0.01$, 2-tailed) and MIB scores at Time 2 ($\rho = 0.300$, $p < 0.01$, 2-tailed), which supports the convergent validity of these scales. With the exception of *risk of abuse*, all PBQ subscales were significantly and positively correlated with each other and with the PBQ total score (all $p < 0.01$).

The correlations between PBQ and MIB scales with the Blues scale were positive and significant (Table 2). However, the relationships between MIB scores at Time 1 and 2 and Blues scores ($\rho = 0.357$, $p < 0.01$, 2-tailed and $\rho = 0.335$, $p < 0.01$, 2-tailed) were only moderately strong, accounting for 12.74 and 11.22% of the variance, respectively. Likewise, the relationships between the Blues scale and PBQ total and subscale scores were largely moderate, ranging from 20.88 to 12.53%. The exception was the PBQ subscale of *anxiety about care* which shared only 6.86% of variance with the Blues scale.

Discussion

This study aimed to examine the psychometric properties of two questionnaires assessing mother–infant bonding. The PBQ demonstrated good internal reliability and reasonable validity. The exception was the fourth subscale pertaining to abuse. This subscale consists of only two items which were not endorsed by this group of mothers. Brockington et al. (2001) reported that this subscale accounted for only 3.4% of the total variance and acknowledged that a self-rating scale was unlikely to identify incipient abuse correctly. Indeed using the scale in clinical samples, we have observed that mothers with obsessional thoughts tended to score false positively on these items. For these reasons we would suggest to omit this subscale from the PBQ.

The MIB scales were significantly correlated with the PBQ and Blues scale, suggesting appropriate convergent and concurrent validity. The fact that the MIB scores immediately after childbirth and on day 2–4 postpartum correlated significantly with each other indicates some test-retest reliability and is consistent with the findings by Taylor et al. (2005). The scores also indicate that levels of bonding improve in the early postpartum period which is similar to the observations made by Robson and Kumar (1980) and MacFarlane et al. (1978). However, the observed difference was relatively small. Robson and Kumar (1980) noted that 40% of primiparous mothers reported feelings of indifference upon first holding their baby. However, they did not screen for psychiatric disorders nor excluded major obstetric complications, both of which could have contributed to their findings.

Despite the fact that both scales demonstrate their usefulness in examining mother–infant bonding, a limitation of this study is that the participants in our sample had no significant mood or psychiatric difficulties and indeed demonstrated appropriate maternal affection and positive attitudes towards their infants. Future studies including mothers with affective and psychotic disturbances or personality disorders may lead to a wider spread of scores. The factor structure of the PBQ also requires further testing using a larger sample as some items appear to be conceptually similar but are assigned to different subscales. For example, ''my baby winds me up'' was assigned to the *impaired bonding* subscale but is com-

parable to ''my baby annoys me'' which is part of the *rejection and anger* subscale. The ability of the PBQ to detect change over time is another area of investigation, which is particularly important when the scale is used in patients with mental illness.

Although observational methods play a role in assessing the mother–infant relationship, the assessment of maternal affection and attitude is important as they are a precursor to the development of this relationship. The PBQ and MIB provide easily administered assessment tools and useful insights into the mother's feelings and attitudes towards her infant for clinical and research purposes.

References

Ainsworth MDS, Blehar MC, Waters E, Wall S (1978) Patterns of attachment: a psychological study of the strange situation. Erlbaum Hillsdale, NJ

Bowlby J (1958) The nature of the child's tie to his mother. Int J Psycho-Analysis 39: 350–373

Brockington IF (2004) Postpartum psychiatric disorders. Lancet 363: 303–310

Brockington IF, Kumar R (1982) Motherhood and mental illness. Oxford University Press, Oxford

Brockington IF, Oates J, George S, Turner D, Vostanis M, Sullivan M, Loh C, Murdoch C (2001) A screening questionnaire for mother–infant bonding disorders. Arch Womens Menl Health 3: 133–140

Cox JL, Holden JM, Sagovsky R (1997) Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry 150: 782–786

Crittenden PM (2001) CARE-INDEX Infants and Toddlers. Coding Manual. Family Relations Institute, Miami, USA

Crittenden PM, Ainsworth MDS (1989) Child maltreatment and attachment theory. In: Ciccetti D, Carlson V (eds) Handbook of child maltreatment. Cambridge University Press, New York

Deale T (2005) Associations between child development and women's attitudes to pregnancy and motherhood. J Reprod Infant Psychol 23: 63–75

Glover V, Liddle P, Taylor A, Adams D, Sandler M (1994) Mild hypomania (the highs) can be a feature of the first postpartum week: association with later depression. Br J Psychiatry 164: 517–521

Kennerley H, Gath D (1989) Maternity Blues: detection and measurement by questionnaire. Br J Psychiatry 155: 356–362

Kumar R, Brockington IF (1988) Motherhood and mental illness: causes and consequences. Oxford University Press, Oxford

Kumar RC (1997) ''Anybody's child'': severe disorders of mother-to-infant bonding. Br J Psychiatry 171: 175–181

MacFarlane JA, Smith DM, Garrow DH (1978) The relationship between mother and neonate. In: Kitzinger S, Davis JA (eds) The place of birth. Oxford University Press, New York

Murray L, Stanley C, Hooper R, King F, Fiori-Cowley A (1996) The role of infant factors in postnatal depression and mother–infant interactions. Dev Med Child Neurol 38: 109–119

Robson KM, Kumar R (1980) Delayed onset of maternal affection after childbirth. Br J Psychiatry 136: 347–353

Robson KM, Powell E (1982) Early maternal attachment. In: Brockington IF, Kumar R (eds) Motherhood and mental illness. Oxford University Press, Oxford

Streiner DL, Norman GR (1995) Health measurement scales. A practical guide to their development and use, 2nd edn. Oxford University Press, Oxford

Taylor A, Atkins R, Kumar R, Adams D, Glover V (2005) A new Mother-to-Infant Bonding Scale: links with early maternal mood. Arch Womens Ment Health 8: 45–51