The Japanese version of the Postpartum Bonding Questionnaire: Examination of the reliability, validity, and scale structure

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A B S T R A C T

Objective: The purpose of this study was to develop the Japanese version of the Postpartum Bonding Questionnaire (PBQ) to gather data on Japanese mothers for comparison with other cultures and to examine the scale structure of the PBQ among Japanese mothers.
Methods: We administered the PBQ to a cross-section of 244 mothers 4 weeks after delivery and again 2 weeks later to 199 mothers as a retest to examine reliability. We used exploratory factor analysis to evaluate the factor structure of the PBQ. Correlations with the Mother-to-Infant Bonding Scale (MIBS), the Maternal Attachment Inventory (MAI), Edinburgh Postnatal Depression Scale (EPDS), and sociodemographic variables were calculated for validation.
Results: The 14-item version of the PBQ extracted by exploratory analysis consisted of four factors: 'impaired bonding', 'rejection and anger', 'anxiety about care', and 'lack of affection'. We found significant correlations of the total scores of the PBQ and the 14-item version of the PBQ positively with the MIBS and negatively with the MAI. Moderate significant correlations with total scores were also found with the EPDS. Total scores for primiparous and depressed mothers were higher than those for multiparous mothers and mothers without depression.
Conclusion: The results of this study demonstrated the reliability and validity of the PBQ and the 14-item version of the PBQ in Japanese mothers 4 weeks after delivery.

Introduction

The relationship between mothers and infants is recognized as important for both infant cognitive and behavioral development and maternal mental health. Bowlby [1,2] developed the 'attachment theory' to explain why children suffered both physically and psychologically when separated from their mothers. Ainsworth and Bell [3] demonstrated this theory by using the Strange Situation Procedure to observe the attachment patterns of infants. On the other hand, maternal feelings toward the fetus or infant have also been referred to as 'attachment' and measurement scales have been developed [4–9]. In the 2000s, confusion over the term 'attachment' provoked controversy among researchers leading to the following clarification: the infant's feelings toward the mother refer to 'attachment', and the mother's feelings toward her infant refer to 'bonding' [10,11]. However, in contrast to 'attachment', a common measure of 'bonding' among researchers has yet to be established.

Brockington et al. [12] developed the concept of the bonding disorder and the Postpartum Bonding Questionnaire (PBQ) consisted of 25 items as a screening instrument for bonding disorders. Clinical validation of the questionnaire for screening of bonding disorders was established by setting a threshold for each scale [13]. Brockington et al. [14,15] emphasized that bonding disorders were only one type of many emotional disorders that could arise in mothers during the postpartum period and that although bonding disorders and depression are reportedly moderately correlated, these disorders are not always a comorbidity of depression [13].

Brockington commented that there was room to improve the PBQ. In subsequent research, using the German version of the PBQ, Reck et al. [16] examined the validity of the scale structure of the PBQ with principal component analysis, and suggested a 16-item version of the PBQ consisting of one main component: 'impaired bonding'. In the UK, Wittkowski et al. [17] examined the factor structure of the PBQ with exploratory factor analysis, and suggested a 22-item version of the PBQ consisting of three factors: 'maternal emotional response (factor 1)', 'anger or irritability towards baby (factor 2)', and 'anxiety about child

care responsibilities (factor 3)'. The main effect of the widespread interest in the PBQ has been to provoke controversy over its scale structure.

At almost the same time as the PBQ was developed, Kumar [10] developed the Mother-to-Infant Bonding Questionnaire (MIBQ), which uses self-reports to assess the severity of bonding disorders in postpartum women with mental health issues on a five-grade scale from 'strong affection' to 'extreme disorder'. Taylor et al. [11] then developed the Mother-to-Infant Bonding Scale (MIBS), which consists of eight adjectives (loving, resentful, neutral or felt nothing, joyful, dislike, protective, disappointed, and aggressive) by adapting Kumar's MIBQ. The MIBS was soon after modified by Kumar's colleague Marks, which resulted in the addition of two adjectives (possessive and scared or panicky) for a total of ten items [18].

Although both the PBQ and the MIBS measure the spectrum of bonding disorders and have been found to be moderately associated with each other [19,20], there are some conceptual differences between them. One difference was that Brockington included 'infant-focused anxiety', which was a subscale of the PBQ, as a criterion of bonding disorders. 'Infant-focused anxiety' was defined as anxious feelings reported by the mother ranging from mild anxiety occurring particularly when alone with her infant to severe anxiety leading to reduced contact with her infant. Another difference was that Brockington also included 'risk of abuse' as a subscale to screen for the possibility of abuse.

In Japan, the number of child abuse [21] in 2013 was reported as 737,651. The number of reports increases annually, so perinatal health care providers are exploring the tool of contributing to perinatal mental health and child abuse prevention [21,22]. The PBQ could be useful in assessing a mother's emotional feelings toward her baby in clinical situations. The purpose of this study was to develop the Japanese version of the PBQ with demonstrated reliability and validity, to examine the scale structure of the PBQ among Japanese mothers, and to gather data on Japanese mothers for comparison with other cultures.

Materials and methods

This was a cross-sectional study with additional retesting to examine the reliability of the Japanese version of the PBQ. Between August and December 2012, 300 mothers who had given birth at local obstetric hospitals in an urban area in Kyushu, Japan, and were undergoing a health checkup 4 weeks after delivery were recruited for this study (Time 1). The Institutional Review Boards of all participating institutes approved the study, and written informed consent was obtained from all participating mothers. Inclusion criteria were women >20 years old and infants with a normal gestational period and a birth weight of 2500–4000 g. Women who gave birth to twins or had medical problems were excluded. A total of 244 mothers were given the following self-rating questionnaires at Time 1: the PBQ, the MIBS [18], the Maternal Attachment Inventory (MAI) [7,23], and the Edinburgh Postnatal Depression Scale (EPDS) [24,25]. Questionnaires were completed at participating obstetrics clinics in a space where privacy was assured or their home, and returned to the researcher. Two weeks after Time 1, the same questionnaires were re-sented to the mothers' homes (Time 2); these were completed at home and returned to the researchers. In addition to completing the questionnaires, each participant also provided sociodemographic data such as age, number of children, marital status, economical status, educational level, and employment status at Time 1.

PBQ

The PBQ [13] consists of 25 items divided into four scales: 'impaired bonding' (12 items), 'rejection and anger' (seven items), 'anxiety about care' (four items), and 'risk of abuse' (two items) (Table A.1). Each item is followed by a six-point Likert scale ranging from 'always" (0) to 'never' (5). When the statement reflects a positive emotion or attitude, the scoring is reversed. Higher scores reflect a problematic mother-to-infant bond.

Development of the Japanese version of the PBQ

Permission to develop the Japanese version of the PBQ was obtained from Brockington, the author of the original PBQ. A Japanese translator with a PhD translated the PBQ into Japanese. Subsequently, a native English speaker proficient in Japanese back-translated the Japanese version into English while blinded to the original English PBQ. Brockington reviewed this back-translated version for conceptual and linguistic equivalence. We modified some expressions and completed the Japanese version of the PBQ with the original author's approval.

MIBS

The MIBS [11,18] consists of questions using ten adjectives to assess the mother-to-infant bond, each followed by a four-point Likert scale ranging from 'very much' (0) to 'not at all' (3). When the adjective reflects a positive emotional response, the scoring is reversed. Higher scores indicate a problematic mother-to-infant bond. The Japanese version of the MIBS was developed by Yoshida et al. [18], and internal consistency is 0.71 at up to 4 months after delivery. The internal consistency in the current study was 0.60.

MAI

The MAI [7] is used to assess maternal feelings of affection. It consists of 26 items, each followed by a four-point Likert scale ranging from 'almost always' (4) to 'almost never' (1). The adjectives reflect the mother's feelings of affection toward her baby, with higher scores indicating a greater degree of affection. The Japanese version of the MAI was developed by Nakajima et al. [23], and internal consistency is 0.92 at 4 weeks after delivery. The internal consistency in the current study was 0.91.

EPDS

The EPDS [24] is an internationally established instrument used to screen for depressive symptoms in postnatal mothers. The EPDS comprises ten items with responses rated on a four-point (0–3) scale. The Japanese version of the EPDS was developed by Okano et al. [25]. Internal consistencies are 0.67 and 0.74 at 1 and 3 months after delivery, respectively. We adopted the threshold of a score of ≥9 for detecting a probable diagnosis of depression, as suggested by Yamashita et al. [26]. The internal consistency in the current study was 0.78.

Statistical analysis

We confirmed the distribution of data using the Shapiro–Wilks test. Internal consistency was calculated with Cronbach's alpha values. Test–retest reliability was examined with Spearman's rank correlation coefficients and Wilcoxon's test. For validity, associations among the MIBS, the MAI, the EPDS, and the PBQ scores were examined using Spearman's rank correlation coefficients. We defined correlation coefficients of <0.3 as slight, 0.3 to <0.5 as moderate, and ≥0.5 as high [27]. When the MIBS and the PBQ were positively associated, we considered convergent validity to be demonstrated. When the MAI and the PBQ showed negative association, we considered the discriminant validity to be demonstrated. When the EPDS and the PBQ were associated, we considered the criterion-related validity to be demonstrated. For known-groups validity, we compared the scores of primiparous and multiparous mothers, and of mothers with depression and without depression, using Mann–Whitney U-tests, and Cohen's d [27]. When the PBQ score of primiparous mothers was higher than that of multiparous mothers, and the score of mothers with depression was higher than that of mothers without depression, we considered the known-groups validity to be demonstrated.

We used exploratory factor analysis for the scale structure of the PBQ instead of principal component analysis by the method of weighted