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A Swedish translation and validation of the Mother-to-Infant Bonding Scale

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Short title

Swedish Mother-to-Infant Bonding Scale

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A Swedish translation and validation of the Mother-to-Infant Bonding Scale

Abstract

Aim: To test initial validity, reliability, and feasibility of the Mother-to-Infant Bonding Scale in a sample of Swedish mothers. **Methods:** A translation was performed through 11 steps using forward-backward bilingual technique. For criterion validity, the Swedish translation of the Mother-to-Infant Bonding Scale (S-MIBS) was compared with the Postpartum Bonding Questionnaire, sub-scale 1 (PBQ1) and 2 (PBQ2) and Edinburgh Postnatal Depression Scale (EPDS) in a sample of 63 Swedish mothers. Internal consistency was calculated with Cronbach's alpha. For feasibility testing, the mothers were asked to grade their experience of S-MIBS and PBQ on a four-point scale. **Results:** The results show a correlation between S-MIBS and PBQ1 ($r=0.80$ $p<0.001$), PBQ2 ($r=0.69$, $p<0.001$) and EPDS ($r=0.44$, $p<0.001$). Internal consistency was $\alpha=0.68$. Most mothers (93.1%) found S-MIBS to be easy or very easy to complete compared to PBQ (88.7%). **Conclusions:** The initial testing of the Swedish translation of the Mother-to-Infant Bonding Scale shows usability to measure the mother's emotions towards her healthy full-term infant.

Key words: Attachment, bonding, feasibility, infant, instrument, mother-infant interaction, parent, reliability, validation

Background

The concept of bonding describes the mother's feelings and behaviour towards the infant throughout the infant's first year (1, 2). A positive healthy bonding process along with a good quality of mother-infant interaction will facilitate the attachment process. If the parent shows positive feelings for the infant, has a loving, emotional behaviour, and are available and responsive to the infant's communicative signals, the infant is more likely to develop a secure attachment to the parent (3-5).

A healthy bonding process facilitates the infant's psychological and physiological development (6-8). A challenging bonding, on the other hand, may lead to an unhealthy parent-infant relationship with increased risk of neglect and child abuse (9). Mothers with challenging bonding and/or symptoms of depression may experience negative emotions towards the infant, which may be one explanation for child abuse (9, 10). Antenatal depressive symptoms and stress relate to poor postnatal mother-infant bonding (11) and mothers with postpartum depression have an increased risk of not bonding to their infants (12-14). O'Higgins et al. showed a correlation between early postpartum depression and poor bonding when the child was one year old. Moreover, an even stronger correlation between poor bonding one to four weeks postpartum and poor bonding when the child was one year old (13). These studies together highlight the importance of acknowledging both postpartum depression symptoms and the quality of the bonding.

Because of the risks to the infant, it is important to assess bonding and, if necessary provide adequate support. The earlier a challenging bonding can be detected and responded to, the better the outcome for the infant (13). Therefore, an easy to use instrument would be helpful in Swedish Child Health Centers and Neonatal Care Units, in order to screen mothers or to initiate a conversation with high-risk mothers. The Postpartum Bonding Questionnaire (PBQ)

is a validated self-rating questionnaire developed to measure bonding (15, 16). The PBQ is translated into several languages including Swedish (17). The PBQ has been criticised for being too extensive and some of the items to be invidious (16, 18). The Mother-to-Infant Bonding Scale (MIBS) is another validated self-rating questionnaire (19). The MIBS has been translated into several languages but not into Swedish. Nurses have described MIBS as feasible to use on a daily basis (12, 20). Because MIBS is a short instrument consisting of only eight words describing each feeling, it is viewed as easy to use even for mothers with reading and writing difficulties (20).

Aim

The aim with this study was to test initial validity, reliability, and feasibility of the Mother-to-Infant Bonding Scale in a sample of Swedish mothers.

Material and Methods

Design

This study used a cross-sectional methodological design. The translation of MIBS was performed through 11 steps using three forward-backward translations. Forth translations were made by the authors while back translations were performed by bilingual (English and Swedish) persons (21). The translation was discussed with bilingual consumers before the final version was decided (Table 1). Since there is no gold standard to measure early bonding in a Swedish population, criterion validity was used to evaluate the relationship between the translated Swedish version of the MIBS (S-MIBS) and two translated and tested instruments measuring bonding and postpartum depression, respectively (22). The instruments are described below. All three instruments were used simultaneously. Reliability test was performed to ensure that the items included in the S-MIBS produced results consistent with the overall instrument. The study was approved by the Regional Committee for Medical Research in Sweden (2016/89-31; 2017/89-41).

Inclusion criteria

Inclusion criteria were mothers who could understand and read Swedish and were attending a routine check-up six to eight weeks after delivery of their healthy full-term infants at the Child Health Care Center.

Data collection

Convenience sampling was used to recruit four participating Child Health Care Centers in South Sweden during the spring of 2017. Three of the Child Health Care Centers were urban centers and one rural. Nine nurses whereof one from the rural Child Health Care Center, were involved in the recruitment process. Nurses meeting mothers provided oral and written information about the study and asked for oral and written consent to participate. Consenting mothers completed a questionnaire collecting demographic data, the S-MIBS, the PBQ, and the Edinburgh Postpartum Depression Scale (EPDS). After the mothers completed each bonding instrument, the feasibility of the S-MIBS and PBQ was rated by asking them how easy they found it to complete the questionnaires. The response alternatives included: very easy; easy; difficult; very difficult. Because of the risk of raising emotions and feelings about motherhood, nurses at the Child Health Care Center offered consultation if required and were also prepared to refer them if appropriate.

Mother-to-Infant Bonding Scale (MIBS)

The MIBS is a self-administrative instrument measuring bonding (19). The MIBS consists of eight adjectives (items), each describing an emotion: loving, resentful, neutral (feel nothing), joyful, dislike, protective, disappointed and aggressive. Mother's answered how well the adjectives correlated to how they felt for the last seven days on a four-point scale ranging 0-3. The maximum score was 24, with higher values indicating more bonding challenges (19). A cut-off of two points has been recommended (12). Consent to translate and validate MIBS was given by the authors.

Postpartum Bonding Questionnaire (PBQ)

The PBQ is a self-administrative instrument measuring bonding (15, 16). The PBQ consists of 25 statements about mothers' feelings, where mothers' answer how well the statement applies to them on a six-point scales ranging 0-5, higher values indicating more problems. The instrument comprises four sub-scales (PBQ1-4), each with a separate cut-off. PBQ1 focuses on generic bonding and includes 12 statements with a maximum score of 60 and a cut-off of 12 points. It has a sensitivity of 0.93, specificity of 0.85 and test-retest correlation of 0.95. PBQ2 measures risk of serious lack of bonding and includes seven statements with a maximum score of 35 and a cut-off of 13 points. It has a sensitivity of 0.89, specificity of 1.0 and test-retest correlation of 0.95 (15). PBQ3 focus on the parent's anxiety about caring for the infant and can be used to identify postpartum anxiety disorders. PBQ4 focus on incipient abuse that need urgent assessment and intervention. Both PBQ3 and 4 demonstrate less sensitivity than PBQ1 and 2 and were not used in the present study because of the different focus (16, 18, 23).

Edinburgh Postpartum Depression Scale (EPDS)

The EPDS is a self-administrative instrument measuring symptoms of clinical depression (24). It consists of ten questions rated on Likert-type scales ranging 0-3, higher values indicating more symptoms. It has a sensitivity of 0.96, specificity of 0.49 and concurrent validity of 0.60 (24). EPDS is validated in a Swedish female population demonstrating a cut-off of 11.5 points (25).

Statistics

Since there is no consensus about sample size for validation and reliability testing of translated instruments, the sample size was based on a ratio of five persons per item, which equals >50 respondents (26). Pearson correlation coefficient (r) was used to calculate criterion validity between S-MIBS and PBQ1 and PBQ2, respectively, and the correlation between MIBS and EPDS. An independent t-test was used for comparison between mothers above and below the cut-off for EPDS and for mothers with or without university education.

For reliability testing, internal consistency was calculated with Cronbach's alpha. A Cronbach's alpha value >0.70 is usually considered satisfactory (27). A statistical significance was considered if the p-value was <0.05 . Descriptive statistics was used for feasibility.

Results

The final S-MIBS is shown in table 2. Sixty-seven mothers submitted the questionnaires, four of them were excluded because S-MIBS was not completed, resulting in 63 respondents. Mean age was 31.2 years (SD 4.6), infants' mean age was 7.1 weeks (SD 1.3). Fifty-seven percent of the mothers had a university education. Demographics are shown in table 3.

Mean (SD) for S-MIBS, PBQ and EPDS are displayed in table 3. Thirty respondents had S-MIBS scores above the recommended cut-off limit of two, the corresponding figures for PBQ1 was three and for PBQ2 was one. Ten of the respondents had an EPDS score above recommended cut-off.

There was a significant correlation between S-MIBS and PBQ1 ($r=0.80$, $p<0.001$), and between S-MIBS and PBQ2 ($r=0.69$, $p<0.001$). There was a significant correlation between S-MIBS and EPDS ($r=0.44$, $p=0.001$). The S-MIBS scores were significantly higher among mothers scoring above the cut-off on EPDS ($n=10$), mean 4.2 (SD 3.8) compared to mother below the cut-off limit ($n=52$), mean 1.6 (SD 1.6) ($p<0.01$). There was no significant difference in S-MIBS scores between mothers with or without university education.

Cronbach's alpha for S-MIBS was 0.68. Removal of the item 'protective' (corrected item-total correlation = 0.015) lead to an improvement in Cronbach's alpha (0.78), removal of any other item resulted in a lower Cronbach's alpha.

Fifty-seven and 61 mothers answered the feasibility questions for S-MIBS and PBQ respectively. Of the respondents, 53 (93.1%) found S-MIBS to be easy or very easy to complete, the corresponding figure for PBQ was 54 (88.7%). No mother found either S-MIBS or PBQ to be very difficult to complete, but four (7%) found S-MIBS and seven (11%) PBQ to be difficult to complete.

Discussion

We found significant correlation between S-MIBS and PBQ1 and PBQ2. The strengths of the correlations are considered good when testing psychosocial variables (22) and are in concordance with previous studies (18, 20, 28). Because PBQ and EPDS previously have shown good validity the correlation between S-MIBS and both of these instruments strengthen the criterion validity of S-MIBS (15, 16, 25). According to van Bussel (20), mothers with depressive symptoms or anxiety have less positive feelings towards their infants, which is in line with the present study as well as other studies (12, 13, 19, 28, 29).

The internal consistency was 0.68, which was close to the original instrument of 0.71 (19) and higher than in the study by Wittkowski et al (18). Since alpha is a function of the number of items included in an instrument, one explanation for an alpha value in the lower range could be that S-MIBS consists of only eight items (27). Another explanation could be that the included items have little in common (27). The removal of any item except 'protective' resulted in a lower Cronbach's alpha suggesting that all other items correlate with at least one other item in S-MIBS. However, since the removal of the item 'protective' resulted in a higher Cronbach's alpha future studies without this item should be considered. Further studies with test-retest reliability is also recommended in order to study stability over time.

The feasibility feedback confirmed previous research, as it showed that most mothers found the S-MIBS easy or very easy to complete (12, 20). Since PBQ is more extensive than S-

MIBS, S-MIBS is an excellent alternative to start with, if the intention is to measure bonding in the Child Health Care Center.

Compared to PBQ1 and PBQ2, more mothers scored above the recommended cut-off limit of two on S-MIBS, thus indicating a high sensitivity for S-MIBS. However, this was a higher prevalence than found in other studies using MIBS (12), which indicates a low specificity. Since we did not control for severe or traumatic events in the present study, it is impossible to know if such experiences had an effect on the prevalence. The age of the infant at the time the mother completes the scale may also be of significance (19). Even if the mother is near to her newborn infant, she does not always develop bonding feelings instantly. It can sometimes take weeks, or longer, which may affect the mother's ability to care for the infant. Therefore, the scores on MIBS may be higher closer to the delivery compared to after 12 weeks (19). Only one infant was more than 12 weeks in the present study, which could be one explanation for the rather high prevalence of scores above two points. To investigate this further a longitudinal design would be appropriate. There may also be cultural differences (30), thus, it may be relevant to find an adequate cut-off limit suitable for a Swedish context. However, at this stage, a staff-mother conversation about the scores is reasonable if the scores are above two (12). Moreover, to schedule a new appointment and repeat the scoring after a few weeks may be a way to watch trends.

Because of the convenience sampling, one limitation with this study is the lack of diversity in included Child Health Care Centers and consequently the participating mothers. For instance, 57% of the mothers had a university education. It is possible that this affected the results. However, there was no significant difference in S-MIBS between mothers with university education compared to mothers without university education. The sample size can also be viewed as a limitation. Sometimes, subject to item ratio is recommended to determine the required sample size (26). However, there is no consensus about sample size

for validity and reliability testing of translated instruments (26, 30). One strength with this study is the thorough forward-backward translation performed three times with assistance from bilingual persons familiar with the concept of bonding. A repeated forward-backward translation conducted by persons skilled in the area of study increases the content validity of the instrument (21). Another strength is that S-MIBS has been tested in relation to previously validated instruments. The S-MIBS is an eight-item instrument that uses single words rather than phrases or sentences and a simple 0-3 scoring scale. It provides Child Health Centers with an easy-to-use instrument. The results are easy to understand and will enable staff to speak to parents about any difficult emotions they may feel towards their infant. The S-MIBS can be used as a complement to observations of the mother-infant interaction and the screening for postpartum depression.

Conclusion

The S-MIBS shows initial validity, reliability and feasibility in a Swedish sample of mothers to healthy full-term infants between six and 13 weeks old. Further studies with repeated measurement and definition of a cut-off limit appropriate for the context, is recommended as well as studies with fathers.

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Declaration of conflicting interests

The authors have no conflicts of interest to declare.

Abbreviations

S-MIBS, Swedish Mother-to-Infant Bonding Scale, PBQ, Postpartum Bonding Questionnaire, EPDS, Edinburgh Postpartum Depression Scale, EPDS.

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Availability of data and materials

Data used for the study is available from the corresponding author upon request.

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Table 1: Steps and actions used to translate the British version of the Mother-to-Infant Bonding Scale (MIBS) into Swedish

Step	Action
1	The first forth translation was made by two of the authors (AE & EJ).
2	The first back translation was made by a Swedish speaking person skilled in English.
3	The authors discussed the translation with a bilingual (English and Swedish) associate professor in psychology.
4	A second forth translation was made by the authors, three words were adjusted (resentful, dislike, and aggressive).
5	The second back translation was made by a second Swedish speaking person skilled in English.
6	A third forth translation was made by the authors, two words were adjusted (resentful and aggressive).
7	A third back translation was made by a bilingual person with a PhD in child psychology.
8	The authors discussed the translation with the third back translator.
9	The authors discussed the translation with an additional external person.
10	To include consumers, the authors discussed the translation with a bilingual (English and Swedish) family.
11	The final version was decided.

Table 2. The Swedish version of the Mother-to-Infant Bonding Scale, S-MIBS including information text (in Swedish). Please note that scores have been inserted to clarify the scoring procedure.

Nedan listas känslor som mammor kan ha gentemot sina barn under de första veckorna efter födseln. Kryssa i de alternativ som bäst beskriver hur du har känt gentemot ditt barn de senaste 7 dagarna.

	Väldigt mycket	Mycket	Lite	Inte alls
Kärleksfull	0	1	2	3
Bitter	3	2	1	0
Neutral / har inte känt något alls	3	2	1	0
Glädjefull	0	1	2	3
Motvillig	3	2	1	0
Beskyddande	0	1	2	3
Besviken	3	2	1	0
Aggressiv	3	2	1	0
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Table 3. The performance of the S-MIBS in comparison to the PDQ and EPDS

Characteristics of mothers and infants	n=63
Age of mothers, mean (SD)	31.2 ±4.6 years
Age of infants, mean (SD)	7.1 ±1.3 weeks
Primiparous, n (%)	31 (49%)
Living with partner, n (%)	61 (97%)
University education, n (%)	36 (57%)
Employed before birth, n (%)	57 (90%)
Mean (SD)	
S-MIBS (maximum score 24)	Mean 2.0 (2.2)
PBQ 1: generic bonding disorder (maximum score 60)	Mean 5.1 (4.6)
PBQ 2: severe bonding disorder (maximum score 35)	Mean 2.2 (2.6)
EPDS (maximum score 30)	Mean 6.3 (5.2)
Correlations	
S-MIBS and PBQ1	r=0.80, p<0.001
S-MIBS and PBQ2	r=0.69, p<0.001
S-MIBS and EPDS	r=0.44, p<0.001
Feasibility	
S-MIBS	n=57
Easy or very easy to complete	53 (93%)
Difficult to complete*	4 (7%)
PBQ1 and PBQ2	n=61
Easy or very easy to complete	54 (89%)
Difficult to complete*	7 (11%)

*No respondents answered very difficult to complete. The EPDS is an established instrument in Sweden and feasibility has already been demonstrated.