

## Validation study of Indonesian mother–infant bonding scale

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### ABSTRACT

Mother–infant bonding scale (MIBS) is a questionnaire that can be used to elaborate the quality dyad between mother and infant; however it is not validated in Indonesian language optimally. This study aimed to identify the validity and reliability of the MIBS-Indonesian (MIBS-I) version based on Japanese MIBS (MIBS-J) that could be used in general population and hospital setting. Design of the study was cross sectional and involving 150 mother–infant dyads recruited from Growth and Developmental Clinic dr. Cipto Mangunkusumo General Hospital-Jakarta and Beji Volunteer-Staffed Integrated Health Service (*Posyandu*)-Depok/West Java. Infant was categorized as children from 0–36 months old. Mother with at least junior high-school background fulfilled MIBS-Indonesian version and also demographic data. SPSS version 21 for Mac and Lisrel 8.8 program for Windows was applied to analyze the data. Results of the study demonstrated that the content validity was good with I-CVI=0.9875 and S-CVI=0.99; and EFA results of 3 components total variance was 57.90% and CFA results showed three factors structure out of eight items and it fulfilled an adequate goodness of fit with each factor CR > 0.7; factor 1: ‘desire to love and denial’, factor 2: ‘hate and being closed’, and factor 3: ‘rejection feeling’. Cronbach’s alpha for the eight items of MIBS-I was 0.535. To be concluded, MIBS-I was a multi-dimensional scale with three-factor model and it was confirmed valid and reliable to be implemented in Indonesian children from 0–36 months old.

### 1. Introduction

Mother–infant bonding refers to an emotional bond or reciprocal relationship between a mother and her infant. It begins at the conception of the baby in the womb and continues to develop even after the first contact between the mother and the baby for several years. Many studies have suggested that the term ‘parent–children bonding’ refers to a long-term process of the development of an emotional bond between children and their parents, which starts since they are in the womb of the mother. Thus, the following can be concluded: (1) Systematic changes occur in maternal response soon after the baby is born, such as feelings of happiness, sadness, or worry, or other emotional responses that occur due to the new responsibilities that must be borne immediately after the baby is born, and (2) these feelings have persisting effects on the behaviour of parents in parenting (Kinsey and Hupcey, 2013; Kitamura et al., 2015; Olsson, 2015).

Various studies have reported that mother–infant bonding has major impacts on the development of children in the future. Parents form bonds or reciprocal emotional bonds with their babies through providing love, attention, nurturing, protection, and affection, which are in accordance with the needs of babies. Optimal bonding between parents and their babies enables the children to establish healthy attachments

with their parents and creates a feeling of security in them. Thus, it is believed to have a positive impact on children’s emotional, social, and cognitive development in the future (Klaus, 2009; Spinner, 1978; Tietz et al., 2014).

How mother–infant bonding develops is crucial for babies as well as toddlers. A study reported that babies and toddlers tend to be more easily attached to parents who are sensitive to their needs according to their ages. On the other hand, parents generally require varying time periods due to the various feelings that arise as soon as the baby is born. Some parents can immediately form a strong bond or emotional bond with their babies as soon as they are born, while other parents may require a certain period of time, especially if the babies need to undergo treatments once they are born or if the parents have mental health problems (Ohoka et al., 2014; O’Higgins et al., 2013).

Thus, mother–infant bonding is related to the development process of child bonding. These two conditions (bonding and attachment) are influential to further the child’s development, including physical, cognitive, emotional, and behavioural development. Newborn babies and toddlers are believed to be unable to develop their own abilities. They need parents/sitters who are competent, pay attention to them, and nurture them with care and affection. Winnicott stated in 1965 that ‘a baby alone does not exist’ (Bowlby, 1977).· Freiberg wrote that

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'someone's personal identity is the most important thing from the aspect of humanity that can only be achieved through initial emotional bond between parents and children.' Frieberg also wrote that individual conscience, which is the most human condition of human evolution, is not only achieved genetically but also obtained through parental love and education (Goldberg, 1983).

Therefore, problems in mother–infant bonding need to be recognised early, so that child development can take place as optimally as possible. Mother–infant bonding scale (MIBS) is a questionnaire that can be used to determine possible mother–infant bonding problems (Brockington et al., 2001). MIBS was originally developed based on the mother–infant bonding questionnaire (MIBQ) by Kumar (1997), consisting of nine items, namely feeling loving, resentful, neutral or nothing, possessive, joyful, dislike, protective, disappointed, and aggressive. Taylor et al. (2005) adapted the MIBQ by adding one item – feeling 'scared or panicky' – making the items 10 in number. Taylor's MIBQ was adapted by Keiko Yoshida et al. (2012), who called it the MIBS-Japanese (MIBS-J). The confirmatory factors analysis conducted by Yoshida et al. (2012) produced 8 significant items (loading factor > 0.5), which were divided into 2 factors, namely the 'lack of affection' factors (items number 1, 6, 8, and 10) and 'anger and rejection' factors (items number 2, 3, 5, and 7). Gracia et al. (2015) tested the validity and reliability of MIBS-J with mothers who had just given birth along with their babies as the research subjects. The study found that the value of internal consistency according to Cronbach's alpha for the overall item of the instrument was 0.4; for the lack of affection factors, it was 0.4, and for the anger and rejection factors, it was 0.2. These values were much lower than those found in the studies conducted in several other countries, such as Japan, France, among others. In addition, as the content validation had only been performed by two experts, accurate content validity and construct validation tests were not carried out. Therefore, the aims of this study are to test the reliability, content validity, and construct validity of MIBS-J (in the form of principal component analysis – PCA) to identify whether the 10 MIBS-J items are valid and reliable in assessing mother–infant bonding in the Indonesian context and identify the items that played a role in the Indonesian version of the MIBS component. Furthermore, mother–infant bonding does not screen so far among pregnancy mothers or mothers with toddler in Indonesia nowadays because there isn't any screening tool that is valid and reliable; even though mother–infant bonding is important to be assessed as it predicts the infants future development. This study also involves a wider range of research subjects, namely mothers with toddlers (0–36 months old) and a greater number of research subjects. Therefore, this study is very important as part of the perinatal mental service in Indonesia.

## 2. Research method

This was a validity and reliability study using a cross-sectional design. The content validity test involved 8 experts in the field of psychiatry, while the construct validity study (PCA) and reliability study involved 150 mothers with toddlers (0–36 months old). The selection of the research subjects was based on the willingness of mothers to take part in this study by signing an informed consent. The research subjects were from Beji Volunteer-Staffed Integrated Health Service (*Posyandu*)-Depok/West Java and Growth and Developmental Clinic – Dr Cipto Mangunkusumo General Hospital. The inclusion criteria for this study were mothers with the education level of at least junior high school who had toddlers and were willing to complete the questionnaire. Mothers who did not complete the questionnaire themselves were excluded in the study. The protocol of the study obtained approval from the Health Research Ethics Committee of FKUI-RSCM.

### 2.1. Mother–infant bonding scale (MIBS)

This study used 10 items of MIBS-J. The questionnaire utilised in the study is a self-report questionnaire on a four-point Likert scale (from 0 to 3, from 'not at all' to 'very much'). Items numbers 1, 8, and 10 were

reversed. A high MIBS score indicates poorer mother–infant bonding as compared to a lower score. The first step of this study involved obtaining the permission to translate MIBS-J into Indonesian and translating it back to English. The permission was obtained from Keiko Yoshida in 2015. The translation and back translation had been arranged by Imelda Gracia for her thesis study in 2015. The translation was performed by a native English translator. Further, the back-translation was done by a translator who did not know about the original MIBS to confirm that the translation was consistent with the original meaning (Gracia, 2015)

The data analysis was performed using SPSS for Mac version 21 for the content validity test and exploratory factor analysis (EFA) with Varimax rotation for tracking whether the 10 Indonesian MIBS items were divided into valid components representing the Indonesian version of mother–infant bonding. The number of component was determined by eigenvalue > 1. The component derived from EFA was confirmed by a confirmatory factor analysis (CFA) done with Lisrel 8.8 program for Windows; t0 fit of each model with the data was elaborated in terms of normal theory weighted least squares Chi-Square (pValue > 0.05), root mean square error of approximation (RMSEA;  $0.05 \leq \text{RMSEA} < 0.08$ ), comparative fit index ( $\text{CFI} \geq 0.90$ ), root mean square residual ( $\text{RMR} \leq 0.10$ ), goodness-of-fit index ( $\text{GFI} \geq 0.90$ ) and adjusted goodness-of-fit index ( $\text{AGFI}; 0.80 \leq \text{AGFI} < 0.90$ ). An internal reliability test was carried out in the form of Cronbach's alpha and interclass correlation coefficient (ICC).

## 3. Research results

### 3.1. Content validity

This study involved eight psychiatrists, including three paediatric psychiatrists and five general psychiatrists, to assess whether the content of each Indonesian version of the MIBS items represented the assessment of mother–infant bonding. Each MIBS item was assessed using a four-point Likert scale—irrelevant (1), slightly relevant (2), relevant (3), and very relevant (4). The results of the content validity test showed that almost all the items were considered relevant and very relevant; only item number 2 was considered irrelevant by one expert. Thus, the Indonesian version of I-CVI and S-CVI MIBS are 0.99 and 0.99 respectively. Hence, the content validity for the Indonesian version of MIBS was excellent.

### 3.2. Construct validity

In this study, 170 mothers and toddlers completed the Indonesian version of the demographic and MIBS questionnaires. Through simple random selection, 150 research subjects were selected. The number 150 was obtained through a formula from the rule of thumb for the validation test, where an item was represented by 15 research samples. Of the 150 research subjects, the demographics of mothers and children were as follows: The mean maternal age (SD) was 29.69 (5.30) years, and the mean baby's age was 18.39 (10.23) months. The highest level of education was high school and above (> 80%). The proportional ratio of boys and girls was quite balanced (50.7% vs. 49.3%). The mother ethnicity was Javanese (38.7%), Sundanese (18.7%), Betawinese (8.0%), and the rest were from various other tribes in Indonesia. The socio-economic background, based on the income levels obtained from the World Bank report of 2015, was high income (64%), middle class (28%), and the rest were from the low-class group. Only 5.3% of the total research subjects admitted that during pregnancy they did not receive any family/husband support. Most of the research subjects reported that they only had 1 child (53.3%), and the rest reported that they had  $\geq 2$  children.

The first stage of PCA, obtained using the Kaiser-Meyer-Olkin Measure of Sampling, was 0.602 and the Bartlett's Test of Sphericity was 15.252 ( $p < 0.05$ ). However, the Measure of Sampling Adequacy

**Table 1a**  
Component structure of the MIBS-Indonesian version items (n = 150).

Item	MIBS-Indonesian Version	1 <sup>st</sup> Component	2 <sup>nd</sup> Component	3 <sup>rd</sup> Component
3.	I feel hate to my infant	-0.116	0.739	-0.218
4.	I do not have any feeling to my infant	-0.202	-	0.797
5.	I feel angry to my infant	0.147	0.625	0.389
6.	I enjoy doing everything for my infant	0.225	0.454	0.417
7.	I wish if my infant is not like this	0.358	-	0.627
8.	I feel wanted to protect my infant	0.829	-	-
9.	I wish I do not have my infant	0.829	-	0.112
10.	I feel close to my infant	-	0.665	-

**Table 1b**  
Component Transformation Matrix.

Component	1	2	3
1	0.652	0.537	0.536
2	-0.595	0.800	-0.078
3	-0.470	-0.268	0.841

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.

(MSA) test showed that item number 2 had a correlation < 0.5. Thus, PCA was carried out by excluding item number 2. The second stage of PCA result, obtained using the Kaiser-Meyer-Olkin Measure of Sampling, was 0.607 and the Bartlett’s Test of Sphericity was 147,767 (p < 0.05). The MSA for all items had a correlation > 0.5, but one item had a loading factor < 0.5 (item number 1). Therefore, the third stage of PCA was carried out by deleting item number 1, such that the Kaiser-Meyer-Olkin Measure of Sampling was 0.592 and the Bartlett’s Test of Sphericity was 128,748 (p < 0.05). The MSA of all items had a correlation > 0.5. The results of the second phase of the PCA grouped the 8 Indonesian language versions of MIBS items into three components, with a total variance of 57.90% (Table 1a and 1b).

The three components that identified in the EFA were elaborated further by the CFA. The results of CFA identified a normal theory weighted least squares Chi-Square = 24.66 and df=17(pValue = 0.10258), RMSEA = 0.055, CFI = 0.92, RMR = 0.011, GFI = 0.96 and AGFI = 0.92 (Fig. 1). The three factors were moderately correlated with each other. CFA results showed that the current model of MIBS-I approximately fit to the model of the data of mothers with 0–36 months old infants. The Construct/Composite Reliability (CR) of each factor was also good (> 0.70); CR factor

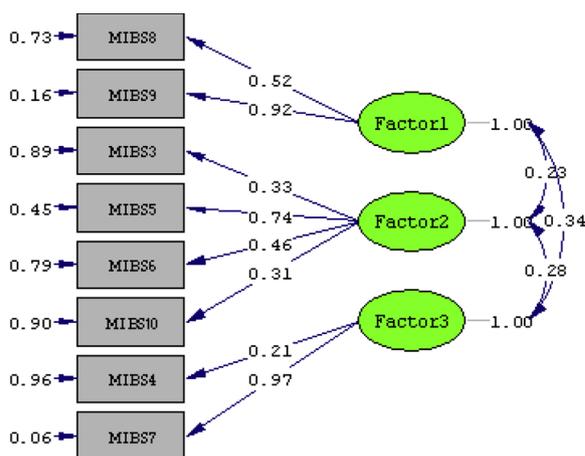
**Table 2**  
Reliability analysis – item total statistic.

	Scale Mean if Deleted	Scale Variance if Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
MIBS3	1.32	3.467	0.075	0.151	0.542
MIBS4	1.25	3.046	0.178	0.073	0.526
MIBS5	1.07	2.646	0.396	0.239	0.446
MIBS6	1.17	2.811	0.350	0.173	0.468
MIBS7	0.87	1.969	0.331	0.173	0.504
MIBS8	1.33	3.242	0.254	0.251	0.511
MIBS9	1.26	2.851	0.340	0.298	0.473
MIBS10	1.26	3.227	0.176	0.123	0.524

1 = 0.94, CR factor 2 = 0.89, and CR for factor 3 = 0.84.

We also tested the one-factor model according to Taylor et al. (2005) and it did not show an adequate goodness of fit with our data (a normal theory weighted least squares Chi-Square = 52.94 and df=33(pValue = 0.015), RMSEA = 0.064, CFI = 0.85, RMR = 0.02, GFI = 0.93 and AGFI = 0.89); the CFA results only showed 3 items that fit the structured-model. Nevertheless, the two-factor model based on Yoshida et al. (2012) showed a goodness of fit with our data respectively (a normal theory weighted least squares Chi-Square = 28.51 and df=20 (pValue = 0.0978), RMSEA = 0.053, CFI = 0.92, RMR = 0.016, GFI = 0.95 and AGFI = 0.92); however only 5 items that fulfilled the loading factor > 0.3.

An internal consistency test of the Indonesian versions of the 8 items of the MIBS produced a Cronbach’s alpha of 0.535 with an interclass correlation coefficient of 0.535 (95% Confidence Interval 0.41–0.64) (Tables 2 and 3).



Chi-Square=24.66, df=17, P-value=0.10258, RMSEA=0.055

**Fig. 1.** Confirmatory factor analysis of 8 items MIBS-I with 3-factor structure.

(A normal theory weighted least squares Chi-Square = 24.66 and df=17(pValue = 0.10258), RMSEA = 0.055, CFI = 0.92, RMR = 0.011, GFI = 0.96 and AGFI = 0.92).

**Table 3**  
Interclass correlation coefficient.

	Intraclass Correlation <sup>b</sup>	95% Confidence Interval		F Test with True Value 0			
		Lower Bound	Upper Bound	Value	df1	df2	p-value
Single Measures	0.126	0.081	0.182	2.150	149	1043	< 0.05
Average Measures	0.535	0.413	0.640	2.150	149	1043	< 0.05

#### 4. Discussion

This study obtained the Indonesian version of the MIBS (MIBS-I), containing 8 items, with the same number of items as the Japanese version of the MIBS (item number 3 to number 10). This result was slightly different from that of the MIBS-J, which did not include item number 4 and 9. However, the EFA and CFA results produced three-factor model and it demonstrated an adequate goodness of fit to our data; (1) the first factor contains statements pertaining more to the ambivalence attitude of the mother towards the infant, namely between the ‘desire to love and denial’ in the same time (item number 8 and 9); (2) the second factor contains an ambivalence feeling statements in the form of emotions of ‘hate and being closed’ to the infant (item 3, 5, 6, and 10); and (3) the third factor represented statements of ‘rejection feeling’ towards the infant (item number 4 and 7). Results of EFA and CFA in this study confirmed that MIBS was the multidimensionality scale and it strengthened the results of Yoshida’s study (2005).

The EFA and CFA result differences in this study might be related with the research subjects that included mothers with children aged 0–36 months. Thus, the mothers might have different feelings and perception as compared to the study conducted by Taylor et al. (2005) and Yoshida et al. (2012), which used mothers who had just given birth 1–5 days ago as the study population. Mothers who had children aged 0–36 months had a longer period to interact with the children, and the emotional component of their bonding might be different because both the mothers and toddlers have adjusted to and tried to empathize each other.

Another result obtained in this study was that the content validation was better than that of Gracia’s (2015) study, indicating that the Indonesian version of the MIBS includes the appropriate content to measure mother–infant bonding. Whereas, based on the internal consistency analysis, the MIBS-I produced a Cronbach’s alpha of 0.535, which was also better than the result obtained in the study conducted by Gracia (2015). However, this result was slightly different from that of the research conducted by Yoshida et al. (2012), who did not clearly mention the internal consistency of MIBS-J consisting 8 items. They only mentioned that the Cronbach’s alpha of the MIBS-J for the subscale lack of affection (4 items) was 0.71, while that of the anger and rejection (4 items) subscale was 0.51. On the other hand, Taylor (2005) obtained a Cronbach’s alpha value of 0.71 for 10 MIBS items, where the research subjects were mothers who had just given birth. The lower Cronbach’s alpha of the MIBS-I in the study might due to the use of fewer research subjects, the children’s age (this study involved mothers with toddlers), and potentially the culture. Most Indonesian people, especially those who have Javanese cultural backgrounds, live by a life philosophy that dictates surrendering to what has been provided by the Creator. Thus, it is considered a taboo for mothers to have feelings of dislike towards their own babies, even though it is very likely to occur. Thus, voicing such feelings is likely to be considered inappropriate according to the culture and the values of the society (Dokhi et al., 2016). Further research needs to be conducted to answer the question “are there cultural differences in terms of internal consistency in this study?”

This study’s results have crucial clinical implications that enable assessing early how mothers feel about their babies and children under 3 years old so that early intervention can take place immediately if a

problem related to mother–infant bonding is detected. Good mother–infant bonding is very important because if the mother–infant bond does not develop optimally, it can affect the entire development of the child, hindering attachment and growth, and other developments that may continue with the occurrence of stress in infants or toddlers. This condition is related to the development of the regulation of children’s emotions. It has been known that stress related to disproportionate mother–infant bonding has a negative influence on the brain development of toddlers and especially with regard to neuronal plasticity disorders, which in turn has an impact on children’s intellectual development as well as their overall physical development (Howell et al., 2017).

The limitation of this study was that it only involved 150 research subjects. Although it fulfilled the requirements for validation research – one statement item should be represented by 15 research subjects – some studies state that the minimum number of research subjects in a EFA and CFA should be 300. In addition, the cultural elements might have influenced the results of the study. Therefore, conducting a culture-based analysis of MIBS may be worthwhile. Nevertheless, the external validation study involving several predictors of mother–infant bonding disturbances such as mother psychopathologies, family structure, socio-demographic issues, etc. valuable to be done. Apart from the limitations of this study, this study is the first to involve mothers with toddlers. Thus, the use of this questionnaire can be expanded, without it being limited to 36-week pregnant women or mothers who are in the puerperium period.

#### Conflict of interest

None.

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