

Translation and Adaptation of the Indonesian Version of the Maternal Infant Responsiveness Instrument (MIRI)

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ABSTRACT

Background: The interaction between mothers and premature babies in the early period of oral feeding is beneficial for forming social, cognitive, and emotional development. It is essential to assess maternal interactions with premature babies using valid and reliable instruments. However, culturally adapted tools in the Indonesian context remain limited, making localized validation efforts crucial. This research was to analyze the translation and adaptation process of the Indonesian version of MIRI.

Methods: The translation and adaptation process followed standard procedures, including forward translation, expert panel review, back translation, pilot testing, and finalization of the instrument. The process involved collaboration with the International Language Institute and experts in pediatric nursing, neonatology, and nutrition. A pilot test was conducted with 30 mothers of premature infants who were receiving care in a neonatal intensive care unit. The evaluation focuses on content validity and reliability of the translation instruments.

Results: The translation and adaptation results showed I-CVI between 0.67 to 1.00. The MIRI S-CVI results for all items were 0.91 in the excellent category. The reliability test on mothers showed a Cronbach's Alpha value of 0.74 in the valid and reliable category. Items with lower I-CVI scores were reviewed and refined based on expert feedback to enhance clarity and cultural relevance. Furthermore, participants reported that the questionnaire items were clear and relevant to their experiences during oral feeding interactions with their premature infants.

Conclusions: The Indonesian version of the MIRI demonstrates strong validity and reliability for assessing maternal interaction with premature infants during oral feeding. The instrument can be effectively utilized in both research settings and clinical practice, particularly in neonatal intensive care environments where understanding maternal-infant interaction is crucial for supporting early developmental outcomes.

KEYWORD: *assessment; interaction; mother; premature babies; oral feeding*

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INTRODUCTION

Interaction between mother and premature baby in the early period of oral feeding is essential to form adequate interaction behavior. Premature babies need support from the care environment, especially the mother to improve oral feeding skills. Interaction patterns during oral feeding are related to stimulation of social, cognitive, and emotional development (1). Interaction between mother and premature baby results in adaptive or maladaptive behavior in oral feeding (2). Adaptive behavior from the mother is indicated by a sensitive and responsive attitude to the feeding needs of premature infants (3,4).

Maternal sensitivity and responsiveness are defined as the mother's ability to correctly recognize premature infant cues and respond to them in a timely and adequate manner (5). Maternal sensitivity and responsiveness will increase the bond between the mother and the premature infant. The interaction process is characterized as a dynamic reciprocal relationship or a symbiotic relationship, both physiologically and psychologically, between the mother and the premature baby, which is called dyadic interaction (5,6).

Maternal sensitivity and responsiveness can be observed during oral feeding in premature babies. Several instruments have been developed between mothers and premature babies including the Nursing Child Assessment Teaching and Feeding Scales, the Parent-Child Early Relational Assess-

ment, and the Emotional Availability Scale. Most instruments use observation methods through video recording or independent observation. Limitations in the use of these instruments include the need for training and a common perception of observers that takes a long time, limited research samples, the emergence of assessment bias, and limited generalization (7).

The development of the Maternal Infant Responsiveness Instrument (MIRI) has the advantage of being more practical and easier to measure maternal sensitivity and responsiveness during maternal interactions with premature babies. MIRI was first developed by (8) in a study entitled Method of Infant Feeding as a Predictor of Maternal Responsiveness. MIRI assessment is obtained through direct maternal reports, thus avoiding the problem of interpreting behavior. MIRI measures maternal sensitivity and responsiveness that includes recognition of maternal responses, premature infant feeding cues, and barriers to being responsive (7).

MIRI consisted of 22 questions using a Likert scale consisting of 1 strongly disagree, 2 disagree, 3 somewhat agree, 4 agree, and 5 strongly agree (7). MIRI had been widely used to assess maternal sensitivity and responsiveness particularly during oral feedings (5,6,9,11). In Indonesia, there are many studies on the interaction of mothers with premature babies in intensive care settings, such as the closeness of mothers and premature babies during the implemen-

tation of kangaroo care (12–21). MIRI instruments in Indonesian can be used in Malay countries such as Malaysia and Brunei Darussalam. This phenomenon explained the importance of research on maternal interaction with premature babies during oral feeding. Therefore, an instrument is needed to measure maternal interaction with premature infants accurately, reliably, and easily understood. MIRI is the objective instrument of choice for measuring maternal interaction with premature infants. The instrument needs to be translated and adapted into Indonesian before being used in research. This study aimed to analyze the translation and adaptation process of MIRI in Indonesia through standardized steps.

MATERIALS AND METHODS

Researchers translated the instrument based on the WHO protocol. The translation process included forward translation, panel discussions with experts, back translation, trials, and preparation of the final instrument. In the forward translation stage, the MIRI instrument was translated from English to Indonesian by the International Language Institute. Researchers then conducted a panel discussion with experts, namely supervisors with the competence in neonatology, pediatric nursing, and nutrition. The discussion is to analyze the concept of the instrument that is adjusted to the characteristics of the research subjects. In the back translation stage, MIRI was translated back into English by the Inter-

national Language Institute (22). The results of forward and backward translation on MIRI were then consulted with experts to assess content validity. Content validity is an analysis of the items that make up the MIRI instrument construct, resulting in expert judgment (23). Expert judgment on MIRI was carried out by at least three experts, namely doctors in the field of pediatric nursing specifically for premature babies. The three experts assessed each item of the MIRI instrument based on the concept of interaction between mothers and premature babies. The results of the expert judgment were then discussed again with the supervisor before being tested on mothers (22). The assessment of content validity by experts was carried out by calculating the Content Validity Index (CVI), namely the Item-CVI (I-CVI) and Scale-CVI (S-CVI) values. The assessment of each statement item used 4 scales including 1 (not relevant), 2 (unable to assess relevance), 3 (relevant but needs slight changes), and 4 (very relevant and concise).

The results of the instrument that had been reviewed by experts and panel discussions were then tested on 30 mothers with premature babies in intensive care. The trial was conducted to assess the interaction of mothers with premature babies during oral feeding. The trial had passed ethical eligibility from one of the hospitals in Central Java with number 1.518/XII/HREC/2022 dated December 9, 2022. The next step was a panel discussion with experts to determine the final instrument. The following described a

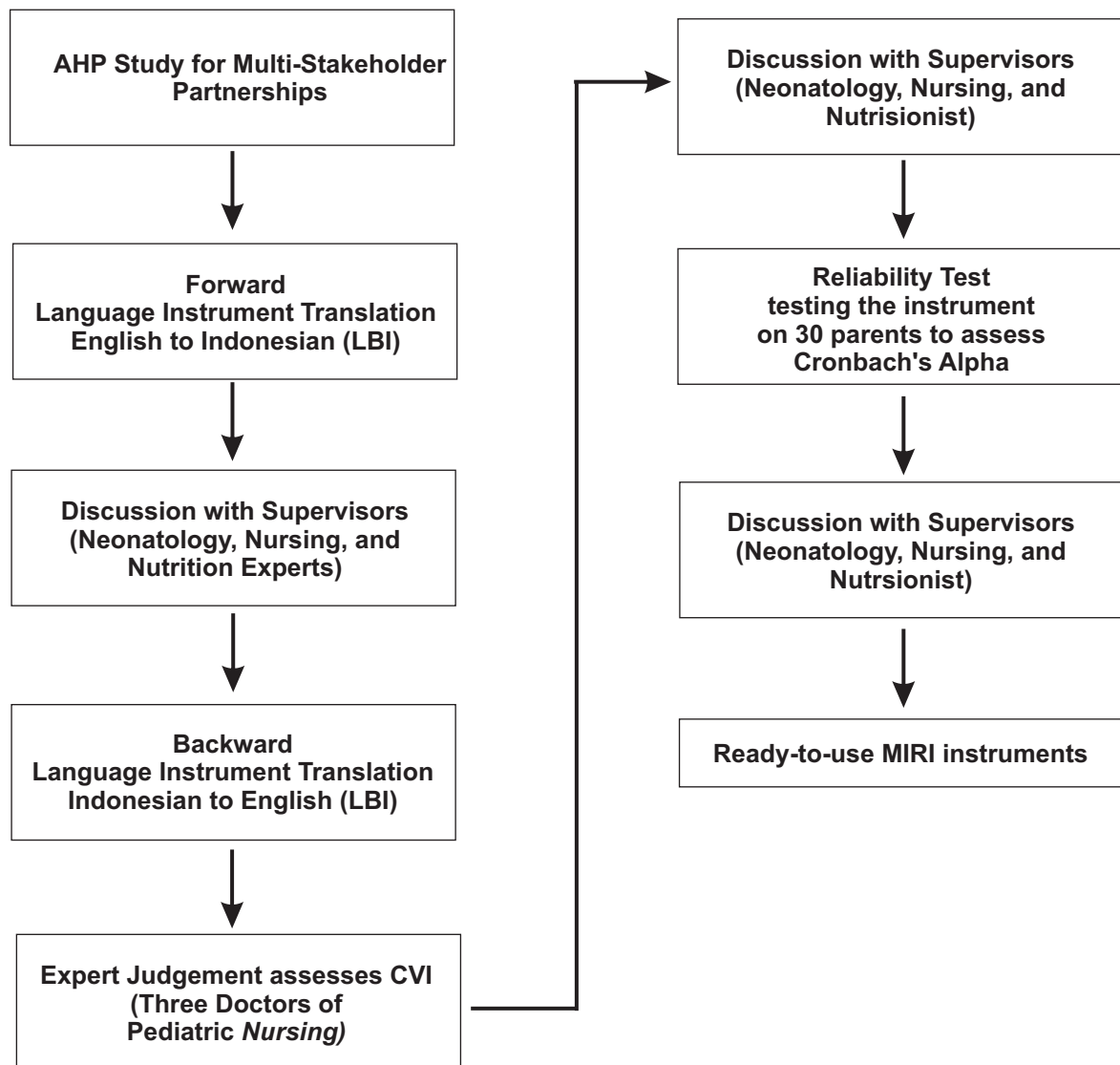


Figure 1. Translation and Adaptation of the MIRI Instrument

scheme of the MIRI translation and adaptation process.

RESULTS AND DISCUSSION

RESULTS

The I-CVI results on the MIRI instrument ranged from 0.67 to 1.00. The researcher made revisions by discussing statement items with values less than 0.78, namely statements number 2, 9, 10, 13, 14,

and 15. The S-CVI results of the MIRI instrument for all items were 0.91. It means that the content validity was in the excellent category with an I-CVI value of more than 0.78 and an S-CVI of more than 0.90 (23). The Indonesian version of the MIRI instrument was then tested for reliability. The results of the reliability test on 30 mothers showed that the Cronbach's Alpha value of the MIRI instrument was 0.74. The instrument was

declared reliable because the Cronbach's Alpha value ≥ 0.6 (23). Table 1 described the results of the translation and adaptation of the MIRI instrument.

Table 1. MIRI Instrument Translation and Adaptation Results

Statement (Original)	Statement Revision (Expert Judgement)	Statement Revision (Panel Discussion/Final Version)
I have made faces and smiled at my baby and watched for my baby's response to me.	Saya menatap, tersenyum, dan melihat respons bayi kepada saya.	Saya menatap dan tersenyum kepada bayi saya, dan melihat respons bayi kepada saya.
I believe my baby wants me to touch him/her too often.	Saya percaya bahwa bayi saya menginginkan saya sering menyentuhnya.	Saya percaya bahwa bayi saya menginginkan saya sering menyentuhnya.
I have seen my baby respond to my playing with him/her.	Saya melihat bayi saya merespons ketika saya bermain dengannya.	Saya melihat bayi saya merespons ketika saya bermain dengannya.
I believe that I can comfort my baby when he/she cries.	Saya percaya mampu menenangkan bayi saya yang menangis.	Saya percaya mampu menenangkan bayi saya yang menangis.
I have seen my baby respond to my talking to him/her.	Saya melihat bayi saya merespons ketika saya berbicara kepadanya.	Saya melihat bayi saya merespons ketika saya berbicara kepadanya.
I believe I know when my baby wants to play.	Saya mengetahui ketika bayi saya ingin bermain.	Saya percaya saya tahu kapan ketika bayi saya ingin bermain.
I have seen my baby respond to my comforting him/her.	Saya melihat respons bayi saya ketika saya menenangkannya.	Saya melihat bayi saya merespons ketika saya menenangkannya.
I believe I know when my baby wants me to feed him/her.	Saya mengetahui ketika bayi saya ingin saya menyusuinya.	Saya percaya saya tahu kapan bayi saya ingin saya menyusuinya.
I have watched my baby respond to my feeding him/her.	Saya melihat respons bayi saya ketika saya menyusuinya.	Saya melihat bayi saya merespons saya ketika saya menyusuinya.
I think I sometimes respond slowly to my baby.	Saya pikir terkadang saya lambat merespons bayi saya.	Saya pikir terkadang saya lambat merespons bayi saya.
I believe my baby responds well to my holding him/her.	Saya percaya bayi merespons dengan baik ketika saya menggendongnya.	Saya percaya bayi merespons dengan baik ketika saya menggendongnya.
I have watched my baby respond to my touching him/her.	Saya melihat respons bayi saya ketika saya menyentuhnya.	Saya melihat respons bayi saya ketika saya menyentuhnya.
I believe my baby wants me to play with him/her.	Saya percaya bayi saya ingin saya bermain dengannya.	Saya percaya bayi saya ingin saya bermain dengannya.
I am sometimes afraid of my baby's appearance.	Terkadang saya merasa takut melihat keadaan bayi saya.	Saya terkadang merasa takut melihat penampilan bayi saya.
I believe my baby wants me to comfort him/her too often.	Saya percaya bayi saya ingin saya sering memberikan rasa nyaman kepadanya.	Saya percaya bayi saya ingin saya sering memberikan rasa nyaman kepadanya.

I believe my baby wants me to talk to him/her.	Saya percaya bayi saya ingin saya berbicara dengannya.	Saya percaya bayi saya ingin saya berbicara dengannya.
I feel good about how I respond to my baby.	Saya merasa nyaman dengan cara saya merespons bayi saya.	Saya merasa nyaman dengan cara saya merespons bayi saya.
I feel good about how my baby responds to me.	Saya merasa nyaman dengan cara bayi saya merespons saya.	Saya merasa nyaman dengan cara bayi saya merespons saya.
I believe I know when my baby needs me to feed him/her.	Saya mengetahui ketika bayi membutuhkan saya untuk menyusuinya.	Saya percaya saya tahu kapan bayi membutuhkan saya untuk menyusuinya.
I sometimes feel afraid to care for my baby.	Terkadang saya merasa takut mengasuh bayi saya.	Saya terkadang saya merasa takut untuk merawat bayi saya.
I like the way my baby responds to me when I play with him/her.	Saya menyukai cara bayi saya merespons ketika saya bermain dengannya.	Saya menyukai cara bayi saya merespons ketika saya bermain dengannya.
I believe my baby wants me to hold him/her too often.	Saya percaya bayi saya ingin saya sering menggendongnya.	Saya percaya bayi saya ingin saya sering menggendongnya.

DISCUSSION

The results of the study showed that the Indonesian version of MIRI was valid and reliable for measuring maternal responsiveness. Maternal responsiveness is a neurobiological process that increases the hormone oxytocin (3). Maternal responsiveness is a behavioral dialogue in forming interactions during feeding (24). Behavioral dialogue consists of both verbal and non-verbal communication which includes two phenomena of premature babies and mothers (25). MIRI is able to measure the mother's responsiveness to interpret basic cues in premature babies such as crying, smiling, and changes in skin color during oral feeding. The maternal response is influenced by memory, environment, and socio-cultural systems. The development of maternal responsiveness is a learning process through repeated interaction(6). The decision to utilize the MIRI instrument was informed by a range

of methodological, theoretical, and practical considerations. The first rationale for selecting the MIRI instrument is its ability to accurately measure the quality of mother-baby interactions, particularly within the context of early bonding and responsiveness. The next reason is that MIRI is based on the assessment process or direct report of the mother, so that richer data were obtained about things that support the interaction pattern between mothers and premature babies. Another reason is the use of a practical instrument without going through the observation process, thus minimizing the occurrence of behavioral bias in the interaction process between mothers and premature babies (11,26).

The Indonesian version of the MIRI instrument has been shown to be user-friendly and easily understood by mothers of premature babies. The translation and cultural adaptation processes successfully

produced items that are both linguistically and conceptually appropriate for the Indonesian context. This finding is consistent with previous studies that have identified MIRI as a practical and effective tool for measuring maternal responsiveness. Comprising 22 items, the MIRI captures the quality of dyadic interaction between mothers and their premature babies. It has been widely used in populations with babies ranging from 28 weeks of gestational age up to 3 years old. In this instrument, mothers are asked to rate each statement using a Likert scale, with some items reverse-scored. Higher scores indicate stronger perceived responsiveness within the mother-baby dyad. The simplicity and efficiency of the MIRI instrument supports its application in clinical settings, particularly in time- and resource-constrained environments such as neonatal intensive care units (11,26).

The ease of use of the MIRI instrument is supported by evidence from various studies demonstrating its validity and reliability. The results of this study were supported by (7) who stated that MIRI had validity results through expert consultation with an internal consistency value ($\alpha = 0.87$). Another study by (24) who conducted back translation of MIRI by experts and trials on 15 mothers with reliability results of 0.82. The results of the narrative review study stated that five studies reported internal consistency (Cronbach's alpha) with $\alpha > 0.70$. MIRI demonstrates a positive correlation with self-efficacy, infant temperament, and life satisfaction. Mothers with high

self-confidence, a positive perception of their infants, and good life satisfaction tend to be more responsive to their babies. Conversely, a negative relationship was found between maternal responsiveness and levels of stress, symptoms of depression, and experiential avoidance. MIRI was a valid and reliable instrument to measure maternal well-being caused by postpartum depression and stress (11).

Several terms in the original version of the MIRI required cultural and linguistic adaptation to ensure they were more relevant and comprehensible to Indonesian mothers. During the translation and adaptation process, researchers carefully considered the local cultural context of mothers with premature infants. For example, the term "to feed" was translated as "menyusui" (breast-feeding), reflecting local cultural values where direct breastfeeding is the predominant practice among mothers. Another critical consideration involved the psychological aspects of mothers with premature infants. Terms such as "to comfort", "feel good", and "afraid of" were adapted with sensitivity to the emotional and psychological experiences of these mothers, many of whom face heightened anxiety and depressive symptoms during their babies' hospitalization in intensive care units. These cultural and psychological dimensions are essential in the translation and adaptation process, as perceptions and meanings of mother-baby interactions are deeply influenced by both individual psychological states and broader sociocultural

values (22,27,28). This study involved experts from various fields, including professional linguists, pediatric nursing specialists, neonatologists, and nutritionists. The linguistic expert contributed to ensuring the accuracy of language and syntax by maintaining grammatical structure, word choice, and clarity of phrasing so that the items are easily understood by mothers without altering their original meaning. Experts in pediatric nursing, neonatology, and nutrition provided critical input to ensure that the terms and concepts within the instrument were aligned with the clinical and emotional experiences, as well as the cultural context, of mothers of premature infants in Indonesia. The involvement of this multidisciplinary team significantly enhanced the content validity and reliability of the Indonesian version of the MIRI instrument (22). The translation results of three experts showed varying terms but still had the same meaning. The differences were related to the application of grammar and language style used by the experts. The differences were then discussed in a panel with the supervisory team to reach an agreement on word choice. Consideration of word choice was based on language standards, terms used in medicine and health, and culture. In the next translation process, MIRI was tested on mothers with premature babies to measure interactions during oral feeding. Mothers with premature babies generally explained that the language used in the instrument was easy to understand (22). The findings of this study have important nursing implications,

suggesting that the MIRI instrument can serve as a valuable screening tool for assessing dyadic interactions between mothers and their premature babies improving maternal well-being, especially in terms of emotional and psychological states, and supports the development of family-centered nursing interventions within neonatal intensive care units. Furthermore, the MIRI instrument holds potential for use in longitudinal studies aimed at evaluating the development of mother-baby relationships over time. Future research is warranted to further examine the psychometric properties of the Indonesian version of MIRI using larger and more diverse samples of mothers with premature infants.

CONCLUSION AND RECOMMENDATION

The translation results indicate that the MIRI instrument is easy to use and well understood by the mothers of premature babies. This instrument has great potential for use in research contexts, particularly for evaluating the interactions between mothers and premature babies during oral feeding process in intensive care units. MIRI can serve as an effective tool for understanding early mother-baby bonding dynamics and supporting the development of family-centered interventions.

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