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(Degree)
博士（保健学）

(Date of Degree)
2021-03-25

(Date of Publication)
2023-03-25

(Resource Type)
doctoral thesis

(Report Number)
甲第8055号

(URL)
https://hdl.handle.net/20.500.14094/D1008055

博 士 論 文

Translation and Psychometric Analysis of the Japanese version of the Perceived Maternal Parenting Self-Efficacy Scale

（日本版 Perceived Maternal Parenting Self-Efficacy Scale の信頼性と妥当性の検証）

令和 3 年 1 月 13 日

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Translation and Psychometric Analysis of the Japanese version of the Perceived Maternal Parenting Self-Efficacy Scale

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ABSTRACT

Objective: To translate the Perceived Maternal Parenting Self-Efficacy (PMP S-E) scale into Japanese and test its psychometric properties among Japanese mothers of low birth weight (LBW) infants.

Design: Descriptive psychometric study.

Setting: NICUs in two regional perinatal care centers in the Kinki region of Japan.

Participants: Seventy-nine Japanese mothers of LBW infants hospitalized in NICUs.

Methods: First, we translated the PMP S-E scale into Japanese and assessed its face and content validity. Second, we assessed the internal consistency, test-retest reliability, and criterion-related and construct validity of the JPMP S-E with Japanese mothers of LBW infants.

Results: The JPMP S-E mean score was 53.0 (SD = 7.1); total scores ranged from 38 to 68. The intraclass correlation coefficient of test-retest reliability was .75, and Cronbach's alpha coefficient was .90. With regard to criterion-related validity, we found a significant positive correlation between the JPMP S-E and the Maternal Attachment Inventory Japanese version

(r = .45, p < .001), but no correlation existed between the JPMP S-E and the General Self-Efficacy Scale (r = .21, p = .06). We evaluated construct validity using confirmatory factor analysis to assess whether the model fit the previously determined structure of the PMP S-E. Model fit was moderate in the confirmatory factor analysis (comparative fit index = .63, goodness-of-fit index = .63, root mean square error of approximation = .15).

Conclusion: We found adequate estimates of reliability and moderate indicators of validity for the JPMP S-E, which support the use of the tool for clinical and research purposes.

KEYWORDS

Parenting, self-efficacy, low-birth-weight infants, neonatal intensive care unit, scale, support

PRÉCIS

Following translation from English to Japanese, the Japanese Perceived Maternal Parenting Self-Efficacy scale demonstrated adequate reliability and moderate validity.

CALLOUTS

1 Mothers of low-birth-weight infants should be given individualized support based on an assessment of their confidence in parenting.

2 The Japanese Perceived Maternal Parenting Self-Efficacy scale had indicators of adequate reliability and moderate validity with the potential for clinical and research use.

3 The Japanese Perceived Maternal Parenting Self-Efficacy scale can be used by care providers, especially maternal-neonatal experts, to provide tailored support interventions.

Self-efficacy is a key concept in social cognitive theory. It was originally proposed by Bandura (1977, 1997a) and defined as a belief in one's own competence to achieve a goal or systematically perform tasks, especially during specific potentially stressful or threatening situations. Perceptions of self-efficacy affect emotional reactions as well as behavior. People with lower perceived self-efficacy require a sustained collective effort from themselves and others who support them to overcome many of the challenges they face and produce significant change. In contrast, people with greater perceived self-efficacy can solve problems and improve their lives through their own concerted effort (Bandura, 1997b).

Since 1975, the number of maternal deaths has declined in Japan, and infants of relatively low birth weight (LBW) have survived because of advanced perinatal care (Ei, 2019). However, negative repercussions have been noted as a result of changes in the child-rearing environment. For example, the number of mothers who experience loneliness during the child-rearing period has increased because the family structure in Japan has changed from extended family structures and relationships with neighbors in a community to a nuclear family. A sense of loneliness in child rearing was associated with increased anxiety (Katayama & Kitaoka, 2018). Anxiety and perceived lack of social support were risk factors for child abuse (Ninomiya et al., 2017). Japanese women who had trustworthy neighbors in the community were less likely to report infant physical abuse than those who lived in areas with less trusting neighbors (Fujiwara et al., 2016). Additionally, mothers who lacked access to child care assistance were more likely to neglect their infants (Zhou, 2019).

Mothers of LBW infants have been recognized as a particularly high-risk group because they experience more intense anxiety than mothers of normal birth weight

(NBW) infants (Harris et al., 2018). Some mothers with infants in the NICU expressed feeling excluded from the process of caring for their infants or that they felt "unwelcomed" in the NICU (Williams et al., 2017). Incubators created barriers between mothers and their infants that may have weakened mothers' motivation to rear their infants (Hagen et al., 2016). Moreover, mothers with LBW infants felt less confident in their child-rearing skills because of difficulties in reading responses, feeding, and holding LBW infants (Cook et al., 2018). Infant development was also a continuous concern for mothers of LBW infants (Brandon et al., 2011).

Health care experts provide various types of information and help build child care skills for mothers of infants hospitalized in the NICU; however, support from such experts may not translate to home life because experts do not understand the home environment (Hobbs et al., 2017). In one study, infants who were abused were more likely to have been born LBW (Puls et al., 2019). Mothers who rear LBW infants should be given priority for support because child rearing is difficult in Japan, even for mothers of NBW infants (Yamazaki et al., 2018). Providing mothers with supportive interventions to enhance their parenting self-efficacy based on an individualized assessment before their infants are discharged from NICUs may help them cope with problems or difficult situations associated with caring for LBW infants.

To support mothers with LBW infants in the NICU, nurses in Japan need an instrument that measures mothers' perceived parenting self-efficacy to help target interventions for individual mothers. Additionally, the instrument should be specialized for mothers with LBW infants because stress and anxiety levels among these mothers differ from those of mothers with NBW infants. Although a parenting self-efficacy scale for mothers rearing NBW infants has been reported (Kanaoka, 2011), a scale to assess

parenting self-efficacy in mothers with LBW infants is not available in Japanese. Therefore, we translated the Perceived Maternal Parenting Self-Efficacy (PMP S-E) scale into Japanese and tested its psychometric properties among mothers with LBW infants.

Parenting Self-Efficacy

Parenting self-efficacy is derived from Bandura's self-efficacy theory and is defined as "beliefs or judgments a parent holds of their capabilities to organize and execute a set of tasks related to parenting a child" (Montigny & Lacharite, 2005, p. 387). Consistent with self-efficacy theory, Montigny and Lacharite (2005) reported that the sources of parenting self-efficacy were positive enactive mastery experiences, vicarious experiences, verbal persuasion by others, and physiological and affective responses to parenting experiences. The mother develops her sense of her child-rearing abilities from these sources of experience and information. Parenting self-efficacy is the degree to which parents perceive themselves as capable of performing the varied tasks associated with this highly demanding role (Coleman & Karraker, 1998). Shorey et al. (2015) collected PMP S-E scale data from 122 primiparous women 1 to 3 days after birth in Singapore. Parenting self-efficacy had a negative relationship with symptoms of postnatal depression within this group. Parenting self-efficacy is also positively influenced by social support during the transition to motherhood (Gao et al., 2014).

PMP S-E Scale

Barnes and Adamson-Macedo (2007) developed the PMP S-E scale. They believed that a robust scale was needed to measure mothers' perception of their ability to understand and care for their hospitalized LBW infants that was sensitive to the various tasks involved in parenting. The PMP S-E scale is classified as a scale of

domain-specific parenting self-efficacy. It includes 20 items, and each item is rated on a four-point Likert scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *agree*, and 4 = *strongly agree*). The total score ranges from 20 to 80, whereby higher scores indicate greater perceived self-efficacy. The PMP S-E scale has four theorized subscales that reflect different aspects of parenting. Factor 1 is Care Taking Procedures and includes four items, Factor 2 is Evoking Behavior(s) and includes seven items, Factor 3 is Reading Behavior(s) and Signaling and includes six items, and Factor 4 is Situational Beliefs and includes three items. Internal consistency and test-retest reliability of the PMP S-E scale have been supported, and the face, content, divergent, and construct validity have been evaluated. The Cronbach's alpha coefficient of the PMP S-E scale from the original research was .91. Winttkowski et al. (2017) examined the psychometric and administrative qualities of 34 parenting self-efficacy measures in a systematic review. They provided clarity regarding the terminology and theoretical underpinnings of these measures and suggested that the PMP S-E scale could be used by researchers and clinicians. The PMP S-E scale has been effectively used in clinical studies (Fong et al., 2018; Ingram et al., 2016; Schneider et al., 2019).

Methods

Design

We conducted a descriptive psychometric study in two parts. The first part consisted of translation the PMP S-E scale to Japanese, whereas the second was testing the psychometric properties of the translated scale. The study was approved by our institution's ethics committee and by the ethics review boards of the hospitals from which participants were recruited. All participants provided written informed consent.

Step 1: Translation of the PMP S-E Scale

We obtained permission from the original author to translate the PMP S-E scale into Japanese. We used the translation process shown in Figure 1. Two Japanese translators, the first author (M.K.) and a professional translator, independently translated an English version to Japanese. The two translators met to discuss their respective translations and resolved any discrepancies between translations. Although the Japanese words chosen by the two translators differed to some extent, the meanings were similar. In such cases of word disagreement, the translators selected the word they considered would be easiest for mothers to understand. The greatest difficulties were related to the translation of "upset" and "fussy," as it was difficult to express the difference between these words in Japanese. Subsequently, two native English speakers with expert knowledge of Japanese, a pediatrician and a professional translator, back translated the Japanese scale into English. C. R. Barnes, who is the original scale author, examined the back translation to verify that it accurately reflected the original. The translation and back translation process were repeated many times by the Japanese pediatrician, health care experts, and the professional translator, and the original author cooperated with us in back translation until we derived the final Japanese version of the PMP S-E (JPMP S-E) scale.

Face validity and content validity

We examined the face validity of the Japanese version of the PMP S-E scale by conducting pretests with mothers of LBW infants. Fourteen mothers who experienced rearing LBW infants were recruited. Each confirmed that she understood the meanings of the questions in the JPMP S-E scale. Their average age was 34.1 (SD = 2.2) years, and the ages of their children ranged from 1 to 2 years. The mothers completed the JPMP S-E scale in approximately 10 minutes. They answered that they understood the

implications of the questions in Japanese. Two mothers told us that they were confused because there were similar statements in different scale items (e.g., “she has been crying” and “she continually cries”). Another mother said that she did not know whether a mother understands her baby’s mood while the baby is hospitalized.

Content validity was evaluated by six experts to examine whether the JPMP S-E scale was applicable as a parenting self-efficacy measure. The experts included two pediatric nurses, two midwives, and two public health nurses who held masters or doctoral degrees. The content validity index was .97, which was close to the recommended value of .99 among five or six raters (Lang & Secic, 2006). Although all experts agreed that the PMP S-E contained items that assessed parenting self-efficacy, two experts suggested that Item 20, “I can show affection to my baby,” seemed to be related to attachment. We did not change the items of the JPMP S-E scale and assessed its validity using an attachment scale for criterion-related validity.

Step 2: Psychometric Testing of the Japanese Version of the PMP S-E (JPMP S-E) Scale.

Design

We conducted a cross-sectional study to evaluate the psychometric properties of the JPMP S-E.

Setting and participants

We collected data from January 2017 to August 2018 from NICUs in two regional perinatal care centers located in the Kinki region of Japan. These NICUs are within major hospitals in the region and consist of open-bay units. The NICU capacities are 6 and 15 infants, respectively. The nurse-to-patient ratios are 1:3 in each case.

A sample size estimation indicated that we needed to collect data for more than

80 participants, and it would have been better to collect data for over 100 participants, because the sample size would be approximately 20 times the number of theoretical factors (Arrindel & Ende, 1985) and exceed the necessary minimum of five times the number of items (Hair et al., 1998). A total of 81 participants completed the questionnaire. The participants were recruited if they had given birth to LBW infants (birth weight < 2,500 g) and were Japanese. Potential participants were excluded if their neonates had genetic anomalies or congenital malformations.

Measures

The sociodemographic and obstetric characteristics of participants included age, educational level, marital status, parity, and expected date of birth. The infants' data included birth weight and the gestational age at birth and at the time of data collection. These data were collected by maternal self-reports.

The Maternal Attachment Inventory Japanese version (MAI-J) was one of two instruments used to assess the criterion-related validity of the JPMP S-E scale. The MAI was developed by Muller (1994) and translated into Japanese by Nakajima (2001). Internal consistency and test-retest reliability of the MAI-J have been supported, and exploratory factor analysis (EFA) conducted to assess its construct validity revealed three factors. Cronbach's alpha coefficient estimate of reliability was .92 in the original study and .93 in our study. The questionnaire includes 26 items that assess maternal emotions and behaviors in the context of parenting. The MAI-J uses a 4-point Likert response format; total score ranging from 26 to 104, and higher scores indicate greater maternal attachment. We hypothesized that the relationship between JPMP S-E and MAI-J scores would be positive but low because others have found a weak correlation between PMP S-E and Maternal Postnatal Attachment Scale scores (Condon &

Corkindale, 1998).

We used the General Self-Efficacy Scale (GSES) as the second criterion measure to evaluate the validity of the JPMP S-E Scale. The GSES was developed by Sakano and Tohjoh (1986) and its validity subsequently tested (Sakano, 1989). Test-retest and split-half method reliability of the GSES have been supported. The GSES is constructed of three factors. Cronbach's alpha was .89 in the original study and .78 in the current study. The GSES has 16 items that are answered as *yes* or *no.* Raw scores that range from 0 to 16 points are converted into a standardized score that range from 20 to 80 points. The standardized score is used in statistical analysis. A higher GSES score indicates greater general self-efficacy. This scale has been widely used in various fields including nursing, physical therapy, and occupational therapy. We hypothesized that the relationship between the JPMP S-E and GSES scores would be positive and medium because the fundamental theory is the same for both parenting self-efficacy and general self-efficacy. For example, scores for the Italian version of the PMP S-E were found to have a medium correlation with GSES scores (Pedrini et al., 2018).

Procedures

The head nurse of the NICU identified potential participants who satisfied the inclusion criteria and informed us immediately. We visited the NICU and informed them of the study details using an outline of the purpose and procedures that included benefits and risks, data management method, and potential publication of the research as ethical considerations. We emphasized the voluntary nature of participation, that the participant could freely withdraw at any time, and the confidentiality of the collected data. We used a questionnaire consisting of self-report measures that was completed using paper and pencil. Participants completed the JPMP S-E scale two separate times, which enabled us

to examine test-retest reliability. A retest interval of 2 to 14 days is usually used because the construct may have changed when the interval is too long, and participants may remember their responses when it is too short (Streiner et al., 2015). We conducted data collection with each participant two times approximately 2 weeks apart. The first set of questionnaires were completed when the infant's condition was stable, the infant had been moved from an incubator to an open crib, and the mother had experienced feeding, changing, and bathing the infant. Participants reported parent and infant characteristics and completed the three scales. Gestational age at birth was not specified because our aim was to provide support to any mother with an LBW infant in the NICU using JPMP S-E data. At the 2-week data collection, participants completed the JPMP S-E scale only. Approximately 15 min were required to complete the questionnaire. Questionnaires were distributed to consenting participants and collected on completion. The data were collected as hardcopy (paper and pencil) and digitized into an Excel database, which was subsequently imported into IBM SPSS Statistics for Windows (Version 25) for analysis.

Statistical analysis

We summarized the demographic data and the total scores of the JPMP S-E, MAI-J, and GSES using descriptive statistics, including the mean and *SD* or median and interquartile range (IQR). We also summarized each item of the three scales using relative frequencies. The internal consistency reliability of the JPMP S-E was assessed with Cronbach's alpha coefficients for the entire scale and each subscale. The test-retest reliability of the JPMP S-E was evaluated with the intraclass correlation coefficient (ICC [2, 1]) at an approximately 2-week interval. Spearman's rank correlation coefficients was used to assess the criterion-related validity between the JPMP S-E scale

and the MAI-J and the GSES. The construct validity of the JPMP S-E was evaluated with confirmatory factor analysis (CFA). Confirmatory factor analysis is used when the number of factors is established, the names of factors have been previously determined from EFA, and there exists a theoretical definition of the concept underlying the structure (Nakayama, 2018). Here, we used CFA to examine whether the data fit adequately to the factor model of the PMP S-E scale. We assessed CFA using the following fit indices: chi-square, goodness of fit index, comparative fit index, and root mean square error of approximation. Statistical analysis was performed using IBM SPSS statistics and Amos software (Version 25).

Results

Participant Characteristics

The multiple questionnaires were completed by 79 participants (response rate = 97.5%). Sociodemographic and obstetric characteristics of the participants and their infants are shown in Table 1. The participants' average age was 32.1 years (*SD* = 4.4). Most were at least primary school graduates (*n* = 74, 93.6%), married (*n* = 78, 98.7%), and lived in nuclear families (*n* = 75, 94.9%). Although approximately half of the participants were multiparous (*n* = 35, 44.3%), none previously experienced their newborns being admitted to NICUs. The infants' median birth weight was 1998.0 g (IQR = 392.0), the median gestational age at birth was 35 weeks 2 days (IQR = 2 weeks 0 days), and the median gestational age at the time of data collection was 37 weeks 3 days (IQR = 2 weeks 4 days).

Descriptive Statistics

The descriptive statistics of the JPMP S-E are shown in Table 2. The mean scores of each item of the JPMP S-E scale ranged from 2.2 (*SD* = 0.6) to 3.6 (*SD* = 0.5).

Although the JPMP S-E items are scored on a 4-point Likert scale, few mothers answered *strongly disagree* or *strongly agree.* The mean total score was 53.0 (*SD* = 7.1), and the total scores ranged from 38 to 68 out of a potential 20 to 80.

Reliability

Cronbach's alpha coefficient for the total JPMP S-E scale scores was .90. ICC values assessing the test-retest reliability of the JPMP S-E scale are shown in Table 3. To estimate the test-retest reliability, participants (n = 72, 91.9%) again completed the JPMP S-E at a mean interval of 10.6 days (*SD* = 6.7). The ICC (2, 1) of the JPMP S-E total score was .75 (95% confidence interval [.44, .87], $p < .001$).

Criterion-related Validity

The results of the criterion-related validity assessment are also shown in Table 3. The correlation between the MAI-J and JPMP S-E scales was moderate (r = .45, $p < .001$), and there was no significant correlation between the GSES and JPMP S-E scale (r = .21, p = .06).

Construct Validity

We performed CFA to verify whether the structure of the JPMP S-E scale in the current study was equivalent to that of the original PMP S-E model. However, the model did not satisfy the criteria for good fit (χ^2 = 455.99 [$p < .001$]), comparative fit index = .63, goodness of fit index = .63, and root mean square error of approximation = .15. Therefore, we conducted EFA using the same data to investigate the factor structure of the JPMP S-E because the CFA model did not fit the data. We found that the factor structure for the current data from Japanese mothers was different from that of the original scale.

EFA factor loadings for the JPMP S-E scale are shown in Table 4. Before EFA,

the Kaiser-Meyer-Olkin (KMO) value was calculated and Bartlett's test of sphericity was conducted to determine the sample adequacy and whether the data were appropriate for EFA. The KMO was .82, and the results from Bartlett's test of sphericity were statistically significant ($p < .001$). Both results indicated that the data were suitable for EFA (Ichihara, 2009). We used principal components analysis with varimax rotation for the EFA. Four factors (subscales) were indicated (just as in the original scale), and these four factors explained 61.63% of the variance. Three of the four factors contained most of the items as the original scale. The first factor included items 18 and 19; the second factor included items 8, 9, 10, 11, 12, and 20; and the third factor included items 2, 3, 4, 15, and 17. On the other hand, the number of items in the fourth factor increased from the original scale and included items 1, 5, 6, 7, 13, 14, and 16. We confirmed that the factor structure differed between the JPMP S-E and PMP S-E, especially the fourth factor. We maintained the original factor names for the PMP S-E scale, because we concluded that all items in the fourth factor were related to mothers' beliefs regarding child rearing. Items in the other three factors were related to mothers' behaviors that dealt with either infants' needs or child-care skills; however, items in the fourth factor were related to mothers' beliefs that they can satisfy their infants even when infants do not need anything.

Discussion

The original English PMP S-E scale was developed to assess parenting self-efficacy of mothers with LBW infants. We translated the PMP S-E scale into Japanese with permission from the original author and tested the psychometric properties of the JPMP S-E scale, so that it may be used to provide individualized help or support to mothers of LBW infants in NICUs.

With regard to the reliability of the JPMP S-E scale, we found good internal consistency with Cronbach's alpha and reproducibility of scores with ICC (McGraw & Wong, 1996; Oshio, 2016). Homogeneity is important for a scale that measures a trait, behavior, or disorder. To determine if a scale has homogeneity, it must be determined whether each item assesses a different dimension of the same content domain. A scale that has homogeneity is supported by high internal consistency among the items (Streiner et al, 2015).

We assessed the criterion-related validity of the JPMP S-E scale using the MAI-J as a measure of maternal attachment scale and the GSES as a measure of general self-efficacy. With regard to the relationship between parenting self-efficacy and attachment, Barnes and Adamson-Macedo (2007) reported a positive but weak correlation between PMP S-E and Maternal Postnatal Attachment Scale scores ($r = .31$, $p < .01$; Condon & Corkindale, 1998). Delavari et al. (2018) reported a positive and moderate correlation between women's attachment to their fetuses and maternal self-efficacy ($r = 0.48$, P $< .001$). Our findings indicate that although parenting self-efficacy and maternal attachment were related, they are separate concept, which supports the discriminant validity of the JPMP S-E scale. The positive correlation also indicates that as women's self-efficacy for parenting their LBW infants increases, their attachment to their infants also increases.

In contrast, we found no significant correlation between scores on the JPMP S-E and the GSES even though both parental self-efficacy and general self-efficacy were derived from the same theoretical perspective. The GSES was developed to assess the self-efficacy of any person in any task, whereas the PMP S-E scale was developed to assess parenting self-efficacy in the specific domain of parenting tasks for LBW infants.

Our results suggest that self-efficacy differs between general social tasks and domain-specific tasks, such as child rearing. People may display confidence toward common social requirements in daily or routine work but not necessarily in specific situations, such as child-rearing. Bandura (2006) recommended that domain-specific scales be used in the measurement of self-efficacy. The absence of a significant relationship between JPMP S-E and GSES scores in our study suggests that each scale has a different use and utility. The PMP S-E and JPMP S-E are domain-specific scales to measure self-efficacy in child-rearing.

We initially examined construct validity using CFA. However, the CFA model fit was insufficient (Brown, 2015; Byrne, 2016), which may be attributed to cultural differences and sample sizes. Cultural differences can sometimes complicate the development of a cross-cultural scale. Strict and faithful translations can lead to limitations with a large sample size because cultural and language differences continually influence translations into another language (Fan et al., 2017). The PMP S-E scale has also been translated into Portuguese (PAEPM; Tristão et al., 2015) and Italian (Italian PMP S-E; Pedrini et al., 2019). Although the construct validity of the PAEPM and the Italian PMP S-E were tested using only EFA or both EFA and CFA, the structures differed from those reported in the original research by Barnes and Adamson-Macedo (2007). We found four factors by EFA; however, the items within each factor differed from those in the original scale. The first three factors were related to engaging in childcare or interpreting a baby's behavior, whereas Factor 4 contained mothers' beliefs such as "I believe that my baby and I have good interactions with each other." Efficacy beliefs affect the nature and intensity of emotional experiences (Bandura, 1997a). The items related to maternal beliefs in Factor 4 might be influenced by an

individual's specific cultural background, unlike childcare procedures or interpreting infants' behaviors, which may be more similar across cultural contexts. Furthermore, differences in the nursing care provided by NICUs in each country are also influenced by cultural differences, which may be reflected in the results of this and other studies.

A study of social surveys revealed that Japanese people tend to avoid extreme answers in favor of moderate responses (Tasaki & Shin, 2017). In our study, about 90% of participants' responses were centralized to *disagree* and *agree* options, even though the JPMP S-E scale uses a 4-point Likert scale. Thus, the answers to the JPMP S-E items by our participants might reflect responses typical of the Japanese population and be reflected in the average item scores of 2.2 to 2.9 that we found. The Japanese response style may have facilitated the generation of a factor structure that differed from that of the original scale. Moreover, the characteristics of Japanese mothers may partially explain why the total mean score of the JPMP S-E (53.1) for our participants was lower than that reported for the Italian PMP S-E (62.4; Pedrini et al., 2019) and the PAEPM (64.8; Tristão et al., 2015).

Implications and Limitations

We found adequate reliability and moderate validity for the JPMP S-E scale, suggesting that it can be used for clinical maternal assessment by NICU nurses. However, some issues remain to be clarified by future studies. The CFA fit was insufficient, and participants' infants in our sample exhibited a wide range of birth weights and gestational ages at birth. Increasing the sample size and changing the sampling criteria to include mothers with infants with a birth weight over 2,500 g could be considered. It would also be valuable to assess the relationship between parenting self-efficacy and infants' birth weight or gestational age at birth because parenting self-

efficacy is likely influenced by infants' clinical status or appearence. The JPMP S-E scale can be used by health care experts who work with mothers and infants to assess parenting self-efficacy and tailor support for individual mothers. The instrument may also be used to assess the outcomes of care provided to infants and their mothers. Enhancing mothers' parenting self-efficacy by assessing and providing individual support in accordance with JPMP S-E scale responses may also help prevent postpartum depression and foster infant development.

Conclusions

We assessed the reliability and validity of the JPMP S-E scale among mothers with LBW infants hospitalized in the NICU. There was good support for the scale's reliability and its validity was adequate. However, the theoretical structure of the JPMP S-E may differ from that of the original English version. Our results suggest that the JPMP S-E scale may be useful for nurses and other health care experts in Japan to assess mothers' parenting self-efficacy and support them more effectively through individualized interventions.

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Table 1

Sociodemographic and Obstetric Characteristics of the Participants and Their Infants (N = 79)

Mothers	
Age (years)	
Mean (*SD*)	32.1 (4.4)
Range	19–40
Educational level, n (%)	
Middle school	4 (5.1)
High school	20 (25.3)
University	54 (68.3)
Unknown	1 (1.3)
Living with partner, n (%)	
Married	78 (98.7)
Unmarried	1 (1.0)
Family type, n (%)	
Nuclear family	75 (94.9)
Extended family	4 (5.1)

Parity, n (%)	
Primiparous	44 (55.7)
1+ previous live births	35 (44.3)
Infants	
Birth weight of infants (grams)	
Median (IQR)	1,998.0 (392.0)
Range	304.0–2,495.0
Gestational age at birth (weeks, days)	
Median (IQR)	35 w 2 d (2 w 0 d)
Range	23 w 2 d to 38 w 2 d
Gestational age at time of data collection (weeks, days)	
Median (IQR)	37 w 3 d (2 w 5 d)
Range	34 w 1 d to 45 w 4 d

Note. IQR = interquartile range, SD = standard deviation

Table 2

Descriptive Statistics of the Japanese Version of the Perceived Maternal Parenting Self-Efficacy Scale (N = 79)

		Frequency distribution			
		Strongly Disagree	Disagree	Agree	Strongly Agree
Item	Mean (SD)	n (%)			
1. I believe that I can tell when my baby is tired and needs to sleep	2.9 (0.5)	0 (0.0)	13 (16.5)	62 (78.3)	4 (5.1)
2. I believe that I have control over my baby's care	2.9 (0.6)	0 (0.0)	19 (24.1)	51 (64.6)	9 (11.4)
3. I can tell when my baby is sick	2.5 (0.7)	6 (7.6)	30 (38.0)	42 (53.2)	1 (1.3)
4. I can read my baby’s cues	2.6 (0.5)	1 (1.3)	32 (40.5)	45 (57.0)	1 (1.3)
5. I can make my baby happy	2.9 (0.5)	0 (0.0)	15 (19.0)	57 (72.2)	7 (8.9)

6. I believe that my baby responds well to me	2.9 (0.6)	0 (0.0)	16 (20.3)	53 (67.1)	10 (12.7)
7. I believe that my baby and I have good interactions with each other	2.9 (0.6)	1 (1.3)	17 (21.5)	52 (65.8)	9 (11.4)
8. I can calm my baby when he/she has been crying	2.9 (0.5)	0 (0.0)	15 (19.0)	58 (73.4)	6 (7.6)
9. I am good at soothing my baby when he/she becomes upset	2.4 (0.6)	4 (5.1)	41 (51.9)	32 (40.5)	2 (2.5)
10. I am good at soothing my baby when he/she becomes fussy	2.5 (0.7)	4 (5.1)	32 (40.5)	40 (50.6)	3 (3.8)
11. I am good at soothing my baby when he/she continually cries	2.3 (0.7)	9 (11.4)	40 (50.6)	29 (36.7)	1 (1.3)

12. I am good at soothing my baby when he/she becomes restless	2.2 (0.6)	9 (11.4)	45 (57.0)	24 (30.4)	1 (1.3)
13. I am good at understanding what my baby wants	2.4 (0.6)	3 (3.8)	39 (49.4)	36 (45.6)	1 (1.3)
14. I am good at getting my baby's attention	2.6 (0.5)	2 (2.5)	30 (38.0)	47 (59.5)	0 (0.0)
15. I am good at knowing what activities my baby does not enjoy	2.4 (0.6)	4 (5.1)	40 (50.6)	35 (44.3)	0 (0.0)
16. I am good at keeping my baby occupied	2.3 (0.6)	2 (2.5)	46 (58.2)	30 (38.0)	1 (1.3)
17. I am good at feeding my baby	2.3 (0.7)	8 (10.1)	40 (50.6)	29 (36.7)	2 (2.5)
18. I am good at changing my baby	2.9 (0.6)	0 (0.0)	19 (24.1)	52 (65.8)	8 (10.1)
19. I am good at bathing my baby	2.5 (0.7)	3 (3.8)	36 (45.6)	35 (44.3)	5 (6.3)
20. I can show affection to my baby	3.6 (0.5)	0 (0.0)	0 (0.0)	28 (35.2)	51 (64.6)

Total	53.1 (7.1)

Table 3

Internal Consistency and Criterion-related Validity of the Japanese Version of the Perceived Maternal Parenting Self-Efficacy Scale (N = 79)

Internal Consistency	**Intraclass Correlation (ICC)**	***p***
Test-retest	0.75	< .001
Criterion-related validity	**Correlation Coefficient** [a]	***P***
JPMP S-E vs MAI-J	0.45	< .001
JPMP S-E vs GSES	0.21	0.06

Note. JPMP S-E = The Japanese version of the Perceived Maternal Parenting Self-Efficacy scale, MAI-J = The Maternal Attachment Inventory Japanese version, GSES = The General Self-Efficacy Scale.

[a] Spearman's rank correlation coefficient.

Table 4

Factor Loading for Exploratory Factor Analysis with Varimax Rotation of the Japanese Version of the Perceived Maternal Parenting Self-Efficacy Scale (N = 79)

Item	Factor			
	1	2	3	4
18. I am good at changing my baby	**.80**	.13	.02	.10
19. I am good at bathing my baby	**.76**	.30	.12	.12
9. I am good at soothing my baby when he/she becomes upset	.19	**.84**	.11	.22
11. I am good at soothing my baby when he/she continually cries	.13	**.82**	.30	.21
10. I am good at soothing my baby when he/she becomes fussy	.28	**.80**	.11	.17
12. I am good at soothing my baby when he/she becomes restless	.06	**.75**	.28	.20
8. I can calm my baby when he/she has been crying	.20	**.46**	.15	.35
20. I can show affection to my baby	.17	**.18**	-.07	.13
3. I can tell when my baby is sick	-.15	.21	**.84**	.00
2. I believe that I have control over my baby's care	.19	.11	**.58**	.10

15. I am good at knowing what activities my baby does not enjoy	-.02	.17	**.58**	.35
4. I can read my baby's cues	-.09	.34	**.45**	.34
17. I am good at feeding my baby	.17	-.03	**.34**	.32
6. I believe that my baby responds well to me	.16	.30	-.11	**.75**
7. I believe that my baby and I have good interactions with each other	.09	.28	.13	**.66**
5. I can make my baby happy	.14	.32	.22	**.60**
14. I am good at getting my baby's attention	.10	.24	.38	**.53**
13. I am good at understanding what my baby wants	.27	.34	.43	**.49**
16. I am good at keeping my baby occupied	.20	.29	.33	**.40**
1. I believe that I can tell when my baby is tired and needs to sleep	-.01	-.01	.23	**.39**

Note. Factor 1. Care taking procedures, Factor 2. Evoking behavior(s), Factor 3. Reading behavior(s), Factor 4. Situational beliefs

Figure Title and Legend

Figure 1. *Translation process of the Japanese version Perceived Maternal Parenting Self-Efficacy scale.*