

# MATERNAL EMOTIONAL WELL-BEING: A SCALE DEVELOPMENT AND PSYCHOMETRIC TESTING STUDY

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March 16, 2024

## Abstract

**Objective:** This study was carried out to develop an instrument to measure the emotional well-being of mothers in line with the Deck-Chair theory of Jean Ball. **Design:** Scale development and psychometric testing study. **Setting:** Turkey **Population or Sample:** A total of 398 postpartum women were included. **Methods:** MEWBS was administered to postpartum women being prepared for discharge (n=398). Factor analyses were carried out to determine the construct validity of the scale. Cronbach's alpha coefficient was used to assess the reliability of the scale. **Main Outcome Measures:** MEWBS is a valid and reliable scale. **Results:** KMO value for EFA was found to be 0.806. As a result of the factor analysis that was carried out with the varimax orthogonal rotation technique, three factors explaining 51.825% of the total variance in the measured characteristic (Healthcare and Education, Social Support, and Mother's Personality and Experiences) were identified. The internal consistency coefficient of the scale revealed that it was highly reliable (Cronbach's alpha=0.860). It was determined that the scale did not have response bias (Hotelling's  $T^2=397.260$ ,  $p=0.000$ ), and its factors were additive (non-additivity: 0.000). **Conclusion:** The validity and reliability test results of MEWBS demonstrated that it is a valid and reliable measurement instrument to assess the emotional well-being of postpartum mothers being prepared for discharge. MEWBS can guide healthcare professionals in identifying the emotional well-being of mothers in line with Jean Ball's deck-chair theory and providing care accordingly. Therefore, healthcare professionals are advised to use MEWBS in their routine practices and assessments of mothers.

## INTRODUCTION

One of the most important roles of a woman in life is considered to be motherhood. Motherhood brings about multiple changes in the woman's life, especially physiological, economic, and psychosocial changes. In the postpartum period, in addition to her existing responsibilities, the mother assumes baby-related responsibilities such as the care and safety of her baby, communication with her baby, the realization of her baby's identity as an individual, and coping with problems. While mothers who receive sufficient social support and healthcare services can perform these responsibilities easily, those who are unable to receive social support may have difficulties. As a consequence, mothers may experience psychological issues such as mood disorders and depression, and thus, they may neglect their self-care and the care of their babies.<sup>1-6</sup> The feeling of being cared for and supported which is experienced by mothers who receive postpartum social support increases their sense of bonding, self-esteem, self-management skills, and self-efficacy.<sup>7</sup> For the adjustment of the woman to her motherhood roles, her well-being, and her capacity to cope with potential problems, it is highly important for her to receive comprehensive healthcare services which include social support.<sup>2,8-10</sup>

The purpose of care theories in the field of midwifery is to guide midwifery practices. With the usage of theories, systematic and comprehensive care in midwifery practices can be achieved by including individual-centered approaches rather than task-centered approaches, as well as holistic approaches. Care services provided based on theories and models allow practitioners to reach their targeted goals more easily and achieve successful care outcomes.<sup>11</sup> In this context, midwives can provide care to women in the pregnancy

and postpartum periods based on the “Mother’s Emotional Well-Being – Deck-Chair Theory” which was developed by Jean Ball with a holistic approach. According to this theory by English midwife Jean Ball, pregnancy and the postpartum period can be viewed as a period of adaptation to a new role.<sup>12</sup> In her book *Reactions to Motherhood: The Role of Post-Natal Care*, Ball stated that for a woman to adapt to motherhood, she needs to be put into an active position, while in addition to physiological factors, psychological and emotional factors in this period are effective in the woman’s adoption of her identity as a mother by motivating her parenthood roles. Accordingly, the mother’s state of well-being is influenced by the care she receives, her environment, her identity, and her experiences. These factors are associated with the care provided by midwives and other occupational groups in obstetric services, the attitudes and resources in society, and the support of family and peers. According to the care model of Ball, midwives should provide care and support to women who are emotionally developing toward a state of well-being and adjustment to motherhood.<sup>5,8,12-15</sup>

According to Jean Ball (1987), the emotional well-being of a mother is affected by factors such as her self-esteem, self-image, life experiences, satisfaction with parenthood, anxiety levels, environment in the postpartum period, the 4th stage of labor, assessment of the development of her baby, individual care plans, being supported in her nutritional choices, the support she receives from her environment, and her perceived level of family support.<sup>5,8,15</sup> Ball showed that an increase in these factors was associated with an increase in the emotional well-being of mothers. She identified three themes that affected the emotional well-being of a postpartum mother, namely the personality of the mother, the support of her family and social environment, and the support of healthcare professionals. Based on these three themes, Ball proposed the deck-chair theory. Accordingly, the bottom part of the chair represents the support and care provided by healthcare professionals, the back of the chair represents the personality traits, living conditions, and experiences of the mother, and the middle part of the chair represents family and social support. If the chair is in balance, this shows that the mother is emotionally well and healthy. That is, in line with the chair metaphor, keeping these factors in balance is important for the postpartum well-being of the mother. If the chair is not placed on solid ground, it sinks when it is sat on, and if its parts are incompatible with each other, even though it supports the mother, it causes discomfort and stress. For a state of complete well-being, all three parts of the chair should be in balance, and the chair should be on solid ground. Furthermore, all factors are interrelated, and balancing the shortcomings of one factor with an emphasis on another will keep the emotional well-being of the mother intact (Figure 1).<sup>5,8,13-17</sup>

In the context of individual needs in obstetrics, to provide comprehensive and high-quality care, it is needed to develop care standards and appropriate assessment tools for midwives in line with scientific knowledge. The content of this scientific knowledge is founded on “concepts” and “theories”, especially in the fields of behavioral and social sciences. Thus, while developing a measurement instrument, its basis should be a theoretical framework.<sup>11</sup> In this study, the deck-chair theory by Jean Ball was adopted as a theoretical framework, and it was determined that the emotional well-being of a mother is dependent on her personality and experiences, social support status, and healthcare support status. Höglund and Larsson (2014) also utilized the deck-chair theory of Jean Ball to plan their study and interpret its results. They concluded that the well-being of women was affected not only by social support but also by professional support.<sup>12</sup> In a dissertation study about nursing care activities which was planned based on the deck-chair theory by Ball, Devi (2012) reported favorable results in terms of the satisfaction levels and outcomes of mothers who were provided with care using this approach.<sup>18</sup> In the literature review, no study on a measurement instrument for the emotional well-being of mothers developed within a theoretical framework could be encountered.<sup>19</sup> Therefore, in this study, it was aimed to develop an instrument to measure the emotional well-being of mothers in line with the deck-chair theory of Jean Ball.

## METHODS

Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) checklist guide was used in the manuscript.

### Sample

The population of the study included postpartum women at the Postpartum Care Service of Atatürk City Hospital in the Balıkesir province of Turkey. To conduct factor analyses in psychometric studies, it is recommended to include a sample size of 5 to 10 times the number of items on a scale. Other recommendations for scale development and testing studies include a minimum of 200 participants for exploratory factor analysis (EFA), a minimum of 200 participants for confirmatory factor analysis (CFA), and a minimum of 400 participants in total.<sup>20-24</sup> As the draft scale form included 39 items, it was planned to include at least 390 participants, while the sample of the study consequently included 403 participants. However, because the responses of 5 participants to the scale items included missing data, the analyses excluded the data of these participants, and the study was completed with 398 postpartum women.

The inclusion criteria for this study were being at least 18 years old, having a living baby, and being ready to be discharged. Postpartum women who were younger than 18 years old, those who were not ready to be discharged, and those who had lost their babies were excluded. The data collection forms were administered to the women who were at the postpartum care service by the researchers. It took each participant approximately 10 minutes to fill out the forms.

### Scale Development

First of all, a literature review was conducted regarding the deck-chair theory developed by Jean Ball about the emotional well-being of mothers. Based on this theory, a theoretical framework was established so that the items of the scale would be gathered under 3 conceptual frameworks (personality and experiences of the mother, social support, and healthcare and education).<sup>5,8,12,13,15-17</sup> To find publications about the emotional well-being of mothers, key phrases such as “personality of a mother”, “experiences of a mother”, “social support”, “health education”, “healthcare”, “emotional well-being of a mother”, and “deck-chair theory” were used for searches on the Cochrane Library, PubMed, Scopus, and Google Scholar databases. Dissertation studies on this topic and existing measurement instruments were also searched. No measurement instrument developed within a theoretical framework regarding the emotional well-being of mothers was encountered. Information about the topic was collected by the researchers, and a broad item pool (39 items) was prepared.

In the second stage, the initial form of the scale (instructions, items, response options) was submitted for the opinions of 16 experts regarding its relevance, comprehensiveness, comprehensibility, and convenience of usage. The consulted experts included 4 professors, 5 associate professors, and 7 assistant professors who specialized in the field of midwifery. The experts were asked to rate each item based on how much it represented the emotional well-being of mothers in the scope of the deck-chair theory by Jean Ball and provide written feedback, if necessary, about words that were considered hard to understand or issues that were considered missing.

In the third stage, the content validity of the scale was tested. The initial form of the scale included 39 items. During the content validity testing phase, no item needed to be removed based on the recommendations of the experts.

### Measures

**Personal Information Form :** This form, which was developed by the researchers based on a review of the relevant literature, included 21 questions about the sociodemographic and obstetric characteristics of the participants.<sup>2,5,12,15-17</sup>

**Maternal Emotional Well-Being Scale:** The scale was developed by the researchers to assess the emotional well-being of mothers within the framework of the deck-chair theory developed by Jean Ball covering 3 conceptual frameworks (personality and experiences of the mother, social support, and healthcare and education in care).<sup>5,12,15-17</sup> The item pool included 39 items. The response options for each item were 1=absolutely disagree, 2=disagree, 3=somewhat agree, 4=agree, and 5=absolutely agree. The content validity and linguistic validity of the scale were determined by consulting 16 experts in the field of midwifery before further analyses of the scale. Following factor analyses, some items were removed from the scale, and the final form of the Maternal Emotional Well-Being Scale consisted of 15 items and 3 dimensions (mother’s personality and

experiences = items 6, 7, 8, and 9; social support = items 16, 17, 18, 19, 20, 21, and 25, and healthcare and education = items 29, 31, 32, and 36) (Appendix A). There was no inversely scored item on the scale. The minimum and maximum total scores were 15 and 75, and higher scores indicated higher levels of emotional well-being.

## Validity

### Content Validity

The scale form was sent to 16 experts in the field of midwifery via e-mail with clear instructions about the definition of each area, scoring, and assessment criteria. In the assessments of the expert opinions, using the Davis technique, the content validity index (CVI) was calculated. The experts were asked to rate each item by selecting one of the following: “not suitable/should be removed”, “somewhat suitable/major revision required”, “highly suitable/minor revision required”, and “completely suitable”.<sup>25</sup> The CVI value was calculated as 0.80. No item needed to be removed from the scale based on its CVI value. A pilot implementation was made with the participation of ten postpartum women with similar characteristics to those in the sample, and it was concluded that the scale could be applied to the main sample as there was no problem in the comprehension of the scale items.

### Data Collection

This study was conducted between February and September 2023. The latest version of the scale following expert assessments was administered to postpartum women at the Postpartum Care Service of Atatürk City Hospital in the Balıkesir province of Turkey (n=403). However, as 5 participants responded to the scale items incompletely, their data were excluded from the analyses, and the study was completed with the data of 398 participants.

### Data Analysis

The collected data were analyzed using the SPSS (Statistical Package for the Social Sciences) for Windows 25.0 program. Descriptive statistics of the data (frequency, percentage, mean, and standard deviation) were calculated.

CVI was calculated for each item of the scale. CVI values were calculated with the following formula: [(number of experts with rating “completely suitable” + number of experts with rating “highly suitable/minor revision required)/total number of experts]. Items with CVI values greater than 0.80 were accepted to indicate sufficient content validity.<sup>25</sup>

To test the construct validity of the scale, an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) were conducted. The EFA and CFA were carried out on separate datasets. For the separation of these datasets, the data points were listed as even and odd numbers in SPSS. The points corresponding to odd numbers were used for EFA (n=199), while those corresponding to even numbers were used for CFA (n=199). The suitability of the data for factor analysis was tested with the Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett’s test of sphericity. A lower eigenvalue threshold of 1 and scree plots were used to confirm the number of factors. Principal component analysis was used as the factorization method, while varimax rotation, which is an orthogonal rotation method, was selected as the rotation method. The threshold of factor load values for each item was determined as a minimum of 0.40.<sup>20,24,26</sup> As model fit indicators in CFA,  $\chi^2/df$  values smaller than five and RMSEA values smaller than 0.08 are accepted to show a high goodness-of-fit. It was accepted that CFI and GFI values needed to be greater than 0.09.<sup>20,27-30</sup>

The reliability of the scale was tested with Cronbach’s alpha and item analyses. The response bias of the scale was tested using Hotelling’s T<sup>2</sup>. The homogeneity of the distribution of responses to each item was tested to analyze response bias. This process involved checking whether the mean scores of the items were significantly different from each other. To determine whether the scale items were suitable for obtaining a total score, Turkey’s test of additivity was carried out.<sup>31-34</sup>

## RESULTS

The sociodemographic and obstetric characteristics of the participants are presented in Table 1. The mean age of the participants was  $28.00 \pm 4.96$  (min: 18, max: 43), their mean number of pregnancies was  $2.01 \pm 1.18$  (min: 1, max: 9), their mean number of childbirths was  $1.77 \pm 0.98$  (min: 1, max: 8), their mean number of miscarriages/curettages was  $1.19 \pm 0.55$  (min: 1, max: 4), and their mean number of living children was  $1.77 \pm 0.97$  (min: 1, max: 8). It was determined that 6.5% of the participants had chronic diseases (30.8% hypothyroidism, 30.8% diabetes mellitus, 19.2% asthma, 11.6% hypertension, 3.8% rheumatism, and 3.8% Crohn’s disease). While 18.8% of the participants stated that they experienced pregnancy complications (54.6% abortus imminens, 25.3% bleeding, 18.7% premature rupture of membranes, and 1.3% diabetes mellitus), 6% said they experienced complications during labor (45.9% difficult labor, 37.5% preterm labor, 12.5% cord entanglement, and 4.1% cord prolapse), and 6.5% reported that the health status of their babies was not good (73.1% respiratory distress and 26.9% preterm birth).

In the Kaiser-Meyer-Olkin (KMO) test that was conducted to decide whether the sample size was sufficient, the KMO value was found to be 0.806. KMO values greater than 0.7 are generally considered satisfactory.<sup>20,24,26,35,36</sup> Accordingly, it was determined that the sample size of this study was “highly sufficient” to conduct factor analyses. The result of the Bartlett’s test of sphericity revealed an acceptable chi-squared value ( $\chi^2(276)=2571.919$ ;  $p<0.01$ ) (Table 2).

The 39-item Maternal Emotional Well-Being Scale was developed in this study based on three dimensions in line with Jean Ball’s theory. These dimensions were “social support, healthcare and education, and mother’s personality and experiences”. Accordingly, to identify the factor structure of the scale, an EFA was performed. Principal component analysis and varimax rotation were used in the EFA. The minimum factor load value to be met was determined as 0.40. Fifteen items that were found to have factor load values smaller than 0.40 in the EFA (items 1, 2, 3, 4, 10, 11, 12, 13, 14, 22, 23, 24, 26, 38, and 39) were removed from the scale (Table 2).

According to the varimax rotation results, it was observed that a four-factor structure was applicable. These factors explained 51.824% of the total variance in the measured characteristic (Table 2). In multi-factor constructs, variance explanation rates between 40% and 60% are considered adequate.<sup>20,21,22,24,26</sup> This shows that a defined factor has a sufficient contribution to the total variance.

As the factor loads of items 15, 27, 28, 34, and 35 were below 0.40 according to the CFA results, these items were removed from the scale (before the items were removed:  $CMIN=555.970$ ,  $CMIN/df=3.731$ ,  $RMSEA=0.118$ ,  $CFI=0.818$ ,  $GFI=0.775$ ). Modifications were made for items 30, 33, and 37 under the Healthcare and Education factor, item 15 under the Social Support factor, and item 5 under Mother’s Personality and Experiences factor to improve the model (for the improvements, covariances were drawn between error terms with high modification index (MI) values), and the resulting goodness-of-fit index values were  $CMIN=180.685$ ,  $df=83$ ,  $CMIN/df=2.177$ ,  $RMSEA=0.077$ ,  $CFI=0.937$ , and  $GFI=0.896$ , which showed an excellent fit.<sup>20,27-30</sup> According to the results of the CFA, in total, 9 items were removed from the scale. The path coefficients of all items under Factors 1, 2, and 3 were found to be statistically significant. Based on the standardized path coefficients, the item with the greatest effect on F1 was item 36 ( $\beta_0: 0.718$ ), the item with the greatest effect on F2 was item 17 ( $\beta_0: 0.887$ ), and the item with the greatest effect on F3 was item 8 ( $\beta_0: 0.881$ ) (Table 3).

The first-level CFA results of the scale are shown in Figure 2. Accordingly, in the scale that consisted of 15 items, the lowest factor load value was 0.43, while the highest was 0.89.

In reliability analyses, it is accepted that Cronbach’s alpha ( $0[?]\alpha[?]1$ ) coefficients in the range of 0.61-0.80 indicate high reliability, while those in the range of 0.81-1.00 indicate excellent reliability.<sup>21,34</sup> It was determined that the Maternal Emotional Well-Being Scale, its social support dimension, and its mother’s personality and experiences dimension had excellent levels of reliability, whereas the healthcare and education dimension had high reliability. The overall reliability coefficient of the scale was calculated as 0.860 (Table 4).

In the reliability analyses of the scale, it was determined that all corrected item-total score correlation

coefficients were greater than 0.20 and adequate (Table 5).

According to the results of the Hotelling's  $T^2$  analysis conducted to test the presence of response bias in the scale, it was found that the participants responded to the items based on their own opinions, and there was no response bias (Hotelling's  $T^2=397.260$ ,  $p=0.000$ ). Tukey's test of additivity was also conducted to determine the additivity of the scale. As the significance level found in the test was  $p=0.000$ , it was determined that the factors of the scale were additive (non-additivity: 0.000). That is, a single total scale score could be obtained by the addition of the scores of all scale items.

### **Final Form of the Maternal Emotional Well-Being Scale**

Following the analyses, the final version of the Maternal Emotional Well-Being Scale consisted of 15 items gathered under three dimensions. The healthcare and education dimension included 4 items, the social support dimension included 7 items, and the mother's personality and experiences dimension included 4 items.

## **DISCUSSION**

### **Main findings**

To the best of the knowledge of the authors, the Maternal Emotional Well-Being Scale is the first scale with demonstrated validity and reliability that was developed to assess the emotional well-being of mothers within a theoretical framework. According to the results of this study, the Maternal Emotional Well-Being Scale was valid and reliable in terms of its usage in mothers who are ready to be discharged in the postpartum period. Its final form consists of 15 items, and higher scores indicate better emotional well-being.

The factor analyses of the Maternal Emotional Well-Being Scale revealed a 3-factor construct that included 15 items. The deck-chair theory proposed by Jean Ball was beneficial for the development of this scale. According to this theory, the emotional well-being of a mother is influenced by her personality and experiences, the social support she receives, and the healthcare services provided to her. By examining the components forming the structure of the identified factors in this context, the factors were named "healthcare and education", "social support", and "mother's personality and experiences". The relevant literature was also reviewed in this process. In the literature, other studies in the context of Ball's deck-chair theory also focused on the mother's personality and experiences, social support, and healthcare. These factors were reported to affect the well-being of mothers.<sup>12,18</sup> The emotional well-being of a mother is an issue that needs to be evaluated in the context of her motherhood. The scale that was developed in this study consists of items relevant to the emotional well-being of mothers. Positive responses of mothers to these items indicate a high level of emotional well-being. The emotional well-being of a mother is very important for the care and development of her baby. A negative emotional state will affect mother-infant bonding, communication, breastfeeding, baby care, and the development of the baby negatively. Considering the problems that can be encountered in the postpartum period, it is crucially important to prevent complications, improve health, and provide the mother with the necessary advice in terms of maternal and neonatal health, and important responsibilities fall upon healthcare professionals in this vital process.<sup>11,37,38</sup> According to the deck-chair theory, the emotional well-being of a mother can be ensured if a shortcoming in one factor is balanced with the reinforcement of another factor. In this sense, negative personality traits and experiences of the mother and insufficient social support can be compensated by postpartum healthcare, and this will be effective in ensuring the comfort of the mother and her emotional response to postpartum changes.<sup>8,14</sup> Therefore, for the promotion of public health, it is important to determine the emotional well-being levels of mothers before they are discharged after childbirth and implement interventions if necessary. The formation of the item pool in this study based on these factors in the theory of Ball indicates that the scale is suitable for this theoretical framework and can guide healthcare professionals in the identification of the needs of mothers.

The homogeneity of the responses of the participants to all items was analyzed based on Hotelling's  $T^2$ , and it was found that the participants responded to the items based on their own opinions, and there was no response bias ( $p=0.000$ ).<sup>31,32,33</sup> Additionally, the results of the Tukey's test of additivity showed that a

single total scale score could be obtained by the addition of the scores of all scale items ( $p=0.000$ ).<sup>31</sup>

In this study, the overall Cronbach's alpha ( $\alpha$ ) coefficient of the scale was found to be 0.860, which indicated its high reliability. Considering the psychometric properties of the Maternal Emotional Well-Being Scale, which was developed in Turkish, all results obtained in this study provided supportive evidence of the validity and reliability of the scale construct. It can be concluded that this scale is a valid and reliable measurement instrument that can be used by healthcare professionals providing care services to mothers in the postpartum period to assess the emotional well-being levels of these mothers.

### **Strengths and limitations**

To the best of our knowledge, this study is the first in the literature to develop a scale to evaluate the emotional well-being of mothers within a certain theoretical framework and demonstrate the validity and reliability of this scale. It is recommended that the validity and reliability of this scale be tested in further studies to reach more generalizable results. A limitation of this study is that its results may not be generalized to samples in countries other than Turkey. The psychometric properties of the Maternal Emotional Well-Being Scale can be re-evaluated in different cultures.

### **Interpretation**

It can be stated that this study fills a significant gap in knowledge regarding the determination of the emotional well-being levels of mothers. The Maternal Emotional Well-Being Scale can be a useful tool to guide healthcare professionals in their provision of care to mothers with a comprehensive approach in clinical settings. Therefore, healthcare professionals are advised to use the Maternal Emotional Well-Being Scale in their routine practices and assessments of mothers.

### **CONCLUSION**

In the literature, there is no valid and reliable measurement instrument to assess the emotional well-being of mothers based on a theoretical framework. The results of this study proved that the Maternal Emotional Well-Being Scale is a valid and reliable instrument. It is a 5-point Likert-type scale with no inversely scored item. The total score range for the scale is 15-75. Higher scores indicate higher levels of emotional well-being. The mean total scale score of the postpartum mothers who participated in this study was found to be  $61.81 \pm 5.95$  (Minimum=41.00; Maximum=75.00).

It is recommended that the validity and reliability of this scale be tested in further studies to reach more generalizable results. The psychometric properties of the Maternal Emotional Well-Being Scale can be re-evaluated in different cultures.

### **Author Contribution**

**Study conception and design:** Hülya TÜRKMEN, Benay OĞUZ, Esra ÇEVİK

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### **Funding Statement**

This report is research supported by the Balıkesir University Scientific Research Project (Project No: 2023/097).

### **Conflict of Interest**

There is no conflict of Interest.

### **Acknowledgement**

The authors express thanks to the pregnant for participation in the study.

## Ethical Statement with Approval Date

### Ethical Considerations

Approval from the Non-Invasive Clinical Studies Ethics Committee of Balıkesir University in Turkey (2022/97) and permission from the Balıkesir Provincial Directorate of Health (E-51829602-604.01.01-209497122) were obtained to conduct the study. Before collecting data, postpartum women were given written information about the objective of the study, its duration, and that their confidentiality would be ensured, and their consent was obtained.

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