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The Validity and Reliability of the Perceived Maternal Parenting Self-Efficacy Scale: Turkish Version

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ABSTRACT

Objective: Preterm birth can result in a situation where mothers feel less confident in newborn care skills due to being unprepared. They may also experience emotional shock, anxiety, and depression. Thus it is important to determine maternal parenting self-efficacy in order for the mothers to cope with the potential difficulties involved in preterm newborn care. The purpose of this psychometric study is to test the validity and reliability of the Turkish version of the Perceived Mother Parenting Self-Efficacy Scale.

Materials and Methods: The study uses a psychometric approach. Online distribution of a questionnaire between the beginning of March and the end of May 2021 was applied. Data was collected from 105 mothers of preterm infants aged between 1-28 days. The original scale was translated into Turkish and content validity was evaluated. Explanatory factor analysis and confirmatory factor analysis were tested in order to determine validity, and Cronbach's α internal consistency coefficient, item-total correlation, test-retest analysis, and equivalent form analysis were tested to determine reliability.

Results: The mean age of the participants was 32.29±5.33. The factor loads of the items were between 0.361 and 0.911. The Cronbach's α, internal consistency coefficient was 0.891, and the test–retest reliability was 0.851 ($p<0.001$). A significant positive correlation between the Turkish version of the Perceived Maternal Parenting Self-Efficacy Scale and the Maternal Attachment Inventory ($r=0.533$, $p<0.05$) was found.

Conclusion: The Turkish version of the Perceived Maternal Parenting Self-Efficacy Scale is a valid and reliable instrument to evaluate maternal parenting self-efficacy. Further studies are needed to measure the parenting self-efficacy levels of mothers with preterm infants.

Keywords: Maternal self-efficacy, parenting self-efficacy, preterm birth, self-efficacy

INTRODUCTION

Self-efficacy is a key notion of Bandura's social cognition and social learning theory. Bandura defined self-efficacy as trust and basic motivation in a person's ability to take action and make decisions to produce a specific result (1). Self-efficacy consists of factors like action planning, awareness and organization of necessary skills, and level of motivation (2,3).Perceptions of self-efficacy affect emotional reactions as well as behavior While people with high self-efficacy perception can solve their problems and improve their lives through their own effort, people with low self-efficacy perception have to constantly strive to overcome the difficulties they face (4).

One of the important factors affecting women's ability to adapt in the transition to parenthood is parenting self-efficacy (5). Based on Bandura's theory, parenting self-efficacy is defined as "beliefs or judgments parent holds of their capabilities to organize and execute a set of tasks related to parenting a child" (6). Parenting self-efficacy is a mother's confidence to make good decisions for her children. The stronger the parenting self-efficacy, the more effort the mother will put into infant care (7).

Preterm birth, which refers to births before 37 weeks of gestation, is the most common health problem among infants. The worldwide incidence of preterm birth is estimated to be around 11.1% (8). In Turkey, it is as high as about 12% (9). Preterm infants are at greater risk of death and medical

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complications than full-term babies. In addition, most preterm infants need to be cared for in intensive care units for the newborn (10). Moreover, a preterm birth is a situation for which mothers are not prepared, and they may experience emotional shock, fear, anxiety, depression, and, post-traumatic stress (11). Mothers with preterm infants can feel less confident in their childcaring skills because of difficulties in reading the baby's responses as well as in feeding and holding them. Determining maternal parenting self-efficacy level is particularly important in order to help mothers cope with these difficulties in preterm infant care. Mothers with high maternal parenting self-efficacy can easily cope with difficulties in preterm infant care like feeding, holding, and reading their baby's cues (7). However, there is no instrument that measures the maternal parenting self-efficacy levels of Turkish mothers with preterm infants. Therefore, the aim of this study is to test the Turkish validity and reliability of the Perceived Maternal Parenting Self-Efficacy (PMPS-E) Scale.

MATERIALS AND METHODS

Design

This cross-sectional, psychometric study was conducted in two parts. The first part of the study was the translation of the PMPS-E scale from English into Turkish, and the second part was the psychometric testing of the scale.

Part 1: The Turkish Adaptation of the PMPS-E

Before starting the study, permission to translate the PMPS-E scale into Turkish was obtained from the original author by e-mail. Then, the scale was translated from English into Turkish, and back from Turkish into English, by three experts, respectively, thus ensuring that integrity was achieved. For the pilot test, the scale was applied to 10 mothers of preterm infants and the intelligibility of the items on the scale was tested. The mothers each confirmed that they had understood the meanings of the questions in the Turkish version of the PMPS-E scale (TPMPS-E).

Content validity was evaluated by seven experts to examine whether the TPMPS-E scale was applicable as a maternal parenting self-efficacy measure. The experts included one paediatric nurse, five women health and diseases nurses, and one psychiatric nurse who held doctoral degrees. The content validity index was 1.00, which was above the recommended value of 0.99 among six or seven evaluators (12). In this way, it was accepted that the statements on the scale fitted the Turkish language. So, the items of the TPMPS-E scale were not changed.

Part 2: Psychometric Testing of the TPMPS-E Scale

A cross-sectional study was conducted to evaluate the psychometric properties of the TPMPS-E scale. The sample size was determined as 100 participants because the scale had 20 items meaning that, by way of minimum, the number of participants would be five times greater than the number of items (13). The data were collected from 105 mothers who had preterm infants aged between 1-28 days. The questionnaire was uploaded onto Google Forms and advertised on e-mail and social media applications (Facebook, WhatsApp, and Instagram) between March 2021 and May 2021. After two weeks after first application, 95 mothers were contacted for retest.

To examine the equivalent form reliability of the scale, Maternal Attachment Inventory (MAI) was used.

Instruments

The Information Form: The information form included 12 questions which evaluated sociodemographic, obstetric, and infant data. It was prepared by the researchers according to the literature (4,14,15).

The Perceived Maternal Parenting Self-Efficacy Scale: The PMPS-E scale was developed by Barnes and Adamson-Macedo in 2007 (16). It was developed to measure the care and understanding abilities of mothers with preterm babies. The PMPS-E scale 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 PMPS-E scale has four theorized subscales that reflect different aspects of parenting (Factor 1=Care Taking Procedures - 4 items, Factor 2=Evoking Behaviours - 7 items, Factor 3=Reading Behaviours - 6 items, and Factor 4=Situational Beliefs - 3 items. The Cronbach's alpha coefficient of the PMPS-E scale from the original research was 0.91 (16).

The Maternal Attachment Inventory: The MAI was developed by Muller in 1994 and Turkish language validity and reliability were tested by Kavlak and Sirin in 2009 (17). The questionnaire in this study includes 26 items designed to assess maternal emotions and behaviours in the context of parenting. The MAI uses a 4-point Likert response format; total scores range from 26 to 104, and higher scores indicate greater maternal attachment. The Cronbach's alpha coefficient of the scale was 0.82 in the Turkish version (17), and in this study the Cronbach's alpha coefficient was found to be 0.83.

Data Analysis

SSPS 22.0 and AMOS software program was used to analyse the data. Number, percentage, mean, and standard deviation values were calculated in the definition of the data. In the translation process, language and content validity were studied. In the validation process, the suitability of the data for explanatory factor analysis (EFA) was evaluated with Kaiser-Meyer-Olkin (KMO) and Bartlett's sphericity test, and the reliability of the scale was evaluated. A confirmatory factor analysis (CFA) was applied to evaluate whether or not the factor model adapted to the data as a result of EFA. Cronbach's alpha coefficient and test-retest analysis was performed to evaluate the reliability of the scale. The Spearman-Rho correlation test was used to determine the relationship between the scales.

Ethical Approval

Ethics committee approval was obtained from the Non-invasive Clinic Ethical Committee of a university (date: 27.01.2021; no:5). Before filling in the questionnaire, consent was obtained from the participants who had met the criteria for being included in the research sample and who had agreed to participate in

the research. The study was conducted in accordance with the Declaration of Helsinki.

RESULTS

The sociodemographic and obstetric characteristics of the participants and their infants are shown in Table 1. The mean age of the participants was 32.29±5.33. The gravida and parity data of the participants were 2.43±1.61 and 1.71±1.02, respectively. The mean gestational age of the infants at birth was 30.63±3.34 and the mean birth weight was 1555.29±600.96. The infants were on average 13 days old (12.88±9.67). The total score ranges from 20 to 80 as with the original scale.

Validity

Before determining the factor structure of TPMPS-E, the KMO test was used to determine the suitability of the sample size for factor analysis and Bartlett's sphericity test was conducted for statistical significance. KMO coefficient was found to be 0.836 and Bartlett's sphericity test was determined as $\chi 2 = 1080.462$ and they were statistically significant ($p<0.001$). According to the results, the sample size was appropriate for factor analysis (Table 2).

Table 1: Characteristics of participants and infants (N=105)

Characteristics	Mean±SD	Min	Max
Age	32.29±5.33	19	50
Gravida	2.43±1.61	1	9
Parity	1.71±1.02	1	9
Gestational age at birth of infants	30.63±3.34	24	37
Birth weight of infants (gram)	1555.29±600.96	580	3500
Infant age (day)	12.88±9.67	1	28
		n	**%**
Education	*Primary School*	9	8.6
	High School	29	27.6
	Undergraduate or above	67	63.8
Working Status	*Working*	48	45.7
	Not Working	57	54.3
Delivery Type	*Vaginal*	12	11.4
	Caesarean Section	93	88.6
Infant gender	*Boy*	47	44.8
	Girl	58	55.2

Table 2: KMO and BTS analysis results and factor loading for EFA with varimax rotation of the TPMPS-E scale (N=105)

Test	Value	p
KMO	0.836	
BTS	1080.462	0.000

Scale Items	Factor Loading	Total Variance (%58.743)
Factor 1: Care Procedures		35.860
18. I am good at changing my baby.	0.375	
19. I am good at bathing my baby.	0.475	
Factor 2: Evoking Behaviors		10.505
8. I can make my baby calm when he / she has been crying.	0.745	
9. I am good at soothing my baby when he / she becomes upset.	0.911	
10. I am good at soothing my baby when he / she becomes fussy.	0.778	
11. I am good at soothing my baby when he / she continually cries.	0.787	
12. I am good at soothing my baby when he / she becomes more restless.	0.868	
14. I am good at getting my baby's attention.	0.718	
Factor 3: Reading Behaviours		6.680
1. I believe that I can tell when my baby is tired and needs to sleep.	0.437	
5. I can make my baby happy.	0.743	
6. I believe that my baby responds well to me.	0.561	
7. I believe that my baby and I have a good interaction with each other.	0.389	
13. I am good at understanding what my baby wants.	0.623	
16. I am good at keeping my baby occupied.	0.497	
Factor 4: Situational Beliefs		5.698
2. I believe that I have control over my baby's care.	0.595	
3. I can tell when my baby is sick.	0.361	
4. I can read my baby's cues.	0.773	
15. I am good at knowing what activities my baby does not enjoy.	0.739	
17. I am good at feeding my baby.	0.719	
20. I can show affection to my baby.	0.854	

KMO: Kaiser-Meyer-Olkin; BTS: Barlett's test of sphericity.

According to the EFA results, there were four factors with eigenvalues greater than 1 (just as in the original scale), and some of the items were different according to the original scales, but the original factor names for the PMPS-E scale were not changed. This is because the Turkish meaning of the items corresponded to the factor names. The factor regarding care procedures was included in items 18 and 19 (16, 17, 18, 19 in the original scale); evoking behaviours factor was included in items 8, 9, 10, 11, 12, 14 (5, 8, 9, 10, 11, 12, 14 in the original scale); reading behaviours factor was included in items 1, 5, 6, 7, 13, 16 (1, 2, 3, 4, 13, 15 in the original scale) and situational beliefs factor was included in items 2, 3, 4, 15, 17, 20 (6, 7, 20 in the original scale). The total variance of the scale was 58.743% and the subscales as follows: care-taking procedures was 35.860%; evoking behaviours was 10.505%; reading behaviours was 6.680% and situational beliefs was 5.698%. The factor loads of the items on the scale were between 0.361 and 0.911. None of the items showed loading under the cut-off (0.30) (Table 2).

Table 3: Item Total Statistics results for TPMPS-E Scale (N=105)

Scale Items	Corrected item total *r*	Cronbach Alpha (α=0.891)
18	0.526	
19	0.371	0.810
8	0.658	
9	0.747	
10	0.715	
11	0.675	0.917
12	0.736	
14	0.653	
1	0.481	
5	0.590	
6	0.565	
7	0.509	0.747
13	0.732	
16	0.577	
2	0.308	0.690
3	0.363	
4	0.497	
15	0.581	0.690
17	0.364	
20	0.571	

We performed CFA to verify whether the structure of the TPMPS-E scale in this study was equivalent to the original PMPS-E model. However, the model did not meet the criteria for good fit ($\chi 2$= 131.98 [p<0.05], comparative fit index [CFI]=0.72, goodness of fit index [GFI]=0.71, and root mean square error of approximation [RMSEA]=0.07). It was found that the factor structure for the current data obtained from Turkish mothers was different from the original scale.

Reliability

Cronbach's α coefficient was applied to calculate the internal consistency of the scale, and it was found to be 0.891. Cronbach's α values for the subscales were as follows: care procedures (α=0.810); evoking behaviours (α=0.917); reading behaviours (α=0.747); situational beliefs (α=0.690). The item total correlation of the scale is shown in Table 3.

Test-retest analysis was performed to determine the stability of the scale over time. For analysis, the scale was applied to the sample group (n=95) a second time, 2 weeks after the first application. Correlation values of the relationship between test and retest results were determined as r=0.851 for total scale score and r=0.800, r=0.711, r=0. 860 and r=0.848 for subdimensions, respectively, and it was found as statistically significant (p<0.001) (Table 4).

Within the scope of the equivalent form reliability of the scale, the correlation between TPMPS-E total score and subscale scores and MAI scores was examined. Correlation values of the relationships between TPMPS-E total scores and MAI total scores were determined as 0.533; the correlation values of the relationships between the subdimensions of TPMP S-E and MAI total score were determined between 0.190 and 0.590 and statistically significant (p<0.05) (Table 4).

DISCUSSION

The original PMPS-E scale was developed to assess maternal parenting self-efficacy for mothers of preterm infants during the neonatal period (16). This study was conducted to determine the validity and reliability of the Turkish version of the PMPS-E. TPMPS-E was tested to determine if the scale was adequate to evaluate the maternal parenting self-efficacy of Turkish mothers with preterm infants.

EFA of the items in the scale was made to evaluate the validity of the scale. It was found that most of the items' factor loads were

Table 4: Internal Consistency and Equivalent Form Reliability of the TPMPS-E Scale (N=105)

	Retest application					MAI
First application	**CP**	**EB**	**RB**	**SB**	**TOTAL**	
Caretaking Procedures (CP)	0.800**					0.190*
Evoking Behaviors (EB)		0.711**				0.361*
Reading Behaviors (RB)			0.860**			0.590**
Situational Beliefs (SB)				0.848**		0.332*
TOTAL					0.851**	0.533**

*p<0.05, **p<0.001

greater than 0.50 (between 0.36 and 0.91). Only six of the items' factor loads were less than 0.50, similar to the original scale (16).In the Japanese version (4),factor loads of the items were between 0.18 and 0.84. In the Italian version (15), all the items' factor loads were greater than 0.50. When the total variance was examined, it was found that the total variance was 58.74% in this study. In scale adaptation studies, it is sufficient to explain 30% of the total variance and to be higher than 0.30 for factor load values (18). Therefore, it can be said that this scale is a useful instrument for Turkish mothers with preterm infants.

After the varimax rotation for the EFA, four factors (sub-dimensions) were indicated as in the original scale (16). However, some of the items in the sub-dimensions of the scale were different from the original scale. Factor 1 (care procedures) included 2 items (18, 19), but this factor consists of 4 items (16, 17, 18, 19) in the original scale. Factor 2 (evoking behaviours) included 6 items (8, 9, 10, 11, 12, 14), but there are 7 items (5, 8, 9, 10, 11, 12, 14) in the original scale. Factor 3 (reading behaviours) included 6 items (1, 5, 6, 7, 13, 16). There are also 6 items (1, 2, 3, 4, 12, 15) in the original scale. Factor 4 (situational beliefs) included 6 items (2, 3, 4, 15, 17, 20), but there are only 3 items (6, 7, 20) in the original scale (16).In Turkish, the meaning of the 16th item (I am good at keeping my baby occupied) was found suitable for reading the behaviour of the baby. The meaning of 17th item (I am good at feeding my baby) in Turkish was found suitable for situational beliefs. It is noteworthy that the items in factor 4 were different from the original scale. In the Turkish version of the scale the meaning of items 2, 3, 4, 15 and 17 were about the mothers' situational beliefs. This difference between the factor items may have to do with cultural differences. The names of the factors were not changed because most of the items were the same according to the original scale and in Turkish the items of the factors were suitable for the factor names.

CFA was applied to evaluate whether or not the factor model adapted to the data as a result of EFA. However, the model did not satisfy the criteria for good fit ($\chi 2=131.98$ [$p<0.05$], comparative fit index [CFI]= 0.72, goodness of fit index [GFI]=0.71, and root mean square error of approximation [RMSEA]=0.07). According to this result, it can be said that the factor structure for the current data from Turkish mothers was different from the original scale. In the Japanese version, the factor structure was also found to be different from the original scale (4). While CFA was not evaluated in the Portuguese version, the four-factor model was confirmed in the Italian version (15).

Reliability is the degree to which a scale can deliver sensitive, consistent, and stable results. One of the methods to find the reliability of a scale is to evaluate the internal consistency. It was decided that the Cronbach's α coefficient should be calculated to evaluate the internal consistency of a Likert-type scale (19). The Turkish version of PMPS-E was found to be reliable since Cronbach's α value was higher than 0.80 (Cronbach's α=0.89). Cronbach's α value was 0.91 in the original scale (16). In the Japanese version the Cronbach's α value was 0.90 (4), and in the Italian version the Cronbach's α value was 0.93 (15). The Cronbach's α value was 0.86 in the Portuguese version (14).

The item-total score correlation test was also used to evaluate internal consistency. Item-total score correlation coefficient shows the relationship between each item and total value, and according to the literature, the total score correlation of an item should be at least 0.30 (20). In this study, the total item correlation of TPMPS-E was determined to be between 0.363 and 0.747. In the Italian study it was between 0.488 and 0.730. According to the item-total correlation coefficients, the Turkish version of the scale's internal consistency is high.

Another consistency criterion is test-retest reliability. The coefficient of the correlation of the total score and the factors was high over a 2-week period, thus supporting the test–retest reliability of the questionnaire. For the equivalent form reliability, the correlation between the TPMPS-E total score and subscale scores and MAI scores was examined. With regard to the relationship between parenting self-efficacy and attachment, a positive and moderate correlation between TPMPS-E and MAI scores was found ($r=0.533$, $p<0.001$). In the original scale, the MAI was also used to evaluate equivalent form reliability and a positive but weak correlation was found (16). When all the tests examining the reliability of the TPMPS-E are evaluated in this study, it can be said that the Turkish version of PMPS-E is a reliable scale for the Turkish population.

CONCLUSION

The study was conducted to test the Turkish validity and reliability of the PMPS-E scale among mothers with preterm infants. The EFA results showed an adequate validity, but the CFA results showed that theoretical and cultural structures may differ from the original scale. The Cronbach's α internal consistency coefficient of the scale showed high reliability in item-total correlation, test-retest analysis, and equivalent form analysis. These results showed that the Turkish version of the PMPS-E scale is a valid and reliable instrument to evaluate maternal parenting self-efficacy.

Ethics Committee Approval: This study was approved by the ethics committee of Non-invasive Clinic Ethical Committee of a university (date: 27.01.2021; no:5).

Informed Consent: Written consent was obtained from the participants.

Peer Review: Externally peer-reviewed.

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