

Psychometric Properties of the Spanish Version of the Perceived Maternal Parenting Self-Efficacy (PMP S-E) tool for Primiparous Women

Abstract

Objective: The objective of this study was to determine the validity and the reliability of the Perceived Maternal Parenting Self-Efficacy tool translated into Spanish and adapted to be used among primiparous women of term babies.

Methods: Validation study. A total of 210 women participated in the survey to establish construct validity and reliability. The questionnaire has 20 items and four subscales. The higher the score, the higher the self-efficacy. A process of translation/back-translation and cultural adaptation in accordance with international standards and an expert review were conducted to test face and content validity. The Validity Content Index and an exploratory factor analysis were used to identify the structure of the questionnaire. Reliability was estimated using Cronbach's alpha coefficient.

Results: Linguistic and cultural adaptation, validation and reliability were performed. Face validity for women was as follows: high comprehension (99%); and for experts: medium comprehension (84.1%), medium clarity (83.9%) and medium precision (80%). Concerning pertinence, the content validity index was 0.93 (i.e., highly pertinent). Concerning relevance, the content validity index was 0.96 (i.e., highly relevant). Factor validation identified four factors that accounted for 91% of the variance. Overall Cronbach's alpha value was 0.98 (IC95: 0.97-0.98).

Conclusions: Given the robust properties of the Spanish version of the Perceived Maternal Parenting Self-Efficacy, it may be used to identify women with low self-efficacy and to assess the effectiveness of health-based interventions.

Keywords: Validation Studies; Psychometrics; Self-efficacy; Mothers; Parenting

Significance

The Perceived Maternal Parenting Self-Efficacy (PMP S-E) questionnaire is based on the theory of Bandura and is identified as the scale with the most robust psychometric properties for use with parents of hospitalized populations. This study is the first to translate this instrument into Spanish with primiparous women of term babies that can be used for practice and research purposes in the area of maternal and child care; to readily measure maternal self-efficacy during hospital stay, at discharge and during postpartum follow-up to assess the effectiveness of healthcare interventions.

Introduction

Becoming a mother is a process during which development is determined by both environmental factors and the characteristics of parent and child (Mercer 2004). When women become mothers they frequently need to develop an independence and self-reliance (Leahy Warren, 2005) that are integral components to motherhood and particularly for primiparous women who may face many challenges. In order to enhance self-reliance it is important to understand the beliefs women have in their ability to successfully perform the tasks and activities related to their parenting self-efficacy (Bandura, 1997).

Considerable evidence exists that links maternal self-efficacy to women's psychological and child health outcomes. For example, research has illustrated that low maternal self-efficacy is linked to an increased risk of postpartum depression and maternal stress (Leahy-Warren and McCarthy 2011;

Law et al. 2019), poorer maternal bonding (Gharaibeh & Hamlan, 2012) and in some cases child neglect (Garay-Gordovil, 2013). A recent systematic review by Albanese, Russo and Geller (2019) suggests that parental self-efficacy may impact parent-child attachment too as a result of the level of support they feel they have from their partner (Casse, Oosterman & Schuengel, 2016), that it may mediate between internalized stigma and postpartum depression (Mickelson, Biehle, Chong & Gordon, 2017), and to child development such that low parental self-efficacy has been associated with increased child hospitalizations (Holland, Yoo, Kitzman, Chaudron, Szilagyi & Temkin-Greener, 2011).

Furthermore, Wittkowski, Garrett, Calam & Weisberg (2017) have identified the most psychometrically robust scales measuring parental self-efficacy including those used with hospitalized/non-hospitalized populations. Whilst some of these measures are strong psychometrically, few have been translated and culturally adapted into Spanish. According to Bandura (2006), scales used to measure self-efficacy must be adapted to the specific domains of interest. A person can consider him/herself very effective in certain situations and very ineffective in others, depending on situational requirements. The Perceived Maternal Parenting Self-Efficacy (PMP S-E) questionnaire (Barnes & Adamson-Macedo, 2007) is based on the theory of Bandura and has the most robust psychometric properties. The PMPS-E scale was originally validated with mothers of hospitalized preterms during the neonatal period, but others have gone on to use it in the postnatal period and with primiparous women (Leahy-Warren, McCarthy & Corcoran, 2012; Gharaibeh & Hamlan, 2012; Aliabadi, Borimnejad, Kamali, Rassafiani & Nazi, 2013). However, it has not been translated adapted for and validated with Spanish speaking. The objective of this study was to determine the validity and the reliability of the Perceived Maternal Parenting Self-Efficacy tool translated into Spanish and adapted to be used among primiparous women of term babies.

Methods

Overview of Study Design

This was a scale development and re-validation study conducted in Colombia in 2018. The research was approved by the Bioethics Committee of the Maternal and Child Clinic San Luis of Colombia and has been carried out in accordance with the ethical standards established in the Helsinki Declaration of 1964 and its subsequent amendments. All participants were required to give their informed consent before participating.

Participants

The participants were recruited from outpatient clinics of a maternal and child care institution in Colombia, and included if they were primiparous, with a full term baby with no complications, aged ≤ 6 months postpartum. A pilot study was conducted to test the linguistic and cultural adaptation with 10 mothers, whilst face validity included a different sample of 10 mothers. The characteristics of these twenty primiparous women were: the mean age of the participants was 24.85 years (SD 5.71). The mean age of the participants' babies was 3.35 months (SD 1.60). Socioeconomic status was 6 (30%) low, 8 (40%) medium and 6 (30%) high. Highest education level was 2 (10%) Primary, 4 (20%) Secondary, 8 (40%) Technical and 6 (30%) University. In addition, twenty-seven experts participated in the first round and four experts participated in the second round, i.e. face and content validity, whom met adjusted Fehring criteria (Fehring, 1994), and were selected through a nationwide call for participants. Sample size was based upon a criterion of 10 participants per number of items in the questionnaire (i.e., $10 \times 20 = 200$) (Morales, 2012),

plus an additional 10 in case of study attrition. A final sample of 210 women took part in the construct validity and reliability testing. The mean age of 210 participating women was 24.39 (SD 5.66). Other sociodemographic characteristics are presented in Table 1. The mean maternal self-efficacy perceived among the participants was 69.43 (SD 9.24).

Instrument

The PMP S-E questionnaire (Barnes & Adamson-Macedo, 2007) is a 20 item measure of parental self-efficacy and was originally adapted from two existing measures (Teti & Gelfand, 1991; Zahr, 1990) with similar objectives, based upon Bandura's self-efficacy theory, a review of the literature, and the authors' experience and expertise. The PMP S-E tool is domain-specific, self-report and requires approximately 10 minutes to complete. Items are distributed across 4 subscales: care taking procedures (e.g. changing a nappy, evoking behaviour(s) (e.g. making the baby calm), reading behaviour(s) or signaling (e.g. knowing baby is tired, and situational beliefs (e.g. that their baby responds well to them. The responses to each item are recorded on a Likert scale ranging from strongly disagree (score 1) to strongly agree (score 4). Scoring ranges from 20 to 80 where a higher score indicates a higher self-efficacy. The PMP S-E in its original version (Barnes & Adamson-Macedo, 2007) demonstrated strong psychometric properties including Cronbach alpha of 0.91 for the full scale. Other UK based studies report Cronbach alphas of 0.89 (Leahy-Warren et al., 2012; Shorey, Chan, Chong and He, 2015); in its Arabic version 0.94 (Gharaibeh & Hamlan, 2012), 0.86 in Brazilian samples (Tristão, Neiva, Barnes & Adamson-Macedo, 2015), and 0.93 in Italy (Pedrini, Ferrari & Ghilardi, 2019) for the full scale.

Procedures and analysis

Translation and backtranslation of the PMP S-E tool with cultural adaptation

The guidelines for translating or adapting tests by Muñiz, Elosua & Hambleton (2013) and Muñiz, Hernández & Ponsoda (2015) was followed. The translation, back translation and cultural adaptation of the questionnaire is summarized in Figure 1. Accordingly, two bilingual nurses and one certified translator, all worked separately, and translated the original version of the PMP S-E from English into Spanish. Once the three translations were completed, the review committee (composed of one certified translator, one philologist and three nursing experts in maternal and child care) compared the translations and reached a consensus. Agreement was reached based upon the translation by checking that meaning had not been lost and that comprehension was maintained for each item.

The Spanish version was then back translated by another certified translator and two further bilingual nurses, who were not acquainted with the English version. Once the three back translations were completed, the Review Committee reached a consensus on the initial translation. The back translated version was then sent to the original authors of the PMP S-E questionnaire to ensure parity across versions. Adjustments were made as requested and the review committee came to a final consensus.

Selection of experts

The adjusted criteria of Fehring's classification system were used (Fehring, 1994), which consist in assigning a weight in points as follows: PhD (4 points), Master's Degree (3 points), Specialization (2 points), paper published (1 point), teaching experience (1 point), professional experience (2 points), research (1 point). It is necessary a minimum of 5 points out of the total 14 points in these criteria were set for the candidate to be considered as an expert. Twenty-seven

experts from 17 universities corresponding to 11 capital cities of Colombia participated in the first round. The highest education level was PhD (7), Master's Degree (16), Specialization (4). Average years of teaching experience in maternal and child care were 12.00 (SD 7.89). Average years of professional experience in maternal and child care were 16.78 (SD 11.16). Average number of articles published on maternal and child care were 4.59 (SD 4.68). Average number of investigations conducted on maternal and child care were 5.04 (SD 5.15). And four experts participated in the second round. The highest education level was PhD: 1, Master's Degree: 2, Specialization: 1. Average years of teaching experience in maternal and child care were 13 (SD 1.63). Average years of professional experience in maternal and child care were 15 (SD 0.82). Average number of articles published on maternal and child care were 4 (SD 0.82). Average number of investigations conducted on maternal and child care were 6 (SD 0.82).

Face validity

The comprehension criterion was assessed in a group of primiparous women with the following rating: 1. I don't understand it, 2. I understand it a little, 3. I understand it. In addition to this criterion, the experts also assessed the clarity criterion with the following rating: 1. It is not clear, 2. It is not very clear, 3. It is clear. Finally, the experts also assessed the precision criterion with the following rating: 1. It is not precise, 2. It is not very precise and 3. It is precise. (Hernández Sampieri, Fernández Collado & Baptista Lucio, 2014). The degree of comprehension, clarity and precision of the items was determined using percentages as follows: high: equal to or greater than 85%, medium: 80-84.9%, low: equal to or less than 79%.

Content validity

The experts assessed the pertinence criterion with the following rating: 1. Not pertinent at all, 2. Not very pertinent, 3. Pertinent, 4. Highly pertinent, and the relevance criterion with the following rating: 1. Not relevant, 2. Not very relevant, 3. Relevant, 4. Highly relevant, with a ratio of values given by: 1 = 0.25, 2 = 0.50, 3 = 0.75, 4 = 1 (Polit, Beck & Owen, 2007).

The content validity index (CVI) (Polit & Beck, 2004) was calculated for each expert with the following formula: number of items with a score of between 3-4/total number of items. The CVI of each item was determined for pertinence and relevance. The calculation was made using the formula: number of experts agreeing upon the relevance or pertinence value of each item/ total number of experts. Upon completion, the above estimations were exported to an Excel Worksheet for average and percentage estimations. Finally, the results were imported into Stata v12 for analysis. The quantitative analysis of content validity was carried out taking into consideration that scores equal to or greater than 0.80 have high content validity (Polit & Beck, 2004). Subsequently, the observations made during the first round of experts to face validity and content items were qualitatively analyzed as follows: in order to control information selection bias (i.e., the inclination to give priority to their observations), in the second round a second group of experts in maternal and child care distinct from the previous one reviewed the observations and consensually made the adjustments to the different items as required.

Construct validity

This research used factor analysis, a multivariate analysis that attempts to explain the tendency of a set of variables called factors to group. It allows to establish which items or variables are grouped forming domains or factors within the measurement. Based on this information, the items can be removed or regrouped (Raykov & Marcoulides, 2008). Factorial principal component analysis was

initiated exploring the total correlations of the items using Pearson correlation coefficient, followed by Bartlett sphericity test, and calculating sample adequacy with Kayser-Meyer-Olkin (KMO) statistics, considering acceptable a coefficient greater than 0.65. Varimax orthogonal rotation was implemented. Factor extraction was performed taking into account the percentage of extracted variance, expecting a minimum of 90% cumulative percentage of variance explained. Stata v12.0 was used for these analyses. Continuous variables were presented with central tendency measures and categorical variables were reported with absolute and relative frequencies.

Reliability

Cronbach's alpha coefficient was used to calculate internal consistency estimates in the total sample and subscales. A coefficient of 1.00 indicates perfect reliability (Khoja et al., 2007).

Results

Cultural adaptation of the questionnaire of the Spanish version of the PMP S-E

The following cultural adaptations were made: I believe that I have control over my baby by “I believe that I have control over my baby’s care”. I believe that my baby and I have a good interaction with each other by “I believe that my baby and I have a good interaction”. I am good at getting my babies attention by “I am good at getting my baby’s attention”.

Face validity and content validity of the Spanish version of the PMP S-E

Ten primiparous women participated in the face validity part of the process, who scored the questionnaire as follows: high comprehension (99%). The score of face validity given by experts was: medium comprehension (84.1%), medium clarity (83.9%) and medium precision (80%). Concerning relevance, the CVI was 0.96 ("highly relevant") and concerning pertinence the CVI was 0.93 ("highly pertinent"). In the second round, other group of experts made the adjustments of the items by consensual agreement.

Construct validity of the Spanish version of the PMP S-E

Factor 1 accounted for 33% of the variance, factor 2 accounted for 22% of the variance, factor 3 accounted for 19% of the variance and factor 4 accounted for 17% of the variance, for a total of 91% of the variance accounted for by the four factors were identified. Sampling adequacy was estimated with Kaiser-Meyer-Olkin statistics ($KMO = 0.97$), and data adequacy for reduction was estimated with Bartlett sphericity test ($X^2 = 4972.01$, $p < 0.01$) (Table 2).

Reliability

Internal consistency reliability of the Spanish version of the PMP S-E

Cronbach's alpha for the entire instrument was 0.98 (95% CI, 0.97-0.98). The values for each item and the values by subscales are shown in Table 3. The Spanish version of the PMP S-E is available in Appendix A.

Discussion

The PMP S-E instrument has been translated from its original English version into Arabic, Persian, Portuguese, Kannada and Italian (Aliabadi et al., 2013; Gharaibeh & Hamlan, 2012; Paul et al., 2018; Pedrini et al., 2019; Tristão et al., 2015). This study involved the translation and cultural adaptation of the instrument from English into Spanish, in adherence to the highest quality standards to ensure its adequacy to Spanish speakers; the second most widely spoken language

from across the world. These linguistic and cultural modifications in some items have also occurred according to the specific needs of each country in the studies mentioned above.

Several studies (Aliabadi et al., 2013; Barnes & Adamson-Macedo, 2007; Gharaibeh & Hamlan, 2012; Leahy-Warren et al., 2012; Pedrini et al., 2019; Shorey et al., 2015a), including this one, clearly evidence that the PMPS-E questionnaire is both clear and easily understandable, and has strong face validity. The Spanish version of the PMP S-E obtained high scores of the CVI with respect to pertinence and relevance when evaluated by leading experts from Colombia, consistent with the high content validity observed in the studies conducted in the UK, Jordan and Singapore (Barnes & Adamson-Macedo, 2007; Gharaibeh & Hamlan, 2012; Shorey et al., 2015a).

Construct validity in this investigation also identified four factors, coinciding with all validity studies conducted in different countries (Barnes & Adamson-Macedo, 2007; Pedrini et al., 2019). This supports the fact that the Spanish version of the PMP S-E provided by this work, in addition to measuring very well the maternal self-efficacy construct, also measures well differentiated aspects of self-efficacy. The study conducted in Italy did not single out one factor of situational beliefs but divided the reading of behaviors or signals into physical and emotional needs. This also occurred with the Spanish version of the PMP S-E; the items in the factor 'situational beliefs' were distributed among other factors and items grouped formed two factors then designated following the denomination used in Italy (Pedrini et al. 2019), as follows; 'reading and managing emotional cues' and 'reading and managing bodily cues.'

In comparison to the study conducted by the authors (Barnes & Adamson-Macedo, 2007), the first two factors in the present work (Evoking behaviour(s) and Care taking procedures) also exhibited the highest percentage of variance accounted for. In the study by Tristão (Tristão et al., 2015), factor one obtained the highest percentage of variance accounted for. Therefore, these first two factors are more significant at accounting for the variability in perceived maternal self-efficacy. These studies involved both women of hospitalized preterm babies and women of term babies, and the time of application of the instrument ranged from the first days of postpartum to 6 months after childbirth. Despite these differences, the measurement of the perceived self-efficacy construct has been similar.

The analysis of the rotated components of the Spanish version of the PMP S-E in comparison to the original English version of the UK (Barnes & Adamson-Macedo, 2007) exhibited different possibilities of distribution of the following items: 5. I can make my baby happy, 6. I believe that my baby responds well to me, 7. I believe that my baby and I have a good interaction, 8. I can make my baby calm when he/she has been crying, 13. I am good at understanding what my baby wants, 15. I am good at knowing what activities my baby does not enjoy, 16. I am good at keeping my baby occupied, 20. I can show affection to my baby. Although they also found a different distribution of some items, the investigators of the study conducted in Brazil (Tristão et al., 2015) decided to maintain the original structure, unlike Pedrini (Pedrini et al., 2019), who also found different distribution of some items on the factors and who did not use the factor of situational beliefs. The present study used the same designation used in Italy for these factors: the factor care-taking procedures refers to the mother's perception of her ability to perform activities and tasks related to basic needs. The factor evoking behaviours refers to the mother's perception of her ability to elicit certain changes in her baby's behaviour. The factor reading and managing bodily cues refers to the mother's perception of her ability to identify and understand the body cues of the baby.

The factor reading and managing emotional cues refers to the mother's perception of her ability to identify and manage changes in her baby's behaviour based on emotional cues. (Pedrini et al., 2019). Nevertheless, the authors of the PMP S-E have recommended to take into account the total score as an overall indicator of the level of maternal self-efficacy and use the sub-scales to understand individual perceptions; such valuable information could provide support to further develop good quality intervention programmes.

As to reliability, the high value of the Cronbach's alpha exhibited by the Spanish version of the PMP S-E both overall and in the subscales and the correlations of each item in the four factors where they were grouped, the alpha coefficients revealed high internal consistency. The present study confirmed the adequate fit of a model with related factors to our data. Both reasons, consistency with the literature and statistical support our decision to recommend this factorial structure, the modified model, in the Spanish version of the questionnaire. Also, possible explanations for the differences found in the factor structure, variance explained, and eigenvalues with other authors could be sample size, culture, demographics and clinical characteristics, among others.

Furthermore, as with several previous studies regarding reliability, we used the same number of items of the original version, namely, 20, unlike the study conducted in Italy (Pedrini et al., 2019) where a panel of experts decided to remove three items. In sum, the psychometric properties of the PMP S-E exhibit high validity and reliability in different languages, including the Spanish version used in this study.

Strengths and limitations

The processes of linguistic and cultural adaptation and validity and reliability measurements followed rigorous methodology involving the participation of leading experts. This study had an adequate sample size for participating women, who self-completed the questionnaire in order to prevent the bias of giving socially desirable answers. A limitation of this study was the absence of test-retest reliability and that only the factor analysis was used for the construct validity, because there are also other methods for its calculation that could be explored in future studies. Other limitation of this study was that the children of most of the available participants were under one month of age avoiding a stratified sampling by age. However, in different studies the psychometric properties of the PMP S-E have been consistent throughout the first six months of the postpartum period. Since the questionnaire was translated into Spanish, the Spanish version of the PMP S-E is a valuable tool that can be used by Spanish speakers. In turn, it is recommended that each Spanish-speaking country performs its corresponding cultural adaptation.

Conclusion

The present study provides a Spanish translation, with cultural adaptation, and psychometric testing measurements of the original English version of the PMP S-E. This is the first instrument in Spanish for primiparous mothers of term babies; it can be used for practice and research purposes in the area of maternal and child care, given the robust capacity of the Spanish version of the PMP S-E to readily measure maternal self-efficacy.

Acknowledgements

The Authors would like to thank all the mothers and the experts who participated to the study.

Funding

None.

Conflict of interest

The authors declare that they have no conflict of interest.

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Table 1. Sociodemographic characteristics of the participants in construct validity and reliability (N=210)

Characteristic	N	%
Age of the baby		
Under 1 month of age	184	87.61
One to six months of age	26	12.39
Baby's gender		
Female	110	52.38
Male	100	47.62
Type of delivery		
Cesarean section	102	48.57
Vaginal delivery	108	51.43
Baby's method of feeding		
Breast	182	86.67
Bottle	2	0.95
Both	26	12.38
Marital status		
Single	29	13.81
Married/living in a free union	181	86.19
Socioeconomic status		
Low	100	47.62
Medium	103	49.05
High	7	3.33
Highest education level		
Primary	6	2.86
Secondary	70	33.33
Technical or technological	60	28.57
University	74	30.84
Occupation		
Housewife	82	39.05
Part-time study	62	29.52
Full-time study	7	3.33
Part-time Job	5	2.39
Full-time job	54	25.71

Table 2. Varimax rotation method with Kaiser normalization of the Italian version of the Spanish version of the PMP S-E

No. Item	Factor 1 *5.03 (33%)	Factor 2 *3.46 (22%)	Factor 3 *2.89 (19%)	Factor 4 *2.59 (17%)
1	0.45	0.36	0.38	0.55
2	0.40	0.41	0.62	0.30
3	0.38			0.61
4	0.38	0.40	0.57	0.34
5	0.41	0.66	0.32	
6	0.52	0.53		0.35
7	0.47	0.63	0.33	
8	0.51	0.38	0.60	
9	0.62		0.49	0.31
10	0.79	0.32		
11	0.83			
12	0.74		0.35	
13	0.43	0.30	0.31	0.41
14	0.48	0.41	0.31	0.41
15	0.42	0.40	0.35	0.32
16	0.37		0.36	0.56
17	0.34	0.43	0.31	0.40
18	0.34	0.35		
19		0.37	0.36	
20	0.41	0.64	0.35	

(Blanks represent abs(loading) < 3) *Factor variance, (proportion of explained variance)

Table 3. Varimax rotated factors, factor loading, item-test correlation and Cronbach's alpha of subscales and if item is removed of the Italian version of the Spanish version of the PMP S-E

Factor	Subscales Cronbach's alpha (CI 95%)	Item	Factor loading	Item-test correlation	α if item is removed
Factor 1	Evoking behaviour(s) 0.95 (0.94-0.94)	9. I am a good at soothing my baby when he/she becomes upset.	0.62	0.91	0.95
		10. I am good at soothing my baby when he/she becomes fussy.	0.79	0.89	0.95
		11. I am good at soothing my baby when he/she continually cries.	0.83	0.92	0.94
		12. I am good at soothing my baby when he/she becomes more restless.	0.74	0.92	0.94
		13. I am good at understanding what my baby wants.	0.43	0.85	0.95
		14. I am good at getting my baby's attention.	0.48	0.88	0.95
		15. I am good at knowing what activities my baby does not enjoy.	0.42	0.85	0.95
Factor 2	Care taking procedures 0.94 (0.92-0.96)	5. I can make my baby happy.	0.66	0.88	0.93
		6. I believe that my baby responds well to me.	0.53	0.91	0.92
		7. I believe that my baby and I have a good interaction.	0.63	0.91	0.92
		17. I am good at feeding my baby.	0.43	0.86	0.93
		18. I am a good at changing my baby.	0.35	0.79	0.94
		19. I am good at bathing my baby.	0.37	0.81	0.94
		20. I can show affection to my baby.	0.64	0.88	0.93
Factor 3	Reading and managing emotional cues 0.94 (0.92-0.96)	2. I believe that I have control over my baby's care.	0.62	0.95	0.89
		4. I can read my baby's cues.	0.57	0.94	0.92
		8. I can make my baby calm when he/she has been crying.	0.60	0.94	0.91
Factor 4	Reading and managing bodily cues 0.89 (0.86-0.92)	1. I believe that I can tell when my baby is tired and needs to sleep.	0.56	0.92	0.82
		3. I can tell when my baby is sick.	0.61	0.90	0.86
		16. I am good at keeping my baby occupied.	0.56	0.91	0.86