

Validity and Reliability of the Lederman Prenatal Self-Evaluation Questionnaire (Pseq) in Brazil

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Abstract

Background: The Lederman Prenatal Self-Evaluation Questionnaire (PSEQ) is used to assess psychosocial adaptation to pregnancy, labor, childbirth, and maternity. The PSEQ is a tool used in various countries and has been translated into Portuguese; however, it needs to be validated in Brazil. This study aimed to analyze the validity and reliability of the PSEQ for Brazilian pregnant women.

Method: This methodological validity study investigated the internal consistency and reliability using Cronbach's alpha and intraclass correlation coefficient, respectively. Construct validity was assessed using Pearson's correlation between the domains and confirmatory factor analysis. To assess the concurrent validity, the Pearson's correlation between the PSEQ and Prenatal Psychosocial Profile-Portuguese Version (PPP-VP) was determined.

Results: This study included 399 pregnant women from the northeastern region of Brazil. The internal consistency and reliability of the total PSEQ score were high (Cronbach's alpha = 0.89; intraclass correlation coefficient = 0.95). Validity analysis showed positive and significant correlations between all PSEQ domains, ranging from 0.14 to 0.56. Confirmation factor analysis demonstrated the following values of goodness of fit: RMSEA = 0.05, SRMR = 0.08, CFI = 0.61, $\chi^2/df = 1.77$. The discriminant and concurrent validities of the PSEQ were confirmed. The level of significance was set at 5%.

Conclusions: The Portuguese version of the PSEQ has adequate psychometric properties and is a valid and reliable tool to evaluate the psychosocial adaptation to pregnancy in Brazilian pregnant women.

Background

The experience of pregnancy in a woman's life affects various aspects of her lifestyle, causing changes in her social role and requiring adjustments in her personal behavior. It is a period of maternal psychosocial adjustment, where the woman may present ambiguous feelings towards gestation and motherhood¹, and it has been reported that the pregnancy-puerperal period is associated with a high risk of psychological disorders in women².

Anxiety, stress, and depression are some of the common psychological disorders associated with pregnancy³. High levels of stress and anxiety have been associated with adverse maternal-fetal outcomes. In the presence of stress and anxiety, it becomes difficult to adopt the maternal role and the risk of postpartum depression and deterioration of the perceived quality of life increases^{4,5,6}. Consequently, the unborn child becomes highly susceptible to premature birth⁷, low birth weight^{8,9}, and neurodevelopmental problems¹⁰, and the mother-infant bond after the child's birth is also weakened. In short, poor adaptation to pregnancy can generate several negative effects related to anxiety, depression, and maternal concerns during prenatal care¹¹, which negatively affect the health and well-being of the child during its life-course¹².

Therefore, the evaluation and follow-up of maternal psychosocial aspects during pregnancy are important steps in planning strategies for promoting the health of mothers and their newborns in an integrated manner.

Some questionnaires have been developed over the years to investigate the elements of maternal psychosocial adaptation in different cultural backgrounds^{13,14,15}. In the Brazilian context, only two questionnaires are available for this purpose: Prenatal Psychosocial Profile-Portuguese Version (PPP-VP)¹⁶ and the Lederman Prenatal Self-Evaluation Questionnaire (PSEQ)¹⁷. The PPP-VP considers four constructs of the psychosocial profile in prenatal care: self-esteem, stress, social support received from the partner, and social support received from other people¹⁶. However, it does not consider aspects of labor and delivery, which are important because they have a considerable impact on the mothers' perceptions. On the other hand, the PSEQ¹ includes seven dimensions of psychosocial adaptation to pregnancy that evaluate the feelings related to pregnancy, labor, delivery, and maternity. The PSEQ shows good validity and reliability in many countries around the world^{18,19,20} and is used in clinical research to analyze maternal psychosocial adaptation in various contexts such as

antenatal care, high-risk hospitalized and low-risk mothers²¹, antenatal education²², and anxiety²³, among others. Although it was culturally adapted for the Brazilian population, its validity and reliability are unknown, limiting its use in clinical practice and research. Thus, the objective of this study was to analyze the validity and reliability of the PSEQ for use in Brazil.

Methods

This was a methodological validity study performed in the northeastern region of Brazil. Data were collected from the Public Health System of Brazil services.

Ethical Considerations

This study was approved by the Research Ethics Committee of the Federal University of Rio Grande do Norte (CEP-UFRN) under approval number 1.065.285/2014. All participants were informed about the research objectives and procedures and signed a consent form, in accordance with Resolution 466/12 of the National Health Council of Brazil.

Sample size

The sample size of this study was based on the recommendation of having a sample size that is five times the number of items on the instrument being validated²⁴. Thus, a sample of 409 volunteers who agreed to participate was selected for this study.

Study participants

The inclusion criteria in this study were as follows: Brazilian citizen, receiving prenatal care in one of the public health services previously defined, at least 14 years old, and attained minimum level of education, i.e., elementary school. The inclusion criteria were defined according to the ethical requirements and relevant heterogeneity sample for methodological analysis²⁵. Return questionnaires with no response to one or more items of the each PSEQ dimensions were excluded.

Recruitment and data collection

All pregnant women were invited to participate in the study when they were in the waiting room for prenatal consultation. The data collection period was from 2015 to 2020 to adjust the sample size.

The investigators were trained by the research coordinator and received an instruction manual for data collection. The pregnant women received the evaluation instruments and could respond independently or request the researcher's help in reading and completing the questionnaires.

First, we collected the socio-demographic, clinical, and obstetric characteristics using a questionnaire developed for this study, with the following variables: age, gestational age, occupation (unemployed or employed), family income (≤ 1 MW or > 1 MW), education level (high school or below, college or above), partner (no or yes), parity (primigravida or multigravida), number of appointments with doctors during prenatal care, gestational planning (no or yes), and antenatal care. The Brazilian minimum monthly wage (MW) is defined as the lowest remuneration that workers receive as payment for their jobs per month.

Then, we administered a version of the PSEQ previously translated and culturally adapted to Brazilian populations by Silva et al.¹⁷. First, authorization was requested from the author for the translation and validation of the Brazilian Portuguese version of the PSEQ¹⁷. Two translators fluent in the English language translated the instrument into Brazilian Portuguese¹⁷. The translations were then reviewed by an expert committee composed of four people who agreed on the final version of the instrument. Subsequently, the questionnaire was sent to two different English-speaking translators for backtranslation¹⁷. The PSEQ was administered to 36 pregnant women in a pilot study to determine its clarity and coherence¹⁷. The pilot showed that 75% of the pregnant women found the questionnaire easy to understand¹⁷.

Originally developed in English in 1984, the PSEQ was designed by a North American nurse, Regina Lederman¹. This assessment tool is meant for pregnant women and addresses 79 items in seven dimensions of psychosocial adaptation to pregnancy: Well-being of self and baby (items 12, 16, 17, 30, 41, 51, 57, 63, 68, and 71); acceptance of pregnancy (items 1, 3, 9, 22, 32, 58, 61, 62, 66, 69, 74, 76, 77, and 79); identification with motherhood role (items 2, 6, 19, 29, 33, 34, 42, 45, 46, 50, 54, 67, 73, 75, and 78); preparation for labor (items 7, 13, 24, 25, 26, 38, 47, 48, 56, and 72); control in labor (items 8, 11, 15, 18, 27, 39, 49, 52, 53, and 64); relationship with mother (items 14, 20, 21, 28, 31, 37, 44, 55, 59, and 65); and relationship with partner (items 4, 5, 10, 23, 35, 36, 40, 43, 60, and 70). Each item consists of a statement related to the period of pregnancy, childbirth, and maternity to which the respondents need to indicate their degree of agreement using a four-point Likert scale, with the following options: (4) Very much so, (3) Moderately so, (2) Somewhat so, and (1) Not at all. However, the scoring for questions with positive statements (questions 1, 2, 3, 4, 6, 7, 8, 10, 11, 12, 14, 15, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 31, 32, 33, 35, 36, 37, 38, 40, 47, 48, 49, 50, 53, 55, 56, 59, 60, 61, 70, 71, 72, 73, 74, 75, 78, and 79) was reversed. High scores indicate poor adaptation, while low scores indicate increased adaptation. The final score allows the assessment of psychosocial adaptation to pregnancy by means of a specific result, with a total score variation of 79 to 316.

The PPP-PV has four subscales, each with 11 items: stress, support received from the partner, support received from other people, and self-esteem, totaling 44 items¹⁶. The score ranges from 1 to 4 for stress and self-esteem and 1 to 6 for support received from the partner and support received from other people, with high ratings reflecting positive adaptation and low scores, poor adaptation¹⁶.

The participants whose mothers had deceased mother and those who did not have a partner did not respond to the items related to the domains of relationship with mother and relationship with partner or support received from the partner, respectively.

Statistical analyses

Descriptive statistics were used to characterize the sample through the median and standard deviation of continuous variables and the absolute and relative frequencies of the categorical variables.

To determine the reliability, internal consistency was evaluated by Cronbach's alpha coefficient. To calculate the intraclass correlation coefficient (ICC), test-retest evaluation was conducted with 24 eligible women with a one-week interval to ensure stability of the analysis. A Cronbach's alpha higher than 0.7 was considered reliable. However, values ≥ 0.6 are considered acceptable in exploratory research²⁶. An ICC ≥ 0.40 is considered good and ≥ 0.75 , excellent²⁷.

Construct validity was assessed using 1) confirmatory factor analysis (CFA), 2) discriminant validity determined by Pearson's correlation coefficient of the seven domains, 3) internal validity determined by Pearson's correlation coefficient between domains and the general scores and 4) concurrent validity determined by calculating Pearson's correlation between the PSEQ and PPP-VP with 34 eligible women, as both instruments evaluate the same constructs. Generally, the goodness of the fit of a model is confirmed by the following indices: root mean square error of approximation (RMSEA) <

0.08, standardized root mean square residual (SRMR) < 0.08, comparative fit index (CFI) \geq 0.90, and normed chi-square (χ^2/df) < 5.00^{28,29}. The correlation between the domains of the PSEQ must be analyzed to test the hypothesis¹. The strength of the Pearson's correlation coefficient increases both from 0 to +1, and from 0 to -1, so, $r < 0.40$ is considered weak, $0.40 \leq r < 0.70$ moderate, and $r \geq 0.70$ strong³⁰. A significance level of 5% was adopted. The participants who did not respond to some items were excluded from the analysis of the said domain. Data analysis was performed using the Statistical Package for Social Sciences (SPSS), version 23 for Windows.

Results

The total sample consisted of 409 pregnant women; ten participants were excluded because of incomplete data or strikethrough response to one or more items in every domain. Therefore, the final sample size was 399 women, of whom, 72 (18%) were adolescents (< 20 years) and 327 (82%) were adults (\geq 20 years), with an average age of 26 years (SD \pm 7.0) and a range of 14–45 years. The average family income was 1.8 MW (SD \pm 1.2), with an average of 3.5 people in the household (SD \pm 1.5). The predominant education level was high school or lower (82.4%), and 54.6% were employed. Nearly all women (93.7%) had a partner. Regarding parity, a total of 201 patients were multigravida (50.5%). About half of the participants (53.8%) had an unplanned pregnancy. The average gestational age of the participants was 26.5 weeks (SD \pm 10.2), and the average number of prenatal consultations was five visits (SD \pm 3.2), with a range of 1–16. The predominant antenatal care status was low risk (55.5%).

Reliability

The reliability was verified by internal consistency. A Cronbach's alpha (α) of 0.89 was reported. The ICC for the overall scores between the test-retest evaluations was 0.95 ($p < 0.001$), indicating excellent test-retest reliability. The process of domain analysis is presented in Table 1.

Table 1
Cronbach's alpha, Intraclass Correlation Coefficients and based Factor loadings of the PSEQ (n = 245).

	Well-being of self and baby	Acceptance of pregnancy	Identification with motherhood role	Preparation for labor	Control in labor	Relationship with mother	Relationship with partner
Factor loadings	0.058–0.770*	0.185*–0.723*	0.050–0.533	0.023 – 0.731	0.340*–0.627*	0.267*–0.815*	0.293*–0.780*
Cronbach's alpha (n)	0.76 (371)	0.79 (364)	0.56 (354)	0.64 (373)	0.70 (373)	0.84 (336)	0.82 (359)
Intraclass Correlation Coefficient (95% CI); p-value	0.73 (0.38–0.88); 0.001	0.95 (0.89–0.98); <0.001	0.84 (0.64–0.93); <0.001	0.58 (0.02–0.82); 0.022	0.72 (0.35–0.88); 0.002	0.96 (0.91–0.98); <0.001	0.75 (0.39–0.89); 0.001
Mean (n; SD)	25.3 (371;6.2)	22.5 (364;5.7)	23.6 (354;4.2)	20.1 (373;4.3)	21.8 (373; 5.1)	15.9 (336;6.1)	16.1 (359;6.0)
*p < 0.01							

Validity

CFA was carried out to verify the factor structure using the data of a subset of pregnant women whose questionnaires had no missing answers (n = 245). CFA demonstrated the following values of fitness: RMSEA = 0.05, SRMR = 0.08, CFI = 0.61, $\chi^2/df = 1.77$. The PSEQ model has seven subscales: Wellbeing of mother and baby (10 items), acceptance of pregnancy (14 items), identification with motherhood role (15 items), preparation for labor (10 items), control in labor (10 items), relationship with mother (10 items), and relationship with partner (10 items) (Table 1).

The internal validity by correlations between the domains and the general scores of the 267 participants were as follows: well-being of self and baby (r = 0.64), acceptance of pregnancy (r = 0.60), identification with motherhood role (r = 0.57), preparation for labor (r = 0.55), control in labor (r = 0.73), relationship with mother (r = 0.62), and relationship with partner (r = 0.62). All correlations were significant at $p < 0.01$. Table 2 presents the correlation between the PSEQ domains.

Discriminant validity analysis showed positive and significant correlations between all PSEQ domains, ranging from 0.14 to 0.56.

Table 2
Correlation between PSEQ domains in a sample of Brazilian pregnant women.

Domains	Well-being of self and baby	Acceptance of pregnancy	Identification with motherhood role	Preparation for labor	Control in labor	Relationship with mother	Relationship with partner
Well-being of self and baby (n)	1 (372)	0.26* (346)	0.35* (340)	0.20* (355)	0.51* (351)	0.28* (332)	0.19* (350)
Acceptance of pregnancy (n)	-	1 (367)	0.38* (337)	0.14* (353)	0.31* (349)	0.34* (327)	0.42* (345)
Identification with motherhood role (n)	-	-	1 (357)	0.14* (342)	0.36* (341)	0.22* (324)	0.32* (338)
Preparation for labor (n)	-	-	-	1 (375)	0.56* (355)	0.25* (332)	0.29* (353)
Control in labor (n)	-	-	-	-	1 (375)	0.26* (334)	0.29* (350)
Relationship with mother (n)	-	-	-	-	-	1 (350)	0.34* (324)
Relationship with partner (n)	-	-	-	-	-	-	1 (370)
*p < 0.01							

The findings of the present study demonstrated moderate-to-strong correlation between several domains of PSEQ and PPP-VP, as shown in Table 3. Stress showed a significant and positive correlation with acceptance of pregnancy and relationship with partner. Significant and negative correlations were observed between the following: Acceptance of pregnancy and partner support, other support, and self-esteem; preparation for labor and partner support; control in labor and self-esteem; relationship with partner and partner support, other support, and self-esteem.

Table 3
Pearson correlation between the domains of the instruments PSEQ and PPP-VP (n = 34).

Domains	Stress	p- valor	Support received from the partner	p- valor	Support received from other people	p- valor	Self- esteem	p- valor
Well-being of self and baby	0,23	0,24	-0,18	0,34	-0,02	0,91	-0,08	0,66
Acceptance of pregnancy	0,72	0,00*	-0,53	0,00*	-0,60	0,00*	-0,79	0,00*
Identification with motherhood role	0,36	0,06	-0,05	0,78	-0,08	0,69	-0,37	0,06
Preparation for labor	0,28	0,13	-0,42	0,01*	-0,32	0,08	-0,34	0,06
Control in labor	0,33	0,06	-0,20	0,27	-0,20	0,26	-0,57	0,00*
Relationship with mother	0,16	0,41	-0,34	0,07	-0,25	0,18	-0,13	0,48
Relationship with partner	0,56	0,00*	-0,70	0,00*	-0,60	0,00*	-0,53	0,00*
*p < 0.01								

Discussion

The results show that the PSEQ is a valid and reliable instrument for a Brazilian population visiting a prenatal public health care provider, given its high internal consistency – Cronbach's α of 0.89. Studies carried out in other countries using the same instrument^{31,32} showed similar results as the current study, where the Cronbach's α was 0.87 in an Iranian study and 0.93 in a Chinese study. If Cronbach's α is higher than 0.90, then some items may be duplicated and need to be deleted to ensure internal consistency³³. The analysis of Cronbach's α by domain in this study indicated a variation of 0.56–0.84; in other studies that used the instrument in other languages, the variations were 0.68–0.82³² and 0.79–0.92¹. For the Brazilian sample in this study, the domains of identification with motherhood role and preparation for labor showed a Cronbach's α < 0.7, which is the recommended minimum value. However, values \geq 0.6 are considered acceptable in exploratory research²⁶. Similar results were found in a previous study that pre-tested the PSEQ with 36 pregnant Brazilian women¹⁷ with similar characteristics to our sample. The authors also found a Cronbach's α < 0.7 in the same domains as the current study. We believe that this finding is related to different aspects of each domain. Regarding the domain of identification with motherhood role, its subscale contained a large number of negative statements, and this may have resulted in a low coefficient. Regarding the domain of preparation for labor, the low coefficient could be attributed to the socio-demographic characteristics of the sample, since 18% of the pregnant women were adolescents and users of the public health system, with a prevalence of low income and low education levels. In Brazil, women – especially of low socioeconomic backgrounds – do not traditionally prepare themselves for labor, and this may have interfered with their understanding of the questionnaire statements. A recent study carried out in Brazil showed that knowledge about the type of birth and the use of evidence-based practices during childbirth was low among women with characteristics similar to those of our study sample³⁴.

The results revealed excellent test-retest reliability between the paired scores of all domains reported before and after the 1-week interval. A study on the PSEQ conducted in Taiwan analyzed its test-retest reliability and found an ICC of 0.95³¹. Such results could be attributed to the 1-week interval between the evaluations. Test-retest reliability tends to decrease as the retest time is extended³⁵. High-to-moderate correlations were observed in each PSEQ domain between evaluation and reevaluation, indicating the reliability of the instrument. Similar to the current study, the test-retest analysis of the original

North American instrument showed correlations ranging from 0.67 to 0.82 between the first and third trimester and from 0.70 to 0.81 between the second and third trimester¹.

The CFA results showed acceptable fitness. The original author did not use factor analysis to determine the construct standard of the scale. The correlations between all domains of the PSEQ were positive and significant, confirming the study's hypothesis, and ranged from 0.14 to 0.56. The strongest correlations were found between the domains of well-being of self and baby and control in labor, and moderate correlations were found between acceptance of pregnancy and identification with motherhood role, preparation for labor, and control in labor. Thus, it can be inferred that the greater the well-being of the self and baby, the better the control in labor; the greater the acceptance of pregnancy, the stronger the identification with motherhood role; and the greater the preparation for labor, the greater the control in labor. In a study of the original instrument conducted in the USA¹, the correlations between the PSEQ domains ranged from 0.06 to 0.54, with the strongest correlations reported between the domains of well-being of self and baby and control in labor, similar to this study. Lederman and Weiss¹ found that the correlation between the domains was smaller than the reliability of each domain; this indicates that the domains are relatively independent, indicating the need for separate analysis. Lin et al.³⁶ analyzed a short version of the PSEQ and found, similar to our study, low-to-moderate correlation, ranging from 0.18 to 0.41, among the subscales, suggesting the presence of discriminant validity between them.

The correlation between the domains and the general score ranged from 0.53 to 0.74, indicating strong-to-moderate correlation. This result means that all domains of the instrument are part of the evaluated construct, highlighting the internal validity of the instrument. Lin et al.³⁶ examined the correlation coefficients between the subscales and found a total score of 0.57–0.71.

Finally, the explanatory variables of psychosocial adaptation in both the PSEQ and PPP-VP showed associations as expected, according to the literature. Acceptance of pregnancy and relationship with partner are factors that stand out for maternal psychosocial adaptation during pregnancy. A previous study suggested that among women who reported negative or ambivalent feelings in early pregnancy, unplanned pregnancy was associated with significantly increased odds of psychological distress, while high-quality marital relationship, in particular, reduced the odds of psychological distress³⁷.

In short, the use of this instrument will help direct an integrated approach to maternal health. In Brazil, health professionals can assess and follow up maternal psychosocial adaptation during prenatal care and develop actions aimed at meeting the maternal needs. In other words, identifying concerns, fears, and the quality of support received during pregnancy is an important step in promoting diverse educational actions, such as preparing for labor and encouraging vaginal delivery.

Strengths and limitations

The PSEQ is a specific and self-administered tool, valid and reliable instrument that can be used to assess maternal psychosocial adaptation through relevant domains related to pregnancy, labor, childbirth, and motherhood.

This study has some limitations. The rate of non-response in the questionnaires generated a large amount of missing data. This may be related to the presence of domains, such as relationship with mother and relationship with partner. This fact made it impossible for some participants to complete the questionnaire. The highlight of this study comprises the heterogeneity of the sample. This may have affected the results. However, heterogeneous sample has been considered a strength in the validation of the instruments^{38,39}, because they may facilitate the assessment of the instruments in different clinical and research contexts, using a representative clinical sample.

Some volunteers requested the researcher's help in reading and completing the questionnaires, which may indicate that these participants found the PSEQ too long to complete. Thus, the administration of the instrument through interviews can

be useful in populations of low socioeconomic backgrounds. All items were maintained because they were considered relevant to the analysis of psychosocial adaptation to pregnancy.

This study involved women using prenatal care in public health services. However, considering the diversity of the Brazilian population and voluntary participation in the research, the results may not fully reflect the spectrum of the Brazilian population with regard to sociodemographic characteristics. Of note, the reliability and validity of an instrument can change according to the characteristics of the studied sample; therefore, even an instrument that is already considered valid and reliable must have its validity and reliability tested for each specific sample³⁵.

Conclusions

The PSEQ is a new instrument that measures psychosocial adaptation to pregnancy in seven domains. After psychometric testing, it demonstrated construct validity, internal consistency reliability, and test-retest reliability. The satisfactory results confirm the reliability and validity of the PSEQ for use in Brazil.

The PSEQ will be useful in future research on psychosocial risks and pregnancy outcomes as well as in clinical practice for antenatal care.

Abbreviations

PSEQ: Prenatal Self-evaluation Questionnaire; RN: Rio Grande do Norte; PPP-VP: Prenatal Psychosocial Profile; CEP-UFRN: Research Ethics Committee of the Federal University of Rio Grande do Norte; SPSS: Statistical Package for Social Sciences; S.D: Standard Deviation; MW: Monthly wage.

Declarations

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Availability of data and materials

The datasets used and/or analyzed during the current study are available from the authors on reasonable request.

Authors' contributions

All authors (JLS, MSM, SMAC, ICC, KSM, RNC, AKG) participated in the design of the study. JLS was the leader researcher of the study, being responsible for the design of research and interpretation of data. MSM was responsible for data analysis. SMAC, ICC, RNC, KSM and AKG participated in the critical review of the article, giving important intellectual contribution. All authors read and approved the final manuscript.

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Ethics approval and consent to participate

The ethical approval of this study was granted by the Research Ethics Committee of the Federal University of Rio Grande do Norte (CEP-UFRN) under resolution number 1.065.285/2014.

Consent for publication

Not applicable.

Conflict of interest

The authors declare that they have no competing interests.

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