General Hospital Psychiatry 83 (2023) 59–65

Contents lists available at ScienceDirect

General Hospital Psychiatry

journal homepage: www.elsevier.com/locate/genhospsych

Psychometric evaluation and validation of the Postpartum Specific Anxiety Scale for the Spanish-speaking population: PSAS-ES

Natalia Costas-Ramón [a], Sergio A. Silverio [b,*], Victoria Fallon [c], Marta E. Aparicio-García [a]

[a] Departamento de Psicología Social, del Trabajo y Diferencial, Facultad de Psicología, Universidad Complutense de Madrid, Madrid, Spain
[b] Department of Women & Children's Health, School of Life Course & Population Sciences, King's College London, London, United Kingdom
[c] Department of Psychology, Institute of Population Health, University of Liverpool, Liverpool, United Kingdom

ARTICLE INFO

Keywords:
Postpartum anxiety
Scale development
Maternal mental health
Psychometrics
Spanish population

ABSTRACT

Objective: The transition to motherhood is a period of risk for the development of mood disorders. Postpartum anxiety has not been as thoroughly studied as other emotional disorders despite its impact on mothers and their babies. The absence of standardized programmes for early detection and specific tools for its diagnosis means postpartum anxiety is often underestimated or overshadowed. This study aimed to translate and validate the Postpartum Specific Anxiety Scale [PSAS] for the Spanish population and to analyse its reliability as an exploratory tool for specific anxiety in mothers.
Method: Four stages were followed in this research: translation and back-translation to obtain the Spanish version [PSAS-ES]; preliminary pilot study to explore the comprehensibility and ease of responding the items ($n = 53$); convergent validity analyses ($n = 644$); and test-retest reliability ($n = 234$).
Results: The PSAS-ES has shown to have good acceptability, convergent validity and high internal consistency with a Cronbach's α coefficient of 0.93 for the overall scale of PSAS. The four factors had good reliability. The results of test-retest was 0.86, indicating excellent stability over time in the first 16 weeks.
Conclusion: The psychometric results show that the PSAS-ES is a valid tool to explore and detect anxiety in Spanish mothers between 0 and 16 weeks postpartum.

1. Introduction

1.1. Perinatal mental health

The postpartum period is a time of great psychological change, with important family and social shifts. The transition to motherhood generates different emotional reactions in different women and is a risk period for the development of mood disorders [8,12]. Loss, frustration, and guilt are some of the common experiences that women encounter after becoming mothers [1]. These emotions appear in response to the demands of caring for a newborn infant and the re-adaptation of the roles played inside and outside the family nucleus [39]. Thus, most women experience reactions including symptoms of anxiety and stress when becoming parents. However, on some occasions these emotions are underestimated both by them and by healthcare environment.

Perinatal mental illnesses are defined as psychiatric disorders which occur between pregnancy and the first year after childbirth. Among them are depression, anxiety, and puerperal psychosis [28,37]. An estimated 8.5% of women in the postpartum period experience at least one bought of emotional disturbance [16]. Perinatal mental illnesses are an issue which influence not only the mother and child, but also family members as well as the health, educational, and legal system of a country [19]. Early detection and effective management of postpartum mood disturbances are essential for the well-being of women and their children [28].

1.2. Postpartum anxiety

Postpartum anxiety is the concern about one or more future events related to parenting, i.e., the transition to parenthood, adaptation to new roles, and expectations of themselves and their environment. While some anxiety after birth is expected, it becomes problematic when it interferes with daily functioning and day to day care of the baby [44]. It is often studied as a symptom of postpartum depression; however, it

* Corresponding author at: Department of Women & Children's Health, School of Life Course & Population Sciences, King's College London, 6th Floor Addison House, Great Maze Pond, Southwark, London SE1 1UL, United Kingdom.
E-mail address: Sergio.Silverio@kcl.ac.uk (S.A. Silverio).

https://doi.org/10.1016/j.genhosppsych.2023.04.011
Received 12 January 2023; Received in revised form 18 April 2023; Accepted 21 April 2023
Available online 24 April 2023

occurs independently of depression, and has distinct characteristics and development [22].

Postpartum anxiety rates are between 6.1 and 27.9% [1,24,33,34]. Poor identification and measurement means this condition is often underdiagnosed. Postpartum anxiety has been less studied than other emotional disorders such as postpartum depression or 'maternity blues' [14], but its prevalence suggests that it is necessary to deepen understanding on its aetiology, risk factors and influence on the health of parents and their children [4,11,14,21,27].

An important barrier in identification of postpartum anxiety is the difficulty in distinguishing between physiological issues which occur naturally as a result of having a baby (e.g., fatigue, restlessness) versus pathological anxieties because of the lack of specific measurement tools [26]. Previous studies use scales designed for general adult populations to measure anxiety such as the Spielberg State-Trait Anxiety Inventory (STAI; [40]) or the Beck Anxiety Inventory (BAI; [3]). These tools are designed to measure anxiety in general in people's lives without including the specific fears, worries, and anxieties of the postpartum period.

1.3. Early detection and diagnostic tools for postpartum mood disorders: Current situation in Spain

Previous studies on the Spanish population show data on maternal psychopathology in the puerperium with ranges between 10.00% and 26.73% [14]. The rate of diagnosis of anxiety postpartum is the 18.50% [23]. Despite the importance and impact of perinatal mental health on parents, care from the health system during pregnancy, childbirth, and postpartum is insufficient [25].

A recent report that analysed the situation of perinatal mental health care in Spain concludes that the Autonomous Regions lack plans and strategies addressing it [7], in addition to the absence of standardized screening and early detection programs [29]. In order to understand emotional disturbances in the puerperium, it is first necessary to design specific and validated tools capable of detecting and measuring them effectively.

1.4. The Postpartum Specific Anxiety Scale: PSAS

The Postpartum Specific Anxiety Scale [PSAS] was designed with the aim of developing and validating an instrument which reflected the specific anxieties of postpartum mothers [13]. The 51 items were developed from qualitative work with mothers and are grouped into four subscales: 'Maternal Competence and Attachment Anxieties'; 'Infant Safety and Welfare Anxieties'; 'Practical Infant Care Anxieties'; and 'Psychosocial Adjustment to Motherhood'. Mothers answer the questionnaire in relation to their emotions, feelings, and experiences of the last seven days.

The PSAS has been developed and validated for use with mothers of babies between 0 and 12 months of age and has demonstrated excellent reliability and validity, with approved translations published in French (PSAS-FR; [20]), Persian (PSAS-IR; [18]), and Chinese (PSAS-CN; [43]); and underway in Italian, Dutch, Arabic (in Palestinian and Jordanian populations), and Brazilian Portuguese, amongst others. Recently, a 16-item English-language research short-form (PSAS-RSF; [10]), and a 12-item research short-form for use in global crises (PSAS-RSF-C; [38]) have been developed – the latter of which was also translated into Spanish, Italian, Dutch, Chinese, and French.

However, there has not yet been an attempt to translate or validate the PSAS in Spain, therefore, the objective of this study is to translate and validate the PSAS for the Spanish population [PSAS-ES] and to analyse its reliability as a tool for measuring postpartum specific anxiety in mothers up to 16 weeks postpartum.

2. Methods

2.1. Procedure for recruiting and participants

Ethical approvals were requested and granted by the Research Ethics Committee of the Complutense University of Madrid (Ref: CE_20230112-10_SAL).

Taking into account the objective of the study, we recruited women between 0 and 16 weeks postpartum. In Stages 2 and 3, they were recruited via word-of-mouth; snowballing; through professional social media platforms related to maternity and the postpartum; and through psychologists, midwives, obstetricians in specialized centres; and mental health forums in the puerperium. The questionnaires were disseminated, completed, and received exclusively on-line through tool Google Forms.

Prior to the main survey, an electronic consent form and information sheet were provided with a tick box to confirm the main points were correct and understood. At the beginning of the questionnaire women accepted the informed consent which detailed the objectives and phases of the study; information about data retention, and contact information of the researchers (in case of any queries). Informed consent had to have been provided in both Stage 2 and 3 to continue with the rest of the questionnaires. Participants did not receive any compensation for participating in the study.

We recruited 644 women for the scale's reliability and validation. The age of mothers ranged from 23 to 45 years. ($M = 33.24$; $SD = 3.97$). Demographic information for the pooled sample can be found in Table 1.

2.2. Measures

2.2.1. Demographic information

Maternal demographic questions were asked at the beginning of the on-line survey, including maternal age, country of residence, marital status, educational attainment, skill level of occupation, and mental health history. Infant demographic data was also asked, including infant age, birth order, multiple birth status (twins/triplets), timing of birth, mode of birth, and mode of feeding.

2.2.2. Postpartum Specific Anxiety Scale (PSAS; [13])

The PSAS is a 51-item self-report questionnaire administered to screen for the frequency of postpartum specific anxieties. The mothers should answer the questionnaire in relation to their emotions, feelings and experiences of the last seven days. Four factors were retained in the original validation: (1) 'Maternal Competence and Attachment Anxieties'; (2) 'Infant Safety and Welfare Anxieties'; (3) 'Practical Infant Care Anxieties'; (4) 'Psychosocial Adjustment to Motherhood'. The PSAS is rated on a 4-point Likert-type scale ranging from 1 (never) to 4 (almost always). Higher scores indicate higher levels of postpartum specific anxiety. The test-retest reliability coefficient in the original scale was 0.88. The psychometric analysis showed that the PSAS had acceptability, validity, and reliability to be used as a tool for detecting specific anxiety in the postpartum period with Cronbach's $\alpha = 0.95$; correlations between items between 0.15 and 0.50, and item-total correlations between 0.30 and 0.70 [13].

2.2.3. State-Trait Anxiety Inventory (STAI; [40])

In this study, the translated version validated for the Spanish population has been used [6]. The STAI measures two types of anxiety. State-anxiety refers to how the individual feels at that particular moment and corresponds to a transitory emotional state. Anxiety as a trait self-assesses anxious propensity with stability over time. It is a self-assessment questionnaire with 40 items and answers are reflected on a 4-point scale: 0-Nothing, 1-Somewhat, 2-Quite a bit, and 3-Very much; where higher scores on the scale corresponds to higher levels of anxiety. The Cronbach's α coefficient in the original Spanish validation was between 0.90 and 0.93 for the State subscale and between 0.84 and 0.87 for the Trait subscale [6].

Table 1
Demographic data of women participants.

Maternal characteristic	Value	Mental health medical history	Value
Age (years)		Diagnosis of emotional disturbances in the past	
Min-Max	21–43	Yes	90 (13.0)
Mean (*SD*)	33.24 (3.97)	No	554 (79.9)
Country of residence (*n*/%)		Had taken or was currently taking medication to control their mood.	
Spain	624 (97.0)	Yes	57 (8.2)
Colombia	4 (0.6)	No	587 (84.7)
Chile	2 (0.3)	Has been admitted to a Mental Health Unit or Psychiatric Centre	
Argentina	4 (0.6)	Yes	4 (0.6)
Dominican Republic	3 (0.5)	No	640 (99.4)
Peru	2 (0.3)	Infant characteristic	Value
Venezuela	3 (0.5)	Age (weeks)	
Mexico	1 (0.2)	Min-Max	1–16
Marital status (*n*/%)		Mean (*SD*)	8.71 (4.52)
Single	196 (30.4)	Birth order (*n*/%)	
Cohabiting	109 (16.9)	First	499 (77.5)
Married	333 (51.7)	Second	133 (20.7)
Separated/divorced	6 (0.9)	Third	11 (1.7)
Educational attainment (*n*/%)		Fourth	1 (0.2)
Primary school education	1 (0.2)	Multiple birth (*n*/%)	
GCSE or equivalent secondary school education	15 (2.3)	Yes	5 (0.8)
Formative Cycle of Average Degree (Medium cycle)	32 (5.0)	No	638 (99.2)
Higher Level Education Cycle (CFGS)	42 (6.5)	Childbirth Modalities (*n*/%)	
School leaving examination (baccalaureate, BUP, COU or equivalent)	39 (6.1)	Normal delivery (spontaneous labour)	372 (57.8)
University education: 3-year Diplomas ("Diplomatura")	195 (30.3)	Caesarean section	149 (23.1)
University education: Bachelor's degree ("Licenciatura")	320 (49.7)	Instrumental vaginal delivery: vacuum	55 (8.5)
Employment situation (*n*/%)		Instrumental vaginal delivery: kiwi	30 (4.7)
Active employment	104 (16.1)	Instrumental vaginal delivery: forceps	38 (5.9)
Not in paid occupation	43 (6.7)	Mode of feeding (*n*/%)	
Housewife	16 (2.5)	Exclusively breastfeeding	465 (72.9)
Maternity leave (Maternity Benefit)	470 (73.0)	Combination feeding	111 (17.4)
Others	11 (1.7)	Exclusively formula feeding	62 (9.7)

2.2.4. The Edinburgh Postnatal Depression Scale (EPDS; [9])

The Edinburgh Postnatal Depression Scale was developed as a screening tool for depression in the postpartum period. The 10 items include anxiety, mood, interest, guilt, sleep pattern, and suicidal ideation. The responses are assigned to a score of 0–3 as a Likert scale. In the following instructions, women are asked to respond based on how they felt in the last week prior the study. Higher scores indicate higher levels of depression. The internal consistency of the version translated and validated for the Spanish population shows a Cronbach's α coefficient of 0.70 [42].

2.2.5. The Beck Depression Inventory-II (BDI-II; [3])

The Beck Depression Inventory is a self-report questionnaire which detects and assesses depression. BDI-II measures a general dimension of depression composed of two factors: cognitive-affective and somatic-motivational. It contains 21 groups of statements where the mothers had to choose the one that best described how they felt in the last two weeks. Each answer has an associated score of 0–3. Higher scores are related to higher levels of depressive symptoms. The reliability in the adaptation of the questionnaire to the Spanish population presents a high internal consistency with a Cronbach's α coefficient of 0.87 [36].

2.3. Procedure

The study consisted of four phases, seen in the flow diagram of Fig. 1.

2.3.1. Stage 1: Translation

The Spanish adaptation of the PSAS in women was performed in the following phases, following the guidelines of the International Tests Commission (ITC; [17]):

i. Three people independently translated the original PSAS from English into Spanish. Translators who have a perfect understanding of both languages and were or had been immersed in the English culture were choses as suitable translators against the original scale allowing for cultural variation and sensibility.
ii. The PSAS Working Group who lead the programme of work into the development, translations, and validation of the original scale checked these translations for relevant visual inconsistencies between the translations.
iii. A fourth independent bilingual speaker was selected who back translated the scale from Spanish to English, again, selecting the item from each of the three versions which they considered most appropriate.
iv. Once the final back-translation was approved, the 51 selected items became part of the new definitive final scale translated into Spanish called: PSAS-ES.

2.3.2. Stage 2: Preliminary pilot study

To explore the degree of comprehension and ease of responding to the items on the scale, a preliminary pilot project was carried out. The inclusion criteria in this phase were: Spanish nationality or countries where Spanish is the official language, the age of their babies between 0 and 16 weeks and having responded to all the items on the scale, including the degree of comprehension and ease of response. After excluding 16 women who did not meet these criteria, 53 women entered the pilot study. The participants responded to demographic questions followed by the 51 items of the PSAS-ES, indicating in each one the ease or difficulty in understanding and answering it. They did it on a 10-point Likert scale, where 0 corresponded to *"it is not easy to understand/answer"*, and 10: *"extremely easy to understand/answer"*.

2.3.3. Stage 3: Reliability and validation study

The inclusion criteria in this phase were the same as Stage 2, including having provided complete data in this Stage. A total of 711 women completed this online study comprising demographic questions, the PSAS-ES, followed by Spanish-language versions of the STAI, EPDS, and BDI-II. After excluding those who did not meet the full inclusion criteria, 644 women were included in this Stage.

2.3.4. Stage 4: Test-retest reliability of the PSAS-ES

Participants were invited back to complete the PSAS-ES again after

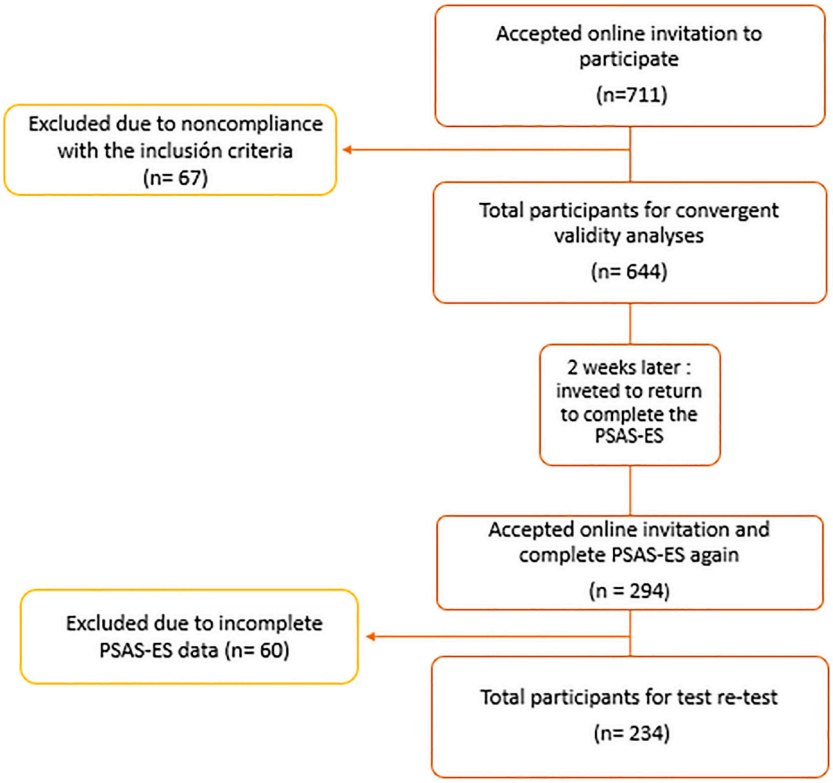

Fig. 1. Phases of procedure.

15 days from their Stage 3 responses, as a measure of test-retest reliability. Most women responded within 2–3 days, however, only those responses which were made one week after the questionnaire was sent were included, in order to avoid differences in the time of response. The questionnaires and scales were answered always ensuring confidentiality by means of a code. The identifying code used the last five numbers and the letter of the National Identity Document of each participant.

2.4. Data analysis

The Confirmatory Factorial Analysis [CFA] was performed with R Studio 4.0.4 from R [31], using the *lavaan* package [35]. The polychoric correlation matrix was used. As parameter estimation method, Diagonally Weighted Least Squares [WLSMV] was used, given the number of response categories and the skewness and kurtosis indexes.

To assess the fit of each model individually, the following indicators were considered: the $\chi 2$ statistic, the comparative fit index [CFI], the Tucker-Lewis Index [TLI], the Root Mean Square Error of Approximation [RMSEA], and the Root Mean Square Residual [SRMR]. For the CFI and TLI indeces, values greater than 0.90 are considered an adequate fit of the model [41], while for the RMSEA values less than 0.08 are considered a reasonable fit [5]. To determine the best statistical model, the chi-square test of differences was used.

The reliability of the scale was analysed by means of Cronbach's internal consistency α coefficient and intraclass correlation coefficient [ICC]. To assess convergent validity was analysed by Pearson correlation.

3. Results

3.1. Preliminary pilot study

The assessment through the Likert scale of 0–10 for comprehension of the 51 items, obtained an average score of 9.00. In the ease of answering, an average score of 9.61 was garnered. The results in this phase were very satisfactory and indicated good acceptability, therefore, this version of the scale was used for the remainder of the study, and was continuously used for the rest of the study Stages.

3.2. Confirmatory factor analyses

In order to validate the structure of the PSAS in Spanish sample, we performed a CFA, using the WLSMV estimation to check the four-factor structure of the original scale. The factor loadings of the items on each one of the factors were statistically significant, but some items have values below the 0.30 standard (see Fig. 2): item 2 of F1 (0.29); items 21 and 22 of F2 (0.24); and item 43 of F4 (0.29). The goodness-of-fit indeces were ($\chi 2$ (1218) = 5457.324, $p < .000$, CFI = 0.920, and RMSEA = 0.076, RMSEA = 0.085, TLI = 0.916.

3.3. Reliability of the PSAS-ES

The Cronbach's coefficient was 0.93 for the overall scale of PSAS-ES. The four factors had good reliability (F1 = 79; F2 = 0.74; F3 = 0.68; F4 = 0.84).

3.4. Convergent validity of the PSAS-ES

The PSAS-ES total score was significantly correlated with the theoretically related measures of anxiety (STAI-state = 0.66 and STAI-trait = 0.69) and depression (EPDS = 0.68, BDI-II = 0.66) indicating good convergent validity. The reliability of these questionnaires was α =0.94 for STAI-state and α =0.91 STAI-trait, α =0.87 for EPDS and α =0.89 for BDI-II.

3.5. Test-retest

Pearson correlation coefficient was calculated to examine the test-

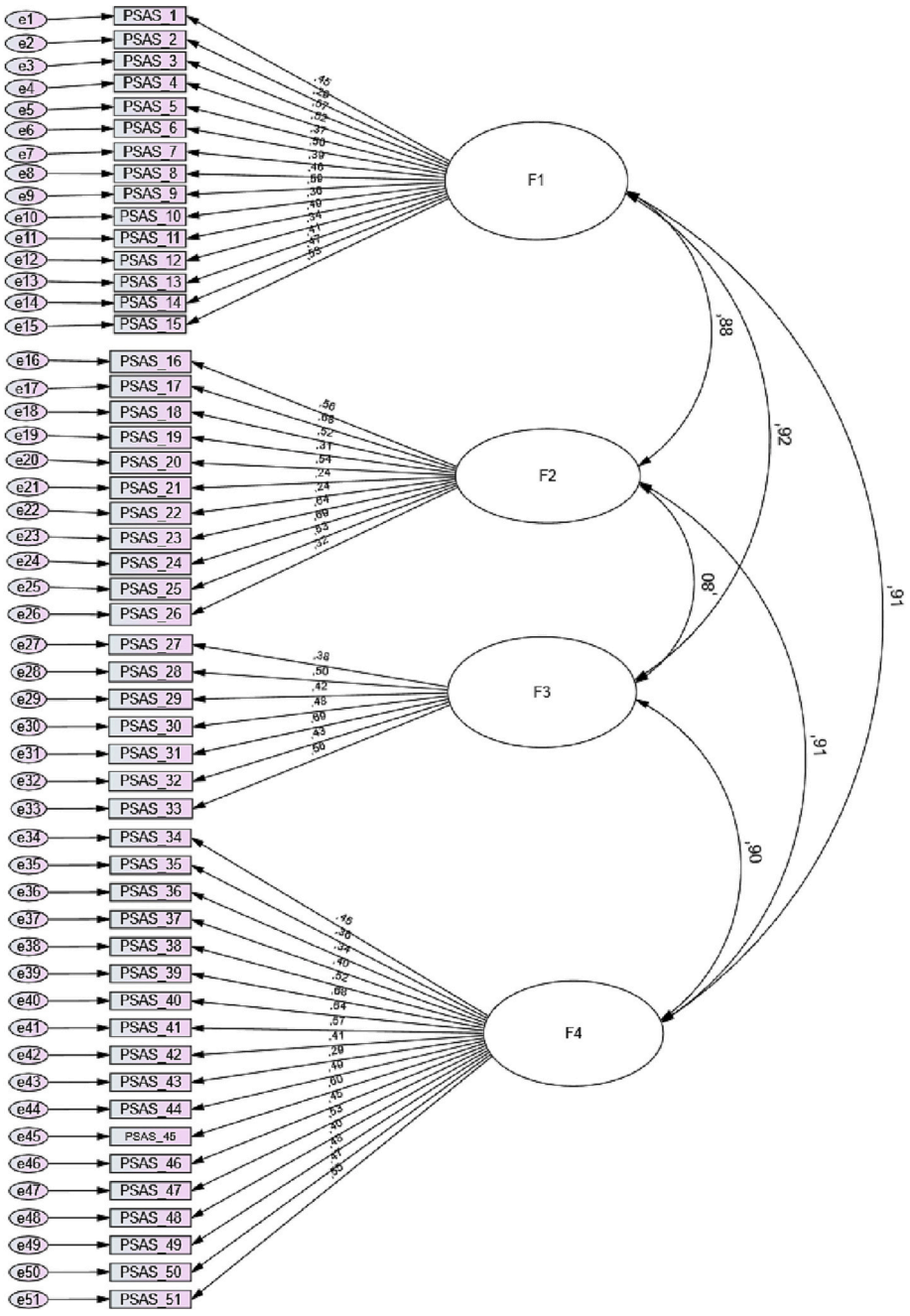

Fig. 2. Standardized Factor Loadings.

retest reliability of the PSAS-ES for a subsample of participants ($n = 234$) who repeated the PSAS-ES within two weeks after the initial administration. The test-retest reliability coefficient for the PSAS-ES was 0.86 ($p < .001$), and ICC was 0.96, indicating excellent stability over time in the first 16 weeks postpartum.

4. Discussion

4.1. Summary of main findings

The aim of this study was to determine the psychometric properties of the PSAS-ES as a tool to explore the anxieties experienced by Spanish-speaking women between 0 and 16 weeks postpartum. The PSAS-ES demonstrated good acceptability, and good construct and convergent validity. The reliability of the tool was also examined and approved through internal consistency (Cronbach's α coefficient) and test-retest stability. The psychometric properties were consistent with those obtained for the original English version and with other versions validated for Iranian, French, and Chinese populations [18,20,43].

In comparison with the UK version, the PSAS-ES studied only the first 16 weeks postpartum. The reason behind it is that the current maternity leave/benefit for Spanish women is 16 weeks. After returning to their job, women's concerns and anxieties can be modified by introducing this new variable in their daily lives. Most of the women in our sample are in a situation of maternity leave-benefit (73%), allowing an accurate comparison.

Regarding the size of the analysed sample, previous studies indicated that the minimum sample necessary to carry out the validation of a scale is from 5 to10 participants per item [18,30]. Since the scale consists of 51 items, the valid sample for the development of the validation is

sufficient.

The Cronbach's α coefficient for the scale was 0.93, which indicates high reliability. This this comparable to the UK original version (α = 0.96; [13]) and the Iranian version (α = 0.93; [18]), French version (α = 0.93; [20]), and Chinese version (α = 0.95; [43]), and demonstrates the reliability of the tool across diverse settings.

The item-total correlation was between 0.21 and 0.63. The four dimensions of the PSAS-ES replicated those found in the English-language: 'Maternal Competence and Attachment Anxieties'; 'Infant Safety and Welfare Anxieties'; 'Practical Infant Care Anxieties'; and 'Psychosocial Adjustment to Motherhood'. The reliability of each factor was good to excellent (Cronbach's α ranged between 0.68 and 0.84).

The CFA indicates adequate fit indices for the 4-factor model, although there are some values below the 0.30 standard. The correlation between the factors is high. In the original study these items presented adequate factor loadings [13], however, the factor analysis technique used in our study is different. We used a polychoric correlation matrix, since the items are correlated and there are only four possible responses [2]. For this reason, the results are not exactly the same and it could be assumed that these items are not suitable for the Spanish version of the questionnaire. However, this result is consistent with other adaptation studies. In the French version, items 2, 7, 42, and 43 were also found to have low factor loadings, indicating there are cultural differences in women's interpretation and response to the items [20]. In the Iranian version, only item 15 has the same problem [18]. In view of these results, it would be necessary to carry out a cross-cultural measurement invariance study.

The PSAS-ES had a positive correlation with previously validated scales and used to measure anxiety like State-Trait Anxiety Inventory (STAI); and postpartum-specific depression like The Edinburgh Postnatal Depression Scale (EPDS), and The Beck Depression Inventory-II (BDI-II). These results are in concordance with those obtained previously [13].

The internal consistency obtained in the STAI (STAI-State α = 0.94, STAI-Trait α = 0.91), BDI-II (α = 0.89), and EPDS (α = 0.87) is similar to their corresponding versions translated and validated for the Spanish population (STAI-State, α = 0.90–0.93, STAI-Trait α = 0.84–0.87, [6]; EPDS, α = 0.70, [42]; BDI-II, α = 0.87, [36]).

There was a link observed between the PSAS-ES and the STAI-state, STAI-trait, BDI-II, and EPDS. This could be explained by co-morbid depression and anxiety, frequent in the postpartum period as indicated on previous investigations [1,15,20,32,33].

The data obtained in the convergent validity of the PSAS-ES in the correlation with STAI (state = 0.66, trait = 0.69), BDI-II (= 0.66), and EPDS (= 0.68), are similar to those indicated by psychometric analyses of the original scale (STAI-state = 0.74, STAI-trait = 0.77, BDI-II = 0.76, EPDS = 0.81; [13]) and other translations for populations similar to Spanish like the French version (STAI-state = 0.66, STAI-trait = 0.68, EPDS = 0.69; [20]).

As in the original scale, it is noteworthy that the PSAS-ES does not correlate better with the STAI-state than with the BDI-II or the EPDS. As it is an anxiety scale, it would be expected to have a higher correlation with the anxiety scales like the STAI, especially with STAI-trait. Despite the fact that the STAI refers to anxiety, its function as a diagnostic tool in the postpartum period has the same limitation as the BDI-II: they are not specific to the postpartum period. For example, the BDI-II contains items related to loss of energy, changes in sleep habits, fatigue, tiredness; and the STAI refers to guilt, fear, nervousness, self-injurious thoughts, and general worries. In other stages of the lifecourse, these could indicate the presence of some emotional disturbance, but these aspects to some degree are considered within the normal spectrum of emotional feelings in the postpartum period as a consequence of having and caring for a newborn baby. The specific concerns related to the baby's health, maternal role, psychosocial changes, or learning new skills for caring needs to be taken into consideration when analysing postpartum anxiety, and this is efficaciously captured by the PSAS-ES.

4.2. Implication for perinatal mental health care system

The Strategic Mental Health Plan of the Spanish National System (2022–2026) includes in its general objectives (10.1): *promoting research in all areas related to mental health through multidisciplinary groups that increase and improve knowledge of these entities*. The PSAS-ES can help health professionals to achieve this goal as a reliable and valid tool for exploring postpartum-specific anxiety. Appropriate identification and measurement of perinatal mental health conditions is the first step for the investigation and development of standardized programmes which are able to improve treatment for perinatal mental health.

4.3. Strengths, limitations, and future research

A strength of the study is the large sample of women who have participated in it with different sociocultural levels, obstetric data, and demographics. The study has not only analysed the reliability and validation of the scale, but has also been carried out in different phases, including a preliminary pilot study and a test-retest study. These complementary assessments help and support the psychometric results.

The PSAS-ES has only been studied in the period 0–16 weeks postpartum. It would be interesting in future studies to analyse the usefulness of this tool in longer postpartum periods, such as after women return to their jobs.

Also, we recognise the self-reported nature of both mental health status and the number of weeks postpartum each woman was, could be a limitation and future studies may want to include medical records assessments.

The development of shorter versions of the original scale, to reduce the time mothers take to complete it, could be very useful in its implementation as a tool for the systematic diagnosis of anxiety in the Spanish Health System. The 12-item research short-form for use in global crises [PSAS-ES-RSF-C] is published ([38]), but requires validation; and sensible next steps will now be taken to develop a Spanish-language research short form [PSAS-ES-RSF].

The transition to fatherhood and the involvement of fathers in their children's care has hardly been studied. As it is the case for mothers, the existence of mood alterations in fathers should be measured with specific and validated tools. The adaptation and psychometric analysis of the PSAS-ES for the Spanish-speaking population of fathers may be a research pipeline in the future.

5. Conclusion

The psychometric results show that the PSAS-ES can be a valid tool to explore and detect specific anxiety in Spanish mothers between 0 and 16 weeks postpartum. These results were consistent with previous translations into other languages which show that the PSAS four-factor model remains consistent across cultures and contexts. We propose that the PSAS-ES can be part of standardized diagnostic programs for postpartum emotional disorders.

Funding information

This study did not receive any funding.

Ethics approval

Ethical approvals were sought and granted from the Universidad Complutense de Madrid Research Ethics Committee [ref:- CE_20230112-10_SAL].

Consent for publication

All participants consented to their data being published as part of this study's analysis.

CRediT authorship contribution statement

Natalia Costas-Ramón: Conceptualization, Methodology, Software, Formal analysis, Data curation, Writing – original draft, Visualization, Project administration. **Sergio A. Silverio:** Validation, Investigation, Writing – review & editing, Supervision. **Victoria Fallon:** Validation, Investigation, Writing – review & editing, Supervision. **Marta E. Aparicio-García:** Conceptualization, Methodology, Formal analysis, Investigation, Resources, Writing – original draft, Supervision.

Declaration of Competing Interest

The authors declare no conflict of interests in the development of this study.

Data availability

The datasets are not publicly available due to their sensitive nature, however they are available upon reasonable request from the corresponding author.

Acknowledgements

The authors gratefully acknowledge the help of Elena Fábrega, Santiago Costas-Ramón, and Blanca Serrano in the three first translations. We deeply appreciate the work of Miguel Toledo as experienced professional translator in the back-translation. In addition, the authors want to thank Nazareth Olivera, Marta Roca, Belén Gabarre, Cristina Triviño, and Nacho Roura for the help during the data collection. A very special mention to the collaboration, assistance, and help throughout the development of the project from The PSAS Working Group.

References

[1] Ali E. Women's experiences with postpartum anxiety disorders: a narrative literature review. Int J Womens Health 2018;10:237.
[2] Asún RA, Rodríguez-Navarro K, Alvarado JM. Developing multidimensional Likert scales using item factor analysis. In: The Case of Four-Point Items. Sociological Methods & Research; 2016. https://doi.org/10.1177/0049124114566716.
[3] Beck AT, Steer RA, Brown GK. Beck depression inventory (BDI-II)vol. 10. London, UK: Pearson; 1996. s15327752jpa6703_13.
[4] Britton JR. Maternal anxiety: course and antecedents during the early postpartum period. Depress Anxiety 2008;25(9):793–800.
[5] Browne MW, Cudeck R. Alternative ways of assessing model fit. In: Bollen KA, Long JS, editors. Testing structural equation models. Newbury Park, CA: Sage; 1993. p. 136–62.
[6] Buela G, Guillén A, Seisdedos N. Cuestionario de Ansiedad Estado-Rasgo: Adaptación española. Madrid: TEA Ediciones; 2011.
[7] Castejón M, Sanz M. Informe sobre la revisión de planes y estrategias de salud mental de las comunidades autónomas en relación con la salud mental perinatal. Naciendo 2021;1:111–20. https://doi.org/10.52961/01.VSAW1768.
[8] Cohen LS, Wang B, Nonacs R, Viguera AC, Lemon EL, Freeman MP. Treatment of mood disorders during pregnancy and postpartum. Psychiatr Clin North Am 2010;33(2):273–93.
[9] Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression: development of the 10-item Edinburgh postnatal depression scale. Br J Psychiatry 1987;150(6):782–6.
[10] Davies SM, Christiansen P, Harrold JA, Silverio SA, Fallon V. Creation and validation of the postpartum specific anxiety scale research short-form (PSAS-RSF). Arch Womens Ment Health 2021;24(6):957–69. https://doi.org/10.1007/s00737-021-01114-7.
[11] Dennis CL, Falah-Hassani K, Brown HK, Vigod SN. Identifying women at risk for postpartum anxiety: a prospective population-based study. Acta Psychiatr Scand 2016;134(6):485–93.
[12] Epifanio MS, Genna V, De Luca C, Roccella M, La Grutta S. Paternal and maternal transition to parenthood: the risk of postpartum depression and parenting stress. Pediatr Rep 2015;7(2).
[13] Fallon V, Halford JCG, Bennett KM, Harrold JA. The postpartum specific anxiety scale: development and preliminary validation. Arch Womens Ment Health 2016;19(6):1079–90.
[14] Fermoselle E, Osma J, Crespo C, Ramón J, Castellano C. Factores de riesgo asociados a la aparición de alteraciones emocionales durante el periodo perinatal y el puerperio: Un estudio preliminar en una muestra de mujeres embarazadas a través de e-Health. Àgora Salut 2015;1:325–36.
[15] Field T, Field T. Postnatal anxiety prevalence, predictors and effects on development: a narrative review. Infant Behav Dev 2018;51:24–32. https://doi.org/10.1016/j. infbeh.2018.02.005.
[16] Goodman JH, Watson GR, Stubbs B. Anxiety disorders in postpartum women: a systematic review and meta-analysis. J Affect Disord 2016;203:292–331.
[17] Hambleton RK. The next generation of the ITC test translation and adaptation guidelines. Eur J Psychol Assess 2001;17(3):164–72.
[18] Hasanzadeh R, Asghari Jafarabadi M, Hasanpour S, Fallon V, Silverio SA, Montazeri R, et al. Psychometric evaluation of the postpartum specific anxiety scale in an Iranian population (PSAS-IR). BMC Pregnancy Childbirth 2021;21(597):1–7. https://doi.org/10.1186/s12884-021-04085-w.
[19] Hernández Murillo M, Aseguinolaza Chopitea A. Los costes de los problemas mentales perinatales no atendidos se traducen en consecuencias para los niños y gastos economicos para el estado. Naciendo 2021;1:149–54. https://doi.org/10.52961/01.ZLQN6161.
[20] Infante-Gil L, Silverio SA, Fallon V, Wendland J. Postpartum specific anxiety in a French population: validation of the French version of the postpartum specific anxiety scale [PSAS-FR]. Perspect Psychiatr Care 2022;58(1):418–28. https://doi.org/10.1111/ppc.12808.
[21] Leach LS, Poyser C, Cooklin AR, Giallo R. Prevalence and course of anxiety disorders (and symptom levels) in men across the perinatal period: a systematic review. J Affect Disord 2016;190:675–86.
[22] Leonetti L, Martins MB. Maternal anxiety in the pre-and postnatal period: a literature review. Rev Lat Am Enfermagem 2007;15(4):677–83.
[23] Martí JMF. Rompiendo el silencio: la salud mental perinatal. Cuadernos de medicina psicosomática y psiquiatria de enlace 2016;(118):7–10.
[24] Matthies LM, Müller M, Doster A, Sohn C, Wallwiener M, Reck C, et al. Maternal–fetal attachment protects against postpartum anxiety: the mediating role of postpartum bonding and partnership satisfaction. Arch Gynecol Obstet 2020;301(1):107–17.
[25] Ministerio de Sanidad, Política Social e Igualdad. Estrategia en Salud Mental del Sistema Nacional de Salud 2022–2026. Ministerio de Sanidad, Política Social e Igualdad; 2022.
[26] Misri S, Abizadeh J, Sanders S, Swift E. Perinatal generalized anxiety disorder: assessment and treatment. J Womens Health 2015;24(9):762–70.
[27] Murphey C, Carter P, Price LR, Champion JD, Nichols F. Psychological distress in healthy low-risk first-time mothers during the postpartum period: an exploratory study. Nurs Res Pract 2017;2017.
[28] O'Hara MW, Wisner KL. Perinatal mental illness: definition, description and aetiology. Best Pract Res Clin Obstet Gynaecol 2014;28(1):3–12.
[29] Olza I, Fernández Lorenzo P, González Uriarte A, Herrero Azorín F, Carmona Cañabate S, Gil Sanchez A, et al. Propuesta de un modelo ecosistémico para la atención integral a la salud mental perinatal. Rev Asoc Esp Neuropsiquiatr 2021;41(139):23–35.
[30] Polit DF, Beck CT. Essentials of nursing research: appraising evidence for nursing practice. Lippicott. 2013.
[31] R Core Team. R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2021. URL, https://www.R-project.org/.
[32] Radoš SN, Tadinac M, Herman R. Anxiety during pregnancy and postpartum: course, predictors and comorbidity with postpartum depression. Acta Clin Croat 2018;57(1):39.
[33] Ramakrishna S, Cooklin AR, Leach LS. Comorbid anxiety and depression: a community-based study examining symptomology and correlates during the postpartum period. J Reprod Infant Psychol 2019;37(5):468–79.
[34] Reck C, Tietz A, Müller M, Seibold K, Tronick E. The impact of maternal anxiety disorder on mother-infant interaction in the postpartum period. PloS One 2018;13(5):e0194763.
[35] Rosseel Y. Lavaan: an R package for structural equation modeling. J Stat Softw 2012;48:1–36. https://doi.org/10.18637/jss.v048.i02.
[36] Sanz J, Perdigón AL, Vázquez C. Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 2. Propiedades psicométricas en población general. Clín Salud 2003;14(3):249–80.
[37] Seymour M, Giallo R, Cooklin A, Dunning M. Maternal anxiety, risk factors and parenting in the first post-natal year. Child Care Health Dev 2015;41(2):314–23.
[38] Silverio SA, Davies SM, Christiansen P, Aparicio-García ME, Bramante A, Cheng P, et al. A validation of the postpartum specific anxiety scale 12-item research short-form for use during global crises with five translations. BMC Pregnancy Childbirth 2021;21(112):1–12. https://doi.org/10.1186/s12884-021-03597-9.
[39] Singley D, Edwards L. Men's perinatal mental health in the transition to fatherhood. Prof Psychol Res Pract 2015;46(5):309–16.
[40] Spielberger CD, Gorsuch RL, Lushene RE. Manual for the state-trait anxiety inventory. Palo Alto, California: Consulting Psychologist Press; 1970.
[41] Schumacher RE, Y Lomax RG. A beginner's guide to SEM. Manwah; 1996.
[42] Vega-Dienstmaier JM, Mazzotti Suarez G, Campos Sanchez M. Validación de una versión en español de la Escala de Depresión Postnatal de Edimburgo. Actas Esp Psiquiatr 2002;30(2):106–11.
[43] Xu J, Sun C, Yan P, Liu X. Revision and reliability and validity evaluation of the Chinese version of the postpartum specific anxiety scale. Chin J Clin Psych 2021;29(3):554–8. https://doi.org/10.16128/j.cnki.1005-3611.2021.03.022.
[44] Barkin JL, Wisner KL, Bromberger JT, Beach SR, Wisniewski SR. Factors associated with postpartum maternal functioning in women with positive screens for depression. J Women Health 2016;25(7):707–13.