Cultural adaptation and psychometric validation of the Pregnancy Experience Scale–Brief version (PES-Brief) in Pakistani women with antenatal anxiety symptoms

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Abstract

Background: Pregnancy experiences influence fetal and birth outcomes. There is scarcity of locally validated tools to assess pregnancy experiences. We aimed to validate the Pregnancy Experience Scale-Brief (PES-Brief) in pregnant Pakistani women with anxiety symptoms.

Methods: A two-step process was used including 1) adaptation via translation/back-translation followed by cognitive interviewing with 10 participants and 2) factor analysis and validation with 605 women in Rawalpindi Pakistan who had mild-moderate symptoms of anxiety, attended the antenatal clinic, and were 22 weeks of gestation and 18 years old. We calculated internal consistency and reliability and conducted exploratory and confirmatory factor analyses.

Results: Cultural adaptation led to inclusion of one item of the hassles subscale and exclusion of one item in the uplifts subscale, resulting in 9 uplifts and 11 hassles. Exploratory factor analysis supported a two-factor structure, with the adapted items exhibiting loading values of 0.24 for their respective factors. Internal consistency was demonstrated for uplifts (Cronbach's alpha = 0.89) and hassles (Cronbach's alpha = 0.85) subscales. Uplift intensity was moderately correlated with the Hospital Anxiety and Depression Scale anxiety subscale (r = 0.54, 95% CI:0.30–0.77).

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Conclusion: The Urdu PES-Brief is a reliable and valid tool for use in Pakistani pregnant women with antenatal anxiety. Future studies on its validity are needed on women without symptoms anxiety.

1. Introduction

Accurate assessment of women's experiences during pregnancy is important given the effects these experiences have on the mother and child (Satyanarayana, Lukose, & Srinivasan, 2011). Constructive thinking and expectations of positive outcomes are associated with maternal wellbeing and improved fetal health (Park, Moore, Turner, & Adler, 1997) while negative experiences can increase psychological distress and risk of depression or anxiety in mothers as well as premature labor in infants (Rosa et al., 2019). Negative maternal experiences are also associated with risk of behavioral and emotional disorders for offspring later in life (Stein et al., 2014). Pregnancy experiences generate specific concerns that are not adequately measured by general instruments (Arizmendi & Affonso, 1987; Huizink, Mulder, de Medina, Visser, & Buitelaar, 2004; Yali & Lobel, 1999), and as such, a range of tools have been developed to better assess pregnancy-specific stress (Alderdice, Lynn, & Lobel, 2012). There is also an increased risk of suicide during the perinatal period (Shi, Ren, Li, & Dai, 2018) which highlights the importance of studying pregnancy experiences and the need to validate instruments to measure them.

Pregnancy experiences require a valid multidimensional measurement tool that assesses both the conditions or events that may create stress for pregnant women and the nature and extent of women's responses to these triggers (Alderdice et al., 2012). The majority of tools related to anxiety, worries, fears, and stressors have been developed and validated in English for use in the US or in Western Europe (Huizink, Mulder, de Medina, Visser, & Buitelaar J. K. J. E. h. d, 2004; Navidpour, Dolatian, Yaghmaei, Majd, & Hashemi, 2015; Roesch, Schetter, Woo, Hobel, & Coping, 2004). For application in other settings, these tools are often translated and used without rigorous cross-cultural adaptation or assessment of validity (Rahman, Iqbal, Waheed, & Hussain, 2003). Moreover, to our knowledge, almost none of the available instruments inquire about positive or uplifting experiences in pregnancy, either alone or in terms of their relation to stressors. The Pregnancy Experience Scale (PES), consisting of 41 items, was developed to measure everyday issues pertaining to both positive and negative experiences of pregnant women (DiPietro, Ghera, Costigan, & Hawkins, 2004). Later, a shorter version consisting of 20 items was developed and tested for its internal reliability, test-retest reliability, and convergent validity (DiPietro, Christensen, & Costigan, 2008b). The PES-Brief provided a shorter, reliable, and validated assessment tool for maternal perceptions of pregnancy experiences (DiPietro et al., 2008b).

Although pregnancy experiences are personal, they are influenced by cultural practices and care provided by family and friends. In South Asia, pregnancy might be considered a time of joy as a woman assumes the role of a mother. However, it may also be anxiety-producing

due to cultural pregnancy-related expectations or burdens as well as high levels of maternal mortality in childbirth, complications at birth, and rates of stillbirth in the region (Aziz et al., 2020; Waqas et al., 2015). Although ideally indigenous instruments would be developed and their content derived from local populations, this is not always possible due to lack of resources and scientific expertise (Hussein & Vostanis, 2008). Given that the PES-Brief is a reliable and a valid assessment tool, easier to administer to populations with low literacy such as in Pakistan, and can be used along with other tools measuring related constructs the cultural adaptation and validation of this economical instrument is valuable for use in Pakistan.

2. Methods

The twenty-item PES-Brief scale was designed to measure both positive experiences ("uplifts") and negative experiences ("hassles") during pregnancy (DiPietro et al., 2008b). Ten of these items correspond to uplifts and ten correspond to hassles. Response categories are measured on a four-point Likert scale, ranging from 3 ="A great deal" to 0 ="not at all". Every item in the PES-Brief is assessed along one dimension, i.e., as either a hassle or an uplift. Scoring yields six metrics: (1) frequency of hassles and (2) frequency of uplifts, i.e., the number of endorsed items among hassles and uplifts, respectively; (3) intensity of hassles and (4) intensity of uplifts, i.e., the sum of scores divided by the number of endorsed items; and composite ratio scores relating (5) the intensity of hassles to uplifts (the intensity of hassles divided by the intensity of uplifts) and (6) frequency of hassles to uplifts (the frequency of hassles divided by the frequency of uplifts). For the composite intensity and frequency ratio values, a score of >1 indicates more hassles than uplifts while a score of <1 indicates more uplifts than hassles.

2.1. Translation and cross-cultural adaptation

We followed the World Health Organization (WHO) guidelines (Sousa & Rojjanasrirat, 2011) to translate and cross-culturally adapt the PES-Brief. First, the original English version of PES-Brief was independently translated into Urdu by two researchers fully proficient in both English and Urdu. We took care to translate the tool based on conceptual equivalence rather than literal translation. The use of jargon and offensive terms was avoided, and efforts were made to include natural language appropriate for a broad audience. Second, a committee consisting of four Pakistani psychologists, a gynecologist, and two research assistants was formed, including the researchers who completed the original translation. This study team had additional and enhanced understanding of local pregnancy experiences in women with symptoms of anxiety based on qualitative research conducted previously on the topic of pregnancy-related stressors, experiences, and anxieties at this study site (N. Atif et al., 2019; Rowther et al., 2020)They compared and discussed Urdu translations done by two independent researchers. This committee approach was used to identify and resolve mismatches between the translations and the original version of the tool until consensus was reached.

The next step was bilingual back-translation to compare and contrast the back translation with the original questionnaire while continuing to emphasize conceptual and cultural

congruence rather than linguistic equivalence. After committee discussion, the consensus version was then back-translated into English by an independent bilingual translator who was not familiar with the original version of PES-Brief. To determine whether an equivalent version across languages and cultures had been created, the original English version and the back-translated versions were reviewed for consistency until consensus was reached regarding necessary modifications.

Lastly, cognitive interviewing (Beatty & Willis, 2007) was used with pregnant women and providers to understand how respondents processed and responded to each of the items. Cognitive interviewing involves investigating underlying cognitive processes employed in reading or hearing items, comprehending and interpreting questions, and formulating answers (Howlett, McKinstry, & Lannin, 2018). The penultimate Urdu version of the PES-Brief was tested with five expectant mothers and five healthcare providers. If alternative words existed that could be used for an item, respondents were asked to select the alternative that was the most appropriate and easiest to understand. Any comments about words that were difficult to understand, unacceptable, or offensive were taken into account and corresponding revisions were made. Revised items were iteratively included until all comments were addressed.

2.2. Data and sample

This validation study was conducted using baseline cross-sectional data collected from April 2019 to March 2020 in Rawalpindi district, Pakistan. Data were from 605 pregnant women in a randomized trial called "Happy Mother, Healthy Baby" (HMHB) that aimed to evaluate the effectiveness of a psychological intervention focusing on perinatal anxiety (Surkan et al., 2020). As suggested by Comrey and Lee, 500 or more is considered a good sample size for instrument validation (Mundfrom, Shaw, & Ke, 2005).

2.3. Study site

Pregnant women were recruited from the Obstetrics and Gynecology Department of Holy Family Hospital (HFH), a large public tertiary care facility at Rawalpindi Medical University that provides free or low-cost antenatal care to a catchment population of almost 7 million. The majority of women in this study had low socio-economic status, and lacked basic necessities. Our study site is located in an urban area but the participants come from both urban and rural settings. According to the Demographic Health surveys in Pakistan, among women in rural areas, only 36% are literate and 66% have only primary school education or less, while in urban areas only 51% are literate and 70% have primary education or less (Demographic Health Survey)

2.4. Sample

Instruments were administered by a team of research assistants trained and supervised by an experienced psychiatrist. They were trained in administering psychosocial instruments, obtaining informed consent, and recording observations of participant reactions and responses through a series of structured sessions and interactive workshops.

At Level 1 screening, all women who attended the antenatal clinic and were 22 weeks of gestation, 18 years of age, residing within 20 km of Holy Family Hospital, intending to reside in the study areas until delivery, and Urdu-speaking were approached for participation in the study. Pregnant mothers with chronic physical conditions such as hepatitis, tuberculosis, uncontrolled diabetes, or hypertension were excluded. At Level 2 screening, because we were particularly interested in studying anxiety alone, women who scored 8 on anxiety score of Hospital Anxiety and Depression Scale (HADS), indicating that they had at least mild anxiety were invited for a baseline assessment. However, those women who scored 8 on anxiety score as well as on depression score of the HADS were assessed on the Structured Clinical Interview for Depression (SCID) in order to exclude women with clinical depression. Other exclusion criteria included suicidal ideation or self-report of past or current psychiatric disorders (e.g., bipolar disorder, schizophrenia) or psychiatric care (e.g., use of anxiolytic medications or other psychotropic drugs). Further instruments were administered to assess demographic characteristics, anthropometry, current medical status, and pregnancy experiences. The PES-Brief and other scales were administered orally and responses were recorded on tablets using the Open Data Kit (ODK), an online data collection tool.

2.5. Statistical analysis

Descriptive statistics were used to examine participant characteristics. Mean scores, standard deviations, and frequencies for each item of the PES-Brief were also calculated. Cronbach's alpha was used to examine if internal reliability was satisfactory for further validation. We used a value of >0.7 as a cutoff for internal reliability (Streiner & Norman, 2008). The Kaiser-Meyer-Olkin (KMO) measure was used to evaluate the adequacy of the sample for factor analysis (Kaiser, 1974). Based on a minimum desired value of 0.6, we used Bartlett's test of sphericity (Bartlett, 1954, pp. 296–298) to examine whether the items had enough in common to justify conducting a factor analysis. We used exploratory factor analysis (EFA) to assess construct validity of the PES-Brief. Cattell's scree plot was used to determine the maximum number of components to retain in the EFA.

After identification of an appropriate factor structure of the PES-Brief, Confirmatory Factor Analysis (CFA) was carried out to verify the factor structure. We calculated the Root Mean Square of Residuals (RMSR), using a cutoff of <0.10 to indicate good fit (Hu & Bentler, 1999). For the Comparative Fit Index (CFI) and Tucker-Lewis index (TLI), we used a cut-off of >0.90 (Hooper et al., 2008). Finally, we used the Goodness-of-Fit Index (GFI) and the Adjusted Goodness-of-Fit Index (AGFI). The GFI and AGFI range from 0 to 1, and >0.9 indicates acceptable model fit (Babyak & Green, 2010).

We summarized the frequencies along with the mean and standard deviation of PES uplift and hassle scores. Six different summary scores of the PES-Brief were calculated: the intensity of uplifts, the intensity of hassles, frequency of uplifts, frequency of hassles, intensity ratio, and frequency ratio of uplifts and hassles, as described by DePietro et al. (DiPietro et al., 2008b). To assess convergent validity, the association of these six scores were examined in relation to the Hospital Anxiety and Depression Scale (HADS) anxiety scores using linear regression. All data were analyzed with R version 4.0.3 (Team, 2013).

Ethical approval was obtained from the Institutional Review Board (IRB) of Rawalpindi Medical University, the Human Development Research Foundation (HDRF), and Johns Hopkins University Bloomberg School of Public Health. All participants provided informed written consent at the time of recruitment.

3. Results

3.1. Cultural adaptation of the PES-Brief

Five married pregnant women and five healthcare providers took part in the cultural adaption of the PES-Brief. Pregnant women ranged from 25 to 40 years old and had eight to sixteen years of education. The healthcare providers included physicians and psychologists, ranging in age from 25 to 45 years.

Several adaptations were made to increase item comprehensibility, relevance, acceptability, and completeness. Item 1 (uplifts) regarding fetal movement was omitted due to its lack of relevance to women in early pregnancy such as our participants, since movements of the baby may not yet be detectible (Please See Table A1). During the cognitive interviews, when asked if there is anything else that makes pregnant women feel unhappy, negative, or upset during pregnancy, we found that participants were very concerned about the "sex of the baby". They explained that the majority of pregnant women or their families have male preference and suggested to include this based on relevance to Pakistani society. While this was not present in the English version of the PES-Brief, the item was originally present (as a hassle) in the long version of the scale. Therefore, we re-introduced it and included it as a "hassle" in the adapted Urdu PES-Brief. Although a preference for male offspring exists in Pakistani society generally, it may be that in families with one or two male children that a female baby is desired. Therefore, this added item prompted the respondent to indicate how worried she was about the baby's sex, without specifying a particular sex. To make the items more comprehensible, examples were added to items 6 & 7 (uplifts) (See Table A1). Participants had difficulty connecting "getting enough sleep" to unhappy or upset feelings [Item 1 (hassles)], so the word "not" was added to the statement to improve understandability. Item 2 (hassles), asking about the physical intimacy, was considered offensive by some participants so the words "between spouses" were added to make the item acceptable.

All the items on the adapted version were reviewed by two trained psychologists and 1 specialist in mental-health related fields. Face validity was based on their assessment of the final version of the instrument as acceptable. Adaptations made to the PES-Brief are shown in Table A1 This final adapted version included an uplifts subscale with 9 items (after exclusion of one item) and a hassles subscale with 11 items (after the addition of one item).

3.2. Quantitative validation

The mean age of participants was 26 (SD = 4.97) years. The majority of participants had basic primary and secondary education, and 82% had husbands with at least primary education. The average number of family members was six (SD = 4.76). Nearly equal proportions of women lived in nuclear and joint families, while a small proportion of women

lived within extended and multiple household structures. More than 90% of the women were unemployed, while their husbands were working (Table A2). Descriptive summary statistics of all PES-Brief items are shown in (Table A3). The most endorsed item in uplifts related to making arrangements for their baby (factor loading 0.74) while the least endorsed item was about visiting health providers (factor loading 0.54). For hassles, the most endorsed item was about physical health changes (factor loading 0.75) while least endorsed item was baby's sex (factor loading 0.24).

3.3. Reliability analysis

The internal consistency of the sub-scales of the PES-Brief (uplifts and hassles) was high, with a Cronbach's alpha of 0.89 for PES uplifts and 0.85 for PES hassles. Systematic removal of each individual item resulted in very little change. Cronbach's alpha values remained >0.82 suggesting that the sub-scales were very reliable.

3.4. Exploratory factor analysis

In the whole sample, KMO test was found to be adequate at 0.87 with Bartlett's test of sphericity was statistically significant ($p < 0.001$) indicating that some questionnaire items were more variable than others. Factors to be retained were evaluated on the following criteria: the number of eigenvalues greater than one, a scree plot of the eigenvalues, and Horn's parallel analysis (Hoyle & Duvall, 2004, pp. 301–315). The eigenvalue for the first factor was 4.8 and the second factor was 4.2, with the next largest at 1.1 (Figure A1). The scree plot indicated two factors should be retained that cumulatively explained 46% of the variance (Figure A1). Assuming that there were two factors, we proceeded to estimate the exploratory structure of these two factors among the items of the adapted PES-Brief. All items strongly loaded on their respective factors (Table A4), with one factor corresponding to positive experiences or uplifts and the second factor corresponding to negative experiences or hassles. The highest loading was reported for item 14 referring to bodily changes (factor loading 0.75) and lowest for item 20 referring to baby's sex (factor loading 0.24).

3.5. Confirmatory Factor Analysis

Several indices were assessed to confirm the goodness of fit for the two-factor structure of the PES-Brief. Using all 20 items (9 uplifts and 11 hassles), the Tucker & Lewis Index (TLI) was 0.90, and the Comparative Fit Index (CFI) was 0.92. The Root Mean Square Error of Approximation (RMSEA) was 0.061 (p ¼ 0.001; 90% CI: 0.056–0.067), significantly lower than Kelley's criterion of 0.09 (Hooper et al., 2008; McIntosh & Differences, 2007). Given these results, we retained all 9 uplift items and 11 hassle items to construct the six summary scales of the PES-Brief as originally defined (DiPietro, Christensen, & Costigan, 2008a).

3.6. Convergent validity

Convergent validity of the PES-Brief was calculated using linear regression to observe the association between HADS-anxiety subscale and the PES-Brief intensity of uplifts, intensity of hassles, frequency of uplifts, frequency of hassles, intensity ratio, and PES frequency ratios. The association between each PES score and HADS-anxiety score is

shown in Table A5, representing six separate bivariate regression models. The regression coefficients showed a positive relationship of PES uplifts intensity with the HADS-anxiety (regression coefficient = 0.54 (CI = 0.30, 0.77, p-value < 0.001). This regression coefficient is interpretable as the expected change in HADS-anxiety for a one-point increase in the PES uplifts intensity.

4. Discussion

The results of this study support use of this adapted Urdu version of the PES-Brief in Pakistan among women with symptoms of anxiety in early pregnancy. We found high internal consistency, reliability and construct validity of the adapted version for assessing maternal appraisal of positive and negative experiences in pregnancy. As part of the cross-cultural adaptation of the original items developed in the US (DiPietro et al., 2008a), in the Urdu version one uplift was exchanged for a hassle based on cognitive interviewing, which helped to improve its cultural appropriateness for Pakistani women in early pregnancy.

Our assessment of the adapted Urdu PES-Brief's psychometric properties showed a two-factor model corresponding to positive experiences and negative experiences, consistent with previous validation studies of translations in Brazil (Ferreira, Marini, Amaral, Santos, & Conti, 2020) and the Netherlands (Ebadi, Kariman, & Hajifoghaha, 2017) and similar to the original structure of the PES-Brief validation by DiPietro et al. (DiPietro et al., 2008a). Prior validations have termed the extracted factors as either 'positive experiences' and 'negative experiences' or as 'uplifts' and 'hassles', in accordance with DiPietro's original naming of the PES-Brief items. This is in contrast to the full-length PES, from which five factors were extracted in psychometric validation: (1) psychological and physical preparation for baby; (2) changes in lifestyle of self and spouse, (3) relationships with family and friends; (4) pregnancy concerns and occurrences, and (5) body image and self (DiPietro et al., 2004).

In addition to the largely educated, married, non-Hispanic white women in which the PES-Brief was originally validated (DiPietro et al., 2008b), the PES-Brief has been subsequently validated in various other populations. This includes a recent psychometric analysis of racial and ethnic disparities across measures of psychosocial states during pregnancy in the US, in which Asian women were found to have the highest scores for the frequency ratio of hassles to uplifts (Grobman et al., 2016). Moreover, cultural adaptations and translations of the PES-Brief have been validated in healthy Brazilian (Ferreira, Marini, Amaral, Santos, & Conti M. H. S. d. J. F. e. M, 2020), Iranian (Askarizadeh, Karamoozian, & Darekordi, 2017) and Dutch pregnant women (van der Zwan, de Vente, Koot, & Huizink, 2017). These validation studies highlight some important differences from ours. For instance, in the Brazilian and Dutch samples, all the items in the original scale were retained with good factor loadings, whereas in the Iranian version of the PES-Brief, the item on physical intimacy and the item regarding "concerns about physical symptoms such as spotting, etc." had low factor loadings and were omitted based on the cultural appropriateness (Mahboubeh, Abbas, & Nourossadat, 2016). These subsequent validation studies demonstrate the importance of thoughtful cultural adaptation and validation of the PES-Brief prior to application in new populations of interest, including diverse racial and ethnic populations and LMICs where prior studies are lacking.

All items except "baby's sex" and "getting enough sleep" demonstrated factor loadings higher than 0.5 in our sample, which suggests there are not large differences in the relationships among the PES-Brief items in our sample of women with anxiety symptoms compared to the healthy samples described in other validation studies (van der Zwan et al., 2017). Summary scores defined by the PES-Brief structure, however, tended to be different among this cohort of women with mild-moderate symptoms of anxiety compared to a study of healthy US women. Both intensity and frequency of uplifts was lower in our cohort, with mean intensity 1.9 compared to 2.3 in DiPietro et al., 2008a,2008b, and mean frequency 8.0 compared to 9.5. Intensity and frequency of hassles also tended to be higher in this anxious cohort than in healthy women, with mean intensity of 1.7 compared to 1.4, and mean frequency 8.4 compared to 7.6 (DiPietro et al., 2008a,2008b). Aside from variation due to differences in the study populations, these differences possibly could also be driven in part by our adaptation of the scale, which increased the number of hassles and decreased the number of uplifts. In the case that women with mild-moderate symptoms of anxiety have more negative experiences during pregnancy, it may be possible to alleviate some of those experiences through support from friends and family (Najia Atif et al., 2019). During pregnancy, family member support for diet and rest may improve the experiences of expectant mothers (Ferreira et al., 2020).

We dropped one original PES-Brief item regarding fetal movement from the uplift items. This improved the scale's relevance to women in early pregnancy for whom detecting the baby's movement item was not pertinent. Despite this item being found to have cultural relevance in our cognitive interviews, there was relatively a poor performance of item #11 'baby's sex' based on the low factor loading, indicating that mothers may not endorse strong affective appraisals related to thoughts of having a male or female child. In a recent study conducted in Karachi, Pakistan, general stress and pregnancy-related stress were positively related, and mothers were showing bigger concerns about giving birth to a baby girl (A. Kazi, Fatmi, Hatcher, Niaz, & Aziz, 2009).

We calculated intensity, frequency, and the ratio of hassles and uplifts of the PES-Brief as described by the original instrument developers (DiPietro et al., 2004). However, our analysis showed a positive association between only the PES-Brief uplifts intensity and anxiety symptoms in contrast to the original validation by DiPietro et al., which found significant, positive associations between PES-Brief hassles frequency and intensity with anxiety and depressive symptoms (DiPietro et al., 2004). A possible explanation for this difference in findings is our study's use of the HADS-anxiety, designed to screen for the presence of clinically significant generalized symptoms of fear and anxiety based on how respondents currently feel. In contrast, the original PES-Brief validation study employed the State-Trait Anxiety Inventory Y-2 scale (STAI-Y2), which includes only items from the full STAI that describe persistent attributes of trait anxiety as opposed to state anxiety (Spielberger, 1989). Prior analyses of the STAI's construct validity have demonstrated limited ability to discriminate anxiety from depression, with some studies even showing a higher correlation between trait anxiety questions on the STAI and measures of depression as compared to anxiety (Kabacoff, Segal, Hersen, & Van Hasselt, 1997; Spielberger, 1989; VanDyke et al., 2004). Nonetheless, this difference in findings warrants further study and exploration of possible differences in the relationship between the PES-Brief scores

and anxiety measures in diverse populations of interest. Of note, counter to our clinical expectations, we found that intensity of uplifts was associated with a higher score on HADS-anxiety. It is possible that more women with mild-moderate symptoms of anxiety were prone to provide socially desirable answers, i.e. they may have felt more pressure to report uplifts compared to other women, or had greater affective intensity overall. In fact, general affective intensity was found to be significantly associated with both hassle and uplift intensity in the original PES validation by DiPietro et al. (2004). A possible explanation for our results, then, is that women who endorse higher levels of anxiety symptoms may also have more intensely endorsed uplifts due to emotionality or affective intensity as opposed to any absence of stressors or negative states (DiPietro et al., 2004).Further research is needed to confirm these findings, to understand the use of the PES-brief in hospital-based settings, and to study differences in the administration of the tool in Pakistan, and when it is not self-administered. There is also a small possibility that this finding could be due to chance.

A main strength of this study was the validation of the PES-Brief in a low-resource country, as it is among the only scales available assessing positive and negative experiences during pregnancy. Other strengths of this study include the use of rigorous methods of translation and back translation, an experienced/trained data collection team, and a fairly large sample size.

4.1. Limitations

Cultural adaptation resulted to an inclusion of one item of the hassles subscale and exclusion of one item in the uplifts subscale, resulting in 9 uplifts and 11 hassles, this is considered a limitation as both ratios can be biased as the number of items are not the same. A limitation to generalizability is that pregnant women in our sample were experiencing mild to moderate symptoms of anxiety, and findings therefore may not be fully transferrable to the general pregnant population Nonetheless, studying pregnant women with mild-moderate anxiety may also be a strength as this is the first study we know of to explore the psychometric properties of the PES-Brief in a sample of women with anxiety symptoms.. Given that our study sample consisted of women who had symptoms of anxiety, it's possible that our determination of factor structure and estimation of regression coefficients for the culturally adapted PES-Brief would be different for pregnant Pakistani women without anxiety symptoms or in another Urdu-speaking population.

Participants were recruited from a tertiary hospital antenatal clinic, and were predominantly of low socio-economic status as the recruitment hospital was attended by women who are not able to afford private hospitals and clinics, further limiting generalizability to pregnant women who generally are of upper or middle socio-economic status or don't seek facility-based prenatal care. Therefore, the findings may also not represent pregnant women of other social classes or in other cultural/geographic settings (e.g. rural areas). we also lacked information on support from extended family members such as in-laws. Although the cognitive interviews did not aim to elicit the local understandings of pregnancy-related uplifts and hassles, the research team involved in the cultural adaptation of the PES-Brief had extensive cultural knowledge and insights into local experiences of

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pregnancy-related stressors and experiences through qualitative research conducted within the same population(N. Atif et al., 2019; A. K. Kazi et al., 2021; Rowther et al., 2020).

4.2. Implications

This tool can serve as a first step for further exploration on this topic. Future studies should test this tool among healthy pregnant women and distinct ethnic groups in Pakistan. It is also suggested to use full version of the tool to determine if further adaptations are appropriate for wider use. In LMICs, there has been very little research on pregnancy-related experiences and stress appraisal. Apart from informing continued efforts to understand how positive and negative aspects of the pregnancy experience affect health outcomes for mothers and infants, this tool could be administered in antenatal clinics where obstetric care staff is trained to refer vulnerable pregnant women for further evaluation of psychological and physical health in their respective department.

5. Conclusion

In summary, the results of the study suggest that the Urdu version of the pregnancy experience scale-short version is a reliable and valid instrument to assess uplifts and hassles in anxious pregnant Pakistani women.

Acknowledgements

Appendix

Table A.1

Items that were modified in the culturally adapted version of the Pregnancy Experience Scale – Brief

Item No.	Original scale	Urdu translation	Status of adaptation
Item 1 (uplifts)	How much the baby is moving	بچہ کتنی حرکت کررہا ہے	This item was dropped since our target population was women in their early pregnancy(weeks <22) who wouldn't be feeling movement yet.
Item 6 (uplifts)	Visits to obstetrician/ midwife	ماہر زچہ بچہ یا مڈ وائف/ دائیکے پاس جانا	Examples of health professionals were added who are the most commonly approached and known "Going to the health expert for example LHW, LHV, doctor, nurse etc." ڈاکٹر،نرس،LHW,LHV صحت کے نمائندے کے پاس جانا جیسے کہ ،وغیرہ
Item 7 (uplifts)	Spiritual feelings about being pregnant	حاملہ ہونے کے بارے میں روحانی احساسات	An example of a spiritual feeling was added "Spiritual feelings about being pregnant (like the feeling that you are going to become a mother)" حاملہ ہونے کے بارے میں روحانی احساسات (جیسا کہ اس بات کا احساس ہونا کہ آپ کے ذریعے دنیا میں نئی(زندگی آنے والی ہے

Item No.	Original scale	Urdu translation	Status of adaptation
Item 1 (hassles)	Getting enough sleep	پوری نیند لینا	The word "not" was added to the statement as women do not relate only "getting enough sleep" with the unhappy or upset feeling. "Not getting enough sleep" پوری نیند نہ لینا
Item 2 (hassles)	Physical intimacy	جسمانی تعلقات	The words "Between spouses" were added to make it culturally appropriate "Physical intimacy between spouses" میاں بیوی کے جسمانی تعلقات
Item 11 (hassles)			An item was added from the long version of the PES which was repeatedly suggested by participants during cognitive interviewing "Baby's sex" بچے کی جنس

Table A.3

Frequency, median, mean and standard deviation of item responses for the PES-Brief among 605 Pakistani women.

Statements	Answers (%)				Descriptive statistics		
	0	**1**	**2**	**3**	**Median**	**Mean**	**SD**
Uplifts							
P1: Discussion of spouse about baby name	17.7	20.2	24.4	37.8	2	1.82	1.12
P2: Comments from others about your pregnancy	13.2	28.7	31.6	26.4	2	1.71	1.00
P3: Making or thinking about nursery arrangements	12.7	20.3	36.2	30.7	2	1.85	1.00
P4: Feelings about being pregnant in this time	6.6	23.8	38.0	31.6	2	1.95	0.90
P5: Visit to health officials	13.9	26.1	36.4	23.7	2	1.70	0.98
P6: Spiritual feelings about being pregnant.	5.3	18.5	40.3	35.9	2	2.07	0.87
P7: Courtesy/assistance from others	6.3	18.7	37.7	37.4	2	2.06	0.90
P8: Thinking about baby's appearance	15.9	16.0	34.9	33.2	2	1.85	1.05
P9: Discussion with spouse about pregnancy	15.5	28.6	32.4	23.5	2	1.64	1.01
Hassles							
P1b: Getting enough sleep	7.8	14.2	29.4	48.6	2	2.19	0.95
P2b: Physical intimacy between spouses.	35.2	20.7	21.0	23.1	1	1.32	1.18
P3b: Normal discomforts of pregnancy	15.0	15.4	35.9	33.7	2	1.88	1.04
P4b: Your weight	30.3	18.9	28.6	22.3	2	1.43	1.14
P5b: Body changes	20.5	19.2	38.0	22.3	2	1.62	1.05
P6b: Thoughts about whether the baby is normal	13.1	12.2	32.9	41.8	2	2.03	1.03
P7b: Thinking about your labour and delivery	8.4	13.6	28.6	49.4	2	2.19	0.97
P8b: Ability to do physical tasks/chores	15.0	15.9	40.7	28.4	2	1.82	1.01
P9b: Concerns about physical symptoms	19.8	21.2	33.8	25.3	2	1.64	1.06
P10b: Clothes/shoes don't fit	46.6	15.7	20.3	17.4	1	1.08	1.17
P11b: Baby's sex	49.3	13.2	17.4	20.2	1	1.08	1.21

Table A.6

Final version of the adapted Urdu Pregnancy Experience Scale

مندرجہذیل میں سے ہر چیز اپ کے لئے کس حد تک خوشی کا باعث ہے: **How much have each of the following made you feel happy, positive, or uplifted?**	بالکل ن ہیں **Not at all**	کسی حد تک **Somewhat**	کافی حد تک **Quite a bit**	ب ہت زیادہ **A great deal**	جواب نہیں دیا **No response**
بچے کے نام کے بارے میں شوہر سے بات کرنا Discussions with spouse about baby names.	0	1	2	3	4
پ کے حمل اور ظاہری حالت پر دوسروں کی رائے Comments from others about your pregnancy/appearance	0	1	2	3	4
بچے کی دیکھ بھال کے انتظامات دیکھنا اور کرنا Making or thinking about nursery arrangements.	0	1	2	3	4
اس وقت حاملہ ہونے کے احساسات Feelings about being pregnant at this time.	0	1	2	3	4
صحت کے نمائندے کے پاس جانا جیسے کہ ڈاکٹر، نرس، LHVاور LHWوغیرہ Visits to health professional (e.g obstetrician/midwife, LHV, LHW, Nurse etc.)	0	1	2	3	4
حاملہ ہونے کے بارے میں روحانی احساسات (جیسا کہ اس بات کا احساس ہونا کہ اپ کے ذریعے دنیا میں نئ زندگی آنے والی ہے) Spiritual feelings about being pregnant (i.e. you are going to bring a new life in the world).	0	1	2	3	4
اپکے حاملہ ہونے کی وجہ سے دوسروں کی طرف سے نرمی اور مدد Courtesy/assistance from others because you are pregnant.	0	1	2	3	4
بچے کی شکل و شہبات کے بارے میں سوچنا Thinking about the baby's appearance.	0	1	2	3	4
شوہر کے ساتہ حمل اور ڈلیوری کے بارے میں ڈسکس/ بات چیت کرنا Discussions with spouse about pregnancy/childbirth issues	0	1	2	3	4
مندرجہ ذیل میں سے ہر چیز اپ کے لئے کس حد تک اداسی یا پریشانی کا باعث ہے **How much have each of the following made you feel unhappy, negative, or upset?**					
پوری نیند نہ لینا Getting enough sleep.	0	1	2	3	4
میاں بیوی کے جسمانی تعلقات Physical intimacy between spouses.	0	1	2	3	4
حمل کے دوران عام طور پر ہونے والی تکالیف (مثلا معدے میں جلن،) پیشاب پر قابو نہ ہونا Normal discomforts of pregnancy (heartburn, incontinence).	0	1	2	3	4
پ کا وزن Your weight.	0	1	2	3	4
حمل کی وجہ سےا نے والی جسمانی تبدیلیاں Body changes due to pregnancy.	0	1	2	3	4
یہ سوچیں کہ ایا اپکا بچہ نارمل ہے Thoughts about whether the baby is normal.	0	1	2	3	4
لیبر اور ڈلیوری کے بارے میں سوچنا Thinking about your labor and delivery.	0	1	2	3	4
جسمانی کام/ گھر کے کام کرنے کی صلاحیت Ability to do physical tasks/chores.	0	1	2	3	4
جسمانی علامات کے بارے میں تشویش (درد، داغ لگنا) Concerns about physical symptoms (pain, spotting, etc.).	0	1	2	3	4

| مندرجہذیل میں سے ہر چیز اپ کے لئے کس حد تک خوشی کا باعث ہے: How much have each of the following made you feel happy, positive, or uplifted?	بالکل ن ہیں Not at all	کسی حد تک Somewhat	کافی حد تک Quite a bit	ب ہت زیادہ A great deal	جواب نہیں دیا No response
کپڑے جوتے پورے نہیں آتے Clothes/shoes don't fit	0	1	2	3	4
بچے کی جنس Baby's sex	0	1	2	3	4

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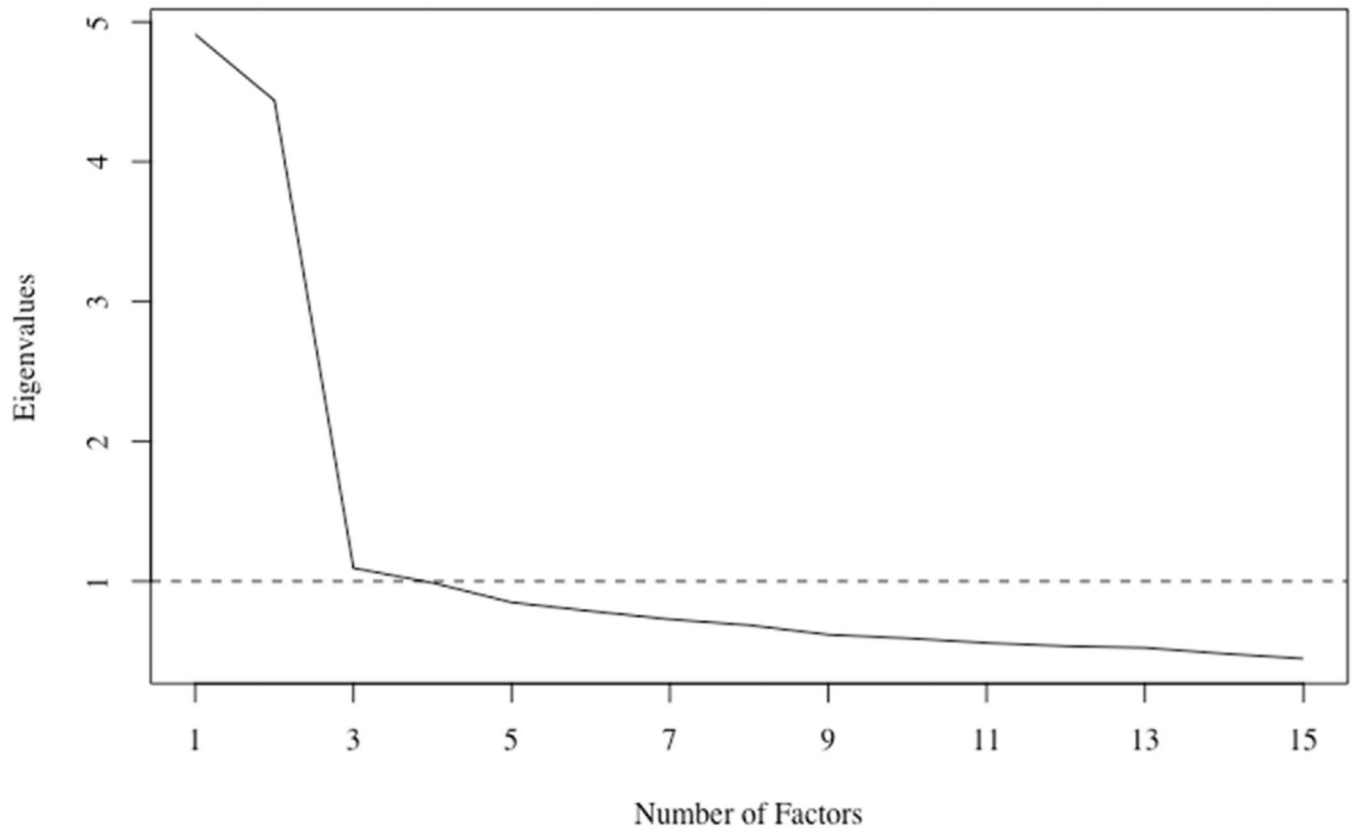
Fig. A.1.
Scree plot displaying the eigenvalues for different numbers of factors in the Pregnancy Experience Scale-Brief (N = 605).

Table A.2

Characteristics of the study population (N ¼ 605)

Characteristics	% and Means (S.D)
Age (years)	25.58 (4.97)
Education (any)	No = 18.51%
	Yes = 81.49%
Gestational age (weeks)	15.4 (4.6)
Husband's education (any)	No = 17.69%
	Yes = 82.31%
Family structure *	Nuclear = 35.21%
	Joint = 31.07%
	Extended = 33.72%
Number of family members in the household	6.76 (4.27)
Characteristics	% and Means (S.D)
Participant's employment (any)	No = 94.21%
	Yes = 5.79%
Husband's employment status	Unemployed = 5.62%
	Employed = 94.38%
Monthly income (US dollars)	130.5 (99.8)
Number of dependents	4.47 (2.2)
Number of children	1.72 (1.2)
Lives with husband	Yes = 94.88%
	No = 5.12%
Family history of psychiatric illness	Yes = 6.28%
	No = 93.72%

*
Joint family refers to living with the husband's parents. Extended family refers to living with husband's extended family (parents and siblings).

Table A.4

Exploratory factor analysis of Pregnancy Experience Scale-Brief for assessing women's experiences during pregnancy in Pakistan (N = 605)

	Factor 1	Factor 2
Uplifts	0.67	
Discussion of spouse about baby name		
Comments from others about your pregnancy	0.69	
Making or thinking about nursery arrangements	0.74	
Feelings about being pregnant in this time	0.73	
Visit to health officials	0.54	
Spiritual feelings about being pregnant.	0.67	
Courtesy/assistance from others	0.69	
Thinking about baby's appearance	0.73	
Discussion with spouse about pregnancy	0.64	
Hassles		
Getting enough sleep		0.32
Physical intimacy between spouses.		0.51
Normal discomforts of pregnancy		0.68
Your weight		0.74
Body changes		0.75
Thoughts about whether the baby is normal		0.58
Thinking about your labor and delivery		0.53
Ability to do physical tasks/chores		0.66
Concerns about physical symptoms		0.74
Clothes/shoes don't fit		0.65
Baby's sex		0.24

Note: Loadings for items with an absolute factor loading less than 0.24 are not shown.

Table A.5

Bivariate regression models of Pregnancy Experience Scale-Brief (PES-Brief) scores in relation to the anxiety subscale score on Hospital Anxiety Depression Scale (HADS)

	HADS-Anxiety Score			
	Mean (SD)	Beta	95% CI	P-value
Intensity of Uplifts	1.86 (0.70)	0.54	0.30, 0.77	<0.00
Intensity of Hassles	1.67 (0.68)	0.01	0.24, 0.25	0.97
Frequency of Uplifts	7.98 (1.71)	0.10	0.003, 0.19	0.04
Frequency of Hassles	8.41 (2.52)	−0.05	−0.12, 0.01	0.09
Intensity Ratio [*]	1.11 (0.93)	−0.08	−0.2, 0.09	0.38
Frequency Ratio [**]	1.16 (0.72)	−0.17	−0.41, 0.05	0.13

[*] Hassles to uplifts Intensity.

[**] Hassles to uplifts frequency.