Original Article

Psychometric Properties of the Persian Version of the Stirling Antenatal Anxiety Scale (SAAS)

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Abstract

Anxiety during pregnancy is a complex experience. Its early identification and addressing causes are essential for maternal and infant health. An effective questionnaire is crucial for measuring anxiety in pregnant women. Therefore, this study aimed to investigate the psychometric properties of the Persian version of the Stirling Antenatal Anxiety Scale (SAAS) among the Iranian population. The population of the present study consisted of all individuals aged 20 to 40 years who attended 7 obstetrics and gynecology clinics in Urmia, Iran, in 2024. The sample comprised 243 individuals who were selected through convenience sampling. To assess convergent and divergent validity, the Penn State Worry Questionnaire (PSW), the Depression, Anxiety, and Stress Scale (DASS-21), and the General Health Questionnaire (GHQ) were used. Reliability was assessed using Cronbach's alpha and test-retest reliability methods. Data analysis was performed using SPSS version 25 and Amos software, version 20. The results indicated that the Stirling Antenatal Anxiety Scale had a Cronbach's alpha of 0.86 and a test-retest reliability of 0.84. The assessments of convergent and divergent validity of the Stirling Antenatal Anxiety Scale also confirmed the acceptable validity of the questionnaire in the sample. The findings suggest that the Stirling Antenatal Anxiety Scale is a reliable and valid tool for assessing pregnancy-related anxiety in the Iranian population, making it useful for both clinical and research settings.

Introduction

Pregnancy-related anxiety is a prevalent issue (Fairbrother et al., 2016; Rubertsson et al., 2014), affecting between 15% and 23% of women (Dennis et al., 2017). This anxiety during pregnancy increases the risk of adverse outcomes for both the mother and the child (Dunkel Schetter & Tanner, 2012; Goodman et al., 2014) and is a strong predictor of postpartum depression (Lee et al., 2007; Motavalli et al., 2024) This anxiety has potentially damaging effects and consequences on childbirth and the child, including increased rates of low birth weight, premature birth (Ding et al., 2014), and a greater risk of developmental problems in the child, including poorer cognitive development (Ibanez et al., 2015) and behavioral and emotional problems (Capron et al., 2015; Leis et al., 2014; O'Donnell et al., 2014; Basharpoor & Taherifard, 2019). Therefore, in the past two decades, pregnancy anxiety has become a growing focus of research and clinical attention (Brouwers et al.,

2001; Goodman et al., 2014). Despite its high prevalence, pregnancy anxiety is estimated to be underdiagnosed in perinatal care, with detection rates below 50% (Bauer et al., 2014; Biaggi et al., 2016). In the UK, the National Institute for Health and Care Excellence (NICE) guidelines on perinatal mental health revealed that anxiety disorders often remain unrecognized and therefore untreated during the critical period from approximately 28 weeks of gestation to 28 days postpartum (National Institute for Health and Care Excellence, 2014). In 2014, NICE introduced two screening questions for anxiety before and after childbirth (GAD-2: Generalized Anxiety Disorder-2, Kroenke et al., 2007). For further evaluation, NICE also recommended the use of the longer GAD-7 (NICE, 2014). However, this recommendation was largely based on evidence from screening tools in non-pregnant populations (National Institute for Health and Care Excellence, 2011), as there was essentially no psychometric evidence to support the use of the GAD-2 in pregnant women (Nath et al., 2018;

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Austin et al., 2021).
Recent studies have reported that self-report anxiety scales used in studies of pregnant women (Evans et al., 2015; Meades & Ayers, 2011; Sinesiet al., 2019) lack satisfactory psychometric properties and have limited use in the antenatal period. A significant limitation in many anxiety scales developed for the general population relates to their emphasis on physical symptoms and their potential confounding role when using questions about physical symptoms to screen for anxiety during pregnancy (Biaggi et al., 2016). Another important issue is the occurrence of " pregnancy-related anxiety," which has been proposed as a distinct syndrome (Huizink et al., 2004). In pregnancy-related anxiety (PrA), anxiety symptoms are specifically focused on pregnancy and childbirth and may include persistent concerns about personal appearance and health, fetal health, fear of labor and delivery, and concerns about postpartum recovery and future parenting (Orr et al., 2007; Dunkel Schetter & Tanner, 2012). A level of worry and anxiety during pregnancy is normal and adaptive (Haines et al., 2015); therefore, it is important not to consider these common concerns as indicators of pathological or problematic anxiety. However, if these fears and worries become persistent or particularly distressing, they can have a detrimental effect on women's mental health throughout pregnancy (Wijma & Wijma, 2017). While this type of anxiety is not covered in conventional diagnostic classifications, it is of clinical significance and has been shown to be an independent predictor of negative outcomes for both mother and child, such as lower gestational age and birth weight, and maternal postpartum mood disorders (Blackmore et al., 2016). Researchers have recently focused more on PrA, leading to the creation of measures such as the Pregnancy-related Anxiety Scale (PrAS: Brunton et al., 2019) and the Perinatal Anxiety Screening Scale (PASS: Somerville et al., 2014). The length of these measures is a major clinical drawback, though, as the 31-item PASS and the 32-item PrAS are not practical for use in standard maternity care. Only brief scales—those with less than 12 items—are deemed potentially practicable for use in maternity care settings in the UK by NICE (NICE, 2014). Sinesi et al. (2022) sought to meticulously craft and validate a succinct yet psychometrically robust self-report scale tailored to screen for an extensive array of anxiety-related challenges—encompassing both general anxiety disorders and pregnancy-specific anxiety (PrA)—among pregnant women, with the intent of rendering it a versatile tool for both scholarly research and routine antenatal care applications. In the Iranian context, where this questionnaire has yet to be adapted or standardized, its systematic calibration promises to substantially improve the detection of at-risk individuals and facilitate proactive preventive interventions. The necessity of this psychometric endeavor stems from the heightened susceptibility of pregnant women to anxiety, which, if unaddressed, may compromise maternal and fetal well-being; standardizing this instrument fills a critical gap in Iran's mental health framework, offering a reliable,

culturally attuned means to identify and mitigate such risks, thereby enhancing psychological care during pregnancy. Accordingly, the present study was undertaken to rigorously evaluate the psychometric properties of the Stirling Antenatal Anxiety Scale (Sinesi et al., 2022) within the Iranian populace.

Method

Participants
This study is applied in purpose and employs a descriptive-correlational methodology.
The population of the present study consisted of all individuals aged 20 to 40 years who attended 7 obstetrics and gynecology clinics in Urmia, Iran, in 2024. The study sample comprised 243 individuals who were selected through convenience sampling. To maximize the questionnaire return rate, 270 questionnaires were distributed among the statistical sample, with 243 completed responses received. Show in sidebar Therefore, the final sample consisted of 243 individuals. It is worth mentioning that the sufficient sample size for factor analysis studies is between three and twenty times the number of variables. Also, Comrey and Lee have suggested that a sample size of 100 is considered weak; 200, relatively good; 300, good; 500, very good; and 1000 and above, excellent (Pourabdol, 2023). The inclusion criteria for participation in the study consisted of: (a) the volunteer's consent to participate in the study; (b) no substance abuse; and (c) being between the ages of 20 and 40 years. The exclusion criteria included not completing the questionnaire after receiving it and missing data on more than 10 questions.

Instrument

Penn State Worry Questionnaire (PSWQ):
The Penn State Worry Questionnaire (PSWQ) is a 16-item scale developed by Meyer et al. (1990) and Molina and Borkovec (1994) to assess an individual's general tendency to worry. The 16 questionnaire items were selected after factor analysis of 161 worry-related questions. The items in the PSWQ are typically rated using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Respondents choose a score from 1 to 5 that reflects their level of agreement with each statement. As a result, the total score typically ranges from 16 to 80 (for the 16-item version), with higher scores indicating more intense worry and lower scores indicating less worry. The scale is primarily used in studies of anxiety and anxiety disorders. The original version consists of 27 items, but a shorter version (PSWQ-16) with 16 items was created for a quicker and more efficient assessment of worry. The PSWQ focuses on long-term, unrealistic worries that are beyond an individual's control, and it uses a Likert scale to assess the intensity of worry. In studies, the Cronbach's alpha coefficient of the aforementioned questionnaire ranged from 0.88 to 0.95, and the test-retest reliability was found to be adequate, between 0.74 and 0.92 (with an interval of 2 to 10 weeks) (Startup & Erickson, 2006). In the study

by Dehshiri et al. (2009), the results of factor analysis showed that the two-factor model of this questionnaire (general worry factor and lack of worry) had a better fit than the one-factor model. The internal consistency and test-retest reliability coefficients (with a time interval of 1 month) of the questionnaire were high. Also, the significant correlation of the scores of this questionnaire with the scores of the trait anxiety and depression questionnaires indicates the validity of the questionnaire.

The Depression, Anxiety, and Stress Scale (DASS-21):

The DASS-21 was developed by Lovibond and Lovibond (1995). The primary function of the DASS is to assess the severity of the core symptoms of depression, anxiety, and stress. This test is suitable for screening and differentiating adolescents and adults and also has the ability to distinguish between the three states of depression, anxiety, and stress. The DASS has three subscales of anxiety, depression, and stress, each of which includes 7 items. Responses are rated on a 4-point Likert scale. Score ranges are from 0 (not at all) to 3 (very much so). The test also does not have reverse scores. Depression, anxiety, and stress scores are obtained by summing the scores of the relevant items. Initial evidence indicated that the DASS has adequate convergent and divergent validity (Lovibond & Lovibond, 1995). In a study, a large sample of students was administered the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI). The correlation between the BAI and the DASS anxiety subscale was high ($r = 0.81$), and the BDI also had a high correlation with the DASS depression subscale ($r = 0.74$). Lovibond and Lovibond (1995), using another non-clinical sample, showed that the reliability of the DASS, calculated using Cronbach's alpha, was acceptable for all three subscales of depression, anxiety, and stress (0.91, 0.84, and 0.90, respectively). In Iran, Sahebi et al. (2005) prepared and validated the Persian version of the DASS. The internal consistency of the DASS scales was calculated using Cronbach's alpha, and the following results were obtained: 0.77 for the depression scale, 0.79 for the anxiety scale, and 0.78 for the stress scale. To assess the criterion validity of the DASS, the Beck Depression Inventory, the Zung Anxiety Scale, and the Perceived Stress Scale were administered concurrently. The correlation between the DASS depression subscale and the Beck Depression Inventory was 0.70, the correlation between the DASS anxiety subscale and the Zung Anxiety Scale was 0.67, and the correlation between the DASS stress scale and the Perceived Stress Scale was 0.49. Factor analysis confirmed the three-factor structure of this questionnaire (Sahebi et al., 2005).

The General Health Questionnaire (GHQ):

The General Health Questionnaire (GHQ) is a psychological tool designed to assess the mental health status of individuals (Goldberg, D., & Williams, 2000). It is commonly used to identify individuals who may be experiencing psychological disorders and is often employed in research and clinical evaluations. The GHQ includes items that assess general mental health in areas such as anxiety, depression, stress, and social functioning. The General Health Questionnaire (GHQ) was designed and developed to assess general health and has been validated in Iran by Yaghoubi et al. (2012). This questionnaire has 12 questions and two components: positive mental health indicators and mental disorder indicators. Based on a four-option Likert scale with questions such as, "Have you, in the past few weeks, lost sleep on account of worry?", it assesses the general health of students. This test has 12 questions and has two subscales of positive mental health indicators and mental disorder indicators, which are usually scored as not at all, normal, more than normal, and much more than normal. Their scoring is in the form of (0-0-1-1). That is, options A and B score zero, and options C and D score one. In this case, the maximum score of the examinee in the General Health Questionnaire (12 questions) will be equal to 12. The reliability of the GHQ has also been extensively supported in research. The tool demonstrates high internal consistency, meaning that its items cohesively contribute to measuring an individual's mental health. Cronbach's alpha for the GHQ typically ranges from 0.80 to 0.90, indicating good reliability (Yaghoubi et al., 2012). Furthermore, the test-retest reliability of the GHQ has been positively evaluated, suggesting that it provides stable and consistent results across different time points (Yaghoubi et al., 2012).

Stirling Antenatal Anxiety Scale (SAAS):

The Stirling Antenatal Scale (SAAS) is a 10-item questionnaire developed by Sinesi et al. (2022) that is scored on a Likert scale ranging from never (1) to always (4). In the study by Sinesi et al. (2022), the internal consistency using Cronbach's alpha for this questionnaire was found to be 0.88. An examination of the inter-item correlation matrix showed that all of the correlations were over 0.20 and below 0.80 (range 0.24 – 0.65), which is a desired pattern for items in a scale (Abell et al., 2009; Streiner et al., 2008). However, the correlations were moderate to moderately high. The Cronbach's Alpha value did not increase if any elements were removed, indicating that each item contributed differently to the final result. Response distribution inspections showed no evidence of a floor or ceiling impact in SAAS components. In a study by Sinesi et al. (2022), correlation coefficients between the total scores of the SAAS, GAD-7, and EPDS were calculated to assess convergent validity. Spearman's rank correlation (r_s) was used to calculate and report the correlation coefficients. A positive and significant correlation was found between the SAAS and GAD-7 ($r_s = 0.70$, n = 174; $p < 0.01$). The strength of the correlation indicated a strong correlation between the two scales, as hypothesized. The correlation between the SAAS and

GAD-2 was only slightly lower (rs = 0.68, n = 174; p < 0.01), also indicating good convergent validity. The correlation between the SAAS and EPDS scores was also examined. There was a positive and significant correlation between the two scales (rs = 0.73, n = 173; p < 0.01), which was slightly higher in strength than that between the SAAS and GAD-7. The results of the factor analysis also indicated a single factor of pregnancy anxiety.

Procedure

Following the translation of the Stirling Antenatal Anxiety Scale into Persian, the translated version was initially reviewed and revised in collaboration with a psychology specialist. Subsequently, to further ensure the accuracy of the translation and the consistency between the English and Persian versions, it was submitted to two English language specialists who, using the back-translation method, translated it back into Persian. After multiple stages of review and final approval, this study was initiated to assess the reliability and validity of the Persian version of the Stirling Antenatal Anxiety Scale. After completing the translation and approval stages of the questionnaire, the Stirling Antenatal Anxiety Scale , the Penn State Worry Questionnaire, the General Health Questionnaire, and the Depression, Anxiety, and Stress Scale (DASS-21) were administered to pregnant women in several obstetrics and gynecology clinics in Urmia using convenience sampling. To control for order and fatigue effects, the scales will be presented in different counterbalanced orders. Confirmatory factor analysis (CFA) was performed using Amos software to examine the construct validity of the Persian version in the Iranian population with the original questionnaire. Pearson correlation coefficients were calculated using SPSS 22 software to obtain convergent and divergent validity.

Results

Among the 243 pregnant women studied, 25.5% was aged 20–25 years, 40.7% was aged 26–30 years, 23.5% was aged 31–35 years, and 10.3% was aged 36–40 years. In terms of education, 23.9% had a high school diploma or lower, 42% had a high school diploma, and 34.1% had higher education. In terms of socioeconomic status, 27.6% were in the low class, 55.1% were in the middle class, and 17.3% were in the upper class. Regarding employment, 73.7% were housewives and 26.3% were employed. In terms of place of residence, 79.4% lived in urban areas and 20.6% lived in rural areas. Also, 46.1% were childless, 39.1% had 1 to 2 children, and 14.8% had more than 2 children. Regarding parity, 51.4% were experiencing their first pregnancy, 35.8% had two previous pregnancies, and 12.8% had three or more pregnancies. A history of premature birth was observed in 12.3% of the women. Additionally, 21.4% had a history of underlying medical conditions, which included diabetes, hypertension, or thyroid diseases. Pregnancy complications were reported in 16.7% of the women, which included problems such as preeclampsia, gestational diabetes, or placental abnormalities.

Table 1. Mean and Standard Deviation of the Items of the Stirling Antenatal Anxiety Scale

Item	Mean (M)	Standard Deviation (SD)
Q 1	3.8	0.9
Q 2	2.5	1.2
Q 3	4.2	0.7
Q 4	3.5	1.0
Q 5	4.5	0.6
Q 6	2.8	1.1
Q 7	3.2	0.8
Q 8	4.0	0.9
Q 9	2.2	1.3
Q 10	3.7	1.2

As seen in Table 1, the mean scores of the items range from 2.2 to 4.5. Item S5 has the highest mean of 4.5, which indicates that respondents, on average, strongly agreed with this item. Also, the low standard deviation of this item (0.6) suggests that the dispersion of responses for this item was very low, and most respondents gave similar scores. In contrast, item S9 has the lowest mean of 2.2, which indicates that respondents, on average, disagreed with this item. The high standard deviation of this item (1.3) also indicates that the responses for this item were very diverse and dispersed. In general, it can be said that respondents were more inclined to agree with items S1, S3, S4, S5, S8, and S10, while they showed more tendency to disagree with items S2, S6, and S9. Responses to item S7 were relatively neutral.

Table 2. Correlation of the Stirling Antenatal Anxiety Scale with the Penn State Worry Questionnaire, the Depression, Anxiety, and Stress Scale, and the General Health Questionnaire

Scale	Penn State Worry Questionnaire	Depression, Anxiety, and Stress Scale	General Health Questionnaire	Stirling Antenatal Anxiety Scale
Penn State Worry Questionnaire	1			
Depression, Anxiety, and Stress Scale	0.75	1		
General Health Questionnaire	0.60	0.66	1	
Stirling Antenatal Anxiety Scale	0.55	0.65	0.45	1

Table 2 presents the correlation results of the Stirling Antenatal Anxiety Scale with the Penn State Worry Questionnaire, the Depression, Anxiety, and Stress Scale, and the General Health Questionnaire. As can be seen in

Table 2, the results showed that Stirling Antenatal Anxiety has a moderate to strong and significant correlation with worry (r = 0.55, p < 0.001) and general symptoms of depression, anxiety, and stress (r = 0.65, p < 0.001), which suggests that women who experience more worry and psychological symptoms are likely to have more Stirling Antenatal Anxiety. Also, a weak to moderate correlation was observed between Stirling Antenatal Anxiety and general health (r = 0.45, p < 0.001), which indicates a relationship between lower general health and increased anxiety during this period. These findings emphasize the importance of paying attention to the various dimensions of the mental health of pregnant women, especially worry and general symptoms of depression, anxiety, and stress, to reduce anxiety and promote the health of this group.

Table 3. Standardized Factor Loadings and Their Significance in the Measurement Model of the Stirling Antenatal Anxiety Scale

No.	Item	Factor Loading
1	My anxiety stopped me from doing things	0.83
2	I felt panicky for no good reason	0.75
3	I felt unable to cope	0.81
4	I worried that something might be wrong with my baby	0.79
5	Thoughts got stuck in my head	0.86
6	I avoided people	0.7
7	I could not control my anxiety	0.78
8	I have had negative thoughts about childbirth	0.84
9	I did not feel worthy of being a mother	0.77
10	My worries overwhelmed me	0.82

Table 3 presents the factor loadings. As can be seen, all coefficients have high values. The t-test of significance shows that all path coefficients with the obtained factor loadings are significant.

Table 4. Cronbach's Alpha and Test-Retest Reliability Coefficients for Stirling Antenatal Anxiety Scale

Variable	Cronbach's Alpha	Test-Retest Reliability
Stirling Antenatal Anxiety Scale	0.86	0.84

Table 5. Summary of Goodness-of-Fit Indices for the Stirling Antenatal Anxiety Scale

Index	Present Study	Acceptable Limit
Chi-square	72.543	Not significant
Degrees of freedom (df)	35	-
Chi-square/degrees of freedom	2.072	Less than 3
Comparative fit index (CFI)	0.93	Greater than 0.90
Goodness of fit index (GFI)	0.92	Greater than 0.90
Adjusted goodness of fit index (AGFI)	0.91	Greater than 0.80
Root mean square error of approximation (RMSEA)	0.062	Less than 0.08

To investigate the internal consistency of the questionnaire, Cronbach's alpha was calculated. Based on the results shown in Table 4, Cronbach's alpha coefficient for the Stirling Antenatal Anxiety Scale was found to be 0.86. Also, the test-retest reliability coefficient of the Stirling Antenatal Anxiety Scale with a four-week interval was found to be 0.84. Overall, the results in the table show that the Cronbach's alpha and test-retest reliability coefficients obtained for this scale are psychometrically desirable.

To examine the goodness of fit of the tested model, the indices introduced by Gefen et al. (2000) were used. These indices include the chi-square/degrees of freedom ratio (values less than 3 are acceptable), the goodness of fit index (GFI), the comparative fit index (CFI) (values greater than 0.9 indicate a good fit), the adjusted goodness of fit index (AGFI) (values greater than 0.8 are acceptable), the parsimony goodness-of-fit index (PGFI) (values greater than 0.6 indicate a good fit), and the root mean square error of approximation (RMSEA) (values less than 0.08 indicate a good fit) (Gefen et al., 2000). Table 5 reports the fit indices of the tested model, which, according to the criteria mentioned, indicate that the tested model has a good fit with the collected data.
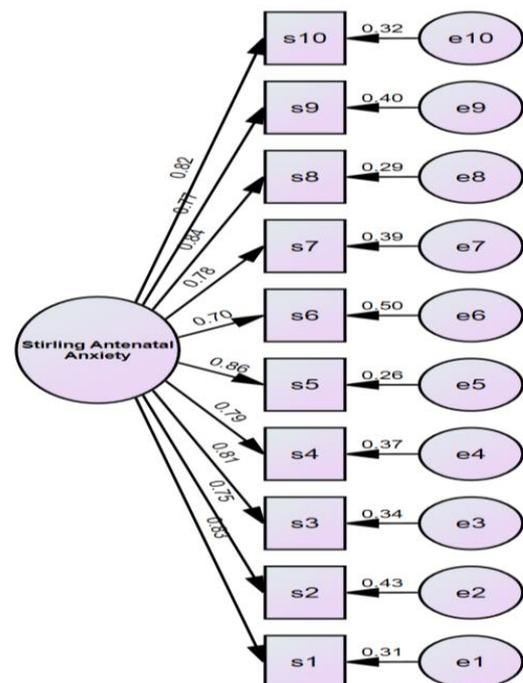

Figure 1. Path Diagram for the Stirling Antenatal Anxiety Scale

Discussion

The purpose of the present study was to investigate the psychometric properties of the Stirling Antenatal Anxiety Scale. To assess construct validity, the results of confirmatory factor analysis showed that all 10 items had high factor loadings. This finding is consistent with the results of the study by Sinesi et al. (2022), which indicated that this questionnaire is unifactorial. In other words, the findings of the confirmatory factor analysis showed that the data fit a unifactorial model well, which was consistent with previous results. The internal consistency of the items of the Stirling Antenatal Anxiety Scale was calculated based on Cronbach's alpha coefficients and was confirmed. This finding was also consistent with the results of the study by Sinesi et al. (2022). The test-retest reliability of the questionnaire was also calculated based on the correlation coefficients between the scores of the subjects with a four-week interval at the level of P < 0.001. These coefficients indicate the satisfactory test-retest reliability of the Stirling Antenatal Anxiety Scale. These findings are consistent with the results of previous studies by Sinesi et al. (2022) regarding the psychometric properties of the Stirling Antenatal Anxiety Scale. The convergent and discriminant validity of the Stirling Antenatal Anxiety Scale was calculated through the simultaneous administration of the Depression, Anxiety, and Stress Scale, the Penn State Worry Questionnaire, and the General Health Questionnaire on the subjects.

The findings showed that there is a positive and significant relationship between Stirling Antenatal Anxiety and depression, anxiety, and stress; in other words, to the extent that individuals experience feelings of sadness, anhedonia, hopelessness, and psychomotor retardation, which are symptoms of depression, Stirling Antenatal Anxiety increases. These findings are consistent with other studies; Gomathy et al. (2021), Schafer et al. (2024), Biaggi et al. (2016), and Staneva et al. (2015). Schafer et al. (2024) showed that symptoms of pregnancy anxiety have a positive and significant relationship with postpartum suicidal ideation. While symptoms of depression during pregnancy and suicidal ideation during pregnancy were not significantly associated with postpartum suicidal ideation. The results of these researchers showed that only symptoms of anxiety during pregnancy are identified as a significant predictor of postpartum suicidal ideation. These results indicate that symptoms of anxiety during pregnancy can act as an important risk factor for postpartum suicidal ideation and outweigh symptoms of depression and suicidal ideation during pregnancy. The study by Staneva et al. (2015) showed that experiencing psychological distress, including depression, anxiety, and stress during pregnancy, can increase the likelihood of adverse birth outcomes, particularly premature birth. This review provided strong evidence that mental distress during pregnancy can increase the likelihood of premature birth (Teymoori et al., 2022). It was also found that depression, anxiety, and stress are in complex interaction with each other and have direct and indirect effects on premature birth. These effects were mainly associated with

spontaneous premature birth, not with premature birth due to medical reasons.

In explaining these results, it can be said that pregnancy anxiety, depression, and stress are closely related and can significantly affect the mental health of pregnant women. Pregnancy anxiety is a predictor of depression during and after pregnancy. Higher levels of anxiety in early pregnancy can lead to increased depression in mid-to-late pregnancy. Anxiety during pregnancy is associated with higher levels of stress. This relationship appears to be reciprocal, with anxiety predicting stress and vice versa. Recent studies since 2021 have highlighted the complex relationship between prenatal anxiety and depression, which is often exacerbated by stress. During the COVID-19 pandemic, research showed a high prevalence of anxiety (39%) and depression (11.4%) among pregnant women, with stress levels being high in 41.9% of participants (Gomathy et al., 2021). Recent studies since 2021 have highlighted the complex relationship between prenatal anxiety and depression, which is often exacerbated by stress. During the COVID-19 pandemic, research showed a high prevalence of anxiety (39%) and depression (11.4%) among pregnant women, with stress levels being high in 41.9% of participants (Gomathy et al., 2021). Additionally, a study by Caracostea et al. (2025), which was a hospital-based study in Romania, showed that pregnant women with COVID-19 experience higher levels of postpartum anxiety. This study also found that there was no significant difference in postpartum depression levels between women with and without COVID-19. In addition, COVID-19 diagnosis was identified as a significant predictor of negative pregnancy outcomes. The results showed that COVID-19 has a significant impact on anxiety and depression during pregnancy. The results of this study emphasized the importance of identifying and treating anxiety and depression during pregnancy, especially in women with COVID-19.

In explaining these findings, it can be said that depression and anxiety during pregnancy may have common roots. Hormonal changes, psychological and social stressors, a family history of mental disorders, and unpleasant life experiences can all increase the likelihood of both disorders. In other words, these factors can create the basis for the simultaneous or sequential occurrence of both depression and anxiety during pregnancy (Gomathy et al., 2021). Furthermore, depression and anxiety can reciprocally influence each other and exacerbate each other's symptoms. For example, feelings of hopelessness and worthlessness resulting from depression can lead to increased worries and fears related to pregnancy and childbirth, which are themselves symptoms of anxiety. Similarly, constant anxiety and worry can lead to fatigue, insomnia, and decreased energy, which are symptoms of depression (Caracostea et al., 2025). Furthermore, research has shown that depression and anxiety may be influenced by similar biological pathways in the brain and body. Changes in the levels of certain neurotransmitters, such as serotonin and noradrenaline, may play a role in the development of both disorders. This may explain why some medications and therapies can be helpful for both

depression and anxiety (Staneva et al., 2015).

Also, the results showed that there was a positive and significant relationship between worry and pregnancy anxiety. This means that with increasing anxiety, the level of worry also increases. This finding is consistent with the research of Arifin et al. (2021), Osborne et al. (2021), and Kakaraparthi et al. (2022). The results of the study by Arifin et al. (2021) showed that 20.2% of the participants had symptoms of depression, 22.5% had anxiety, and 79% had pregnancy-related worries. The risk factors identified for depression included low education level, and worry included employment and first pregnancy. Also, social support played an important role in reducing pregnancy worries. In the research of Osborne et al. (2021), they sought to determine whether the Penn State Worry Questionnaire (PSWQ), which was designed for the general population, could identify excessive worry during pregnancy and predict the likelihood of postpartum depressive symptoms (PPDS). The results showed that women with a history or current diagnosis of major depressive disorder (MDD) or generalized anxiety disorder (GAD) were more likely to experience severe worry during pregnancy (defined as PSWQ > 60) (p < 0.004 for MDD and p < 0.001 for others). Severe worry during pregnancy was the only significant predictor of PPDS, with an odds ratio (OR) of 3.91 (95% CI 1.44-10.65). In the multivariate model, neither psychiatric diagnoses nor depressive symptoms during pregnancy were significantly associated with PPDS. The findings of the research by Kakaraparthi et al. (2022) showed that pregnant women during COVID-19 showed a significant increase (P < 0.001) in the levels of anxiety, depression, stress, and worry compared to before the pandemic. Multiple regression analysis showed that panic disorder was significantly associated with HADS, PSS, and BMWS scores. Pregnancy complications were associated with HADS scores, health problems with PSS and BMWS scores, and current anxiety, depression, stress, and worry with HADS, GAD-7, and BMWS scores in pregnant women during COVID-19.

In explaining these findings, it can be said that according to cognitive models of anxiety, worry acts as a strategy for managing emotions and preventing perceived threats during pregnancy. Pregnant women, due to physical and psychological changes, are more sensitive to the future and the health of themselves and the fetus, which can create a cycle of constant anxiety and worry (Kakaraparthi et al., 2022). Also, increased worry in pregnant women with anxiety may be due to constant thoughts and rumination about fetal health, childbirth, and maternal role. These worries can disrupt daily functioning and lead to avoidance or obsession Furthermore, research has shown that high levels of worry can lead to increased activity of the autonomic nervous system and stress hormones such as cortisol, which may negatively affect fetal development (Arifin et al., 2021). From a psychological perspective, the cognitive sensitivity model suggests that individuals with more anxiety tend to process threatening information, which exacerbates worry (Kakaraparthi et al., 2022).behaviors such as frequent checking of physical symptoms (Osborne et al., 2021).

Also, the results showed that there was a negative and significant relationship between pregnancy anxiety and women's general health. This negative relationship indicates that with increasing levels of anxiety, the mental health indicators of pregnant women decrease, and the likelihood of problems such as depression, stress, and reduced quality of life increases. This finding is consistent with the research of Bhushan et al. (2020), Zilmer et al. (2025), and Wang et al. (2020). The study by Bhushan et al. (2020) evaluated the mental health status of pregnant women during the COVID-19 pandemic in China. The researchers examined the levels of perceived stress, anxiety, and depression among pregnant women and highlighted the impact of the pandemic on prenatal mental health. A cross-sectional study conducted by Zilmer et al. (2025) examined the role of recent life events and adverse childhood experiences in predicting prenatal depression and anxiety. This research identified specific recent life events and childhood experiences that were strongly associated with poor mental health during pregnancy. A web-based survey conducted by Wang et al. (2020) examined the intention of pregnant women at risk for depression or anxiety to seek mental health services during the COVID-19 pandemic in China. The study found that a significant proportion of women at risk for mental health problems do not intend to seek help and highlights the need to improve mental health support during pregnancy. These studies, taken together, demonstrate a growing interest in understanding and addressing prenatal anxiety and its relationship to women's overall mental health, particularly in challenging circumstances. In explaining these results, it can be said that this may be due to the physiological effects of anxiety on the bodies of pregnant women, including increased levels of the stress hormone cortisol and changes in brain and nervous system function (Zilmer et al., 2025). Additionally, anxiety can lead to increased worries, fears, and negative thoughts in pregnant women and intensify feelings of hopelessness and helplessness, which in turn leads to a decline in mental health (Bhushan et al., 2020). Furthermore, anxiety can exacerbate the psychological problems of pregnant women by reducing social support and isolating them (Wang et al., 2020). It should also be noted that other variables are probably also playing a role in this, which have not been addressed in our research. For example, factors such as socioeconomic status, the quality of family relationships, the social support received, and even individual beliefs and attitudes toward pregnancy and parenting can affect both the level of anxiety and the mental health of pregnant women.

Conclusion

In summary, the results of the confirmatory factor analysis demonstrated that the Pregnancy Anxiety Scale consists of 10 items. There is no research regarding the psychometric properties of the Pregnancy Anxiety Scale in Iran, and this research is the first in this direction. Moreover, the factor structure reported by Sinesi et al. (2022) is similar to the findings of the present study. After examining the structure of the instrument using factor analysis, its

confirmatory model was also investigated. The obtained fit indices showed that the model is confirmed. Considering that one of the methods of examining construct validity is the use of factor analysis, it can be said that given the confirmation of the Pregnancy Anxiety Scale, this instrument has construct validity.

The results of this research can be useful in the field of measuring pregnancy anxiety, and many therapists can use this scale in their therapeutic and research work. As one of the goals of science is to help develop and complete previous findings, this research, by standardizing this questionnaire within the country, has addressed the necessity the importance of pregnancy anxiety and by examining this questionnaire has come to the aid of researchers and therapists in using a new tool to measure chronic pregnancy anxiety. Also, the findings of this research, by confirming the validity and reliability of the Pregnancy Anxiety Scale, provide research support for the original developers of this scale.

This research had limitations. The present study was conducted as a convenience sample. Also, the research sample was limited to a psychiatric hospital, which limits the generalizability of the results; therefore, it is suggested that in order to complete the validation process, numerous studies be conducted in other geographical areas and psychological centers of the country.

Acknowledgment

Disclosure Statement

Based on the authors' statement, there was no conflict of interest in this article.

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