Sinhala translation of Perinatal Anxiety Screening Scale: A valid and reliable tool to detect anxiety among pregnant women

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Abstract
Background Anxiety disorders during pregnancy are not routinely assessed in Sri Lanka despite being common and leading to adverse pregnancy outcomes. A screening tool will help early detection and management of anxiety to improve pregnancy outcomes. Our aim was to determine the validity of Sinhala translation of Perinatal Anxiety Screening Scale (PASS) to detect anxiety among Sri Lankan pregnant women.

Methods A cross-sectional study was conducted in antenatal clinics of a teaching hospital in Colombo. PASS was translated to Sinhala language using the standard translation/back-translation method. Pregnant women (n=221) were sequentially recruited and assessed by a psychiatrist until 81 women with anxiety disorder were diagnosed using International Classification of Diseases-10 criteria (gold standard). Sinhala translation of PASS (PASS-S) was administered to all recruited women, including to 139 women without anxiety. Receiver-Operator-Characteristics (ROC) analysis was performed, the optimal cut-off score for PASS-S was determined, and its validity was assessed using sensitivity, specificity, predictive values and positive and negative likelihood ratios. Internal consistency was assessed using Cronbach’s alpha. Test-retest and inter-rater reliability for PASS-S score and anxiety classification were assessed using intraclass correlation coefficient (ICC) and Cohen’s kappa (k), respectively.

Results Mean age (± SD) of women was 30 (± 5.8) years. Of them, 53.7% were multiparous. Psychiatrist diagnosed anxiety disorder in 37.0% of women while PASS-S at its optimal cut-off of 20 classified 37.5% of women as having anxiety. Area under the ROC curve for PASS-S was 0.96 (95% CI 0.94-0.99). Sensitivity, specificity and positive and negative predictive values of PASS-S were 0.93 (95% CI 0.84-0.97), 0.90 (95% CI 0.83-0.94), 0.85 (95% CI 0.75-0.90) and 0.95 (95% CI 0.89-0.98), respectively. Positive and negative likelihood ratios were 8.8 (95% CI 5.3-14.5) and 0.08 (95% CI 0.04-0.18), respectively. Internal consistency was high (Cronbach’s alpha 0.95). Four factor structures obtained by exploratory factor analysis were “Generalized anxiety, acute anxiety and adjustment difficulties”, “Social anxiety, excessive worry and specific fears”, “Perfectionism, control and trauma” and “Generalized anxiety”. Test-retest reliability was high for the PASS-S score (ICC 0.85
Inter-interviewer reliability was also high (ICC 0.92 [95%CI 0.81-0.97] for the PASS-S score and (k0.86 [95%CI0.59-1.1] for anxiety classification).

Conclusion Sinhala translation of PASS is a valid and reliable instrument to screen for anxiety disorders among antenatal women in Sri Lanka.

Background
Anxiety during pregnancy is an emotional state resulting from anticipated uncertainties related to pregnancy-specific issues during antenatal and/or post-partum period, especially due to worries about the labour process, wellness of the baby to be born and neonatal care(1,2). Anxiety symptoms are common during pregnancy and postpartum period(3). The probabilities of onset of anxiety disorder and worsening of pre-existing anxiety disorder are higher during perinatal period than those in the general population(3). Limited evidence suggests that anxiety during pregnancy is associated with adverse foetal and maternal outcomes including still birth, intrauterine growth restriction(IUGR), prolonged labour and caesarean deliveries, preterm birth, low birth-weight, and low Apgar scores at birth (4–7).

Early detection and management of anxiety during pregnancy will improve pregnancy outcomes(8). However, it is not feasible for all pregnant women to be assessed by a psychiatrist which is the gold standard to detect anxiety(9). Therefore, standard questionnaires such as Perinatal Anxiety Screening Scale (PASS) is used to screen pregnant women for anxiety. PASS is an acceptable, psychometrically-sound questionnaire that performed well in screening for anxiety disorders during pregnancy and postnatal period (10). It detects a broad range of anxiety presentations and is not confounded by physiological symptoms of pregnancy(10).

In Sri Lanka, the proportion of adverse pregnancy outcomes remain high despite other health indices being satisfactory. This could be due to causes that are not assessed routinely during pregnancy, including anxiety. As no valid screening tool is available in Sri Lanka to detect anxiety during pregnancy, we aimed to translate PASS into Sinhala language and validate it among pregnant women.

Methods
This study was conducted in three phases. In phase-1, PASS was translated into Sinhala. In phase-2, construct validity of Sinhala translation of PASS was assessed and in phase-3, criterion validity and reliability of Sinhala translation of PASS was assessed.

Perinatal Anxiety Screening Scale

PASS is a 31-item validated instrument used to screen for problematic anxiety in antenatal and postpartum women. Each item enquires about the presence of anxiety symptoms and is scored on a Likert scale ranging from 0 (not at all) to 3 (almost always). A total score between 0–20 is considered as “asymptomatic”, 21–41 as “mild-moderate anxiety symptoms” and 42–93 as “severe anxiety symptoms”. An overall score > 26 indicates high risk of presenting with anxiety disorder(10).

Phase-1: Translation of PASS into Sinhala language

Firstly, the English version of PASS was reviewed by a local expert panel to determine its comprehensiveness and appropriateness for local use. This panel consisted of three psychiatrists, an obstetrician, three community physicians and two clinical psychologists. Secondly, two independent bi-lingual experts translated PASS into Sinhala. The two Sinhala versions were compared by a third bi-lingual expert. Discrepancies were reconciled and the first draft of the Sinhala version was finalized. Thirdly, this was back-translated into English by two other independent bi-lingual translators who were blinded to the English PASS. A sixth bi-lingual translator who was blinded to PASS reviewed and reconciled the discrepancies between the two versions. This final back-translation was assessed by a psychologist and three psychiatrists, who gave consensual approval on the preservation of original English meaning of all items of PASS.

This final Sinhala translation of PASS (PASS-S) was checked by an expert panel comprising three psychiatrists who were not involved in the initial translation process for its content, conceptual and semantic validity of PASS-S.

PASS-S was pre-tested among twenty women attending hospital antenatal clinics (ANCs) and piloted among twenty other women selected from a field ANC to check its suitability for use in field clinics.

Phase 2: Construct validity of Sinhala translation of PASS

Sample adequacy and suitability for factor analysis was assessed by Kaiser-Meyer-Olkin (KMO) test
and Barlett’s test, respectively. Principal Component Analysis for factor extraction in Exploratory factor analysis (EFA) and oblique rotation method which was suggested for correlated variables (11) was used.

Confirmatory factor analysis (CFA) was also performed after ensuring that the required assumptions had been met. The LISREL 10.2 software was used for this. Additivity test was used to check whether the scale was on an additive scale. Four-factor model was evaluated. The indices used to determine the model fit included the absolute fit indices, relative fit indices and parsimony fit indices. Absolute fit indices were chi-squared test, root mean squared error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), and standardized root mean squared residual (SRMR). Relative fit indices were comparative fit index (CFI) and non-normed fit index (NNFI) while parsimony fit indices were parsimony goodness of fit index (PGFI) and parsimonious normed fit index (PNFI).

RMSEA values of < 0.05 indicate a good fit to data; value between 0.05 and 0.008 are an acceptable fit; value between 0.008 and 0.10, marginal fit; and values of 0.10, a poor fit (12,13). For the CFI and NNFI, values > 0.95 (14) indicate a good fit to the data while for GFI and AGFI > 0.90 indicate a good fit (15).

Phase 3: Criterion validity of Sinhala translation of PASS

Validation of PASS-S against the gold standard was conducted among pregnant women attending ANCs at Colombo South Teaching Hospital, which is a tertiary care hospital in Sri Lanka. As per the expected sensitivity (70%) and specificity (30%) of PASS (10) the calculated sample size was 81 antenatal women with anxiety disorder and 81 women without anxiety disorder.

Pregnant women (≥ 18 years) attending ANCs were recruited using systematic random sampling with a sampling interval of 5. Women with hearing difficulty, visual and/or speech problems or who were not conversant in Sinhala or unable to give consent due to mental illness were excluded.

Recruited women were assessed by a psychiatrist using International Classification of Diseases-10 (ICD-10) criteria. Recruitment was continued until 81 women with anxiety disorder were diagnosed. The total number recruited was 221. PASS-S was administered as an interviewer administered
questionnaire on the same day by two trained nurses. The finding of the psychiatrist and the nurses were blinded to each other. PASS-S was re-administered to a randomly-selected 20 women 2–3 days after the initial assessment by the same nurse who administered PASS-S at the first interview. To another randomly-selected 20 women, PASS-S was re-administered 2–3 days after the initial assessment by a nurse different from the one who administered it at the first interview.

Ethical approval was obtained from the Ethics Review Committee (ERCref.No: 25/27, May 2017) of the Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka. Written informed consent was obtained from all participants.

Statistical analysis
EFA and CFA were performed as described above under the Phase-2 of the study. Using the psychiatrist’s diagnosis as the gold standard, receiver-operator-characteristics (ROC) curve was graphed for the total scores obtained by the participants for PASS-S. The optimal cut-off score of PASS-S for detecting anxiety in pregnancy was determined using Youden’s index (16). Performance of PASS-S at this optimal cut-off score against the psychiatrist’s diagnosis was assessed using sensitivity, specificity and predictive values.

Internal consistency of PASS-S was measured using Cronbach’s alpha. Test-retest reliability and interrater reliability of the total PASS-S scores were assessed using intra-class correlation coefficient (ICC) for the total PASS-S score and those of anxiety classification (anxious/not anxious) were assessed using Cohen kappa (k).

Results
All 31 items of PASS were marked as suitable for screening anxiety symptoms in antenatal women by the first expert panel. The psychiatrists and the psychologists who reviewed the final back-translation rated 28 items as the correct translation while the other three items needed minor revisions. The final expert panel confirmed all 31 items in the PASS-S as of appropriate standard to screen for anxiety symptoms of antenatal women in Sri Lanka, of which 30 items were rated as culturally relevant and one item as moderately relevant.
Construct Validity of PASS-S

The KMO test value for sampling adequacy was 0.95. Bartlett’s test of sphericity was significant ($\chi^2 = 4390.838; \text{df} 496; p < 0.01$).

As per the four-factor model analysis, the total variance was 58.1 (n = 221). An examination of the factor loadings after rotation (Table 1) showed that Factor 1 (“General anxiety, acute anxiety and adjustment difficulties”) accounts for 46.89% of the total variance, Factor 2 (“Social anxiety, excessive worry and specific fears”) accounts for 4.03%, Factor 3 (“Perfectionism, control and trauma”) accounts for 3.92%, and Factor 4 (“General anxiety”) accounts for 3.27%. These four factors’ factor loading described the characteristics of 31 variables included in the PASS-S.

| Factors                                                                 | Factor | 1   | 2   | 3   | 4   |
|------------------------------------------------------------------------|--------|-----|-----|-----|-----|
| 1. “Generalized anxiety, acute anxiety and adjustment difficulties”    |        |     |     |     |     |
| 25. Losing track of time and can’t remember what happened              |        | .775|     |     |     |
| 27. Anxiety getting in the way of being able to do things              |        | .754|     |     |     |
| 29. Fear of losing control                                            |        | .751|     |     |     |
| 30. Feeling panicky                                                   |        | .744|     |     |     |
| 28. Racing thoughts making it hard to concentrate                      |        | .688|     |     |     |
| 26. Difficulty adjusting to recent changes                            |        | .684|     |     |     |
| 23. Avoiding things which concern me                                  |        | .658|     |     |     |
| 24. Feeling detached like you’re watching yourself in a movie          |        | .632|     |     |     |
| 21. Feeling really uneasy in crowds                                    |        | .543|     |     |     |
| 22. Avoiding social activities because I might be nervous              |        | .440|     |     |     |
| 7. Really strong fears about things, e.g. needles, blood, birth, pain, etc |        | .428|     |     |     |
| 31. Feeling agitated                                                   |        | .413|     |     |     |
| 19. Worry that I will embarrass myself in front of others              |        |     |     |     | .719|

Table 1
Factor Structure of PASS-S
The results of EFA indicated that four factor arrangement in PASS-S (with Eigen values over 1 and suppressing absolute value less than .03) is explaining all the factors included in PASS-S.

Confirmatory Factor Analysis

Fit indices obtained in the CFA indicated that the data fit the hypothesized measurement model well. The four factor model gave Chi squared value ($\chi^2$) of 705.57 (df 428; p < 0.001). RMSEA was 0.056 while SRMR, GFI and AGFI were 0.046, 0.83 and 0.803 respectively. CFI, NNFI, PGFI and PNFI
were 0.92, 0.919, 0.716, and 0.766 respectively. The four-factor model was closer to the good fit indices in each absolute, relative, and parsimony fit indices.

Criterion validity of PASS-S

The mean age ± SD of the recruited antenatal women was 30 ± 5.8 years. Most (74.2%) had completed primary education and 56.1% were multiparous (Table 2). Nearly half (48.9%) were in third trimester of pregnancy, while 36.7% and 14.5% were in second and first trimesters, respectively.

| Variable                        | Frequency | Percentage (%) |
|---------------------------------|-----------|----------------|
| Age (Years)                     |           |                |
| 18–23                           | 30        | 13.6           |
| 24–29                           | 80        | 36.2           |
| 30–35                           | 75        | 33.9           |
| 36–41                           | 1         | 0.5            |
| Level of Education              |           |                |
| No schooling                    | 164       | 74.2           |
| Primary                         | 56        | 25.3           |
| Secondary                       | 33        | 14.9           |
| Monthly income Level (SLR)      |           |                |
| 0-20000                         | 42        | 19             |
| 20001–40000                     | 18        | 8.1            |
| 40001–60000                     | 10        | 4.5            |
| 60001–80000                     |           |                |
| 80001–100000                    |           |                |
| Pregnancy and childbirth status |           |                |
| First pregnancy                 | 97        | 43.9           |
| Living child 1                  | 94        | 42.5           |
| Living children 2               | 23        | 10.4           |
| Living Children 3               | 6         | 2.7            |
| Living Children 4               | 0         | 0.0            |
| Living Children 5               | 1         | 0.5            |
| Trimester in current pregnancy  | 31        | 14.5           |
| Trimester 1                     | 108       | 48.9           |
| Trimester 2                     |           |                |
| Trimester 3                     |           |                |

The psychiatrist diagnosed 37.0% of women (n = 81) as having anxiety disorder. Most women with anxiety had generalized anxiety disorder or phobias (Table 3).

| Severity of anxiety | Frequency | Percentage (%) |
|---------------------|-----------|----------------|
| Mild                | 47        | 58.02          |
| Moderate            | 31        | 38.27          |
| Severe              | 03        | 3.71           |

| Domains of anxiety disorder | Frequency | Percentage (%) |
|-----------------------------|-----------|----------------|
| Generalized anxiety disorder| 30        | 37.03          |
| OCD                         | 02        | 2.46           |
| Phobias (blood and injection)| 32       | 39.5           |
| Social phobia              | 06        | 7.4            |
| Specific fear (Child birth)| 04        | 4.93           |
| PTSD                        | 01        | 1.23           |
| Panic disorder             | 06        | 7.4            |
According to PASS-S scores, 3.7% of the pregnant women (n = 3) had severe anxiety symptoms, while 96.3% of the participants (n = 79) were with mild to moderate anxiety symptoms.

The area under the ROC curve for PASS-S scores was 0.96 (95% CI 0.94–0.99) (Fig. 1). The optimal sensitivity and specificity for PASS-S was found at the score of 20. At this cut-off score, the sensitivity was 0.93 (95% CI: 0.84–0.97) and the specificity was 0.90 (95% CI: 0.83–0.94) (Table 4). The positive and negative predictive values of PASS-S at this cut-off score were 0.85 (95% CI: 0.75–0.90) and 0.95 (95% CI: 0.89–0.98), respectively. The likelihood ratios for positive and negative tests were 8.8 (95% CI: 5.34–14.5) and 0.08 (95% CI: 0.04–0.18), respectively.

Table 4
Sensitivity and specificity of PASS-S at different cut-off scores (only the scores immediately above and below the optimal cut-off score are shown).

| PASS-S Score | Sensitivity | Specificity |
|--------------|-------------|-------------|
| 12.50        | .988        | .569        |
| 13.50        | .988        | .613        |
| 14.50        | .988        | .679        |
| 15.50        | .976        | .759        |
| 16.50        | .976        | .810        |
| 17.50        | .964        | .832        |
| 18.50        | .952        | .876        |
| 19.50        | .929        | .898        |
| 20.50        | .869        | .927        |
| 21.50        | .810        | .956        |
| 22.50        | .738        | .956        |
| 23.50        | .726        | .971        |
| 24.50        | .631        | .971        |
| 25.50        | .619        | .978        |

Cronbach’s alpha for internal consistency was 0.95 (95% CI 0.93–0.96). The ICC for total PASS-S score was 0.85 (95% CI: 0.65–0.96) for test-retest reliability and 0.92 (95% CI: 0.81–0.97) for inter-rater reliability. The Cohen’s kappa for anxiety classification (anxiety/no anxiety) was 0.77 (95% CI: 0.34–1.2) for test-retest reliability and 0.86 (95% CI: 0.59–1.1) for inter-rater reliability.

Discussion
The Sinhala translation of PASS produced an acceptable tool to assess anxiety during pregnancy in Sri Lanka. PASS-S had high sensitivity, specificity, and predictive values in a local clinic setting and its test-retest and inter-rater reliability measures were also high.

The standard translation-back translation method that we followed was similar to how the translation of PASS was done in Bangladesh (18) and in Turkey (19). PASS-S also showed good content, conceptual and semantic validity similar to those in the said two studies, indicating its appropriateness for use in
multicultural settings.

Sampling adequacy for EFA was excellent (KMO = 0.95) and was similar to the English PASS validation study (KMO = 0.96(10)). Inter-item correlation was sufficiently large for PCA (Bartlett’s test of sphericity, p < 0.00) and was also similar to English PASS. Number of factors identified was 4 which is consistent with the English PASS. However, the item distribution for the factors slightly varied from the English PASS and Turkish translation of PASS (PASS-TR). In English PASS, factor 1 (acute anxiety and adjustment) had items that addressed symptoms of panic disorder, dissociative disorder and adjustment difficulties, factor 2 (general worry and specific fears) covered symptoms of general anxiety disorder and phobia, factor 3 (perfectionism, control and trauma) included symptoms of obsessive compulsive disorder and posttraumatic stress disorder, and factor 4 (social anxiety) had questions that included to determine social anxiety. However, in PASS-S, factor direction and titles of factors were altered. Factors 1–4 were reclassified as “Generalized anxiety, acute anxiety and adjustment difficulties”, “Social anxiety, excessive worry & specific fears”; “Perfectionism, control & trauma” and “Generalized anxiety”, respectively. These changes were essential components of intercultural adaptations, and the factor structure of current study reflects specific classification of anxiety in Sri Lankan context. The factor analysis has shown that generalized and acute anxiety symptoms among antenatal women in Sri Lanka are more prominent (factor loaded under factor 1 of the factor structure) while excessive worry and specific fears are prominent anxieties among participants of the English PASS validation study.

The optimal cut-off point of 20 for PASS-S was lower than the score of 26 for the English PASS (10) but was higher than the score of 16 for PASS-TR (19). It suggests that Sri Lankan women’s anxiety risk occurs at a lower symptoms threshold compared with their Australian counterparts but at a higher threshold compared with the Turkish (19). Specificity of PASS-S was similar to that of PASS-TR but higher than the English PASS while the sensitivity of PASS-S was higher than both the English PASS (10) and the PASS-TR (19). One reason for comparable sensitivity with PASS-TR may be due to assessment of criterion validity against the gold standard using the entire sample in both these studies. In the English validation study, criterion validity was assessed only in a sub-sample. The socio
cultural factors that affect participants from different geographical areas differently would also have contributed to the variable perception and reporting of anxiety symptoms by the participants in different studies. The Bangladesh study does not report sensitivity, specificity and the cut off score since criterion validity was not assessed in that study (18). When a screening tool has high sensitivity and high specificity, it detects large proportions of true positives and true negatives, and its quality is at an optimum level (20). Furthermore, the accuracy of a screening test depends on its ability to differentiate between those who have and not have the disease and is measured by the area under the ROC curve. PASS-S accurately classified 96% of the women with and without anxiety compared to 93% for PASS-TR (19) and 70% for the English PASS (10). The minimal misclassification when PASS-S was used makes it an ideal tool to be used in settings where the gold standard assessment is not available.

The internal consistency of PASS-S was similar to PASS-TR (19), PASS Bangladesh version (18) and the English PASS (21). The high test-retest ICC for the total score (0.85) and Cohen’s kappa (0.77) for anxiety classification indicates that the symptoms measured in PASS-S were stable over time. High test-retest reliability was also seen in the English PASS (Pearson r = 0.74 for the total score (10)) and the Bangladesh version of PASS (Pearson r = 0.83 for the total score (18)). Our study is the first to report inter-interviewer reliability for PASS in any language and showed that this was high for the total score (ICC 0.92) and anxiety classification (Cohen's kappa 0.86). This suggests that PASS-S is suitable for use in clinic settings that often have multiple interviewers.

PASS-S was administered as an interviewer-administered questionnaire to maximize the response rate and ensure that literacy level of the participants did not influence the responses (22, 23). The time taken to complete it was 6-8 minutes on average. This was not very different from 2-10 minutes that took to complete the English PASS and PASS-TR which were administered as self-administered questionnaires (10, 14).

The main strength of our study is that PASS-S was validated against the gold standard diagnosis for anxiety. Ours is only the second study to do this, the first being validation of PASS-TR against both Diagnostic and Statistical Manual of Mental Disorders-4th edition (DSM-IV) criteria and ICD-10 criteria.
Furthermore, the performance of PASS–S compares well with the English PASS and its other translated versions for validity, reliability, and discriminatory ability. One limitation in our study is that our sample represented the urban and semi-urban antenatal women in Sri Lanka. However, as nearly half of the Sri Lankan women belong to this category and the perception and expression of anxiety symptoms among rural women are unlikely to differ significantly from those of urban/semi-urban women, the findings can be applied to all Sinhala-speaking antenatal women in Sri Lanka.

Tools hitherto available in Sri Lanka (25) to assess anxiety were not specific/suitable to screen anxiety in pregnancy (10). The good validity and reliability of PASS–S makes it a suitable tool to be used in clinical practice and in research which may even be used routinely to detect anxiety among antenatal women in Sri Lanka. Studies to assess the feasibility of using PASS–S as a screening tool to detect anxiety during routine antenatal care is recommended. Validation of PASS in Tamil, the other local language in Sri Lanka, is also recommended.

**Conclusion**

PASS–S is a valid and a reliable instrument to assess anxiety during pregnancy among Sinhala-speaking women and maybe useful in routine assessment of anxiety in such women.

**List Of Abbreviations**

PASS; Perinatal Anxiety Screening Scale, PASS–S; Sinhala version of Perinatal Anxiety Screening Scale, PASS–TR; Turkish translation of Perinatal Anxiety Screening Scale, ROC; receiver-operator-characteristics, ERC; Ethics Review Committee, k-; Cohen kappa, ICC; intra-class correlation coefficient, EFA; Exploratory Factor Analysis, CFA; Confirmatory factor analysis, ANC; antenatal clinics, ICD-10; International Classification of Diseases-10, RMSEA; Root mean square error of approximation, RMR; Root mean square Residual, GFI; Goodness of fit index, AGFI; Adjusted goodness-of-fit index, CFI; Comparative fit index, KMO; Kaiser-Meyer-Olkin, DSM-IV; Diagnostic and Statistical Manual of Mental Disorders, 4th edition

**Declarations**

**Ethics approval and consent to participate**

Ethical approval was obtained from the Ethics Review Committee (ERC ref. No: 25/27, May 2017) of the Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka. All participants were
informed that their participation was voluntary and their identities will be kept strictly confidential.

Informed written consent was taken from all participants who voluntarily participated.

**Consent to publish**

Not applicable.

**Availability of data and materials**

The datasets used and/or analyzed (those included personal information of antenatal women) during the current study are available from the corresponding author on reasonable request.

**Competing interests**

The authors declare that they have no competing interests.

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Funding was available only for data collection of half of the population (100 antenatal women out of two hundred and twenty-one women). Data collection of the other 121 women was done voluntarily by the principal investigator. And also funding was not available for data entry, analysis, and interpretation of data and publication of the manuscript.

**Authors’ contributions**

MNP collected and analyzed data, interpreted results and was responsible for manuscript writing. MDIAW conducted Reference test as the psychiatrists’ diagnosis of anxiety based on International Classification of Diseases-10 criteria (ICD-10). MDIAW also contributed in data acquisition and writing the discussion. DMSF and BCVS as senior authors contributed in conceptualizing and developing the study, interpreting results and in revising the manuscript. CSEG contributed in implementing the study and revising the manuscript several times. AB contributed to interpreting results. All authors read and approved the final version of the manuscript. All authors are guarantors of the paper.

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Figures

![Receiver Operating Characteristic Curve](image)

Figure 1

The receiver operator characteristic curve of the participants
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