Factor structure and internal consistency of Oriya version of Edinburgh Postnatal Depression Scale

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ABSTRACT

Background: “Edinburgh Postnatal Depression Scale” (EPDS) is a widely used screening instrument for assessing peripartal depression. To utilize it for Oriya-speaking population, we translated the scale and studied its internal consistency and factor structure.

Materials and Methods: Consenting Oriya-speaking pregnant women attending antenatal checkup during second or third trimester were administered the translated EPDS. Internal consistency analysis (Cronbach’s alpha and item-total correlation) and exploratory factor analysis (principal component analysis) with varimax rotation were carried out to identify factor structure.

Results: The Cronbach’s alpha coefficient for the scale was found to be 0.81, whereas principal component analysis revealed a three-factor solution that accounted for 87.61% of the total variance. The factors included “cognitive depression,” “somatic depression,” and “anxiety factor,” with a percentage of variance being 41.18%, 28.09%, and 18.33%, respectively.

Conclusion: The translated Oriya EPDS is a reliable scale with adequate internal consistency and three-dimensional factor structures.

Key words: Depression, Edinburgh Postnatal Depression Scale, factor analysis, perinatal

INTRODUCTION

The prevalence rates of perinatal depression are reported at about 9.1%–26.9% across various studies and meta-analysis, whereas 9.18%–65.0% was reported by a systemic review in Indian settings. For assessing the symptoms of perinatal depression and anxiety, the “Edinburgh Postnatal Depression Scale” (EPDS) is one of the most widely used screening instruments. The psychometric properties of the EPDS were assessed in primary health care, which yielded a sensitivity of 86%, a specificity of 78%, and a positive predictive value of 73%

In a study data collected from 262 Iranian postpartal females and analysed with principal component analysis with varimax rotation and extracted two-factor solution; which was...
named as anhedonia and depression factor.\textsuperscript{[7]} Many other factor analytic studies of EPDS found two-factor models of depression and anxiety.\textsuperscript{[8-10]} A Japanese exploratory factor analytic study reported a three-factor model consisting of anxiety, depression, and anhedonia.\textsuperscript{[11]}

EPDS is a very popular scale internationally, but its Oriya translation is not available, hence we attempted to translate and see that if the translated scale may also express similar underlying dimensions or not in our population.

MATERIALS AND METHODS

This study was conducted at the antenatal outpatient department of a tertiary care medical college hospital in Odisha, India. The study protocol was approved by the institutional review board of the institute. This cross-sectional study included all consenting women who visited the hospital for antenatal checkup during second or third trimester and admitted for childbirth. The exclusion criteria included those with a past history or presence of any medical or psychiatric illness, except depression, found on evaluation.

Tools

Sociodemographic data sheet
The sociodemographic data sheet included age, religion, occupation, education, and clinical information such as duration of pregnancy and other obstetric history.

EPDS\textsuperscript{[6]} (translated to Oriya): EPDS is a 10-item self-report screening tool that is scored 0, 1, 2, or 3 according to the increased severity of the symptom, and item numbers 3, 5, 6, 7, 8, 9, and 10 are reverse scored (i.e., 3, 2, 1, and 0). The total score is determined by adding the scores with a range of possible scores from 0 to 30. The original version of EPDS has good internal consistency (Cronbach’s alpha = 0.87) and reliability (split-half reliability = 0.88).\textsuperscript{[6]}

Procedure

The scale was translated to Oriya language, by three bilingual psychiatrists and two gynecologists separately; it was reverse translated to English by well-educated five bilingual persons, and finally, the best translated version was selected by all translators together.

It was a cross-sectional observational study; all participants were interviewed for gathering sociodemographic and clinical details and EPDS administration.

Statistical analysis
Statistical analysis was done using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, Illinois, USA) version 16.0 for Windows. Frequency analysis for sociodemographic characteristics and item analysis was done to know the internal consistency of EPDS by calculating Cronbach’s alpha coefficient; exploratory factor analysis (principal component analysis) was carried out to identify the factor structure of EPDS. To retain the number of factors, both Kaiser’s criteria of Eigen values greater than unity and Scree plot inspection were done. Varimax rotation was carried out along with Kaiser’s standardization, and a cutoff of 0.5 in factor loading was considered significant.

RESULTS

A total of 196 participants were included in this study; the mean age of the sample was 29.08 ± 4.62 years. Nearly 41.8% (n = 82) of the sample size were primigravida; it was second pregnancy for other 29.6% and third pregnancy for 23%. There was a history of spontaneous abortion in the past among 10.7% of sample, and a history of medical termination of pregnancy was reported by 21.4%. A total of 37 (18.9%) patients were treated for infertility.

The mean EPDS total score was 5.03 (standard deviation 4.48), and 15 (7.65%) persons scored at EPDS diagnostic cutoff ≥12. The means of the individual items ranged from 0.41 to 0.67 (Cronbach’s alpha = 0.71–0.77); on analysis of Pearson’s item-total correlations [Table 1], all items were significantly associated with each other. The scale mean if item deleted was measured for all ten items, which ranged 68.76–80.02, and Cronbach’s alpha if item deleted for all 12 items ranged from 0.714 to 0.771 (Cronbach’s coefficient alpha for complete scale was 0.81).

Factor analysis
We performed principal component analysis, and the initial solution showed three components with an Eigen value >1, which accounted for 87.61% of the total cumulative variance. The first two components had four items each, whereas the third component had two items with loading ≥0.5. Scree plot revealed the point of inflexion after the third component. Therefore, a three-factor solution was considered appropriate that accounted for 87.61% of the total variance, further with varimax rotation, the pattern matrix produced clinically satisfactory solution with high loadings in the obtained factors [Table 2].

The first factor had an Eigen value of 4.11 and explained 41.18% of variance, it consisted of four items of the EPDS with highest loading (0.963). This factor included “I have blamed myself unnecessarily when things went wrong,” “I have felt sad or miserable,” “I have been so unhappy that I have been crying,” and “The thought of harming myself has occurred to me.” The factor seems to represent the cognitive aspect of depression and hence named as “cognitive depression” factor. The second factor had an Eigen value of 2.80 and explained 28.09% of variance. It also had loading of four items, namely, “I have looked forward with enjoyment to things” (0.927), “Things have been getting on top of me” (0.906), “I have been able to laugh and see the funny...
Table 1: Score on Edinburgh Postnatal Depression Scale, Pearson item-total correlations (rtt), Cronbach’s alpha

| Items                                                                 | Mean±SD     | Interitem correlation | Scale mean if item deleted | Cronbach’s alpha |
|-----------------------------------------------------------------------|-------------|-----------------------|----------------------------|------------------|
| 1 - I have been able to laugh and see the funny side of things         | 0.67±0.92   | 0.716                 | 68.76                      | 0.716            |
| 2 - I have looked forward with enjoyment to things                     | 0.43±0.68   | 0.676                 | 72.24                      | 0.727            |
| 3 - I have blamed myself unnecessarily when things went wrong         | 0.41±0.60   | 0.829                 | 71.65                      | 0.722            |
| 4 - I have been anxious or worried for no good reason                 | 0.50±0.72   | −0.107                | 81.40                      | 0.771            |
| 5 - I have felt scared or panicky for not very good reason            | 0.65±0.85   | −0.015                | 80.02                      | 0.768            |
| 6 - Things have been getting on top of me                              | 0.41±0.65   | 0.706                 | 72.25                      | 0.726            |
| 7 - I have been so unhappy that I have had difficulty sleeping        | 0.67±0.92   | 0.716                 | 68.76                      | 0.714            |
| 8 - I have felt sad or miserable                                      | 0.41±0.60   | 0.829                 | 71.65                      | 0.722            |
| 9 - I have been so unhappy that I have been crying                    | 0.41±0.60   | 0.829                 | 71.65                      | 0.722            |
| 10 - The thought of harming myself has occurred to me                 | 0.41±0.60   | 0.829                 | 71.65                      | 0.722            |
| Total                                                                 | 5.03±4.48   | 1.000                 | 20.13                      | 0.818            |

Table 2: Factor structure of Edinburgh Postnatal Depression Scale items (principal component analysis with varimax rotation and Kaiser normalization) showing factor loadings >0.5

| Items                                                                 | Factor 1 “cognitive depression” | Factor 2 “somatic depression” | Factor 3 “anxiety factor” |
|-----------------------------------------------------------------------|---------------------------------|-------------------------------|--------------------------|
| 3 - I have blamed myself unnecessarily when things went wrong         | 0.963                           |                               |                          |
| 8 - I have felt sad or miserable                                      | 0.963                           |                               |                          |
| 9 - I have been so unhappy that I have been crying                    | 0.963                           |                               |                          |
| 10 - The thought of harming myself has occurred to me                 | 0.963                           |                               |                          |
| 2 - I have looked forward with enjoyment to things                     | 0.927                           |                               |                          |
| 6 - Things have been getting on top of me                              | 0.906                           |                               |                          |
| 1 - I have been able to laugh and see the funny side of things         | 0.664                           |                               |                          |
| 7 - I have been so unhappy that I have had difficulty sleeping        | 0.664                           |                               |                          |
| 5 - I have felt scared or panicky for not very good reason            | 0.646                           |                               | 0.845                    |
| 4 - I have been anxious or worried for no good reason                 | 0.798                           |                               |                          |
| Eigen value                                                           | 4.118                           | 2.809                         | 1.834                    |
| Percentage of variance                                                | 41.184                          | 28.09                         | 18.338                   |

Sample size adequacy is an important consideration in factor analytic study, however if the sample size is ten times of the number of scale items, it may be considered adequate; we collected nineteen times sample size. This study showed that Cronbach’s alpha value ranged from 0.714 to 0.771 for all the ten-item questions of EPDS, and it was found to be 0.81 for the total score of EPDS subscales. This value is in fact better than that of few previous studies who have reported 0.70[12] and 0.72[13]. It is comparable and in accordance to many studies reporting Cronbach’s alpha value of 0.85[11] 0.83[14] and 0.79[7]. Thus, this study affirms that the items of the EPDS-Oriya are reliable as having adequate internal consistency.

DISCUSSION

Our study attempted to address the reliability, internal consistency, and factor structure in our own demographics. In a sample size of 196, we found that 15 (7.65%) persons scored above the diagnostic threshold and higher rates of depression were found among primigravida (9.3%) and gravida II (11.5%), and for others, it was 3.5%. Most of the variables such as age, socioeconomic class, and education were not associated with depression, except that a history of medical termination of pregnancy (5% in the negative group and 20% in the positive group) and a history of abuse victim (negative group 5.6%, positive group 14.28%) were found to be significant risk factors for peripartum depression.

Principal component analysis with varimax rotation shows three-factor solutions for EPDS, which accounted for 41.18% for the first, 28.09% for the second, and 18.33% for the third factor with a cumulative variance of 87.61% for all the three factors. All these factors scored Eigen values of 4.118, 2.809, and 1.834, respectively, therefore, a three-factor solution was considered expressing 87.61% of the total variance. This again affirms the multifactorial structure of the EPDS. The three-factor solution is in accordance with few previous factor analytic studies on EPDS,[15,16] and these studies were also named factors as depressive and anxiety factors, which were similar to our study. Only the third factor was named...
differently as “anhedonia,” with loadings of items 1 and 2 of EPDS in those studies. However, we named the second factor as “somatic depression,” and it also included items 1 and 2 of EPDS in addition to items 6 and 7 [Table 2].

However, depression and anxiety are common to most of the factor analytic studies including ours, yet studies also found a third factor with a single item of “suicide.”[17]

This may be the first study demonstrating the factor structure of the Oriya version of EPDS using a large sample of antepartum women. Our findings suggest that the factor structure of EPDS-Oriya is the same as already reported in previous studies in different cultures and countries, although there are some variations in the item composition of specific factor loadings.

CONCLUSION

This study finds a good inter-item reliability of EPDS-Oriya with Cronbach’s coefficients alpha of 0.81, and also exploratory factor analysis finds a three-factor solution of EPDS-Oriya, namely “cognitive depression,” “somatic depression,” and “anxiety factor,” which accounted for 87.61% of the total variance.

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Conflicts of interest
There are no conflicts of interest.

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