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Original Article

Psychiatry/Mental Health Section

Development and Validation of a Scale to Measure Awareness among Healthcare Workers about Perinatal Depression in Indian Context: A Cross-sectional Study

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ABSTRACT

Introduction: Women in the perinatal phase experience significant physical and emotional changes, heightening their vulnerability to mental health disorders, particularly Perinatal Depression (PND). Healthcare Workers (HCWs) are often the first point of contact for expectant or new mothers, yet studies indicate poor awareness of PND among HCWs in India. This gap underscores the need for a validated tool to assess and improve HCWs' understanding of PND.

Aim: To develop and validate a tool to measure awareness of PND among HCWs.

Materials and Methods: The cross-sectional study for instrument development and validation was conducted in Anand, Gujarat, Western India, using a three-round Delphi technique with 16 experts from Obstetrics, Psychiatry, Community Medicine, Social Work, and Paediatrics. Thirty questions were selected through consensus and rated for relevance on a 5-point Likert scale. After pilot testing, the tool was administered to 200 HCWs. Exploratory Factor Analysis (EFA) using principal axis factoring with oblique rotation was employed for validation. The number of respondents for the validation part was 170 for the 30 item questionnaire. Statistics and Data (STATA) 14 was used for analysis, with $p<0.05$ considered statistically significant.

Results: EFA revealed a four-factor structure explaining 58.66% of the variance. The model showed excellent fit: Bartlett's test of sphericity ($p<0.001$) and Kaiser-Meyer-Olkin (KMO=0.878). The factors included: Risk Factors and management strategies (9 questions), myths and misconceptions (4 questions), symptoms of maternal depression (3 questions), screening and treatment (2 questions). The tool demonstrated high internal consistency (Cronbach's α=0.854).

Conclusion: This validated 18-item scale reliably assesses PND awareness among HCWs in West India. It serves as a foundation for targeted educational interventions to enhance maternal mental healthcare.

Keywords: Attitudes, Health personnel, Mental health, Pregnancy complications, Psychological, Questionnaires

INTRODUCTION

The PND is a common mental health condition affecting mothers in the postpartum period [1]. It encompasses a spectrum of mood disorders, including Antenatal Depression (AND) and Postpartum Depression (PPD), characterised by persistent sadness, anxiety, and loss of interest in daily activities [2]. PND poses a significant global health burden, impacting maternal and infant well-being [3]. In India, despite increasing awareness, PND remains a critical public health concern, contributing to adverse maternal and infant outcomes [4,5].

HCWs play a crucial role in identifying and addressing PND [6]. Early detection and timely intervention by HCWs can significantly improve maternal and infant health outcomes. However, several barriers hinder effective PND identification by HCWs in India, including knowledge gap, stigma and attitude towards mental illness, cultural belief and misconceptions etc., [7-9].

There is no widely validated, standardised tool currently available specifically for measuring HCWs' awareness of PND. Most studies rely on self-developed Knowledge, Attitude, and Practice (KAP) questionnaires or qualitative interview guides, which vary in content and lack standardisation [6,9,10]. Commonly used screening tools like the Edinburgh Postnatal Depression Scale (EPDS) and Patient Health Questionnaire-9 (PHQ-9) are designed for patient assessment, not for evaluating provider awareness [10,11].

A critical research gap exists in the measurement of HCWs' awareness of PND in India [3,10]. Currently, there are no validated tools specifically designed to assess HCWs' knowledge, attitudes, and practices regarding PND in this context [12].

The present study aimed to develop and validate a scale to measure awareness about PND among HCWs in India. This scale will serve as a valuable tool for assessing HCWs' knowledge, attitudes, and practices regarding PND and will inform the development of targeted interventions to improve PND identification and management in the Indian context.

MATERIALS AND METHODS

The present cross-sectional survey was designed to develop and validate a scale for measuring awareness about PND among HCWs in Karamsad, Western India.

Ethical issues and use of Artificial Intelligence (AI): The survey was conducted in the vicinity of Anand between July 2024 to September 2024, where HCWs, primarily doctors, were approached at their convenient time and were provided with detailed information about the study and the tool. Participants were given a participant information sheet, and their response to the forms was considered as implied consent. A total of 200 forms were distributed to HCWs who were comfortable responding to the English questionnaire. The sample size was based on the recommendations of best practices for developing and validating scale [13]. Sufficient time was given to participants to complete the forms at their convenience, after which responses were collected.

Inclusion criteria: All healthcare workers willing to respond to the English questionnaire.

Exclusion criteria: None.

Study Procedure

The scale was developed in English using the Delphi technique [14] involving 16 experts (professionals in practice, having at least five years of experience in the field, post their masters course) from diverse fields, including psychiatry (4), community medicine (3), paediatrics (3), obstetrics and gynaecology (3), and social sciences (3). A purposive, criterion-based sampling method was used to select these experts to ensure content validity. The finalised tool consisted of an anonymous questionnaire with two sections: a) Demographic information (10 items); b) Awareness of PND (30 items). Participants responded to the awareness section using a 5-point Likert scale ranging from "strongly disagree" to "strongly agree" [15]. Reverse coding was applied to five negatively worded items to ensure consistency in scoring. The tool was pilot-tested to refine item wording and assess preliminary reliability and validity. E.g., For question: 'Poor neonatal outcome is a risk factor for depression in mother', details "e.g., poor growth of the foetus, newborn admission to Intensive Care Unit (ICU) or newborn death" was added in the question for more clarity.

STATISTICAL ANALYSIS

The collected responses were entered into Microsoft Excel and analysed using STATA 14.2. Data cleaning procedures included checks for extreme scores, missing data, and normality testing. Mahalanobis distance was calculated to identify multivariate outliers, leading to the exclusion of 15 forms from further analysis due to incomplete responses. Normality was assessed using the Shapiro-Wilk test. The EFA was conducted to identify the latent constructs of the scale. The KMO test was used to measure sampling adequacy, and Bartlett's test of sphericity was used to assess suitability of the data for factor analysis. Principal axis factoring was performed due to the non-normal data distribution, and a direct oblimin oblique rotation was used, given the expected correlation between factors. The number of factors was determined iteratively using the Kaiser criterion (eigenvalues > 1) and scree plot analysis. Items with factor loadings below 0.40 were removed in successive rounds. The internal consistency of the final scale was assessed using Cronbach's alpha.

RESULTS

Out of 200 forms distributed, 185 forms were returned making the response rate to be 92.5. However, 15 forms were found not fit for analysis due to incomplete information so were excluded from analysis. Therefore, total of 170 participants' responses were analysed to refine the tool measuring awareness about PND and its association if any with the other variables. The demographic details of the participants are presented in [Table/Fig-1].

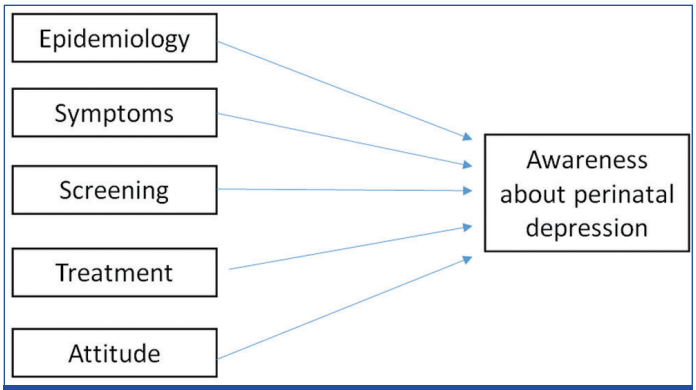
A five factor solution was expected at the end of the EFA based on the theory driven approach. With an assumption, that knowledge of Epidemiology, symptoms, screening, treatment and attitude collectively explain awareness about PND [Table/Fig-2]. However, different methods for number of factors to be extracted gave different results. Hence the final number of factors extracted was based on the Kaiser criterion of Eigen values and scree plot through iterative process [Table/Fig-3].

The EFA was performed by principal axis factoring using direct oblimin oblique rotation method to obtain rotated factor solution. The minimum factor loading criteria was set to 0.40. The communality of the scale, which indicates the amount of variance in each dimension, was also assessed to ensure acceptable levels of explanation.

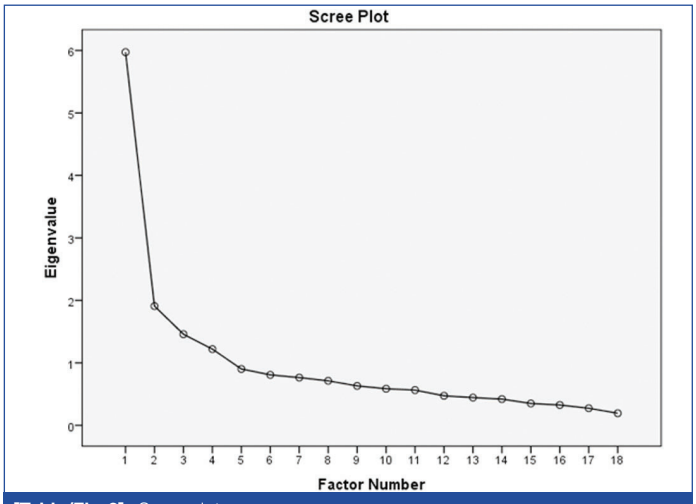
The Bartlett's test of Sphericity measuring overall significance of the correlation matrix showed significant correlations among some of its components. The results were significant, $x^2(n=170) = 2113.265$ ($p<0.001$), indicating suitability for factor analysis. The KMO MSA, which indicates the appropriateness of the data for factor analysis, was 0.879. Finally, the factor solution derived from this analysis yielded four factors for the scale, which accounted for 58.66 per cent of the variation in the data.

Variables	Category	n (%)
Gender	Male	73 (42.9%)
	Female	97 (57.1%)
Marital status	Unmarried	94 (55.3%)
	Married	75 (44.1%)
	Divorced	1 (0.6%)
Education	MD	73 (43.0%)
	MBBS	68 (40.0%)
	BSc. Nursing	13 (7.7%)
	Master's degree in Allied Sciences	13 (7.7%)
	BHMS	3 (1.8%)
Profession	Doctor	144 (84.7%)
	Nurse	15 (8.8%)
	Other (MSW, Dietician)	11 (6.5%)
Work setting	Private	160 (94.1%)
	Government	10 (5.9%)
Exposure to depressed patient	Never	130 (76.5%)
	Yes	40 (23.5%)
Exposure to PND patient	No	125 (73.5%)
	Yes	45 (26.5%)

[Table/Fig-1]: Demographic details of respondents for English version of PND awareness tool (n=170).
The Shapiro-wilk test suggested that the data does not follow normal distribution.
The KMO Measure of Sampling Adequacy (MSA) was found to be 0.878 and Bartlett test of Sphericity, <0.0001, suggesting that the data was suitable for factor analysis



[Table/Fig-2]: Five factor solution based on theory driven framework.



[Table/Fig-3]: Scree plot.

The initial EFA model was able to account for 60.48% variation in the data. After the iterative process, the final solution with 18 items questionnaire with four factors with the model explaining 58.66% variation attained [Table/Fig-4].

Items	Factor 1	Factor 2	Factor 3	Factor 4
Q2-EPI	0.480			
Q4_EPI4	0.837			
Q5-EPI5	0.657			
Q8_SYMP1			0.566	
Q9_SYMP2	0.490			
Q12_SYMP5	0.574			
Q13_SYMP6			0.537	
Q14_SYMP7			0.476	
Q19_SCREEN4				0.540
Q21_TREAT2				0.573
Q22_TREAT3	0.436			
Q23_TREAT4	0.759			
Q26_ATTI2	0.564			
R_Q3_R_EPI3		-0.507		
R_Q18_R_SCREEN3		-0.635		
R_Q24_R_TREAT5		-0.753		
R_Q28_R_ATTI4		-0.734		
Q30_ATTI6	0.411			

[Table/Fig-4]: Factor loadings.
*Extraction method: principal axis factoring.
*Rotation method: Oblimin with Kaiser normalisation.

The four factors so found were named as Factor 1: Risk factors and management strategies for PND, Factor 2: Myths and misconceptions about PND, Factor 3: Symptoms of maternal depression and Factor 4: Screening and treatment for PND [Table/Fig-5].

Factor name	Items
Factor 1: Risk factors and management strategies for Perinatal Depression (PND)	Q2: Women with prior episode of mood disorder have higher risk of Perinatal Depression (PND) Q4: Poor support from husband and poor family support is a risk factor for depression in mother Q5: Poor neonatal outcome (e.g., poor growth of the foetus, newborn admission to ICU or newborn death) is a risk factor for depression in mother Q9: Loss of interest in previously interested activity is a core symptom of depression in antenatal/post-natal period Q12: A mother with depression may feel excessively anxious or worried for no good reason Q22: Physical activity is one of the effective ways for the prevention or management of Postpartum Depression (PPD) Q23: Seeking help with tasks like infant care and household chores from husband and family members is helpful for the prevention or management of PPD Q26: An untreated PND can have a lot of negative impact on the mother, the baby, and the entire family Q30: With proper treatment from the healthcare team along with care and support from the family, PND can be cured
FACTOR 2: Myths and misconceptions about Perinatal Depression (PND)	Q3: Unplanned and/or unwanted pregnancy is not a risk factor for depression in mother Q18: Pregnant women need not be screened for depression Q24: Psychotherapy (talking therapy or counseling) is not effective in treating Postpartum Depression (PPD) Q28: Mothers with PND do not need any special support from Healthcare Workers (HCW)
FACTOR 3: Symptoms of maternal depression	Q8: A mother with depression may cry and feel sad or miserable most of the time. Q13: A mother with depression may have difficulty in sleeping quite often because of sadness or excessive worries Q14: A mother with depression may lose appetite and/or not gain enough weight
FACTOR 4: Screening and treatment for Perinatal Depression (PND)	Q19: There are validated screening tools to screen mothers for depression Q21: Medications available for treatment of depression are relatively safe for the mother and baby

[Table/Fig-5]: Factor details.

In this EFA, two items (i.e., "Q19: There are validated screening tools to screen mothers for depression." And "Q21: Medications available for treatment of depression are relatively safe for the mother and baby.") continued to load on a separate dimension always and both are important aspects to understand awareness about PND. These items demonstrated fair inter item correlation (r=0.325) and substantial factor loading (>0.5). Given their conceptual coherence and empirical support, the investigators decided to retain this factor. However, they acknowledged the limitation of having only two items and suggested future research to include additional items to further validate this factor.

The overall internal consistency calculated using Cronbach's alpha for the extracted factors was 0.854. The Cronbach's alpha calculated for Factor 1 was 0.879, for Factor 2 was 0.767, for Factor 3 was 0.571 and for Factor 4 was 0.488.

DISCUSSION

The base tool was developed using the Delphi technique, aligned with Association for Medical Education in Europe (AMEE) guidelines for questionnaire development [16]. For validation, 170 participants responded to the 30-item questionnaire in English, a sample size consistent with recommendations for such studies [17,18]. The final model accounted for 58.66% of the variance. Factor 1 (Risk Factors and Management Strategies) and Factor 2 (Myths and Misconceptions) showed high internal consistency (Cronbach's α=0.879 and 0.767), consistent with literature emphasising early diagnosis and management [19-22]. Factor 3 (symptoms of maternal depression) and Factor 4 (screening and treatment) had lower reliability (α=0.571 and 0.488), likely due to fewer items, indicating a need for scale refinement and potential future validation through Confirmatory Factor Analysis (CFA).

Despite few limitations, the scale addressed essential PND awareness aspects, including validated screening tools and treatment safety. The validity of the instrument was found good, however, two subscales had lower internal consistency (Cronbach's α), likely due to few items. This may differ from some other validation studies due to variations in samples or scoring methods. However, strong factor loadings supported their relevance, and adding more items to the subscales in future could improve reliability [23,24]. The continued development of screening and treatment methods underscores the urgency of improving HCWs' capacity to manage perinatal mental health [8,9].

Significant knowledge gaps persist despite general awareness of PND among HCWs. Routine screening is infrequent, potentially delaying care and worsening outcomes [10,25]. Mental health remains underrepresented in India's national programs, necessitating integration into maternal and child health services [23,24] and policy reforms recognising perinatal women as a vulnerable group [26,27]. Capacity building through professional development and structured training can enhance early detection, reduce stigma, and improve care [25,28]. Community-based interventions and specialised training can further improve reach and impact, especially in underserved regions [28].

Institutional stigma and lack of support in rural areas are barriers to care. Culturally sensitive campaigns and engagement of community health workers {e.g., Accredited Social Health Activist (ASHAs)} can address these gaps [10]. Increasing HCW awareness and responsiveness to PND supports maternal and child well-being and aligns with public health goals [10,28]. A multisectoral approach is necessary, combining policy reforms, training, stigma reduction, and integration of mental health services into maternal care [26,27]. The 2023 ACOG guidelines recommend PND screening during prenatal and postpartum visits [11]. Despite the availability and validation of EPDS in Indian languages [21,29,30], screening is not standard

practice. Recent pharmacological advances show promising treatments for moderate to severe PPD, with good safety profiles [31]. Psychotherapeutic interventions, including interpersonal therapy, group-based support, and cognitive behavioral therapy, have proven effective [1,32].

Culture significantly influences awareness and management of PND. Social norms, stigma, and healthcare practices affect whether women seek and receive care. Therefore, culturally tailored approaches are essential [33]. Addressing PPD requires comprehensive strategies involving awareness, training, and policy support. Bridging the gap between need and services is crucial for maternal and child health improvement [34]. The present study contributed to addressing a critical gap in HCWs' understanding of PND, with important implications for maternal and infant outcomes.

Limitation(s)

Despite its strengths, the study has several limitations. First, the data were collected from a convenience sample of HCWs in a single geographic region, potentially limiting generalisability to other parts of India or HCWs from different cultural or professional backgrounds. Second, the reliance on self-reported data may introduce social desirability bias, as participants might overestimate their awareness levels. To overcome this bias, the data collection was kept anonymous. The reliability of certain factors is low due to the limited number of items they include. Improving the number of items for the factors in future studies may improve the reliability.

CONCLUSION(S)

The validated PND awareness scale developed in this study fills a critical gap in the assessment of HCWs' knowledge and preparedness to address PND. By enabling systematic evaluation and targeted training, the scale has the potential to improve early identification and management of PND-a key determinant of maternal and child health outcomes. Integrating this tool into routine healthcare practice and policy can standardise screening, reduce stigma, and ensure that all HCWs are equipped to support perinatal women, particularly in underserved communities. Ultimately, widespread adoption and use of this scale can contribute to healthier families and more equitable maternal mental healthcare.

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Author Declaration: Study was granted waiver of informed consent by the IEC as the questionnaire was anonymous and it mentioned that the return of the questionnaire with response by any participant will be considered as implied consent. Study tools used in the conduct of the study was developed through Delphi technique with 16 subject experts' inputs for the purpose. ChatGPT or any AI tools were not used in the development or research conduction process. Later manually generated content was entered in ChatGPT for compliance with standard reporting guidelines.

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