Original Article

Proportions and Correlates of Postpartum Depression among Mothers from Sunderbans area attending a Tertiary Care Hospital of Eastern India

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Abstract

Background : Postpartum depression is a psychological issue which challenges the woman's physical and psychological wellbeing. Prompt screening, early diagnosis and timely management may ameliorate the severity of the condition and may help reduction of maternal and neonatal morbidities.

Purpose : In the setting of dearth of published literature for the same in the resource limiting terrains of Sunderbans, this study was done with the objective of exploring the proportions and covariates of postpartum depression among postnatal mothers.

Materials and Methods : A cross-sectional hospital based epidemiological study was conducted among 215 postnatal mothers, who were permanent residents of Sunderbans, West Bengal. The study subjects were selected using principles of simple random sampling design. Data on postpartum depression were collected using validated Edinburgh Postpartum Depression Scale (EPDS) and correlates were assessed by a pre-designed pre-tested schedule. Multivariate logistic regression was carried out with all the variables classified under the constructs of factors to determine the affecting factors of post-partum depression after adjusting for confounders.

Results : 215 mothers were interviewed, 48 (22.3%) mothers scored ≥13 on EPDS and thus, were categorised as depressed. Illiteracy, early child-birth, giving birth to a female child, lacking of breast feeding of the baby and intimate partner violence were found to be significantly associated with postpartum depression.

Conclusion : Proportions of postpartum depression were found to be considerably high. The complex interplay of multiple factors was found to culminate it, upon which socio-economic and lack of psycho-social support system were prominent. A multi-disciplinary approach focusing on timely screening, early diagnosis and appropriate management of the condition and mitigation of the modifiable risk factors can ensure better maternal and child health outcome.

Key words : Mental Health, Postpartum Depression, Edinburgh Post-natal Depression Scale, Sunderbans.

Childbirth represents a highly anticipated milestone in a woman's life. However, this remarkable journey into motherhood can be overshadowed by a non-psychotic mental health disorder known as Postpartum depression, which affects an estimated 100 to 150 women per 1,000 births globally[1]. Typically, Postpartum depression manifests after six weeks following childbirth, although it can arise within the first year postpartum[2-4]. This condition is marked by a range of depressive symptoms, including a persistent low mood, feelings of worthlessness, fatigue, loss of interest in activities, diminished appetite and sleep disturbances[3-5]. Research indicates that if Postpartum depression remains undiagnosed and untreated, it can escalate into more severe issues for both the mother and her child. For the mother, there is a significantly increased risk of experiencing recurrent depressive episodes later in

Editor's Comment :

- Postpartum Depression (PPD) is a serious mental health condition that affects some women after childbirth. It goes beyond the "baby blues", causing persistent feelings of sadness, anxiety and difficulty bonding with the baby.
- PPD can impact emotional well-being and daily functioning but is treatable with therapy, support and sometimes medication.
- Early identification and seeking help are crucial for recovery, and it's important for new mothers and their support networks to recognize the symptoms and offer assistance.
- Seeking professional help is a sign of strength, not weakness.

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life[6]. For the child, the consequences may include hindered language acquisition and cognitive development. Additionally, the immediate impact of Postpartum depression can impair the mother's ability to engage in essential nurturing activities, such as breastfeeding and caring for the newborn. There is an increasing awareness that the prevalence of Postpartum depression is particularly pronounced in low- and middle-income countries. A systematic review and meta-analysis focusing on postpartum depression in India revealed a pooled prevalence rate of 22% (with a 95% confidence interval of 19-25)[7-8]. Nevertheless, there is a notable lack of research aimed at estimating the prevalence of Postpartum depression among women in various regions of this diverse nation. In particular, the Sunderbans, recognized as a world heritage site, face significant challenges in delivering quality healthcare services to residents living in remote and difficult terrains, often in close proximity to wildlife. The current study aims to assess the prevalence of Postpartum depression and the factors associated with it among women who have recently given birth. By focusing on this specific demographic, the research seeks to fill the existing gap in knowledge regarding postpartum mental health in the Sunderbans region. Understanding the burden of postpartum depression in this context is crucial for developing targeted interventions and improving maternal and child health outcomes. The findings of this study may contribute to a broader understanding of the mental health challenges faced by new mothers in underserved areas, ultimately guiding healthcare policies and practices to better support these women during a critical period of their lives.

Materials and Methods

This study was a descriptive epidemiological investigation employing a cross-sectional design, conducted at a Tertiary Care Medical College & Hospital that serves a population from the challenging terrains of the Sunderbans, where residents typically exhibit low to moderate socio-economic and educational levels. The research spanned three months, from October, 2022 to December, 2022, focusing on adult women who were mothers of neonates (aged less than one week) and who were proficient in Hindi, Bengali or English, as well as being permanent residents of the area for a minimum of six months. Women who were unwilling or unavailable to participate, as well as those with a prior diagnosis of depression, were excluded from the study.

The sample size was determined using the appropriate formula for cross-sectional studies, aiming for a 95% confidence level and a 5% margin of error, while considering an estimated prevalence of Postpartum depression of 15% among women in Northern India, along with a 10% nonresponse rate[8]. Consequently, the final sample size was established at 215. Participants were recruited in the Postpartum ward and during the immunization and well-baby clinic sessions, which occur bi-weekly at the hospital. Women who fulfilled the inclusion criteria were selected using simple random sampling, with around 5 to 10 women included in each session. Socio-demographic information from the participants was gathered through an interview schedule. The women were evaluated for postpartum depression using the Edinburgh Postnatal Depression Scale (EPDS) devised by Cox[5], *et al*, which is widely regarded as one of the most dependable screening tools for assessing Postpartum depression[9,10]. The EPDS comprises ten items on a Likert scale that evaluate the emotional experiences of women over the past week. In the EPDS, the scoring for questions 1, 2, and 4 follows a 0, 1, 2, 3 sequence from top to bottom, while questions 3 and 5-10 are reverse scored from the bottom up, with each respective score being 3, 2, 1, and 0. A maximum score of 30 is permissible, with a cut-off score of $\geq$10 indicating the presence of Postpartum depression, where higher scores reflect increasing severity of depression[11].

The English version of the scale was linguistically validated into the local language of Bengali. This translation process comprised: (a) a forward translation of the original EPDS into Bengali by a native speaker; (b) a back translation into English executed by another native speaker; (c) the forward and back translation process continued until the back-translated version was consistent with the original English version of the scale; and (d) the translated version underwent pretesting in 30 women who were not part of the study to evaluate its comprehensibility.

The classification of the Socio-economic Status (SES) among the women was based on the revised BG Prasad social classification scale, utilizing the Indian consumer price index for industrial workers for the year 2022. This scale categorizes a person into one of five socio-economic classes, with Class I representing the highest SES and Class V the lowest SES[12,13]. We dichotomized SES into two groups: high/middle SES, which included respondents from Classes I and II, and low SES, which encompassed respondents from Classes III, IV and V.

The participants were evaluated for postpartum depression using the Edinburgh Postnatal Depression Scale (EPDS), which is widely recognized as a reliable tool for assessing postpartum depression. This scale includes ten Likert-scale items that examine women's emotional states over the past week. For items 1, 2, and 4, scores ranges from 0 to 3, while questions 3 and 5-10 use reverse scoring, yields scores of 3, 2, 1, and 0 from bottom to top. The total score can reach a highest value of 30, with a cut-off of >10 indicating postpartum depression, and elevated scores reflecting greater levels of depressive symptoms. Variables were categorized under factors related to postpartum depression.

Data was collected utilizing a pre-structured and pretested form, maintaining strict confidentiality throughout. Data entry was conducted in Excel (Microsoft Inc), while statistical analyses were executed using the IBM Statistical Package for the Social Sciences (SPSS) (Version 20.0, IBM). Both descriptive and analytical statistical methods were applied in the analysis. Categorical data were expressed as percentages, and continuous data were reported as means and standard deviations. The relationship between independent variables and postpartum depression was evaluated through univariate analyses utilizing the Chi-square test, with statistical significance established at $P<0.05$. A multivariate logistic regression analysis was completed to identify factors affecting postpartum depression, adjusting for potential confounders and calculating adjusted odds ratios with 95% confidence intervals, considering intervals that exclude 1 as significant. The goodness of fit for each model was assessed using the Hosmer and Lemeshow test.

The study was conducted after the approvals of the Institutional Ethics Committee Diamond Harbour Government Medical College vide letter number DHGMCH/2022/744 dated 09.06.2022. Informed consent was obtained from all the study participants.

Analysis and Results

Descriptive of the Study Subjects :

The study participants' mean age was 22.83 years, with a Standard Deviation of 2.36 years. The majority, 126 (58.6%), were Hindus, 169 (78.6%) were from lower socio-economic groups and 58 (26.9%) were illiterate. The majority of mothers (177, 82.3%) were unemployed and over half of the women (146, 67.9%) were from a lower socio-economic level. The overall proportion of Postpartum depression was 22.3% (95% confidence interval 19.52-26.89%), with a median EPDS score of 6.7 (Q1 = 4; Q3 = 10).

Factors associated with Post-partum Depression:

Univariate analysis

The independent variables that had significant effects on the Postpartum depression of the study subjects were as follows, belonging to lower socio-economic status, having history of intimate partner violence, child requiring neonatal intensive care support and those experienced natural disasters in recent past which is quite frequent in the Sunderbans area (Table 1).

Multivariable analysis

Table 2 shows three predictive models for predicting the Postpartum depression that were developed for the present study. Model 1 includes only the social factors, Model 2 includes the social and physical parameters related variable and Model 3 includes the psychological variables in addition to the variables in Model 2.

The final model, Model 3, of the multivariate logistic regression analysis, after resolving for confounders,

Table1 — *Univariate Analysis showing the association of factors with Postpartum depression (N = 215)*

Variables	Postpartum Depression		OR (95% CI)
	Absent N;(%)	Present N;(%)	
Age	27.6(±6.3)	21.3(±4.9)	*1.34(1.02-3.88)
Socio-economic Status			
Class I,II,III	64(29.8)	5(2.3)	1.00 (Reference)
Class IV, V	103(47.9)	43(20)	*2.26(1.17-4.41)
Education			
Illiterate	36(16.7)	22(10.2)	1.00 (Reference)
Literate	131(60.9)	26(12.1)	0.91(0.56-1.48)
Parity			
Primipara	58(26.9)	14(6.5)	*2.16(1.31-3.57)
Multipara	109(50.7)	34(15.8)	1.00 (Reference)
High-risk Pregnancy			
Absent	156(72.6)	39(18.1)	1.00 (Reference)
Present	11(5.1)	9(4.1)	1.45(0.89-2.35)
Lactational Status			
Breast-feeding	58(26.9)	11(5.1)	1.00 (Reference)
Formula-feeding	109(50.7)	37(17.3)	*2.510(1.219-3.968)
Gender of Child			
Male	81(37.1)	28(13.0)	1.00 (Reference)
Female	65(30.2)	41(19.7)	*1.926(1.237-5.032)
Intimate Partner Violence			
Absent	101(46.9)	21(9.8)	1.00 (Reference)
Present	66(30.6)	27(12.6)	1.09(0.67-1.81)
Child Requiring Intensive Neonatal Support			
Absent	158(73.5)	33(15.3)	1.00 (Reference)
Present	9(4.1)	15(6.9)	*2.81(1.71-4.60)
Victim of Natural Disaster			
Absent	14(6.5)	46(21.4)	1.00 (Reference)
Present	34(15.8)	121(56.2)	*5.12(2.92-8.99)

*dnotes statistical significance

Table 2 — *Multivariate models of predictors of Postpartum depression among study subjects*

Variables		Model 1	Model 2	Model 3
Intercept		-1.867	-5.371	-1.638
Socio-demographic variables	Age	*1.151(1.088-1.217)	*1.172(1.096-1.253)	1.036(0.907-1.184)
	Socio-economic status			
	Class IV, V	0.793(0.201-3.133)	1.119(0.251-5.000)	0.606(0.032-11.327)
	Class I,II,III	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
	Education			
	Literate	*0.116(0.029-0.468)	*0.107(0.023-0.509)	0.595(.029-12.016)
	Illiterate	1.00 (Reference)	1.00 (Reference)	1.00 (Reference)
Physical variables	Parity			
	Primipara		1.007(0.181-5.590)	3.404(0.220-5.584)
	Multipara		1.00 (Reference)	1.00 (Reference)
	High-risk pregnancy			
	Absent		1.00 (Reference)	1.00 (Reference)
	Present		1.025(0.241-4.361)	2.867(0.280-4.391)
	Lactational Status			
	Breast-feeding		1.00 (Reference)	1.00 (Reference)
	Formula-feeding		1.933(0.843-6.549)	*3.435(1.158-5.662)
Physiological variables	**Gender of child**			
	Male			1.00 (Reference)
	Female			*3.361(1.412-7.538)
	Intimate partner violence			
	Present			*1.230(1.040-1.610)
	Absent			1.00 (Reference)
	Child requiring intensive neonatal support			
	Present			1.658(1.335-3.295)
	Absent			1.00 (Reference)
	Victim of natural disaster			
	Present			1.895(1.087-4.047)
	Absent			1.00 (Reference)

*dnotes statistical significance

identified the following factors as significantly increasing the probability of Postpartum depression ie, belonging to lower socio-economic status, having history of intimate partner violence, child requiring neonatal intensive care support and those experienced natural disasters in recent past.

The present study utilised Receiver Operating Characteristics Curve (ROC) and Area Under Receiver Operating Characteristics Curve (AUROC) to measure the quality of the classification models. It was seen that inclusion of physical factors improved the model ie, AUROC 0.717 in Model 1 to AUROC 0.823 in Model 2. On addition of psychological factors in Model 3 the AUROC improves further to 0.915 (Fig 1/Table 3).

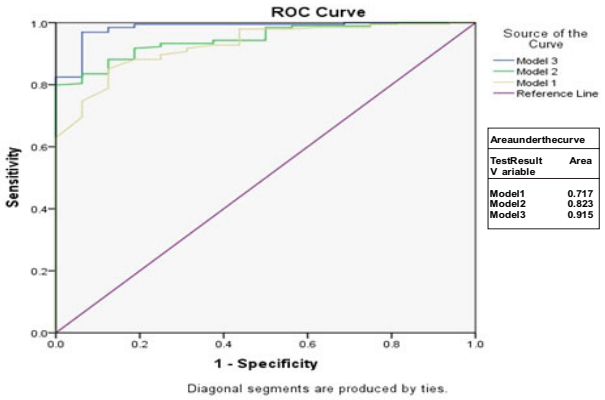

Fig 1 — ROC curve showing the three predictive models

Discussion

The present study revealed a Prevalence of Post-partum Depression (PPD) at 22.3% among postnatal women, aligning with findings from other studies conducted in India. In rural regions, the reported prevalence of PPD ranges from 12% to 31.4%[14-19], while urban areas exhibit a prevalence between 12.75% and 25.08%[20-22]. Our findings suggest that the prevalence observed in this study is on the higher end of the spectrum reported in various national studies. The discrepancies in prevalence rates may be attributed to differences in research methodologies, socio-cultural factors, levels of poverty, and the challenges associated with basic living conditions in the historically impoverished Sunderbans delta. The widespread illiteracy and lack of awareness regarding mental health issues among mothers in this region, compounded by inadequate healthcare facilities and poor communication

Table 3 — *Model statistics for the three predictive models*

	Omnibus Tests of Model Coefficient			Hosmer	-2 Log	Cox & Snell	Nagelkarke
	Chi-square	df	Significance	Lemeshow P	Likelihood	R Square	pseudo R square
Model 1	44.747	3	0.000	0.975	68.387	0.192	0.461
Model 2	50.698	6	0.000	0.852	62.435	0.214	0.515
Model 3	82.344	11	0.000	0.714	30.789	0.324	0.779

infrastructure, contribute to this situation.

Furthermore, a significant association was found between Postpartum depression and socio-economic status, with higher rates observed among individuals classified as belonging to Classes IV and V. This finding is consistent with numerous other studies that indicate a greater prevalence of depression among lower-income groups[14,20]. The financial constraints imposed by poverty exacerbate mental health issues, particularly when families are faced with the additional responsibilities that come with a new family member.

Having a low birth weight or preterm baby, requiring special support and care was observed to be a predisposing factor for post-partum depression which is similar to another study[20]. There is a significant finding that none of the mothers complained of any psychiatric problems during antenatal period or even before being pregnant. The reasons could be attributed towards the lack of knowledge or some cultural perceptions influencing the reporting of their symptoms.

Psychological factors like intimate partner violence, victims of natural calamities were found to be significantly associated with Postpartum depression in the index studies. Similar, house-hold stressors were reported in other studies both our nation[14-17] and globally[21-26].

Postpartum depression screening by simpler methods like EPDS is highly recommended and should be fundamental to postnatal care in order to avert distressing consequences on mother and child. The women in the postpartum period are likely to have multiple contacts with the health systems, so primary care physician is well placed to identify the warning signs and symptoms of Postpartum depression and could thus provide an adjunct for screening and managing Postpartum depression for the benefit of women, infants and families. Therefore, these providers should be equipped with the correct knowledge and necessary tools for finding optimal solutions to Postpartum depression.

This was a hospital based study, thus selection bias may be an issue which may challenge the external validity of the study. Larger community based studies on the issue are thus warranted. Presence of antenatal depression was beyond the scope of this study due to poor maintenance of medical records by patients in a resource limited settings of Sunderbans. Also, as EPDS is a screening tool for PPD and not a confirmatory one, using multiple validated scales to diagnose presence of probable depression would have increases the internal validity of the study. Nonetheless, the present study reflecting the mental health status of mothers from difficult terrains of Sunderbans will not only give valuable inputs to the extent of this disease entity but shall also apprise the policy makers to assign resources for capacity building in maternal mental health care by evolving and executing new guidelines/ protocols for effective screening, management and the reduction of the burden of Postpartum depression ensuring a safe motherhood for better maternal and child health outcomes.

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Conclusion

The proportion of Postpartum depression reported in the present study was 22.3%. A complex interplay of social, physical and psychosocial factors play pivotal role in the causation of Postpartum depression. Experiencing natural disasters, being illiterate, belonging to BPL populations, having high-risk pregnancies with neonates requiring intensive support and domestic violence could predict the risk of Postpartum depression. Timely screening, early diagnosis and appropriate management of the condition and mitigation of the modifiable risk factors can prevent emergence of PPD. Most determinants identified by this study can be managed by a continuum of maternal and child health care. Emotional and psychosocial support should be provided by the well knit family and social support

system under the supervision and guidance of community level health care workers to reduce the risk of depression. This study also advocates a monitoring mechanism in which the primary care physicians should screen patients for depression at least once during pregnancy or during the first year post delivery. Additionally, a follow up with behavioural health resources for any patient with a positive screen should also be considered. This will definitely prove to be a cost effective approach in improving Quality of Life for these affected individuals. Hence, the sensitization of the primary healthcare providers and early screening and counselling of the mothers and their families is essential for the reduction of associated morbidities and unfavourable outcomes.

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Conflicts of Interest : None

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