Original Article

The Prevalence and Risk Factors of Postpartum Depression in Western India: A Cross-Sectional Study

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Abstract

Background: Postpartum depression (PPD) is a nonpsychotic mental health condition associated with child birth. It poses a major global public health challenge as it remains unrecognized most of the time and impairs both the immediate and long-term health of both the mother and child. The study was conducted to estimate the prevalence and associated risk factors for PPD. **Materials and Methods:** A cross-sectional study was conducted among 450 women who delivered babies within the past 1–12 months and attending a tertiary care hospital during April to November 2021. Systemic random sampling was used to obtain the desired sample size. Basic sociodemographic variables (age, duration of postpartum period, residence, religion, education, occupation, birth spacing, complication during pregnancy, desired gender of child, birth weight of baby) related to pregnancy were collected. The Edinburgh Postnatal Depression Scale was used to estimate the prevalence of PPD. **Results:** The prevalence of PPD in the study was 14.2%. The mean ± standard deviation age of women was 27.1 ± 4.7 years. Sociodemographic factors such as maternal age, low level of education, and family type and obstetric factors such as age at first pregnancy, parity, and history of abortion were significantly associated with PPD ($P < 0.05$). **Conclusion:** Risk factors related to sociodemographic and obstetric history were found to be significantly associated with PPD. To prevent major depression in postpartum, early detection and timely referral are needed.

Keywords: Edinburgh Postnatal Depression Scale, postpartum depression, postpartum women, prevalence, risk factors, western India

Introduction

As a tragic but rare event, maternal mortality accounts for a small fraction of the overall burden of poor maternal health. Maternal morbidity, the health problems borne by women during pregnancy, childbirth, and the postpartum period also contribute to this burden in a major way. Measuring the burden of pregnancy and related postpartum morbidity is crucial to achieving the health and development goals articulated in the Sustainable Development Goals (SDGs) and those of the Global Strategy for Women's Health.[1]

Many females experience a wide range of overwhelming emotions such as anticipation, excitement, happiness, fulfilment, anxiety, frustration, confusion, and sadness/guilt during pregnancy and the postpartum period. The postpartum period makes them highly vulnerable to various psychiatric disorders. There are three common forms of postpartum affective illness: the blues (baby blues, maternity blues), postpartum (or postnatal) depression, and puerperal (postpartum or postnatal) psychosis. Postpartum nonpsychotic depression is the most common complication of childbearing affecting approximately 10–15% of women and as such represents a considerable public health problem affecting women and their families.[2]

The effects of postpartum depression (PPD) on the mother, her marital relationship, and her children make it an important condition to diagnose, treat, and prevent.[3] The prevalence of PPD in India is 20–22 per 1000 births according to the Bulletin of the World Health Organization on PPD in India 2017. The southern region of the country tops the PPD chart with an estimated overall pooled prevalence of 26%, followed by eastern (23%), south-western (23%), and western regions (21%).[4] The highest proportion of disability adjusted life years (DALYs) for women occurs during key reproductive-age years. These findings highlight the

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importance of consideration for perinatal (i.e. timeframe just before and after birth) psychiatric morbidity. On average, 10% of pregnant women and 13% of postpartum women experience some type of mental disorder, most commonly depression or anxiety.[5]

Most of the time, PPD remains undiagnosed and due to that remains untreated also. This could be due to social taboos related to psychiatric illness in society. Other factors contributing to the low detection rate include low screening rates for PPD, lack of awareness, and knowledge gaps regarding symptoms associated with PPD among mothers and caregivers. Untreated PPD can lead to chronic depression. The study was conducted to estimate the prevalence of PPD and assess the associated risk factors for PPD.

Materials and Methods

An institutional-based cross-sectional study was conducted during April 1, 2021 to November 30, 2021 at a tertiary care hospital of Rajkot city, Gujarat. Four hundred and fifty postpartum women with a gestational period ranging from 1 to 12 months postpartum, attending the Paediatric Outpatient Department (OPD) of a tertiary care hospital, were included in the study after taking informed written consent. The ethical issue of research and human protection was ensured by obtaining an ethical approval letter with the registration number ECR/635/INST/GJ 2014/RR-20 from the Institutional Ethics Committee. The sample size was calculated with the 20.4% prevalence of PPD found in a previous study conducted in Gujarat.[6] With the help of the formula $N = 4PQ/L^2$ and taking 20% of relative error (L), the sample size derived was 390. Considering whether 10% of them were nonrespondents, the final sample size was calculated to be 450. The sampling method was systemic random sampling. OPDs of a specific pediatric age group (1 to 12 months) were approximately 20–25 daily, and OPDs function from Monday to Saturday except on Government holidays. The first women entering a pediatric OPD of a given age group were selected as the first study participants from the nursing station list, and then every fourth woman was selected as a sample. If selected women refused to give consent for the interview, the next eligible mother was enrolled as a study participant. Women who were not willing to give written informed consent and women with an ongoing history of any form of known psychiatric illness or being treated at the time of data collection were excluded from the study.

Information was collected in preformed, pretested, and semistructured questionnaires by the interview technique. The questionnaire included information regarding the sociodemographic details and obstetric history. Modified BG Prasad's socioeconomic classification was used considering All India Consumer Price Index of March 2021.[7]

Validated Gujarati version of Edinburgh Postnatal Depression Scale

For estimation of prevalence, women were screened for possible PPD using Edinburgh Postnatal Depression Scale (EPDS) in Gujarati language. This scale was created by Cox *et al*. specifically for postpartum women and is considered one of the most reliable screening tools globally for assessment of PPD. It has been well validated and found to have high sensitivity, specificity, reliability, and accuracy.[8,9] It is a 10-item self-rated questionnaire used extensively for the detection of PPD. The assessment scale was converted into local language Gujarati and was standardized by retranslation to the original language and verified by the psychiatric department. Women who scored ≥10 on the EPDS were considered to have PPD based on a previous study done in Gujarat that suggested the cutoff of 10.5 for the Gujarati women.[10]

Data entry and statistical analysis

Data entry was done in Microsoft Office Excel 2019, and analysis was done using the software package Epi Info (version 7.2.2.6) from CDC, Atlanta, U.S.A. Descriptive analysis (frequency and percentage) was done on all variables. Statistical tests like Chi-square were applied to find a possible association with various risk factors. All the factors with a *P* value < 0.05 were considered for binary logistic regression, which was used to determine the magnitude of the association between risk factors and PPD.

Results

A total of 450 postnatal women were screened for PPD. Of them, 64 were found to be suffering from PPD by the EPDS cutoff point at ≥10. Hence, the prevalence of PPD was 14.2% [Table 1].

The age of the women ranged from 19 to 38 years with a mean ± SD (standard deviation) of 27.1 ± 4.7 years. One hundred sixty-seven (37.1%) participants were educated up to high school or beyond (≥10 years). Among the study participants, 118 (26.2%) were working women, whereas the rest were homemakers, the majority of them were living in urban areas [339 (75.3%)], and more than half of them belonged to the middle socioeconomic class [300 (66.7%)]. On bivariate analysis, more than half of women with PPD [37 (57.8%)] were ≤25 years of age. PPD was more likely in women with lesser education [56 (87.5%)]. Considering the type of family, more than half of women [36 (56.2%)] who had PPD were from nuclear family. Sociodemographic factors such as age of women, literacy status, and family type were found to be associated with PPD and found to be significant ($P < 0.05$) and considered for binary logistic regression. After adjustment by binary logistic regression, the factors seen to be significantly associated with PPD were age of women [adjusted odds

Table 1: Prevalence of PPD (*n*=450)

Postpartum depression	EPDS score	No. of women (*n*=450), *n* (%)
Present	≥10	64 (14.2)
Absent	<10	386 (86.8)

EPDS: Edinburgh Postnatal Depression Scale

ratio (AOR): 6.9; 95% confidence interval: 2.3–20.5], education level (AOR: 4.5; 95% CI: 1.7–11.3), and type of family (AOR: 2.8; 95% CI: 1.1–7.1). There was no statistical significance between duration of postpartum period, area of residence, religion, occupation, and socioeconomic status of women and having PPD ($P > 0.05$) [Table 2].

PPD was higher in women [27 (42.2%)] who conceived first pregnancy at an age of ≤ 20 years. Obstetric factors such as type of pregnancy, parity, past history of abortion, birth spacing between last two childbirths, any complication during pregnancy, and birth weight of baby were significantly associated with PPD in bivariate analysis ($P < 0.05$) and were considered for binary logistic regression. A male child desired by the partner was observed more frequently among the majority of women who had PPD [42 (95.5%)] and significantly associated with PPD. After adjustment with binary logistic regression, the factors that showed a significant association with PPD were age at first pregnancy (AOR: 8.2; 95% CI: 2.8–23.6), parity (AOR: 3.1; 95% CI: 1.7–5.5), and past history of abortion (AOR: 3.2; 95% CI: 1.5–7.0) [Table 3].

Discussion

PPD is the most common complication associated with childbirth. Various studies have been conducted in different parts of the world to find out the link between risk factors and PPD, showing different results. The present study was carried out with the aim of finding an association between sociodemographic and obstetric factors and the occurrence of PPD.

In the present study, a prevalence of PPD was found to be 14.2%; therefore, one in seven women screened with the EPDS was found to have PPD. This finding is comparable with the results of studies carried out in Delhi and Uttar Pradesh, which reported 11.0% and 11.4% prevalence, respectively.[11,12] In another study conducted at Ahmedabad, Gujarat, among 250 postpartum women, the prevalence of PPD using the EPDS scale was found to be 20.4%.[6] Different studies have reported different prevalences.[13-17] A likely explanation for this variation in prevalence is the different study areas, cultures, and population characteristics.

Maternal age has a crucial role in occurrence of PPD. The younger the mother, lesser is her readiness for proper care of the child. In the present study, more than half of women (57.8%) with PPD were ≤ 25 years of age. Maternal age was significantly associated with PPD in the present study ($P < 0.05$). A study carried out in Karnataka found that the majority of women with PPD (66.7%) were younger than 24 years.[18] PPD has been reported to occur in women experiencing motherhood at a younger age and of a low educational level.[4] The present study showed that 87.5% women with PPD had <10 years

Table 2: Association of sociodemographic factors and mental status of women (binary logistic regression analysis) (*n*=450)

Variable	Postpartum depression		Crude OR [95% CI]	Adjusted OR [95% CI]	*P*
	Present (*n*=64) *n* (%)	Absent (*n*=386) *n* (%)			
Age (years)					
≤25	37 (57.8)	162 (42.0)	1.8 [1.1-3.2]	6.9 [2.3-20.5]	<0.001
>25	27 (42.2)	224 (58.0)	1	1	
Duration of postpartum period (months)					
1 – 6	35 (54.7)	235 (60.9)	0.7 [0.4-1.3]	-	-
7-12	29 (45.3)	151 (39.1)	1		
Residence					
Urban	43 (67.2)	296 (76.7)	0.6 [0.3-1.1]	-	-
Rural	21 (32.8)	90 (23.3)	1		
Religion					
Hindu	51 (79.7)	304 (78.8)	1.0 [0.5-2.0]	-	-
Other	13 (20.3)	82 (21.2)	1		
Education					
<10	56 (87.5)	227 (58.8)	4.9 [2.3-10.5]	4.5 [1.7-11.3]	0.001
≥10	8 (12.5)	159 (41.2)	1	1	
Occupation of women					
Working	17 (26.6)	101 (26.2)	1.0 [0.5-1.8]	-	-
Housewife	47 (73.4)	285 (73.8)	1		
Type of family					
Nuclear	36 (56.3)	158 (40.9)	1.9 [1.1-3.2]	2.8 [1.1-7.1]	0.03
Joint	28 (43.8)	228 (59.1)	1	1	
Socioeconomic class					
Upper	2 (3.1)	9 (2.4)	1	-	-
Middle	36 (56.3)	264 (68.4)	0.6 [0.1-2.9]		
Lower	26 (40.6)	113 (29.2)	1.0 [0.2-5.1]		

Table 3: Association of obstetrics factors with PPD (binary logistic regression analysis) (*n*=450)

Variable	Postpartum depression		Crude OR [95% CI]	Adjusted OR [95% CI]	*P*
	Present (*n*=64) *n* (%)	Absent (*n*=386) *n* (%)			
Age at marriage					
≤20	34 (53.1)	165 (42.7)	1.5 [0.9-2.6]	-	-
>20	30 (46.9)	221 (57.3)	1		
Age at first pregnancy					
≤20	27 (42.2)	87 (22.5)	2.5 [1.4-4.3]	8.2 [2.8-23.6]	<0.001
>20	37 (57.8)	299 (77.5)	1	1	
Type of pregnancy					
Unplanned	39 (60.9)	160 (41.5)	2.2 [1.3-3.8]	2.1 [0.9-4.7]	0.07
Planned	25 (39.1)	226 (58.5)	1	1	
Parity					
Primipara	30 (46.9)	104 (26.9)	2.4 [1.4-4.1]	3.1 [1.7-5.5]	<0.001
Multipara	34 (53.1)	282 (73.1)	1	1	
History of abortion					
Present	45 (70.3)	160 (41.5)	3.3 [1.9-5.9]	3.2 [1.5-7.0]	0.002
Absent	19 (29.7)	226 (58.5)	1	1	
Number of male children					
Nil	19 (29.7)	127 (32.9)	0.9 [0.5-1.5]	-	-
≥1	45 (70.3)	259 (67.1)	1		
Number of female children					
Nil	14 (21.9)	92 (23.8)	0.9 [0.5-1.7]	-	-
≥1	50 (78.1)	294 (76.2)	1		
Birth spacing (in years)*					
<3	27 (79.4)	125 (44.3)	4.8 [2.0-11.5]	1.0 [0.9-1.0]	0.06
≥3	7 (20.6)	157 (55.7)	1	1	
Complication during pregnancy					
Present	8 (12.5)	13 (3.4)	4.1 [1.6-10.3]	2.9 [0.9-9.7]	0.07
Absent	56 (87.5)	373 (96.6)	1	1	
Desired gender of child in partner**					
Male	42 (95.5)	206 (80.2)	4.9 [1.1-21.3]	1.0 [0.9-1.0]	0.14
Female	2 (4.5)	49 (19.2)	1	1	
Birth weight of baby					
≤2.5	41 (64.1)	161 (41.7)	2.5 [1.4-4.3]	1.9 [0.9-4.3]	0.10
>2.5	23 (35.9)	225 (58.3)	1	1	

*Primi women were excluded. **Partners who had no specific gender preference were excluded. OR: Odds ratio, CI: Confidence interval

of schooling ($P < 0.05$). Similar results were reported from a study conducted in Chennai and found that the risk of PPD is 1.70 times higher in mothers who have studied below class 10.[19]

Maternal occupation was not associated with PPD in this study, which was consistent with a study done in Darbhanga.[20] Considering the type of family, women living in a nuclear family had odds of 2.8 times higher risk of PPD compared to women living in a joint family. Similar findings were observed in a study conducted in Assam and reported that women living in a nuclear family had odds of 3.7 times higher risk of postnatal depression.[21] The lack of family support increases women's burden of child rearing in the nuclear family, causing stress and depression. In contrast to this finding study done at Anand, Gujarat reported that staying in a nuclear family reduces the odds of PPD by 11.11 times compared with staying in a joint family.[14] Socioeconomic status is a strong predictor of mental health. A study conducted at Karnataka reported that PPD was more common in women (63.8%) belonging to a middle socioeconomic class.[18] Similar results were observed in the present study, where more than half of women (56.3%) were from the middle socioeconomic class. The association between socioeconomic status and PPD was not found to be significant in the present study ($P > 0.05$).

PPD (42.2%) was more common in women with a younger age at first pregnancy (≤20 years), and the association was statically significant ($P < 0.001$). For new mothers, increased responsibilities related to child rearing could be first experience and failure to effectively manage these changes can eventually lead to depression. In the present study, a statistically significant association was found between parity and the onset of PPD. These results were compared with a study carried out at Bihar and Gandhinagar and reported that women were more likely to suffer from PPD during their first pregnancy.[20,22]

Abortion can be stressful for a woman and may lead to depression. In the present study, women with previous history

of abortion had odds of 3.2 times higher risk of development of PPD. This finding can be comparable with the result of a study conducted at Udupi, Karnataka, and reported that the previous history of abortion was 4.4 times more likely to develop PPD.[23] Birth spacing reduces infants and maternal mortality. The accumulation of physiological and psychological stress caused by rearing children of the same age has a long-term effect on maternal mental health, but in the present study, birth spacing was not a significant risk factor for PPD. Similar findings were reported from the study done at Ahmedabad, Gujarat.[6] Unplanned pregnancies have a higher risk of developing PPD.[16,21] In contrast to these results, unplanned pregnancy was not significantly associated with PPD in the present study.

Infants' physical health problems in the first year were associated with more maternal mental health problems.[24] In the present study, 64.1% of mothers with low-birth-weight (LBW) babies were depressed during the postpartum period, but this association was not statistically significant. A study done at Indore reported that 52.1% babies who have a low birth weight and their mothers also developed PPD.[25] Preference for a male child may cause or worsen existing depression. Among the Indian studies, carried out at Delhi and Valsad, Gujarat reported a similar risk factor to be significantly relevant for the development of PPD. Furthermore, contrary to these results, the present study found no association between the preference of the male child in the partner and the occurrence of PPD.[17,26] In India, pressure on women to give birth to a male child is tremendous in many places, resulting in an environment that increases the risk of PPD.

Limitations

This study was a hospital-based cross-sectional study; hence, a chance of selection bias was there and this may not represent the entire population at risk.

Conclusion

The study reported 14.2% of prevalence of PPD. The factors which were found to be significantly associated with PPD are maternal age, age at first child, education level, type of family, parity, and previous history of abortion. All potential risk factors associated with PPD can be addressed in routine antenatal and postnatal care for early detection, treatment, and planning of preventive strategies. Future studies can be conducted in the community. Focused group discussions (FGDs) among PPD patients and their family members may elucidate hidden social factors responsible for PPD.

Key message

Planning for effective public health interventions for pregnant women related to early detection and treatment of PPD will help to improve outcome.

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Conflicts of interest

There are no conflicts of interest.

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