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Original Research Article

Prevalence of Postpartum Depression in Mothers Following Delivery in the Tertiary Center of Vidisha

Nehal Jain[1], Naresh Solanki[2], Vikas Yadav[3], Amrendra Kumar Singh[4], Rashmi Dhakad[5*]

[1]MBBS Student, ABV GMC, Vidisha
[2]Associate Professor, Department of Psychiatry, ABV GMC, Vidisha
[3]Scientist, NIREH Bhopal
[4]Assistant Professor, Department of Psychiatry, ABV GMC, Vidisha
[5]Junior Resident, Department of Psychiatry, ABV GMC, Vidisha

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Corresponding author: Dr. Rashmi Dhakad
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Abstract:

Postpartum depression is a mood disorder with a high prevalence, especially in India. The aim of this study was to see the Prevalence of postpartum depression in mothers following delivery in the tertiary center of Vidisha. This is a cross-sectional study done in ABV Government Medical College and associated hospitals, we applied The Edinburgh Postnatal Depression Scale (EPDS) to evaluate mental health. We had seen that the prevalence of postpartum depression was found to be 12.7% in our study. Mean score for women in the immediate postnatal period was 3.86 (SD=5.334). Factors found to be statistically significant with development of depression were no/low level of literacy, lack of family support, marital disharmony and unplanned/unwanted pregnancy.

Keywords: Postpartum Depression, Depression, Perinatal Depression, Depression in Mothers.

Introduction

Postpartum depression (PPD) is a complex mix of physical, emotional, and behavioral changes that happen in some women after giving birth. Postpartum depression (PPD) is a major public health problem in both resource-rich and resource-limited countries [1]. Postpartum depression affects 10-15% of mothers in resource-rich settings [2]. In contrast, the prevalence ranges from 11% to 42% in resource-limited settings [3-14]. This contributes substantially to maternal mortality and morbidity and represents a considerable public health problem affecting women and their families [15]. In addition, maternal depression affects the children's physical and psychological health. Maternal depression results in lower birth weight of infants, higher rates of underweight at 6 months of age, poor long-term cognitive development, higher rates of antisocial behavior, and more frequent emotional problems among their children [16].

Postpartum depression is characterized by tearfulness, emotional liability, loss of appetite, disturbed sleep, despondency, feelings of failure as a mother, problem in concentration, fatigue, and irritability (Robinson et al., 2001). Some women may worry excessively about the baby's health or feeding habits and see themselves as 'bad', inadequate, or unloving mothers (Robinson et al., 2001). Currently, postpartum depression is not classified as a separate illness by itself. Diagnosed as part of an emotional or mood disorder by both DSM-IV (American Psychiatric Association, 1994) and ICD10 (World Health Organization, 1993). Within DSM-IV are "postpartum onset" specifiers for identifying emotional or short psychotic episodes that occur during the postpartum period. Episodes are designated as having postnatal onset if they occur within the first four weeks of childbirth (American Psychiatric Association, 1994). Similarly, in ICD-10, episodes should be diagnosed within a major diagnostic category using specifiers to show their association with puerperium (World Health Organization, 1993).

To address some of these issues, rating scales have been developed, especially for use within the postnatal population. The most established is the Edinburgh Postnatal Depression Rating Scale (EPDS). These are 10 self-assessed measurements that have been translated into more than 12 languages and are highly correlated with physician-rated depression measurements (Cox, Holden, and Sagovsky, 1987) [17]. Many researches provide strong evidence that postpartum depression in

mothers is associated with long term emotional, cognitive and intellectual problems in children [18,19]. Studies from South East Asia document that maternal depression is associated with poor infant health and malnutrition [20-23]. Studies have identified many psychosocial and biological risk factors associated with PPD.

The determinants of postpartum depression in a resource-rich and resource-limited environment share themes across different cultures [24]. However, in low- and middle-income countries such as India, Pakistan, Turkey and Nigeria, unique factors such as child gender, financial anxiety, marital violence, and lack of social support have emerged as risk factors for postpartum depression [6,8,13]. There are very few studies conducted on postpartum depression and associated factors in Central India [5-8], and no data is available in our local setting. The objective of this study is to estimate the prevalence and associated factors for postpartum depression, among women who are delivered in the tertiary care center, Vidisha.

Material and Methods

This study was conducted as a hospital-based cross-sectional study of postpartum women who received postnatal care at the tertiary care center of Vidisha. The tertiary care center provides routine antenatal care, obstetric services, and postpartum care for mothers and childhood immunizations. Vidisha is one of the districts of Madhya Pradesh in India, Vidisha District population in 2021 is 1,631,532 (estimates as per aadhar uidai.gov.in Dec 2020 data). As per the 2011 census of India, Vidisha District has a population of 1,458,875 in 2011 out of which 52% are male and 48% are female.

Literate people are approximately 70.53% out of which 79.14% are male and 60.85% are female. Vidisha District sex ratio is 896 females per 1000 males [25].

Study population, sampling, and recruitment

Eligible participants included all postpartum women, aged 18 years or older, who delivered at the tertiary care center of Vidisha and could speak Hindi, the local primary language.

Exclusion criteria

- Women who are unwell due to perinatal medical complications.
- Women who have a pre-existing chronic physical condition, cognitive deficits, or mental retardation.
- Women who are unable to give informed consent or have the inability to comprehend the questions of the study

The required sample size was 110 based on the formula 4PQ/L2.

During the 2-month study period, we went daily to the postpartum ward and approached all postpartum women. Eligible women were invited to take part in the study. Participants, who fulfilled the inclusion criteria for the study and provided written informed consent, were recruited by continuous sampling method.

All diagnostic interviews were conducted in the postpartum ward in Hindi, the most widely spoken language in Vidisha. Participants were interviewed on the third or fourth day after delivery in the hospital ward. Most of the postpartum women were discharged from the hospital, 72-96 hours after delivery. First, written consent was taken, then mothers completed a structured questionnaire that collected information on demographics and socio-economic characteristics, family composition, obstetric variables, and history of current or past psychiatric illness in the participant or family.

Obstetric histories included information about the current pregnancy, including the type of delivery, prematurity of the infant, infant gender, infant illness, infant hospital admission, and infant death. Information on life events, the quality of the marital relationship, and family support were also collected. The Edinburgh Postnatal Depression Scale (EPDS) was used to evaluate mental health. All study measures were translated into the local language (Hindi).

Measures

The first questionnaire consisted of demographic (socio-cultural) questions and the second one was Edinburgh postnatal depression scale (EPSD). The Edinburgh postnatal depression scale: The EPDS is a 10-item self-report scale based on a 1-week recall, and is specifically designed to screen for postpartum depression in the community.

EPDS assesses the rating of Anhedonia and reactivity. (I have been able to laugh and see the funny side of things; I have looked forward with enjoyment to things) self-blame, anxiety, panic, coping (things have been getting on top of me), insomnia (due to unhappiness) sadness, tearfulness, and self-harm. Each item is rated from 0 to 3, yielding a total score of 0-30. Seven of its items are reverse-scored.

The EPDS is easy to administer and has proven to be an effective screening tool. Mothers who score above 13 are likely to be suffering from a depressive illness of varying severity. The scale indicates how the mother has felt during the previous week. In doubtful cases, it may be useful to repeat the tool after 2 weeks.

The scale will not detect mothers with anxiety neuroses, phobias, or personality disorders [17]. In India, the Hindi version of the EPDS has been validated as a screening tool to detect perinatal depression The optimal cut-off score for the Hindi validation of the EPDS was 9/10 for antenatal depression with sensitivity, specificity, positive and negative predictive value of 65.38%, 79.73%, 53.13%, and 86.76% respectively and area under the curve 0.7346. The internal consistency using Cronbach's alpha was 0.86 indicating good homogeneity [26].

Data analysis

Data entry and analysis of the variables were done using the Statistical Package for Social Sciences (SPSS for Windows, Version 16.0. SPSS Inc., Chicago). Descriptive statistics were calculated for background variables, postpartum depression. Association between postpartum depression and the related factors were analyzed using the Chi-square test.

Ethical considerations

Informed consent was obtained from all study participants. The study protocol was approved by the institutional ethics committee.

Results

Participant characteristics

During the study period, a total of 110 women were selected by continuous sampling. None of the participants refused to participate. The demographic and socio-economic characteristics of the study sample are depicted in table 1. 58.2 % of the subjects were aged between 18-25 years.31.8% of the subjects was aged between 26-30 years.

Only 10 % of the patients were aged above 30 years. 7(6.4%) women were illiterate, 49(44.5%) women had primary school education, 32 (29.1%) had attended secondary school, 15 (13.6%) had a graduate degree, and 7(6.4%) women had a postgraduate degree.

All of them were married. The majority of participants was unemployed (88.2%) and lived in extended or joint families (74.5%). Nearly, all fathers (98.2%) were employed; 44 (40%) of households had a family income of less than 5000 INR per month, 32.7% of households had a family income between 5000-10,000 INR, and 27.3% had an income of more than 10,000 INR. 49 women (44.5%) were primigravid. Most pregnancies were planned (91%) and a majority of women (84%) did not have any significant antenatal problems. Most women had a cesarean delivery (82.7%); 17.3% had a vaginal delivery. Nearly, half of the women (54.5%) delivered a male infant while 45.5% of women gave birth to a female infant. The socio-demographic factors are shown in table 1.

Table 1:

Frequency			**Percent**
Age	18-25	64	58.2
	26- 30	35	31.8
	>30	11	10.0
	Total	110	100.0
Residence	Urban	49	44.5
	Rural	61	55.5
	Total	110	100.0
Education	illiterate	7	6.4
	primary	49	44.5
	secondary	32	29.1
	graduate	15	13.6
	post graduate	7	6.4
	Total	110	100.0
Mother's occupation	Unemployed	97	88.2
	Employed	13	11.8
	Total	110	100.0
Father's occupation	Unemployed	2	1.8
	govt job	4	3.6
	private job	19	17.3
	Bank	2	1.8
	Labourer	25	22.7
	Farmer	28	25.5
	Self	30	27.3
	Total	110	100.0
income per month	less than 5000	44	40.0

	5000-10000	36	32.7
	>100000	30	27.3
	Total	110	100.0
type of family	Nuclear	28	25.5
	Joint	82	74.5
	Total	110	100.0

Prevalence of postpartum depression

Screening by EPDS gives a maximum score of 30 and women who scored more than 13 are considered screened positive for postnatal depression. The prevalence was found to be 12.7% in our study. The mean score for women in the immediate postnatal period was 3.86.(SD=5.334)

Factors associated with postpartum depression

Factors found to be associated with depression were no/low level of literacy (p=0.029) family support (p=0.001), marital disharmony (p=0.003) and unplanned/unwanted pregnancy (0.002). The prevalence of depression was found to be higher in women aged between 26 to 30 years (14.3%) as compared to other age groups but it is statistically not significant (0.900). This means that there is no age variation among depression in mothers. Grossly, it may appear significant but it is due to less sample size. Depression among rural mothers was found more(18%) than urban mothers(6%). P value for this is 0.062 which is slightly more than 0.05.

Among illiterate mothers, 42.9% of mothers were found depressed while depression was not found in graduate mothers. This is highly significant (p=0.029). 11% of the unemployed women were depressed while 23.1% of the employed women were depressed. But statistically, this is not significant. 24% of the women whose husband was a laborer were found to be depressed, which is a high percentage as compared to the other professions. But this is not statistically significant.15.9% of the women whose monthly income was less than 5000INR were found to be depressed. But since p=0.488, monthly income is not a significant factor.

Among women living a in a nuclear family, 14.3% were found to be depressed, while 12.2% of the women living in joint family were found to be depressed. This is statistically not significant.

Of women who received no/poor family support, 50% of them were found to be depressed, while only 9.8% women who received family support were found to be depressed. This is statistically significant (p=0.001). 38.5% of the women who had marital disharmony were found to be depressed while 9.3% of women who had no such issues were found to be depressed. This is statistically significant (p=0.003).

For women who had unplanned pregnancies, 1.4% of them were found to be depressed and 60% of women who had unwanted pregnancy were found to be depressed. Unplanned/unwanted pregnancy is a statistically significant factor(p-0.002) in contributing to the development of depression.

Among women who delivered by vaginal route, 15.8% were found to be depressed while 12.1% of the women who had C-section were found to be depressed. This is statistically not significant.

Table 2 depicts the relationship of socio-demographic factors with depression.

Table 2: Relationship of socio-demographic factors with depression

Depression					**Total 64**	
No				**Yes**		**Significance**
Age	18-25	Count	56	8		$X^{2=}.210^{a}$ Df=2 P=0.900
		% Within Age	87.5%	12.5%	100.0%	
	26- 30	Count	30	5	35	
		% Within Age	85.7%	14.3%	100.0%	
	>30	Count	10	1	11	
		% Within Age	90.9%	9.1%	100.0%	
Total		Count	96	14	110	
		% Within Age	87.3%	12.7%	100.0%	
Residence	Urban	Count	46	3	49	$X^{2=}3.470^{a}$ Df=1 P=0.062
		% Within Residence	93.9%	6.1%	100.0%	
	Rural	Count	50	11	61	
		% Within Residence	82.0%	18.0%	100.0%	
Total		Count	96	14	110	
		% Within Residence	87.3%	12.7%	100.0%	

Education	illiterate	Count	4	3	7	$X^{2=}10.806^{a}$ Df=4 P=0.029
		% Within Education	57.1%	42.9%	100.0%	
	Primary	Count	42	7	49	
		% Within Education	85.7%	14.3%	100.0%	
	Secondary	Count	30	2	32	
		% Within Education	93.8%	6.3%	100.0%	
	Graduate	Count	15	0	15	
		% Within Education	100.0%	0.0%	100.0%	
	Post graduate	Count	5	2	7	
		% Within Education	71.4%	28.6%	100.0%	
Total		Count	96	14	110	
		% Within Education	87.3%	12.7%	100.0%	
Mother's occupation	Unemployed	Count	86	11	97	$X^{2=}1.422^{a}$ Df=1 P=0.233
		% Within Mother's occupation	88.7%	11.3%	100.0%	
	Employed	Count	10	3	13	
		% Within Mother's occupation	76.9%	23.1%	100.0%	
Total		Count	96	14	110	
		% Within Mother's occupation	87.3%	12.7%	100.0%	
Father's occupation	Unemployed	Count	2	0	2	$X^{2=}7.319^{a}$ Df=6 P=0.292
		% Within Father's occupation	100.0%	0.0%	100.0%	
	Govt job	Count	4	0	4	
		% Within Father's occupation	100.0%	0.0%	100.0%	
	Private job	Count	19	0	19	
		% Within Father's occupation	100.0%	0.0%	100.0%	
	Bank	Count	2	0	2	
		% Within Father's occupation	100.0%	0.0%	100.0%	
	Labourer	Count	19	6	25	
		% Within Father's occupation	76.0%	24.0%	100.0%	
	Farmer	Count	25	3	28	
		% Within Father's occupation	89.3%	10.7%	100.0%	
	Self	Count	25	5	30	
		% Within Father's occupation	83.3%	16.7%	100.0%	
Total		Count	96	14	110	
		% Within Father's occupation	87.3%	12.7%	100.0%	
income	Less than 5000	Count	37	7	44	$X^{2=}1.437^{a}$ Df=2 P=0.488
		% Within income per month	84.1%	15.9%	100.0%	
	5000-10000	Count	31	5	36	
		% Within income per month	86.1%	13.9%	100.0%	
	>100000	Count	28	2	30	
		% Within income per month	93.3%	6.7%	100.0%	
Total		Count	96	14	110	
		% Within income per month	87.3%	12.7%	100.0%	
type of family	nuclear	Count	24	4	28	$X^{2=}.082^{a}$ Df=1 P=0.774
		% Within type of family	85.7%	14.3%	100.0%	
	joint	Count	72	10	82	
		% Within type of family	87.8%	12.2%	100.0%	
Total		Count	96	14	110	
		% Within type of family	87.3%	12.7%	100.0%	

Table 3: depicts relationship of obstetric factors with postpartum depression

Depression						Significance
No				Yes	Total	
Gravidity	1	Count	43	6	49	
		% Within Gravidity	87.8%	12.2%	100.0%	
	2	Count	32	4	36	
		% Within Gravidity	88.9%	11.1%	100.0%	
	3	Count	16	2	18	
		% Within Gravidity	88.9%	11.1%	100.0%	
	4	Count	3	1	4	
		% Within Gravidity	75.0%	25.0%	100.0%	
	5	Count	2	1	3	
		% Within Gravidity	66.7%	33.3%	100.0%	
Total		Count	96	14	110	X^2=1.826[a] df=4 p=0.768
		% Within Gravidity	87.3%	12.7%	100.0%	
Parity	1	Count	49	6	55	X^2=3.538[a] df=3 p=0.316
		% Within Parity	89.1%	10.9%	100.0%	
	2	Count	37	5	42	
		% Within Parity	88.1%	11.9%	100.0%	
	3	Count	7	1	8	
		% Within Parity	87.5%	12.5%	100.0%	
	4	Count	3	2	5	
		% Within Parity	60.0%	40.0%	100.0%	
Total		Count	96	14	110	
		% Within Parity	87.3%	12.7%	100.0%	
Abortions	0	Count	78	11	89	X^2=.700[a] df=3 p=0.873
		% Within Abortions	87.6%	12.4%	100.0%	
	1	Count	15	3	18	
		% Within Abortions	83.3%	16.7%	100.0%	
	2	Count	1	0	1	
		% Within Abortions	100.0%	0.0%	100.0%	
	3	Count	2	0	2	
		% Within Abortions	100.0%	0.0%	100.0%	
Total		Count	96	14	110	
		% Within Abortions	87.3%	12.7%	100.0%	
Children	1	Count	51	6	57	X^2=2.399[a] df=3 p=0.494
		% Within Children	89.5%	10.5%	100.0%	
	2	Count	37	5	42	
		% Within Children	88.1%	11.9%	100.0%	
	3	Count	5	2	7	
		% Within Children	71.4%	28.6%	100.0%	
	4	Count	3	1	4	
		% Within Children	75.0%	25.0%	100.0%	
Total		Count	96	14	110	
		% Within Children	87.3%	12.7%	100.0%	
Current pregnancy	planned	Count	83	8	91	X^2=12.283[a] df=2 p=0.002
		% Within Current pregnancy	91.2%	8.8%	100.0%	
	unplanned	Count	11	3	14	
		% Within Current pregnancy	78.6%	21.4%	100.0%	
	unwanted	Count	2	3	5	
		% Within Current pregnancy	40.0%	60.0%	100.0%	
Total		Count	96	14	110	
		% Within Current pregnancy	87.3%	12.7%	100.0%	
Complications	None	Count	75	9	84	X^2=3.679[a] df=2 p=0.159
		% Within Complications	89.3%	10.7%	100.0%	
	hypertension	Count	11	1	12	

		% Within Complications	91.7%	8.3%	100.0%	
	other	Count	10	4	14	
		% Within Complications	71.4%	28.6%	100.0%	
Total		Count	96	14	110	

Delivery	normal	Count		16	3	19	X^2=.194[a]
		% Delivery	Within	84.2%	15.8%	100.0%	df=1 p=0.660
	caesarean	Count		80	11	91	
		%	Within	87.9%	12.1%	100.0%	
		Delivery					
Total		Count		96	14	110	
		%	Within	87.3%	12.7%	100.0%	
		Delivery					
Sex of the child	Male	Count		51	9	60	
		% within Sex of the child		85.0%	15.0%	100.0%	X^2=.614[a] df=1
	female	Count		45	5	50	p=0.433
		% within Sex of the child		90.0%	10.0%	100.0%	
Total		Count		96	14	110	
		% within Sex of the child		87.3%	12.7%	100.0%	

Table 4: Family support and marital disharmony

			Depression		Total	Significance
			No	Yes		
family support	no	Count	4	4	8	X^2=10.791[a] df=1 p=0.001
		% within family support	50.0%	50.0%	100.0%	
	yes	Count	92	10	102	
		% within family support	90.2%	9.8%	100.0%	
Total		Count	96	14	110	
		% within family support	87.3%	12.7%	100.0%	
marital disharmony / interpersonal issues	yes	Count	8	5	13	X^2=8.790[a] df=1 p=0.003
		% within marital disharmony / interpersonal issues	61.5%	38.5%	100.0%	
	no	Count	88	9	97	
		% within marital disharmony / interpersonal issues	90.7%	9.3%	100.0%	
Total		Count	96	14	110	
		% within marital disharmony	87.3%	12.7%	100.0%	

Discussion

Mental health is a very important component in well-being of any community. Depression has been received. in recent years depression has received increased attention as it contributes to a considerable disease burden throughout the world. Pregnancy and childbirth, in particular, are major sources of physical and emotional stress for women. Mental well-being is of increasing importance during this period. Postpartum depression is a disease that can severely impair this well-being. Postpartum depression remains a threat to the mother and child relationships as well as the developmental outcomes of the infant. Postpartum depression in mothers can have a detrimental effect on the cognitive development as well as the emotional development of infants. Early recognition and management of postpartum depression is important for better outcomes for the mother and child.

There is great variation in the prevalence of postpartum depression found in different parts of the world. Nevertheless, studies conducted in different parts of India also have a great variation in the prevalence of postpartum depression. It ranges from 6% to 48.5% [27-29]. The possible reasons for great variation are differences in sample size, study population, study design, scales used for measurement.

Recommended value for cut off for EPDS is 13. However, some authors have taken the cut off as low as 8 [27] which may have resulted in over estimation of prevalence rate. In a study in Anand district of Gujarat, where the EPDS was validated for Gujarati women at cut-off score of 10.5 the prevalence was found to be 48.5% [30]. Developers

of the EPDS scale stated that the EPDS score should not override clinical judgment. A detailed clinical assessment should be done to confirm the diagnosis. We took the cut off as 13 in EPDS scale. Our study was a single interview-based study which found the prevalence as 12.7%.

In a cross-sectional study conducted in Puducherry the prevalence was found to be 10.23% [31]. Out of various factors analysed, type of marriage, recent history stressful event, addiction in husband, past history of psychiatric illness, parity were significantly associated with PPD. In contrast to usual belief of parent's preference to male child, this study results show most of them preferred female child. In a study conducted in Delhi by Jain A, Tyagi P, Kaur P, et al, the prevalence was found to be 6.8% [32]. It was found that higher EPDS scores were significantly associated with the birth of a female child. In a community-based cross-sectional study was carried out in rural areas of Ahmedabad the prevalence of depression was 12%.

Sociodemographic factors of postnatal women like age >30 years, nuclear family, domestic violence, and imbalanced budget were significantly associated with depression. Variables related to the health of the mother like unwanted pregnancy, preterm baby, caesarean section, and past history of any psychiatric illness, were also significantly associated with the depression. The variables related to child, like the birth of the female child, very low birth weight, and complication to child during ante, intra, and postnatal periods were also significantly associated with depression [28]. A high prevalence rate (48.5%) was found in a study in Anand district of Gujarat, where the EPDS was validated for Gujarati women at a cut-off score of 10.5 [30]. In another study conducted by Sudeepa et al in rural Bangalore, the prevalence of depression was 11.47% [33]. Partner noon-involvement in baby's care, and spousal dissatisfaction with sex of the new born child were found as risk factors. Other risk factors were excessive crying of the infant, marital dissatisfaction, problem in breastfeeding, inadequate sleep of the mother, lack of social support and not living with the family of origin.

Factors found to be statistically significant ($p<0.05$) with the development of depression were no/low level of literacy ($p=0.029$) family support ($p=0.001$), marital disharmony ($p=0.003$) and unplanned/unwanted pregnancy (0.002).

Literacy plays a very important role in any one's life. It is necessary for leading satisfactory life. It helps the women to deal with ongoing problems. An educated woman is successful mother. Also, health education provides her awareness about the diseases, their prevention and develops health-seeking behavior. Literacy increases the overall earning potential of the family. In countries like India, mothers are primary caregivers and they have a predominant influence in shaping their children. Low levels of literacy are associated with development of depression.

A study conducted by Weiss BD et al, found that low levels of literacy are significantly associated with post-natal depression [34]. Similar results are found in our study. Low levels of literacy emerged as a significant factor ($p=0.029$) in development of depression.

A cross-sectional study conducted in the Wardha district found poor marital relationships as an important cause in development of postpartum depression. In our study, marital disharmony was found to be statistically significant ($p=0.001$). The birth of a child is a very major event in a female's life. Support and good relationship with the husband plays a very important role in emotional stability of the new mother. Marital disharmony depletes a sense of meaning and purpose of life. Also, a good relationship between parents is very necessary for optimum overall development of a child [35].

Family support is very necessary for the emotional well-being of women. Many studies have found a significant association between family support and the development of depression. In our study too family support ($p=0.001$) was found to be statistically significant. Some studies have found unplanned/unwanted pregnancies as a significant factor in the development of postpartum depression. A study conducted by RJ Mercier et al, it was found that Depression was more likely in women with unintended pregnancies [36] .In another study, conducted by Ryanawati Putriarsih et al, a similar finding was noted [37]. In our study too, unplanned/unwanted pregnancies were found as statistically significant ($p=0.001$) in development of depression.

Many studies have found no association of parity with postpartum depression [38,39]. Some studies have found that primiparity associated with development of depression [40,41]. In our study, multiparity was found to be a contributing factor to the development of postpartum depression. The percentages of women with depression increase with parity. This can be explained as due to multiparity the mother may feel an additional load of responsibilities, she has to take care of the new born, look after other children and also complete daily household chores. A very few studies have shown high parity as a risk factor for developing depression [41]. In the study by Hegde et al, most of the multiparous depressed women were from low socioeconomic strata, which would have worsened their adversities and probably made them more susceptible to developing depression [42]. A

similar observation was made in our study. Also, multiparity was associated with perinatal complications, unwanted pregnancies along with low income which together contributed to the development of depression. Multiple factors can be attributed to the development of depression.

In our study, more women in the depressed group, lived in families whose monthly income was below Indian Rupees 5000, although the finding was not found in multivariate analysis, to have a significant impact on postpartum depression. Financial burden also act as an additional stressor, especially when a new family member is being added to the family. Three of the depressed women who lived in nuclear families, were extremely worried about their house rent and how would they manage their daily expenses. Several previous studies have found out very significant association between sex of the child and depression [5].

South Asian countries and developing countries like India have patriarchal society and therefore a male child preference. Many families want a male child and coerce the woman for producing a male child. With repeated conceptions, and unfulfillment of family expectations the woman gets more distressed and this may contribute to the development of depression as documented in previous studies. Chandran et al in Tamil Nadu, south India, showed that the birth of a daughter, when a son was desired, was an important risk factor for depression [6].

Contrary to the above-mentioned studies, our study found no significant association between the gender of the new-born and depression. However, total five women admitted that their family wanted a male child out of which one woman was depressed. A similar study conducted in the Anand district of Gujrat also found no significant relationship between birth of a female child and the development of depression. Instead, it was found that the female sex of the infant was a protective factor from developing postpartum depression for the mother [30,43].

None of the subjects in our study had admitted to having pre-existing illnesses such as depression or psychiatric illness before pregnancy. Lee et al. have suggested these factors as risk for postpartum depression [44]. We did not find any significant relationship between depression and miscarriages in our study. The study of Dr. Amit Vaja et al. (2009)9 (n =370) reported history of miscarriage was a significant risk factor for the development of postpartum depression which is similar to this study [45]. Some studies have shown little or no association of demographic factors with development of postpartum depression [46,47].

In our study too, except literacy all other sociodemographic factors showed no/little association with the development of postpartum depression. Endogenous depression occurs in absence of any stressor or trauma. In other words, it has no apparent outside cause. Its primary cause may be genetic or biological factors.

Out of 14 depressed mothers, two of them had no external stressors, in terms of family support, marital disharmony, illiteracy, unwanted/unplanned pregnancy, sex of the child, perinatal complications, and abortions. We found no studies that have discussed endogenous depression.

In a cohort study, conducted on rural women in Tamil Nadu, the incidence of post-partum depression was 11%. Low income, birth of a daughter when a son was desired, relationship difficulties with mother-in-law and parents, adverse life events during pregnancy and lack of physical help were risk factors for the onset of post-partum depression [6].

Limitations

The limitations of this study are being time bound, a low sample size was recruited and only a single interview was taken. This study was a hospital based cross sectional study. We could have planned a prospective study design for better understanding of the problem. Further studies are required in this field for generalizing the results. Data is not actually representative of the general population as the samples are taken from a particular hospital.

Conclusion

The prevalence of postpartum depression was found to be 12.7%. Factors found to be statistically significant ($p<0.05$) with development of depression were no/low level of literacy($p=0.029$) family support ($p=0.001$), marital disharmony ($p=0.003$) and unplanned/unwanted pregnancy (0.002). More studies should be done on this topic with large sample size and repeated interviews at multiple intervals. A community-based study is always better than hospital-based studies as the former can be applied to the whole community. Several other factors can also be considered in further studies like performing thyroid function tests, hormonal assays, effect of COVID-19 on the mothers.

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