

# Depression in postpartum women residing in urban slums using Patient Health Questionnaire-9

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## ABSTRACT

**Background:** Postpartum period starts about an hour after the delivery of the placenta and followed until 6 weeks. The hormonal changes that take place during this period lead to depression, one of the silent contributors of poor maternal and child health indices in developing countries leading to increased morbidity among women. In India, postpartum depression (PPD) reports approximately 23% of women in hospital-based data and prevalence varies from 11% to 26% in community-based studies. **Objective:** The objective of this study was to estimate the prevalence and factors leading to PPD among women residing in urban slums. **Materials and Methods:** A community-based, cross-sectional study was conducted for 1 year consisting of postpartum women (2–6 weeks) of any age group in urban slums, Dharwad. Patient Health Questionnaire-9 (PHQ-9) scale was used to estimate the prevalence of PPD. **Results:** Of the 284 women, 45.8% were in the age group of 21–25 years, 38.4% had completed secondary education, and most of them 84.9% were housewives. 35% of women were from nuclear family and 53.2% belonged to the upper middle class. Using PHQ-9 scale, it was seen that 7.7% had minor depression and 0.4% had major depression. Increasing age ( $\chi^2=25.97$ ,  $P = 0.001$ ), unplanned pregnancy ( $\chi^2=13.51$ ,  $P = 0.009$ ), those who had pre- and post-term delivery ( $\chi^2=13.83$ ,  $P = 0.008$ ), and those who delivery through cesarean section ( $\chi^2=35.84$ ,  $P < 0.0001$ ) were found to be associated with PPD and the association was found to be statistically significant. **Conclusion:** Equal importance should be given for both physical and mental health of postpartum women for a healthy mother and child.


**KEY WORDS:** Postpartum Depression; Postnatal Depression; Unplanned Pregnancy; Patient Health Questionnaire-9; Cesarean Section

## INTRODUCTION

Estrogen and progesterone, which increase greatly during pregnancy, rapidly drop back to their normal non-pregnant levels in the first 24 h after childbirth. Symptoms of depression may be triggered with such rapid changes in

hormone levels.<sup>[1]</sup> Postpartum depression (PPD) which is also called as postnatal depression (PND) is defined as “a non-psychotic depressive episode of mild to moderate severity beginning in or extending into the first postnatal year” and is often missed by primary health-care physician.<sup>[2]</sup>

PND usually is a result of multiple factors in combination including genetic predisposition, hormonal imbalance, worry, and anxiety.<sup>[3]</sup> Depressed mothers often report lower levels of maternal self-efficacy than non-depressed mothers.<sup>[4]</sup> The child may be exposed to malnutrition, infections, poor growth, and development as these mothers may not be able to breastfeed the infant adequately. PPD can also affect the child’s interpersonal interaction which may lead to insecure

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attachment between an infant and the mother, sleep, and behavioral difficulties.<sup>[5]</sup> From a global perspective, it can also compromise the economic status of the family.<sup>[6]</sup>

Major depression is the fourth leading cause of burden and leading cause of disability as identified by the WHO. Women (25%) have a higher prevalence of major depressive disorder compared with men (10%) during their lifetime.<sup>[7]</sup> Most of the admissions to psychiatric hospital of women occur during the postpartum period accounting for 12.5%.<sup>[8]</sup> Nearly 34% and up to 65% of pregnant women, as reported by the National Family Health Survey-2 from India, do not visit any health facilities even once during their pregnancy, only 35% had institutional deliveries, and these were reported to be more among women from low-income families and those with lower education. Both lower antenatal visits and institutional deliveries have been found to be risk factors for depression.<sup>[9]</sup>

Cultural variations in reporting, interpretation of signs and symptoms, and distinct socioeconomic variables give rise to a wide range of prevalence, and hence, it has been advocated that “the widely cited mean prevalence of 10–15% for PPD is not representative of the magnitude of the problem, due to the wide range of reports.”<sup>[10]</sup>

There are very few studies on PPD and associated factors in India, and no data are available in our local setting. The objective of this study is to know the prevalence and factors leading to PPD among women residing in urban slums as detected by rating scales.

**MATERIALS AND METHODS**

A community-based cross-sectional study was conducted for 1 year in the urban slums of Dharwad, attached to the Department of Community Medicine, SDMCMSH, Dharwad. The sample size was calculated based on the formula  $n = 4pq/L2$ . The prevalence of PPD in India is 26%.<sup>[11]</sup> Hence, the sample size was worked out to be 284 at 5% alpha error.

Postnatal women residing in the urban slums in the postnatal period of 2–6 weeks and who gives consent to participate in the study were included in the study. Women with previously known psychiatric disorder and those who delivered a stillborn or baby with congenital anomalies were excluded from the study.

The study was conducted by doing a house-to-house survey in selected slum areas for 3 days a week with the help of medicosocial workers and anganwadi workers. The anganwadi workers helped in locating the house while the medicosocial workers aided in establishing a rapport with the family of the study participants and assisted in recording the required information. During the study period, the postnatal mothers who were willing to participate voluntarily were explained the need and importance of the study and a written consent

was obtained. The pre-designed and pre-tested pro forma was used to collect information on sociodemographic profile of the mother, birth history, morbidity profile, and health-seeking practices. General physical examination and systemic examination were performed. Anthropometric measurements such as weight and height of the mother were measured and recorded. Patient Health Questionnaire-9 (PHQ-9)<sup>[12]</sup> was used to assess depression among postnatal women.

PHQ-9 is a 9-item depression module, which consists of the actual criteria on which the diagnosis of major depression is based. Due to its brevity, relatively high positive predictive value (55% in primary care settings), and ability to provide information about both diagnostic criteria and depression severity, the PHQ-9 is thought by some to be the “best available depression screening tool for primary care.” PHQ-9 scoring: A score of 0–4 was considered as having no depression, 5–9 considered as mild depression, 10–14 as moderate, and 15–19 moderately severe.

**Data Analysis**

Descriptive statistics were applied and data were analyzed using proportions and percentages. Chi-square test was used to find the association between different attributes. Statistical significance was set at 0.05% level of significance ( $P < 0.05$ ).

**Table 1:** Sociodemographic characteristics of postnatal women

Characteristics	Categories	Number, n=284 (%)
Age	15–20	33 (11.60)
	21–25	130 (45.80)
	26–30	93 (32.70)
	31–35	26 (9.20)
	36–40	2 (0.70)
Education	Illiterate	12 (4.20)
	Primary	61 (21.50)
	Secondary	109 (38.40)
	Pre-university	58 (20.40)
	Graduate and above	41 (15.50)
Occupation	Housewife	241 (84.85)
	Business	21 (7.40)
	Laborer	3 (1.05)
	Government employee	8 (2.80)
	Private employee	11 (3.90)
Socio-economic status	Class I	69 (24.29)
	Class II	151 (53.16)
	Class III	51 (17.95)
	Class IV	12 (4.25)
	Class V	1 (0.35)
Type of family	Nuclear	101 (35.60)
	Joint	81 (28.50)
	Three generation	102 (35.90)

**Table 2:** Distribution of study participants based on their delivery parameters

Characteristics	Categories	Number n, n=284 (%)
Planning of pregnancy	Planned	255 (89.70)
	Unplanned	23 (8.10)
	Treated infertility	6 (2.20)
Parity	Primi	135 (47.50)
	Multi	149 (52.50)
Gestational age at delivery	Term	256 (90.14)
	Pre-term	22 (7.75)
	Post-term	6 (2.11)
Place of delivery	Home	1 (0.35)
	Hospital	280 (98.60)
	PHC	3 (1.05)
Mode of delivery	Normal	209 (73.60)
	LSCS	73 (25.70)
	Instrumental	2 (0.70)
High-risk pregnancy	Elderly primi	4 (1.41)
	Twin pregnancy	1 (0.35)
	Grand multipara	3 (1.06)
	Previous LSCS	15 (5.28)
	Previous two abortion	8 (2.82)
	Gestational diabetes	6 (2.11)
	Pregnancy-induced HTN	14 (4.93)
Type of delivery	Normal	209 (73.60)
	LSCS	73 (25.70)
	Instrumental	2 (0.70)

LSCS: Lower abdominal cesarean section

**Table 3:** Distribution of study participants based on information of the baby they delivered

Characteristics	Categories	Number n, n=284 (%)
Duration of stay	1–3	181 (63.7)
	4–7	30 (10.6)
	8–10	58 (20.4)
	>10	15 (5.3)
NICU admission	Yes	62 (21.75)
	No	223 (78.25)
Weight of the baby	Low birth weight	86 (30.18)
	Normal	198 (69.47)
	Big baby	1 (0.35)
Sex of the baby	Male	157 (55.28)
	Female	126 (44.37)
	Twin	1 (0.35)
Trouble breastfeeding	Yes	18 (6.3)
	No	266 (93.7)

Data entry was performed using Microsoft Excel and analysis was carried out with the help of Statistical Package for the Social Sciences – 20.0.1 (SPSS Statistics – 20.0.1).

**Table 4:** Prevalence of postpartum depression using PHQ-9

PHQ-9	Frequency (%)
No	261 (57.7)
Mild	22 (7.7)
Moderate	1 (0.4)
Total	284 (100)

PHQ-9: Patient Health Questionnaire-9

## RESULTS

In the present study, of the 284 pregnant women studied, majority of them 130 (45.8%) belonged to 21–25 years of age group and only 2 (0.7%) were in the age group of 36–40 years. Majority 109 (38.4%) of women had completed secondary level education, while 12 (4.2%) were illiterates. Our study showed that 241 (84.85%) women were unemployed or homemakers, 102 (35.9%) and 101(35.6%) women belonged to three generation and nuclear family, respectively, and 151 (53.16%) of them belonged to Class II socioeconomic status (SES) [Table 1].

In our study, 23 (8.1%) women had an unplanned pregnancy, 6 (2.2%) were treated for infertility, 149 (52.5%) were multipara, 22 (7.75%) had preterm delivery, and 6 (2.11%) had post-term delivery. Three (1.05%) deliveries were conducted in primary health center and one (0.35%) was home delivery. 73 (25.7%) women had lower abdominal cesarean section (LSCS) (both elective and emergency) and only two (0.7%) had instrumental delivery. About 51 (18%) pregnancies were high-risk pregnancy, of which 4 (7.84%) were elderly primi, 1 (1.96%) was twin pregnancy, 3(5.88%) were grand multipara, 15(29.42%) had a history of previous LSCS, 13 (25.49%) had previous two abortions, 6 (11.76%) had gestational diabetes, and 14 (27.45%) had pregnancy-induced hypertension. Of the 284 women, 53 (18.7%) had more than three children, 126 (44.37%) delivered female baby, one (0.35%) had a twin delivery, of which one was male child and the twin was a female child, 86 (30.18%) of them delivered low birth weight baby, and one (0.35%) had a big baby. Eighteen (6.3%) women had trouble breastfeeding [Tables 2 and 3].

When PHQ-9 was administered to diagnose PPD, it was seen that 261 (91.9%) women had no depression with a score of 0–4, 22 (7.7%) women scored 5–9 had mild depression, and 1 (0.4%) who had a score of >10 had moderate depression [Table 4].

It was seen that 2 (100%) women in the age group 36–40 years had developed minor PND followed by 3 (11.53%) women in 31–35 years, while only 4 (3.08%) and 9(9.68%) in the age group of 21–25 years and 26–30 years, respectively, developed depression. This difference was found to be statistically significant [Table 5].

**Table 5:** Association between postpartum depression and sociodemographic characteristics

Variables	No n=261 (%)	Mild n=22 (%)	Moderate n=1 (%)	Total n=284 (%)	Statistical significance
<b>Age</b>					
15–20	27 (81.82)	6 (18.18)	0 (0)	33 (11.62)	$\chi^2=25.97, P=0.001$ (SS)
21–25	125 (96.15)	4 (3.08)	1 (0.77)	130 (45.77)	
26–30	84 (90.32)	9 (9.68)	0 (0)	93 (32.75)	
31–35	23 (88.46)	3 (11.54)	0 (0)	26 (9.15)	
36–40	2 (100)	0 (0)	0 (0)	2 (0.70)	
<b>Type of family</b>					
Nuclear	91 (90.09)	10 (9.91)	0 (0)	101 (35.56)	$\chi^2=0.785, P=0.94$ (NS)
Joint	76 (93.83)	5 (6.17)	0 (0)	81 (28.52)	
Three generation	94 (92.16)	7 (6.86)	1 (0.98)	102 (35.91)	
<b>Education</b>					
Illiterate	12 (100)	0 (0)	0 (0)	12 (4.22)	$\chi^2=5.406, P=0.067$ (NS)
Literate	249 (91.54)	22 (8.09)	1 (0.37)	272 (95.77)	
<b>Occupation</b>					
Employed	38 (88.37)	4 (9.31)	1 (2.32)	43 (15.14)	$\chi^2=0.987, P=0.610$ (NS)
Unemployed	223 (92.53)	18 (7.47)	0 (0)	241 (84.86)	
<b>SES</b>					
Class I	67 (97.11)	2 (2.89)	0 (0)	69 (24.29)	$\chi^2=8.007, P=0.237$ (NS)
Class II	139 (92.05)	12 (7.95)	0 (0)	151 (53.16)	
Class III	44 (86.28)	6 (11.76)	1 (1.96)	51 (17.96)	
Class IV+V	11 (84.62)	2 (15.38)	0 (0)	13 (4.58)	

SES: Socioeconomic status

**Table 6:** Association between postpartum depression and delivery parameters

Variables	No n=261 (%)	Mild n=22 (%)	Moderate n=1 (%)	Total n=284 (%)	Statistical significance
<b>High-risk status</b>					
Yes	44 (86.27)	7 (13.73)	0 (0)	51 (17.96)	$\chi^2=2.848, P=0.240$ (NS)
No	217 (93.13)	15 (6.44)	1 (0.43)	233 (82.04)	
<b>Parity</b>					
Primi	122 (90.37)	12 (8.89)	1 (0.74)	135 (47.53)	$\chi^2=0.238, P=0.887$ (NS)
Multi	139 (93.29)	10 (6.71)	0 (0)	149 (52.46)	
<b>Mode of delivery</b>					
Normal	194 (92.82)	15 (7.18)	0 (0)	209 (73.59)	$\chi^2=35.84, P<0.001$ (SS)
LSCS	65 (89.04)	7 (9.59)	1 (1.37)	73 (25.70)	
Instrumental	2 (100)	0 (0)	0 (0)	2 (0.70)	
<b>Gestational age at delivery</b>					
Term	237 (92.58)	18 (7.03)	1 (0.39)	256 (90.14)	$\chi^2=13.83, P=0.008$ (SS)
Pre-term	19 (86.36)	3 (13.64)	0 (0)	22 (7.75)	
Post-term	5 (83.33)	1 (16.67)	0 (0)	6 (2.11)	
<b>Planning of pregnancy</b>					
Planned	235 (92.16)	19 (7.45)	1 (0.39)	255 (89.79)	$\chi^2=13.514, P=0.009$ (SS)
Unplanned	20 (86.96)	3 (13.04)	0 (0)	23 (8.098)	
Treated infertility	6 (100)	0 (0)	0 (0)	6 (2.11)	

LSCS: Lower abdominal cesarean section

Of the 73 women who delivered through LSCS, 7 (9.59%) had minor depression and one (1.37%) had moderate depression. Three (13.64%) women who had a pre-term delivery, 1 (16.67%)

women who had a post-term delivery, and three (13.04%) who had not planned their pregnancy had minor depression. These associations were found to be statistically significant [Table 6].

## DISCUSSION

This study was a community-based study conducted among 284 postnatal women residing in urban slums of Dharwad. When PHQ-9 was administered in our study to diagnose PPD, it was seen that 261 (91.9%) women had no depression, 22 (7.7%) had mild depression, and 1 (0.4%) had moderate depression. When tested for factors associated with depression, it was seen that older age women, women who had delivered pre- or post-term, those who had an unplanned pregnancy, and those who delivered through cesarean section had a higher chance of developing depression.

A similar study which was conducted in the University of Minnesota where participants were recruited from Minneapolis and St. Paul metropolitan area clinics used PHQ-9 questionnaire to diagnose PND. It was seen that 45 (8.9%) women had a diagnosis of major depression in 1<sup>st</sup> month of postpartum over the entire course of the study and the findings were similar to our study.<sup>[12]</sup> In a study conducted in a rural population in Thiruvallur district to know the prevalence of depression using PHQ-9, it was seen that 11% women had a mild depression, 7.5% had a moderate depression, 19% women had moderately severe depression, and 2.3% of women had a severe depression.<sup>[13]</sup> The difference in the prevalence of depression is because the study was conducted in a rural area and the study included all the women in the reproductive age group along with postnatal women.

Two (15.38%) women who belonged to Class IV and V SES developed mild PPD followed by 6 (11.76%) women who belonged to Class III SES. One (1.96%) woman in Class III SES had moderate depression. In a study conducted in a rural population in Thiruvallur district, it was seen that 43.17% of women belonging to low SES had a PHQ-9 score of >5 compared to 27.05% of women belonging to medium and high SES.<sup>[13]</sup> Women belonging to lower SES had higher chances of developing PPD when compared to women in higher SES. This may be due to the financial burden on the family which will restrict them from giving the mother and it was seen that 13.64% of the mother in our study who had a preterm delivery, 16.67% of women who delivered after 40 weeks of gestation, and only 7.42% who had term delivery developed PPD. Since sophisticated special care which is extremely expensive, require technological equipment and skilled personnel, is not available in many settings, the survival of, especially the very pre term babies are lower. This is an important cause of disability and handicap and hence might be one of the reasons why preterm delivered mothers had a higher prevalence of PND compared to term deliveries.

This study was a part of a bigger study which also included administration of Edinburgh PND scale, and this scale is to be administered only to postnatal women in the postnatal period 2–6 weeks. This can be extended up to 1 year of postnatal

period while using PHQ-9 scale which will add up to the current scenario. This is a limitation of our study.

## CONCLUSION

Prevalence of depression among postpartum women in the present study was found to be 8.1%. Women >30 years, those who did not have a planned pregnancy, women who had pre- or post-term delivery, and those who delivered through cesarean section had a higher chance of being depressed. Health education sessions should be conducted to educate and counsel the mother about the postnatal period. Health-care personal dealing with pregnant women should be familiar that it is crucial to screen the females for mental ill-health, especially, depression with simple mean from the very first moment of planning for a child and should be continued during and after pregnancy.

PND is a treatable and curable disorder, and hence, doctors and nurses should promptly screen all the postnatal women to ensure that affected women receive the help they need. It is common that women might not herself freely disclose her personal emotional information with a clinician as she might feel that she is judged. Simple instrument PHQ-9 can be used in such cases to screen for women with emotional disturbance.

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