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Postpartum Depression among Mothers of Low-Birth-Weight Babies

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ABSTRACT

Objective: To determine the Postpartum depression among mothers of low-birth weight babies and its associated risk factors.
Study Design: Cross-sectional analytical study.
Place and Duration of Study: Pak Emirates Military Hospital, Rawalpindi Pakistan, from Jun to Dec 2021.
Methodology: A total of 144 women (44 with low-birth weight (LBW) and 100 with normal-birth-weight babies) were enrolled using a consecutive sampling technique. Edinburgh Postnatal Depression Scale (EPDS) was used to assess postpartum depression (PPD). Variables included age, education status, ethnicity, occupation, parity, socioeconomic status, BMI, gestational age at delivery, mode of delivery, comorbidity, antenatal depression, past or family history, suicidal attempts, history of antidepressants, and stressful life events. social support, sleep deprivation, birth weight, gender, feeding practice, length of hospital stays, stay with mother in neonatal period, and ongoing illness.
Results: Mothers of LBW babies had a higher rate of PPD 47.4% as compared to mothers of normal birth weight babies 23.0%. Lower socioeconomic status (p=0.018), preterm delivery (p=0.003), stressful life events (p=0.03), lack of social support by in-laws (p=0.05), antenatal depression (p=0.001), baby not being with mother (p=0.003), bottle-fed babies (p<0.0001), ongoing illness (p=0.002), and prolonged hospital stay (p<0.0001) were associated with PPD with significant p-values.
Conclusion: Health care workers need to be mindful that a low-birth weight baby increases the risk of developing PPD in mothers. Prevention revolves around social support and building confidence among these mothers.

Keywords: Postpartum depression, low-birth weight babies, mothers, risk factors

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INTRODUCTION

Maternal postpartum depression (PPD) is defined as persistent low mood, along with symptoms of feeling low, useless, irritable, and tearful, felt by mothers in their postpartum period.[1] The incidence of this psychiatric disorder is 10 to 15 percent, but it is much higher in the developing world.[2] Among South Asian countries, Pakistan has the highest prevalence of postpartum depression, reaching up to 63 % in some studies.[3] Worldwide statistics say that 7 to 12 percent of all births belong to preterm births, and low income countries are contributing significantly to this issue leading to more low birth weight babies.[4] PPD is dangerous for both the mother and the baby, resulting in maternal mental disorders, infanticide, and increased suicidal rates, and late sequelae involves children with growth and behavioral problems.[5] The Edinburgh postpartum depression scale (EPDS) is a 10-item questionnaire used to evaluate PPD in mothers. Treatment includes supportive therapy, cognitive behavioral therapy, and pharmacological management. Several risk factors for PPD have been identified in multiple studies, but the association with birth weight has seldom been made clear. The objective of our study is to determine the rate of postpartum depression among mothers with low-birth-weight babies and their association with other risk factors.

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METHODOLOGY

The cross-sectional analytical study was conducted at Pak Emirates Military Hospital Rawalpindi, Pakistan from June to December 2021. Sample size of 144 was calculated by taking the prevalence of post-partum depression as 15%[6], at 95% Confidence level and 5% margin of error using the WHO sample size calculator. Non-probability consecutive sampling technique was used to collect data.

Inclusion Criteria: Pregnant patients who delivered an alive baby after 28 completed weeks of gestation and were willing to participate were included in the study.

Exclusion Criteria: Women with an anomalous baby or twin gestation and postpartum or intrapartum

complications. Data was collected from patients at 6 weeks postpartum after taking written informed consent who met the inclusion criteria.

After receiving approval from the Hospital's

Table-I: Characteristics and Socio-demographic of Mothers of Normal and Low-Birth-Weight Babies (n=144)

Variables	Normal Birth-Weight Mothers (n=100) Frequency (%)	Low-Birth-Weight Mothers (n=44) Frequency (%)	*p*-value
Maternal Characteristics			
Age (years) (Mean±SD)	23.90±2.95	25.90± 4.00	0.01
Education			
Illiterate - Matriculate	17(17.0%)	8(18.2%)	0.32
Intermediate	64(64.0%)	32(72.7%)	
Graduate	19(19.0%)	04(9.1%)	
Ethnicity**			
Punjabi	78(78.0%)	33(75.0%)	0.42
Urdu speaking	4(4.0%)	3 (6.8%)	
Kashmiri	3(3.0%)	3 (6.8%)	
Pathan	13(13.0%)	3 (6.8%)	
Hindko	1(1.0%)	1 (2.3%)	
Others	4(4.0%)	1 (2.3%)	
BMI (Kg/m²)**			
18-24.5	24 (24.0%)	8 (18.0%)	0.17
25-29.9	62 (62.0%)	34 (77.0%)	
30 and above	14 (14.0%)	2 (4.5%)	
Occupation			
Housewife	89 (89.0%)	33 (75.0%)	0.10
Working	11 (11.0%)	11 (25.0%)	
Socio-economic status			
Lower	71(71.0%)	35 (79.5%)	0.54
Middle	29 (29.0%)	9 (20.5%)	
Gestational Age at delivery			
(weeks) (Mean±SD)	39.23±1.50	33.3±1.05	<0.001
Parity			
1	44(44.0%)	35(79.5%)	0.001
2-3	47(47.0%)	9(20.5%)	
4 or more	9 (9.0%)	0(0%)	
Mode of delivery			
SVD	48(48.0%)	23(52.3%)	0.7
LSCS	52(52.0%)	21(47.7%)	
Antenatal depression			
Yes	10(10.0%)	0(0%)	0.03
No	90(90.0%)	44(100.0%)	
Family history			
Yes	5(5.0%)	1 (2.3%)	0.6
No	95 (95.0%)	43 (97.7%)	
Past history			
Yes	2 (2.0%)	0 (0%)	1.00
No	98(98.0%)	31(100.0%)	
History of PPD			
Yes	8(8.0%)	1(2.3%)	0.27
no	92 (92.0%)	43(97.7%)	
Stressful life event			
Yes	3 (3.0%)	2 (4.5%)	0.6
No	97 (97.0%)	42 (95.5%)	
Social support by Husband			
Yes	93 (93.0%)	40 (90.9%)	0.73
no	7 (7.0%)	4(9.1%)	
In-laws			
Yes	95 (95.0%)	41 (93.2%)	0.6
no	5(5.0%)	3(6.8%)	
Own family			
Yes	98(98.0%)	44(100.0%)	1.00
no	2(2.0%)	0(0%)	
Use of antidepressants			
Yes	3(3.0%)	1 (2.3%)	?
no	97(97.0%)	43(97.7%)	
Suicidal attempts			
Yes	0 (0%)	0 (0%)	-
no	100 (100.0%)	44(100.0%)	
Baby with mother in postnatal period			
Yes	94 (94.0%)	37 (84.1%)	0.06
No	6 (6.0%)	7 (15.9%)	
Relationship difficulties with Husband			
Yes	3(3.0%)	0 (0%)	0.53
No	97 (97.0%)	44 (100.0%)	

In-laws			
Yes	2 (2.0%)	4 (9.1%)	0.07
No	98 (98.0%)	40 (90.9%)	
Family			
Yes	0 (0%)	0 (0%)	-
no	100(100.0%)	44 (100.0%)	
Sleep Deprivation			
Yes	13(13.0%)	8(18.2%)	0.44
no	87(87.0%)	36 (81.8%)	
Maternal Co-Morbid			
Yes	5(5.0%)	9(20.5%)	0.01
No	95(95.0%)	35(79.5%)	
Neonatal Characteristics Babies' Gender			
Male	39(39.0%)	16(36.4%)	0.76
Female	61(61.0%)	28(63.6%)	
Feeding Practice			
Breast-fed	85(85.0%)	24(54.5%)	<0.001
Bottle-fed	15(15.0%)	20(45.5%)	
Length of Hospital Stay			
Early neonatal period	9(9.0%)	22(50.0%)	<0.001
Neonatal period	47(47.0%)	3(6.8%)	
Not hospitalized	64(64.0%)	19(43.2%)	
Ongoing Illness			
Yes	5(5.0%)	8(18.2%)	0.02
No	95(95.0%)	36(81.8%)	
EPDS Score			
>12	23 (23.0%)	21 (47.7%)	0.003
< 12	77 (77.0%)	23 (52.3%)	

**BMI=Body Mass Index; SVD=Spontaneous Vaginal Delivery; LSCS=Lower Segment Cesarean Section; PPD=Postpartum depression; EPDS= Edinburgh Postnatal Depression Scale **Missing values*

Ethical committee (EC-432/2022), the study was initiated. Patients were divided into two groups; 44 patients had low-birth-weight babies, while 100 mothers delivered babies with normal weight. Screening of postpartum depression was executed using the Edinburgh postpartum depression scale (EPDS), a 10-item self-report scale where a cut-off score of 12 or more was considered as positive for depression. EPDS is a reliable and valid tool with a sensitivity of 85% and a specificity of 77%. Urdu version was used by Hussain *et al*., for the participant's understanding. Demographic variables included age, education status, ethnicity, occupation, parity, socioeconomic status, and BMI. Maternal obstetric factors included gestational age at delivery, mode of delivery, and comorbidity. Psychiatric variables included antenatal depression, past history or family history of Post-partum depression, suicidal attempts, history of taking antidepressants, and any stressful life events. Social factors were socioeconomic status, support by family or husband, relationship difficulties with family or husband, and sleep deprivation. Among baby characteristics, birth weight, gender, feeding practice, length of hospital stays, stay with mother in neonatal period, and ongoing illness were checked. Patients were divided into two groups based on birth weight. The cut-off limit of normal birth weight was 2.5 kg.

Statistical Package for the Social Sciences (SPSS) version 26.00 was used to analyze data. The analysis of variables was presented in the form of frequencies and percentages for categorical variables and Mean±SD for continuous variables. Pearson Chi-square or Fisher's exact test was applied for categorical data to find association. An independent samples t-test was run for normally distributed continuous variables to make the comparison between both groups. The *p*-value of ≤0.05 was considered statistically significant.

RESULTS

A total of 144 pregnant mothers participated in this study. Mean age of the patients was 23.90±2.95 years in the normal birth weight group and 25.90±4.00 years in the low-birth-weight group. Majority fell in 25-29.9 kg/m2 category of BMI. Mean Gestational age at delivery was 39.23±1.50 weeks in normal birth weight group and 33.3±1.05 weeks in low-birth-weight group. Table-I displays the comparison of the characteristics and sociodemographic of mothers of normal and low-birth-weight babies.

When maternal sociodemographic factors were independently assessed for their association with PPD, lower socioeconomic status (p=0.018), preterm delivery (p=0.003), stressful life events (p=0.03), lack of social support by in-laws (p=0.05), and antenatal depression (p=0.001) were associated with significant p-values as shown in Table-II.

When baby demographic variables were independently assessed, baby not being with mother in the postnatal period (p=0.003), mothers who could not breastfeed their newborn (p<0.001), ongoing illness of baby (p=0.002), and prolonged hospital stay of baby (p<0.001) were associated with significant p-values as shown in Table-III.

Mothers of low-birth-weight babies had a higher rate of postpartum depression (47.4%) as compared to mothers of normal birth-weight babies (23%). Analysis revealed a significant association between postpartum depression and low birth weight babies (p=0.003) as shown in Table-IV.

DISCUSSION

Depression postpartum is associated with significant morbidity and mortality both physically and socially which ultimately affects kid's development and learning skills.[7] In UK, Confidential Enquiry into deaths of mothers have emphasized that suicide in pregnancy and during the first postnatal year has become a major cause of maternal death.[8] The overall prevalence of postpartum depression found in this study was 30 % which is in accordance to some recent studies.[6,9] Studies in Asian population have shown negative consequences of postpartum depression on upcoming generations and psychological support can lead to better outcomes both in terms of mental and physical health.[10]

Our analysis has shown that there is a significant difference in postpartum depression of mothers with

Table-II: Association of Maternal Socio-demographic Characteristics with Postpartum Depression (n=144)

Variables	Depressed (n=44) Frequency (%)	Not Depressed (n=100) Frequency (%)	*p*-value
Age (Years)	25.25±4.13	25.50±4.02	0.65
Education			
Illiterate	7(28.0%)	18(72.0%)	0.34
Matriculate	27 (29.0%)	69(70.0%)	
Intermediate	10 (43.0%)	13(56.0%)	
Graduate			
Ethnicity	31(38.0%)	80(72.0%)	0.41
Punjabi	4(57.0%)	3(42.0%)	
Urdu speaking	2 (33.0%)	4 (66.0%)	
Kashmiri	5(32.0%)	11(68.0%)	
Pathan	1(100.0%)	0(0%)	
Hindko	1(33.0%)	2(66.0%)	
Others			
BMI (Kg/m2)**	13(46%)	15(53%)	0.15
18-24.5	23(26.7%)	63(73.2%)	
25-29.9	4(30.0%)	9(69.2%)	
30 and above			
Occupation	40(30.0%)	92(70.0%)	1.00
Housewife	4(30.0%)	8(70.0%)	
Working			
Socio-Economic Status**			
Lower	25(24.6%)	77(75.4%)	0.01
Middle	19(47.5%)	21(52.5%)	
Gestational Age at delivery (weeks) (Mean±SD)	35.80±3.20	37.70±3.60	0.003
Parity	30(37.0%)	49(62.0%)	0.162
1	13(24.0%)	43(76.0%)	
2-3	1(11.2%)	8(88.8%)	
4 or more			
Mode of Delivery**	25(34.0%)	46(64.0%)	0.23
SVD	19(82.0%)	4(18.0%)	
LSCS			
Relationship Difficulty With Husband			
Yes			
No	2(66.7%)	1(33.0%)	0.22
In-laws	44(30.0%)	99(69.0%)	
Yes			
No	4(66.7%)	2(33.3%)	0.07
Own Family	40(29.0%)	98(71.0%)	
Yes			
no	0(0%)	0(0%)	-
Sleep deprivation	44(30.5%)	100(69.5%)	
Yes			
no	9(43.0%)	12(57.0%)	0.18
Maternal co-Morbids	35(29.0%)	88(71.0%)	
Yes			
No	9(50.0%)	9(50.0%)	0.39
	38(29.0%)	91(70.5%)	

	1(70.0%)	2(30.0%)	1.00
Past History	43(31.0%)	98(69.0%)	
Yes			
No			
History of PPD	7(87.5%)	1(12.5%)	0.001
Yes	36(26.4%)	100(73.0%)	
no			
Stressful Life Event	4(80.0%)	1 (20.0%)	0.03
Yes	40(29.0%)	99(71.0%)	
No			
Social Support by			
Husband	40(30.0%)	93(70.0%)	0.73
Yes	4(36.0%)	7(64.0%)	
No			
In-laws	37(28.0%)	97(72.0%)	0.05
Yes	5(62.5%)	3(37.5%)	
no			
Own Family Yes	44(31.0%)	98(69.0%)	1.00
No	0(0%)	02(100%)	
Baby with Mother in Postnatal Period			
Yes			
No	35(27.0%)	96(73.0%)	0.003
BMI (Kg/m2)**	9(69.0%)	4(31.0%)	
18-24.5			`
25-29.9	9(42.8%)	12(57.1%)	0.03
30 and above	10(43.0%)	13(57.0%)	
Antenatal depression	6(100.0%)	0(0%)	
Yes			
No	8(80.0%)	2(20.0%)	0.001
History of Antidepressants	36(27.0%)	98(73.0%)	
Yes			
No			
Suicidal Attempt	3(75.0%)	1(25.0%)	0.085
Yes	41(30.0%)	99(70.0%)	
No			
	0(0%)	0(0%)	-
	44(30.5%)	100(69.5%)	

**BMI=Body Mass Index; SVD=Spontaneous Vaginal Delivery; LSCS=Lower Segment Cesarean Section; PPD=Postpartum depression; EPDS= Edinburgh Postnatal Depression Scale*
***Missing values*

TABLE-III: Relationship of Baby's Demographic Variables with Postpartum Depression (n=144)

Variables	Low-Birth Weight Babies (n=44) Frequency (%)	Normal Birth Weight Babies (n=100) Frequency (%)	*p*-value
Babies' Weight (kg)			
≤2.5	21(48.0%)	23(52.0%)	0.004
>2.5	23(23.0%)	77(77.0%)	
Babies' Gender			
Male	20(36.6%)	35(63.3%)	0.23
Female	24(26.9%)	65(73.1%)	
Feeding Practice			
Breast-fed	24(22.1%)	85(77.9%)	<0.001
Bottle-fed	20(57.0%)	15(43.0%)	
Length of Hospital Stay (days)**			
Early neonatal period	18(58.1%)	13(41.9%)	
Neonatal period	3(60.0%)	2(40.0%)	<0.001
Not hospitalized	14(46.6%)	16(53.4%)	
Ongoing Illness			
Yes	9(69.2%)	4(30.7%)	0.002
No	35(26.7%)	96(73.2%)	

***Missing values*

Table-IV: Postpartum Depression among Mothers of Low-Birth-Weight and Normal Birth Weight Babies (n=144)

Variable	Mothers of Normal Birth Weight Babies Frequency (%)	Mothers of Low-Birth-Weight babies Frequency (%)	*p*-value
Postpartum Depression	21(47.4 %)	23(23.0%)	0.003

normal and low birth weight babies with a higher rate of depression among mothers having low birth weight babies. This was in conformity to an evidence based systemic review.[11] Social support by in laws and husband had a major impact on the presence of psychiatric illnesses like postpartum blues and depression. This has been emphasized in various studies where lack of social support was considered a cause of PPD in immigrant African American women.[12] Two recently original articles found that when social support is increased, it could profoundly reduce the risk of PPD.[13] In our study, the risk of depression was significantly higher among mothers who chose to bottle feed their newborn. This was consistent with a cross sectional study done at Hunan province, china in 2015. According to a research

conducted by Scime *et al.,* 2019, skin to skin care and baby being with mother in the postpartum period was associated with 1.04 % reduction in the rate of PPD. Our study also supported this fact by showing high rates of depression among mothers where baby was not kept with mother in the neonatal period.[14] Our study revealed no association between sleep loss and postnatal depression which was not consistent to an updated review that pointed out that sleep disturbance affects day time alertness and productivity ultimately increasing PPD rates.[15]

One meta-analysis has illustrated more depression among mothers with medical illnesses like diabetes mellitus.[16] Our study fails to show any increased proportion of PPD among mothers with or without co-morbid. Some studies hypothetically say that insulin resistance co-occurs in both diabetics and patients with depressive illness hence supporting their association with each other.[17] Several studies reveals strong positive associations between antenatal depression or depression pre pregnancy with postpartum depression which is consistent with our results.[18] A quantitative study carried out by Hossein and colleagues pointed out a 63 % increase in PPD risk post cesarean section while lower rates were noted after vaginal delivery.[19] This current study demonstrates no association of mode of delivery with depressive illnesses postpartum.

Such higher rates of postnatal depression among new mothers brings us food for thought and workup needs to be done particularly at tertiary care level to provide support and encouragement to mothers. Adequate counselling of families and involvement of psychiatric team may prove to be beneficial in such cases.

LIMITATION OF STUDY

This study had some limitations. First, we could not assess all risk factors for depression postpartum and history of social support was only taken through maternal self-report hence the factor of bias could not be ruled out. Secondly, majority patients who presented to military hospital belonged to lower socioeconomic status. Thirdly, interventions to control this psychiatric illness has not been catered for in the current study, hence future endeavors are required to address this issue.

CONCLUSION

Giving birth to a low birth weight baby increases the risk of developing postpartum depression in mothers. Health care workers need to be mindful that prevention revolves around social support and building confidence among mothers to nurture their newborn in the best possible ways.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

HS & AC: Data acquisition, data analysis, critical review, approval of the final version to be published.

HR & SM: Study design, data interpretation, drafting the manuscript, critical review, approval of the final version to be published.

ZAM & AK: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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