

Postpartum Depression in Mothers of Infants with Very Low Birth Weight

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Abstract: Postpartum depression (PPD) remains a significant public health concern, particularly among mothers of infants with very low birth weight (VLBW). Despite advancements in neonatal intensive care improving survival outcomes, maternal psychological health is often overlooked. The present study explores the association between infant birth weight and maternal depression severity. **Methods:** A cross-sectional analytical study was conducted at Ward 8 of Jinnah Postgraduate Medical Centre, Karachi, from January 2024 to January 2025. A total of 110 postpartum mothers were recruited using non-probability sampling. The participants were categorized into two groups: mothers of infants with birth weights <2500g and ≥2500g. Data were collected using a structured questionnaire comprising demographic details and the Edinburgh Postnatal Depression Scale (EPDS). Statistical analyses included Pearson correlation, chi-square test, and multinomial logistic regression using SPSS version 17.0. **Results:** The mean EPDS scores were significantly higher among mothers of infants with birth weight <2500g (16.29 ± 3.14) compared to those with normal birth weight (13.38 ± 2.78) ($p < 0.001$). Regression analysis indicated a strong association between low birth weight and elevated PPD risk, even after controlling for confounders such as maternal age, education, parity, and family support. Additionally, unplanned pregnancies, cesarean deliveries, and longer neonatal intensive care unit (NICU) stays were linked to higher depression scores. **Conclusion:** Very low birth weight is a significant predictor of postpartum depression. Early identification of high-risk mothers, especially those with limited family support and VLBW infants, is crucial. Routine psychological screening and integrated postpartum care are recommended to mitigate adverse maternal and infant outcomes.

Keywords: Infant, very low birth weight, postpartum depression

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Introduction

There has been a significant improvement in the survival rate of infants who are born with low birth weight. The improvement has resulted from the medical advancements occurred in neonatal intensive care. The medical institute globally has also worked on high-risk pregnancies (1-4). However, there is still the challenge of handling and caring for the infants with low birth weight because they are highly vulnerable (5). Studies also identified that women also go through hormonal changes after the birth of the child, as well as life changes, which also result in depression and its severity can even result into postpartum depression, which is also known as PPD. Around 15% of women face postpartum depression (6, 7). However, the previous studies also failed to isolate any specific reason for depression in mothers post-childbirth. Studies identified various reasons that can result in postpartum depression in women. Some very common reasons include stressful life events, health problems with the child, lack of support from partner and family members, and any stressful event that occurs before or during the pregnancy period (6, 8, 9). In the view of Martins et al. (10) and Luoma et al. (11), depression faced by mothers can hurt the interaction between mother and infant (10, 11). Mothers can show negative behavior towards infants, which damages the interaction between mother and child. The lack of interaction between mother and child can lead to insecure attachment and, in the long run, can also damage the cognitive and growth scores of the infants (5). Children with very low birth weight can be more vulnerable to low cognitive growth due to postpartum depression of the mothers in comparison to children who are born full-term. Around 15 million newborns are preterm, which is a global issue. The worst situation is that around 18% of these children die at the age of five, and one reason for the death is a lack of attention from mothers due to postpartum depression. Postpartum depression can cause malnutrition among newborn infants and a poor quality of life. Therefore, it can be said that finding the right

reason for the depression among mothers and finding the solution is crucial.

The focus of the current research is to find the reason for depression among mothers with a child with very low birth weight. The reason for selecting very low birth weight children and mothers' depression is the limited number of studies available on the topic. The purpose of the research will be to identify the factors of depression in women and their association with very low birth weight.

Methodology

The mothers of infants were recruited from ward 8 of the Jinnah hospital between January 2024 to January 2025. The sample size of the study is based on 110 respondents. Mothers were randomly selected, which is why the sample includes mothers with very low birth weight and full-term babies. The data is collected to identify the relationship between depression and post-traumatic distress in mothers and the low birth weight of the child. Non-probability sampling technique is utilized in the selection of the sample because the researcher is required to focus on specific characteristics of the sample, such as depression, low birth rate of children, and so on. The inclusion criteria that are used for the selection of the respondents for the research are women who gave birth through vaginal delivery or cesarean section, Primigravida and multigravidas, Women with medical conditions like hypertension, diabetes, thyroid disorder or any other illness and Women who delivered after 28 weeks of gestation. Women with stillbirth were not included in the research sample. The respondents were also selected on the basis of the availability of a smartphone.

Quantitative research method is selected, and the data is gathered through a questionnaire survey. The purpose of the selection of a quantitative research method was to be able to include a large sample size to increase the reliability and authenticity of the data, and also to increase the findings



of the research. The questionnaire is developed into selections using the general questionnaire and the Edinburgh Postnatal Depression Scale (EPDS). In the first section of the survey, demographic questions are asked along with the information on mode of delivery, birthweight, and medical illness of the mother. The second section of the survey was based on the statements on depression. The last section was to identify the role of family support during pregnancy. The mothers who were included in the survey were screened for post-partum depression. The respondents were asked to sign their consent before responding to the questionnaire. However, the purpose of the survey was discussed with the respondents to help them make the right decision on whether they want to participate or not.

Survey Questionnaire: The survey questionnaire was developed with questions on demographics and depression, mode of birth, and birth weight.

Edinburgh Postpartum Depression Scale (EPDS): The tool is designed for self-reporting of depression. The range of the score is 0 to 30. A score higher than 12 indicates depression (12).

The data in the current research are presented as means±standard deviations and percents. The categorical data is analyzed through a chi-squared test, which helps in identifying the difference in the results between two different groups of the sample, including the group with normal birthweight and the group with low birthweight. In the study, Pearson correlation analysis was also conducted to identify the relationship between the variables of the results. Regression analysis identified the significance of the relationship between the independent variables, such as low birthweight (main variable), age, number of

pregnancies, education, pre-depression condition, stay of the child in NICU, family support, and so on. The author conducted Multivariate logistic regression, which helped in identifying the impact of each variable on the different groups of the sample. The whole statistical analysis process in the current research is conducted through SPSS. The Windows version 17.0 (SPSS Inc., Chicago, Illinois, USA) was used. A p-value of less than 0.05 was considered statistically significant.

Results

The low birthweight of the infants resulted in longer stays in the NICU and constant tension for mothers about the safety of their child. On the other hand, infants with normal weight at the time of birth were discharged sooner from the hospital with a positive review on the health of the child. It is identified from the Pearson correlation test that the birthweight is also insignificantly linked to the age of the mother. The data indicates that the education of the mother is statistically significant, with a moderate positive relationship with the birthweight. It can be assumed from the data that mothers with education can control the birthweight of their child by proper care during pregnancy. The marital status of the mother is also significantly and positively related to the birthweight of the child. Employment status, household income are also the variables that are positively linked to birthweight. However, the number of previous pregnancies has a negative relationship with the birthweight (Table 1). It is also identified that the cesarian delivery method is common in mothers with low birthweight infants.

Table 1. Demographic characteristics of mothers and their infants

	Category	N%	Mean total PDD±SD	p-value
Age				
Employment	Employed	30 (27.3%)	~14.80	0.000
	Unemployed	42 (38.2%)	~16.52	
	Self-employed	12 (10.9%)	~15.50	
Delivery method	Vaginal	32 (29.1%)	13.84 ± 2.86	0.015
	Cesarean	78 (70.9%)	16.14 ± 3.36	
birthweight	<2500 g	84 (76.4%)	16.29 ± 3.14	0.000
	≥2500 g	26 (23.6%)	13.38 ± 2.78	
Mothers age	18–23	19 (17.3%)	~15.37	0.012
	22–28	18 (16.4%)	~14.33	
	29–32	48 (43.6%)	~15.91	
	33–35	25 (22.7%)	~15.36	
Gestational Age	<38 weeks	47 (42.7%)	16.02 ± 3.0	0.031
	38–42 weeks	63 (57.3%)	14.35 ± 3.40	
Planned pregnancy	Yes	85 (77.3%)	15.07 ± 3.27	0.000
	No	25 (22.7%)	17.12 ± 3.58	

statistically significant difference between group 1 vs. group 2 at the $p < 0.01$ Level

Table 2. Differences in postpartum depression and perceived social support scores between groups

	Group 1 (2.49)	Group 2 (2.5)	2 P value
EPDS	9.72 ± 1.14	10.14 ± 1.04	.000
EPDS (> 12)	15.38 ± 2.33	17.16 ± 3.56	.000

EPDS: Edinburgh Postpartum Depression Scale a statistically significant difference between group 1 vs. group 2 at the $p < 0.01$ Level

statistically significant difference between group 1 vs. group 2 at the $p < 0.01$ Level

Table 3. The correlation coefficients related to EPDS

	Birth Gestational Hospital MSPSS weight	Gestational age at birth	Delivery method	Planned pregnancy	Baby, stay at NICU
PDD	r	r	r	r	r
	-0.569	-0.206	-0.232	-0.376	-0.097
	p-value	p-value	p-value	p-value	p-value
	0.000	0.031	0.015	0.000	0.314

EPDS: Edinburgh Postpartum Depression Scale

The mean score of PPD and the number of mothers with high depression scores indicate that low birthweight results in high depression in mothers. The high PPD score is a score higher than 12. The data also indicates that the majority of the mothers did not have family support. It is identified that low family support for women with low birth weight can result in high depression. The (Table 2).

The multinomial logistic regression results indicate a strong and statistically significant association between low birthweight (LBW) and higher postpartum depression (PPD) scores. Mothers of low-birthweight infants had significantly higher odds of scoring at the highest levels of PPD (e.g., 29), and much lower odds of scoring at the lower levels (e.g., 9–16). This suggests that birthweight is a significant predictor of maternal PPD severity. A 95% confidence interval indicates that the data is statistically significant.

Discussion

The purpose of the current study is to identify the impact of low birthweight on the mental health of mothers. The study identifies whether low weight causes depression or not. The mothers of both normal birthweight 2.5 and low birthweight 2.49 are selected for a survey. The survey was designed using the EPDS. In the survey, other factors such as family support, staying at the hospital, prior symptoms of depression, and marital status were also considered as predictors.

In the study, it was found that the majority of the mothers with low birthweight had a high level of depression. Around 70% or more women had high depression. The high depression rate among mothers with low birth weight was higher than 12. Henceforth, it can be identified from the data that low birthweight causes high depression levels among women. The data shows that around 75% of respondents had low birthweight in the sample. The findings of the current study are similar to other studies that have been conducted to identify the impact of low birthweight on the mental level of mothers, especially the depression level.

The previous studies show that mothers with infants born with low birth weight show signs of depression, and the depression can be of an extreme level. Around 70% and more mothers (from the current sample) showed high depression, and the frequency results indicate a similar number of mothers with low birthweight. Around 70 % or more women had PDD>12. The studies of Singer et al. (2), Kersting et al. (3), and Davis et al. (13) also indicated a high depression rate among mothers with low birthweight. Kersting et al. (3) found that 40% of mothers with low birthweight show symptoms of depression. Davis et al. (13), on the other hand, identified slight depression among women with low birthweight (13). Henceforth, the findings of the study point out the cruciality of continuous screening of mothers with low birthweight for symptoms of depression. Depressive mothers can have harmful thoughts for themselves or their infants, which also makes it significant for mothers to be screened for and treated for their depression (14).

In the current research, a very weak relationship is identified between EPDS and the age of the mothers. However, it is identified that higher education can reduce the depression rate. On the other hand, the mode of delivery (e.g., cesarean) can cause high depression among women. It is also identified from the current study that the longer time spent by the child in NCU can also cause depression among mothers (13, 15). The current study also identified that premature birth (at 33 weeks or less) can also cause depression among women. It is identified that mothers start self-blaming for premature birth. On the other hand, the study also found that high depression can also result in the birth of an infant with low birth weight.

The findings of the current study also say that family support plays a crucial role at the time of birth as well as after it (9, 16). It is identified that the majority of the mothers had low family support (4, 14).

The screening of the mothers is recommended in a traditional manner, such as the follow-up programs (14, 17). On the other hand, a pediatrician can be assigned, such as for regular visits to ensure that mothers and infants who are most at risk of facing the harmful impacts of PDD are

protected at the right time, and it also gives the chance of timely treatment. The treatment of mothers with PPD due to low birth weight is crucial for the protection and development of the child, as well as to enhance the stability of the family.

Conclusion

In the current study, low birthweight is identified to have a strong association with high maternal depression scores. It is recommended that pediatricians focus on the behavior of mothers during follow-up sessions and evaluate carefully for the symptoms of depression.

Declarations

Data Availability statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (IRBEC-MMS-03-24)

Consent for publication

Approved

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Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

MK (FCPS Trainee)

Manuscript drafting, Study Design,

SN (Associate Professor)

Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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