Original Article

Beyond the First Cry: Prevalence and Risk Factors of Postpartum Depression in Sindh, Pakistan

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Abstract

Objective: To assess Post Partum depression (PPD) prevalence across hospitals in Sindh, Pakistan, and determine its association with various maternal, neonatal, and socioeconomic risk factors.

Methodology: This multicenter cross-sectional study was conducted between April and September 2023 at various hospitals in Hyderabad and Karachi. A total of 219 mothers aged 20-40 years with recent singleton births were included in the study. The Edinburgh Postnatal Depression Scale (EPDS) and a structured questionnaire were used to gather data. Statistical analysis was done using SPSS (version 22) with chi-square tests and Pearson's correlation analysis.

Results: The mean EPDS score among participants was 18.18±5.90, with 66.21% screening positive for PPD. Significant positive correlations were found between PPD and maternal age ($r=0.96$, $p<0.001$), BMI ($r=0.95$, $p<0.001$), and significant negative correlation with maternal education level ($r=-0.93$, $p<0.001$). Factors such as low income, rural residence, extended family structure, cesarean delivery, non-exclusive breastfeeding, multiparity, lack of spousal support, neonatal complications, and previous miscarriages were significantly associated with PPD ($p<0.05$).

Conclusion: PPD is highly prevalent in Sindh and is significantly associated with a multitude of maternal, neonatal, and socioeconomic risk factors such as maternal age, education, income, and multiparity, among others.

Keywords: Depression, Edinburgh Postnatal Depression Scale, Mental Health, Post-natal depression, Postpartum Depression

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Introduction

Mental health is a growing public health burden that considerably affects the well-being of not only the individual but of the entire population at large. More than 10% of the worldwide burden of illness is attributed to mental health problems.[1] According to the World Health Organization (WHO), 1 out of every four individuals experiences a mental health disorder at some point in their life, and over 300 million individuals are suffering from depressive disorders globally[1,2] Research has shown that depression is likely to be more prevalent among women than men, owing to variable factors such as hormonal alterations, pubescence, gestation, and peri-menopausal phase.[3, 4]

Among the most commonly occurring side effects of childbirth is postpartum depression (PPD). PPD is defined by the American Psychiatric Association (APA) as a Major Depressive Episode (MDE) that happens within four weeks of giving birth, during which a mother experiences strong feelings of sadness, anxiety, indifference, and despair.[5] However, the International Classification of Diseases (ICD 10) states that symptoms of PPD typically manifest in the first six weeks after childbirth, and can also be detected up to six months later.[6] In extreme cases, however, they can persist into the first and second years after giving birth.[7] Symptoms of PPD such as mood swings, bulimia nervosa or anorexia nervosa, anxiety, irritability, and suicidal ideation, can drain new mothers at a particularly crucial time in their lives, depriving them of the anticipated joy of having a baby due to which PPD is often referred to as the "the thief that steals motherhood".[8, 9] Mothers may feel hesitant and self-conscious, and they might feel the need to suppress inappropriate melancholy. As a result, mothers are less inclined to seek professional assistance and express their emotions with their families, which can make PPD even worse. Self-mutilation associated with PPD constitutes up to 20% of all postpartum fatalities, with PPD also posing risks to a child's cognitive or intellectual development and having a detrimental impact on the health of mothers and the conformity of their families.[10]

It is estimated that 1 out of every 5 females experiences PPD; however, there is a significant variation in PPD prevalence across different nations. The incidence is much lower in developed countries such as America (<22%) and Europe<17%.[11] Conversely, with a reported incidence of 94%, one of the highest incidence rates in the world is seen in Pakistan.[12] This discrepancy is attributed to variations in the risk factors associated with PPD such as maternal age, education, mode of delivery, obesity, family structure and support, history of miscarriages, etc., among different nations and cultures. A proper understanding of these risk factors is crucial for the recognition of at-risk mothers and the prompt detection and timely management of PPD. Given the substantial variance in the PPD prevalence among various regions of Pakistan, this study seeks to narrow the existing literature gap and provide stakeholders with the necessary information to understand better and combat this disorder holistically.

Hence, the objective of this study was to assess the prevalence of PPD across various hospitals in Sindh and explore the association of PPD with various maternal, neonatal, and socioeconomic risk factors.

Methodology

This multicenter cross-sectional study was carried out at various institutes in Hyderabad (Isra University Hospital, Civil Hospital Hyderabad) and Karachi (Aga Khan University Hospital, Dr. Ziauddin Hospital) between April and September 2023 after being approved by the Isra University Ethical Review Board (ERB letter no: IU/RR-10-IRC-23/N/2023/74).

The study details were explained to the participants, after which informed written consent was obtained and their anonymity was guaranteed. 219 participants were selected using a purposive sampling technique, keeping anticipated frequency at 67%,[13] confidence level at 95%, and margin of error at 5% (OpenEpi).

The inclusion criteria were mothers between 20-40 years of age who recently gave birth and singleton pregnancies. Whereas women experiencing their first pregnancy but have not given birth yet, mothers <20 and >40 years, preterm deliveries, multiple pregnancies (twins, triplets, etc.), stillbirths, mothers with a medical condition causing severe debility including hepatic dysfunction, respiratory disorder, and mothers having children with genetic disorders were excluded from the study.

Data was collected regarding maternal and fetal variables including level of education, maternal age, family structure, monthly income, occupational status, mode of delivery, parity, history of miscarriage, supportive spouse, neonatal outcome, and NICU admission, etc. The data was collected in the respondents' native language to ensure optimal data collection and minimize potential language barriers.

The status of PPD was evaluated using the Edinburgh Postnatal Depression Scale (EPDS).The EPDS is a 10-component assessment with a score of 0 to 3 per component. A lower score indicates less severe depression, and the total score can vary from 0 to 30. The EPDS scale was administered by asking questions in the patients' native languages, including Urdu, Sindhi, and Saraiki. This approach was adopted to minimize language barriers and eliminate any potential ambiguity. The questions were thoroughly explained to the patients, and their responses were subsequently recorded on the EPDS scale. Based on their EPDS scores, the study respondents were split into two groups: Score ≥13 for the PPD group and score <13 for no PPD group.[14]

Statistical analysis was done using SPSS (version 22). Chi-square tests assessed relationships between categorical data and outcome variables, like the EPDS score. Pearson's bivariate correlation analyzed associations between continuous variables and EPDS scores.

Results

The mean EPDS score among the study participants was 18.18±5.90. PPD was found positive (i.e. ≥13) in 66.21% of females. Participants ranged in age from 20 to 40, with a mean age of 28.45±5.77. The EPDS score-based distribution of study participants in different age groups is presented in Figure 1.

The majority of the participants belonged to rural areas (54.79%) and had an extended family structure (70.77%). Most participants (75.79%) were unemployed or homemakers and had a monthly income of less than 50K PKR. Study population demographics are presented in Table 1.

Figure 2. Shows the correlation of EPDS score with maternal age, BMI, and level of education. A significant positive correlation was found between EPDS scores and maternal age. (r= 0.96, p<0.001), as well as BMI (r= 0.95, p<0.001), whereas a significant negative correlation was found between EPDS scores and maternal education level (r= -0.93, p<0.001).

Table 2. shows the association of various categorical maternal and neonatal risk factors with EPDS scores. A significant association of PPD was observed with a monthly income of less than50K (p<0.05), rural residence (p<0.05), extended or joint family structure (p<0.05), cesarean section delivery (p<0.05), non-exclusive breastfeeding (p<0.05), multiparity (p<0.05), and lack of a supportive spouse (p<0.05). In addition, giving birth to a girl (p<0.05), admission of the baby in the Neonatal Intensive Care Unit (NICU) (p<0.05), and a history of previous miscarriage were also significant factors of PPD. Likewise, maternal and neonatal complications were also related to the risk of having PPD

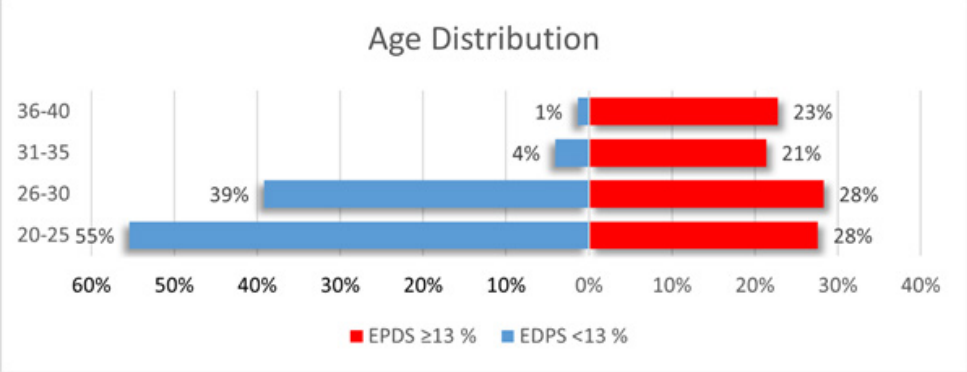

Figure 1: EPDS-Based Age Distribution: Population Pyramid of Study Participants

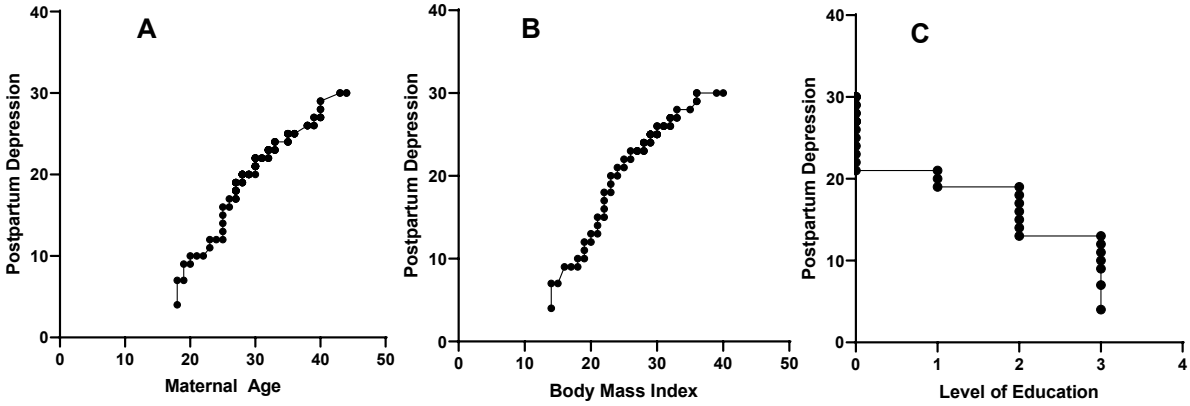

Figure 2: (A) Correlation between maternal age and PPD (r = 0.96, p < 0.001); (B) Correlation between BMI and PPD (r = 0.95, p < 0.001); (C) Correlation between maternal education level and PPD (r = -0.93, p < 0.001).

Table 1. Demographic variables: Summary of study participants (n=219)

Variables	n	%
Age group (in years)		
• 20-25	82	37.44
• 26-30	72	32.87
• 31-35	37	16.89
• 36-40	28	12.78
EPDS Score		
• <13	74	33.78
• ≥13	145	66.21
Residence		
• Urban	99	45.20
• Rural	120	54.79
Education		
• No formal education	85	38.18
• Primary	21	9.58
• Secondary	62	28.31
• Tertiary	51	23.28
BMI		
• Underweight	21	09.58
• Normal	119	54.33
• Overweight	52	23.74
• Obese	27	12.32
Family structure		
• Nuclear	64	29.22
• Extended	155	70.77
Occupational status		
• Employed	53	24.20
• Unemployed/Homemakers	166	75.79
Monthly income		
• <50K	113	51.59
• 50K-100K	71	32.42
• >100K	35	15.98

Monthly income expressed in Pakistani Rupees (PKR)

(p<0.05). The most commonly observed maternal complication was postpartum hemorrhage, followed by gestational hypertension, which was present in 26.4% and 13.2% of the study participants, respectively. Similarly, the most commonly observed neonatal complication was respiratory diseases followed by sepsis, which was present in 18.26% and 14.61% of the study participants. There was no significant association found between maternal occupational status and PPD (p>0.05).

Discussion

This study aimed to examine the prevalence of PPD

Table 2. Comparison of PPD prevalence among various risk factors (n=219)

Risk Factors		Postpartum Depression		X^2	P-value
		<13	≥13		
Monthly Income	<50K	15	98	43.92	.001*
	≥50K	59	47		
Residence	Urban	61	38	60.28	.001*
	Rural	13	107		
Family Structure	Nuclear	43	21	45.08	.001*
	Extended	31	124		
Occupational Status	Employed	31	57	0.13	0.71
	Unemployed	43	88		
Mode of Delivery	NVD	51	36	39.77	.001*
	Cesarean	23	109		
Breastfeeding	Exclusive	71	105	17.19	.001*
	Non-exclusive	03	40		
Parity	Primipara	49	61	11.42	.001*
	Multipara	25	84		
Neonatal Outcome	Boy	53	41	37.57	.001*
	Girl	21	104		
History of Miscarriage	Yes	19	108	47.90	.001*
	No	55	37		
Planned Pregnancy	Yes	55	122	3.04	.11
	No	19	23		
Maternal complications	Yes	9	74	31.45	.001*
	No	65	71		
Neonatal complications	Yes	18	83	21.36	.001*
	No	56	62		
NICU Admission	Yes	13	78	26.47	.001*
	No	61	67		
Supportive Spouse	Yes	73	127	7.56	.005*
	No	01	18		
Previous Depression	Yes	39	34	18.86	.001*
	No	35	111		
Difficulty in Neonatal Compatibility	Yes	03	25	7.64	.005*
		71	120		

* Statistically significant (p-value <0.05) using Chi-square test.

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and its associations with various demographic, maternal, and neonatal variables in mothers across different hospitals in Sindh. As the nucleus of a family, a mother serves as her child's primary caregiver and emotional anchor. PPD is a serious mental health condition affecting mothers after childbirth, with significant impacts on the well-being of both mother and child.[15]

The prevalence of PPD was found to be 66.21% in the current study. Worldwide, the prevalence of PPD ranges from 0.5% to 60.8%.[16] The incidence of PPD in Asia ranges from 3.5–63.3%.[17] Thailand has the highest reported PPD prevalence of 74.1%, Afghanistan 60.93%, while Malaysia has the lowest reported PPD incidence of 4.8%.[11, 18]

Pakistan, on the other hand, exhibits a spectrum of significantly elevated PPD prevalence rates, varying from 12.5% to 94%.[12, 13] This disparity can be owed to variations in the sample population, screening tool, and cutoff values.

The incidence of PPD had a significant positive correlation with BMI in the current study. This is in accordance with the findings reported by Iqbal et al., who reported that a BMI of >30 raised the risk of developing PPD by threefold.[19] Similarly, in a study conducted in China, Zhao et al. also reported PPD to be correlated with higher BMI.[20] Obesity is linked to disordered eating patterns, which are more frequently linked to underlying depression, even though BMI does not appear to be influenced by the associated risk factors contributing to PPD.[21] Pregnancy undoubtedly causes more stress, which tilts the scales in favor of PPD. The incidence of PPD had a significant positive correlation with maternal age but a negative correlation with maternal education in the current study. This is similar to the findings reported by Iqbal et al., Zulfiqar et al., and Afsheen et al., all of whom observed advancing maternal age, particularly age of >35 years, to be a potent risk factor of PPD.[13, 15, 19] This can be attributed to several factors linked with higher ages such as increased hormonal fluctuations, increased work as well as domestic demands coupled with potentially diminished social support networks and a notably increased probability of experiencing pregnancy complications.[22, 23] In contrast, however, a review of 58 studies conducted by Agarwal et al. revealed inconsistent findings regarding the association between maternal age and PPD. While some studies reported an approximately threefold higher risk of PPD among younger mothers (under 25 years old), numerous studies found no connection between maternal age and PPD.[24] The variation in findings may stem from cultural disparities between Eastern and Western countries, where early marriage is common in the former and delayed marriage is prevalent in the latter. These differing cultural norms could lead to conflicting results regarding the relationship between maternal age and PPD across different study populations.[11] Dubey et al. observed that low educational status of mothers is correlated with a higher risk of developing PPD, which is in accordance with the findings of the current study.[25] This can be because less educated women may have limited access to information regarding healthcare, social support, and mental health. They may also suffer from higher levels of stress stemming from social stigma, leading to reluctance to seek medical aid for mental health symptoms and fewer coping strategies to combat these symptoms. In addition, superstitious beliefs are more common in uneducated people and can lead them to unwanted rituals, due to which proper medical care is often overlooked.[26]

Additionally, Dubey et al. also reported that low monthly family income and rural population were also associated with PPD, which is consistent with the findings of our study.[25] Factors such as unawareness of mental health problems, traditional methods of treatment, scarcity of food, overdue payments, housing insecurities, child expenses, and most importantly, higher medical bills have come across to be reasons behind the higher incidence of PPD in these populations.[27] On the subject of being less educated, the female gender of a baby was found to be associated with PPD in the current study. This can be due to cultural and societal norms where males are often associated with gender-specific roles in society, and the birth of a girl can lead to feelings of disappointment, especially among people with low education levels. These results are consistent with the findings of Iqbal et al., who reported that while a male child is not associated with PPD, the risk for PPD is twofold in the case of female children and a staggering sevenfold if the number of female children is ≥4.[19] Owing to higher medical bills, along with reduced physical strength, pain, and postpartum complications, cesarean deliveries are an independent risk factor of PPD compared to NVDs.[28] Al-Nasr et al. and Papadopoulou et al reported a significant association between cesarean deliveries and PPD which is consistent with our findings.[29, 30]

In the early postpartum period, mothers' ability to care for newborns is hampered by pain, sleep deprivation, and hormone abnormalities, necessitating social assistance from family and loved ones.[31] Ugurlu et al. reported that spousal support leads women to adjust to motherhood more rapidly, allowing them to feel better emotionally and psychologically and significantly reducing the incidence of PPD, which is similar to our findings.[32] Consistently, Ugurlu et al. also reported that women living in extended families have weak marital relationships and do not receive the desired partner support, putting them at a higher risk of PPD.[32]

A significant association was observed between parity and PPD in the current study. Increased stress due to managing the needs of multiple children, less attention to self-care, previous birth-related negative experiences, and changes in family dynamics can contribute to PPD in multiparous women. Sinuligga et al. carried out a study in Indonesia that revealed that multiparous is around 2,700 times at risk of experiencing PPD as

compared to primiparous.[33] Similarly, Iqbal et al. also reported a higher risk of PPD among multiparous (≥4) women.[19]

Among other perinatal factors, clinical depression and triggers such as maternal or neonatal complications, a history of previous miscarriages, and infant admission to a NICU were found to be significantly associated with PPD. Bakhtiar et al., Schoretsanitis et al., Lin et al., Clayton et al., and Iqbal et al. have reported similar results.[19, 34-37]

Despite extensive research and awareness drives, estimates show that nearly half of the cases evade detection, leaving mothers without any treatment when they are most vulnerable. These findings emphasize the significance of identifying related risk factors for PPD to understand better and manage this issue. Finding the risk variables will enable us to include pertinent patient education, such as the '5 5 5 rule of postpartum', in their prenatal care. Additionally, individuals who are at risk can receive supportive care during the postpartum phase.

This study has various limitations. Despite being a multi-centered study, the smaller sample size prevents the generalizability of results. The study's cross-sectional design limits its ability to assess changes in PPD symptoms over time. The lack of antenatal data limits a more comprehensive understanding of PPD risk factors.

Conclusion

PPD is highly prevalent in Sindh and is significantly associated with a multitude of maternal, neonatal, and socioeconomic risk factors such as maternal age, education, household income, history of previous miscarriages, birth of a girl child, NICU admission and multiparity, among others. These findings underscore the urgent need for targeted interventions to identify and support at-risk mothers, ensuring timely management and support.

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Authors' Contribution Statement

KAM contributed to the conception, design, acquisition, interpretation of data, drafting of the manuscript, and final approval of the version to be published. AMM contributed to the acquisition, analysis, interpretation of data, drafting of the manuscript, and critical review of the manuscript. AMR contributed to the design, acquisition, analysis, and drafting of the manuscript. IM contributed to the acquisition, analysis, and drafting of the manuscript. SR contributed to the acquisition, analysis, and drafting of the manuscript. FS contributed to the analysis, data interpretation, and manuscript drafting. All authors are accountable for their work and ensure the accuracy and integrity of the study.

Confilct of Interest

Authors declared no conflict on interest

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None

Data Sharing Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.