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Research Article

A Cross-Sectional Study Elucidating Associated Predictors in Postpartum Depression among Pakistani Women

Shumaila Zulfiqar*, Zahra Tariq, Hafsa Adnan, and Iram Anjum

Department of Biotechnology, Kinnaird College for Women, Lahore

Abstract: Postpartum depression is a psychological condition that deteriorates a mother's cognitive health and overall family functioning. This survey-based cross-sectional study was done on postpartum mothers between 15-40 years of age to determine the epidemiology of postpartum depression in Pakistan. Edinburg postnatal depression scale (EPDS) and an adapted relationship assessment tool were used to determine the prevalence of postpartum depression. A total of n=103 responses were collected from different regions of Pakistan. Univariate and Bivariate analyses, Pearson Correlation Tests, and Binary Logistic Regression Analyses were applied to investigate the predictors. Postpartum depression was found in 67.96 % of the participating women and EPDS was found to be the most reliable tool to evaluate postpartum depression.

Keywords: PPD, EPDS, Gestational, Women's health, Depression, Stress, Postpartum, Disorder

1. INTRODUCTION

Women undergo different reproductive stages and hormonal changes throughout their life. Childbirth and the postnatal period are major transformations, in which women face various complications including heavy vaginal bleeding, vaginal discharge, fever, lower abdominal pain, perineum, and extreme fragility.

During this phase, various hemodynamic, genitourinary, metabolic, and emotional changes occur in the female's body [1]. These variations eventually lead to various psychological changes which may cause debilitating mental disorders such as postpartum depression. Postpartum depression (PPD) is a non-psychotic depressive mood disorder that deteriorates a mother's mental health and ultimately affects her family life by impairing her ability to endure various life challenges including parenting [2]. Post-partum depression (PPD) could be manifested by various physical and emotional symptoms initiated within 2-4 weeks of childbirth and may have severe outcomes for both mother and infant including maternal mortality and morbidity, increased risk of infanticide, and poor attachment between the mother and her child [3]. Different diagnostic systems may define postpartum depression in different ways as the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV–TR) categorizes it as a major depressive disorder whose symptoms may begin within four weeks postpartum while the International Statistical Classification of Diseases and Related Health Problems (ICD – 10) defines it as a mild mental and behavioral disorder having an onset within six weeks postpartum [1]. The symptoms may include severe mood swings, irritability, insomnia, lethargy, anxiety, difficulty bonding with the baby, feeling of worthlessness, appetite problems, recurring anxious and suicidal thoughts, reduced concentration, short-term memory loss, paranoia, thoughts of killing the baby, hallucinations, disorientation, self-isolation, and hyperactivity. Women who are at risk of developing depressive conditions are rarely identified during pregnancy or at the time of delivery [4-6].

The World Health Organization states that about 10 % of pregnant women around the world

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*Corresponding Author: Shumaila Zulfiqar <shumaila.zulfiqar@kinnaird.edu.pk>

and 13 % of the women who recently gave birth experience some type of mental disorder. The prevalence of PPD across Asian countries varies (3.5-63.3 %); Malaysia has the lowest rates (<4 %), while Pakistan has a wide range of extremely higher rates ranging from 28 % to 94 % in different studies [7-13]. Higher rates of PPD could be due to conflicting recommendations from family, strict cultural norms, illiteracy, and poor health facilities. There may sometimes be quite different opinions and demands from the family regarding the care of the baby and mother. Often it causes considerable stress when mothers follow the traditional structures while at the same time health care professionals with contradictory beliefs impose their advice that seldom seems to be reasonable for the mothers [14].

Generally, the important factors involved in the prevalence of PPD could be divided into various categories: Biological/ physical factors, psychological factors, pediatric factors, socio-demographic factors, and cultural factors [15, 16]. These include prenatal anxiety, spouse relationship, family support, income problems, health issues, gestational age, and various other living conditions. In addition, a history of previous episodes of PPD, marital conflict, and single parenthood are also predictive of PPD [17, 18].

In the onset of postpartum depression, multiple factors including genetics, epigenetic modifications, neuroactive molecules, and environment play their role [19]. The heritability of PPD is approximately 50 % which indicates a significant genetic contribution suggesting genetic etiologies [20]. Similarly, different DNA methylation biomarkers have been identified which play important role in the onset of postpartum depression as the epigenetic modifications due to stress, medications, and reproductive hormones may cause DNA methylation which makes it of particular interest to discover the onset of postpartum depression [21]. Studies have indicated that various neuroactive molecules such as reproductive hormones including allopregnanolone and brexanolone, γ-aminobutyric acid (GABA), brain-derived neurotrophic factors (BDNF), and beta-endorphins may play important role in the onset of postpartum depression [19, 22, 23]. Adverse life events having a significant impact on women's physical and mental health and psychiatric history are the most validated and repeated predictors discussed in the literature. Moreover, eating habits, proper nutrition intake, and various demographic factors including age and a number of children may play an important role in the onset of postpartum depression [19].

The majority of the patients seeking mental healthcare are women (69 %) that may get treatment for neurotic, stress-related, and mood disorders. Yet, mental health facilities receive only 0.4 % of the share of the total healthcare budget. However, the diagnosis and treatment of postpartum depression are not included in these healthcare facilities. Thus, it remains under-diagnosed [1].

So far, not many studies have been conducted in Pakistan that represents the overall prevalence of PPD at provincial and national levels. The cultural norms do not pay serious attention to these psycho-social women's health issues along with the lack of reliable screening tools for PPD; therefore, the cases remain undiagnosed and untreated [10]. Not many women get diagnosed with the development of PPD based on the symptoms and thus do not receive proper treatment for the prevailing condition.

For the diagnosis of postpartum depression, certain scales and screening tools have been developed. Edinburg postnatal depression scale (EPDS) is the most widely used and reliable tool to investigate the prevalence of postpartum depression having a 92 % response rate, 79 % sensitivity, and 85 % specificity [24]. Moreover, other scales including WHO Schedule for Clinical Assessment in Neuropsychiatry (SCAN), Personal Information Questionnaire (PIQ), and Brief Disability Questionnaire (BDQ) have been used by various researchers [1, 7, 8, 10]. Moreover, the relationship of the women with the spouse can be assessed by the relationship assessment tool and women experiencing with battering scale (WEB) to determine the quality of life and effect of behaviors in the development of postpartum depression.

The knowledge of prevalence rates and important indicators of PPD are essential for the implementation of preventative measures and to address the at-risk groups. Herein, we evaluated characteristic predictors for PPD among Pakistani women ranging between the ages of 15-40 years.

2. MATERIALS AND METHODS

2.1 Study Design

A cross-sectional study design was used to evaluate the factors playing a significant role in the prevalence of post-partum depression. A closed-ended questionnaire was developed, both in English and Urdu language as a data collection tool so that information about the challenges faced during the postpartum period could be collected from the mothers currently in their postnatal period. The questionnaire had 4 sections. First was about the general information; second included their family life experiences post-partum; third section consisted of an adapted relationship assessment tool (Figure 1). The tool consisted of 10 questions and was formulated by merging questions from three different scales including (1) Women's Experiencing Battering (WEB) [25], (2) Hit-Insert-Threaten-Scream (HITS) [26], and (3) Relationship Assessment Tool (RAT) [27-29]. The fourth section evaluated depression by Edinburgh Postnatal Depression Scale (EPDS) [30]. Scoring was done based on the Likert scale (Tables 1 & 2). The questionnaire was circulated via various online platforms and the data was collected.

2.1.1 Inclusion Criteria

The participants were mothers between 15-40 years of age who recently gave birth. The study participants were from different provinces of Pakistan i.e., Punjab, and Khyber Pakhtunkhwa (KP). However, no one participated from the province of Baluchistan and Sindh.

2.1.2 Exclusion Criteria

The exclusion criteria were as follows: (1) Unmarried women who have no experience of parturition, (2) Married women but haven't experienced a parturition period, (3) Women experiencing their first pregnancy but haven't given birth yet, and (4) Women who faced miscarriages and does not have any children. (5) Mothers having children with genetic disorders. Patients who met the inclusion and exclusion criteria were asked to fill in the designed questionnaire.

2.2 Data Management

A total of n=103 responses were collected and the data after the quality examination was entered using Microsoft Excel. The analysis of the data gathered was completed using the Statistical Package for the Social Sciences (SPSS), Version 21 (IBM, Chicago, Illinois, USA). Univariate and bivariate analysis was performed for all the variables to examine the association of postpartum depression to various other factors. To analyze the main predictors of postpartum depression, a multivariate analysis was performed using binary logistic regression in which model variables were included that showed significant associations between the dependent and independent variables in the bivariate analysis with the confidence limit kept at 5 %.

2.3 Outcome and Predictor Variables

To examine the prevalence of PPD, the status of the mother with respect to PPD was taken as the dependent variable. Various other physical, psychological, socio-demographic, and pediatric factors which could influence postpartum depression significantly as recruited by the scales used literature review were taken as independent variables. The fundamental maternity-related data included the gestational age of mother, no. of pregnancies, history of miscarriages, and the number of children and breastfeeding status of mothers.

Univariate and Bivariate analyses, Pearson Correlation Tests, and Binary Logistic Regression Analyses (Figure 2) were applied to investigate the predictors.

3. RESULTS

We received 103 responses from women ages between 15-40 years out of which 67.96 % were positive for post-partum depression. The sensitivity of our questionnaire incorporating an adapted relationship assessment tool and Edinburgh postnatal depression scale along with the socio-demographic information came out to be 88.4 %, specificity 73.5 %, and accuracy 83.4 %. The odds ratio calculated OR=21.18 indicated that the odds of development of postpartum depression in the

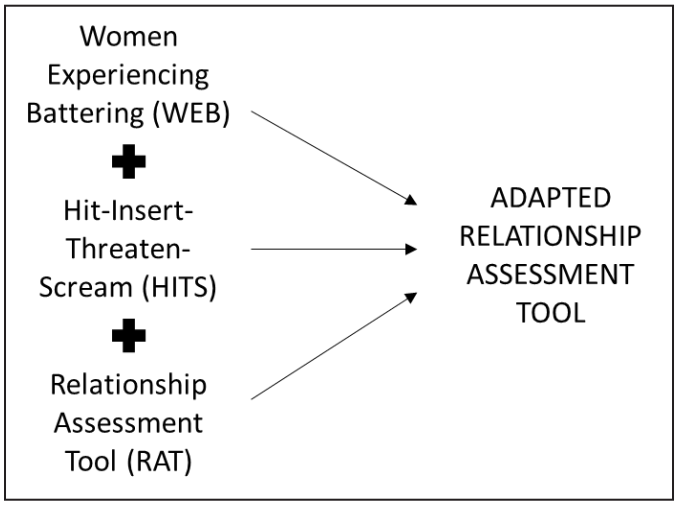

Fig. 1. Adapted relationship assessment tool

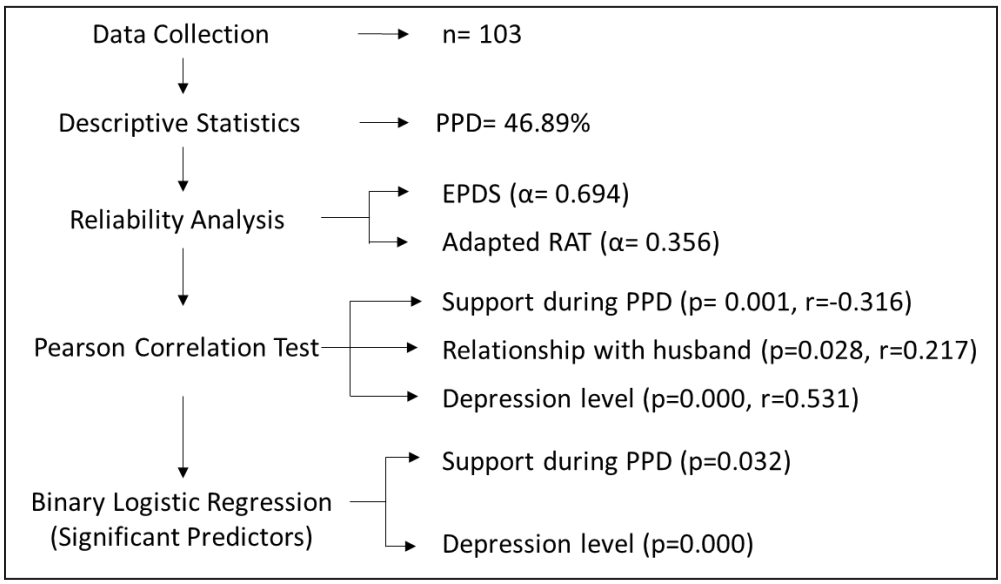

Fig. 2. Schematic description of methodology and results

women self-claiming about having depression were 21.18 times higher as compared to those women feeling content with their physical, psychological, and socio-demographic factors. The SD score of postpartum depression came out to be 46.89 %. The majority of the women who were predicted to be positive for PPD had ages ranging between 30-40 years and the mean marrying age of the women who responded was 24.1942 (SD=3.4699). Most of the women claimed to have experienced postpartum depression with the birth of their first child. Eighty percent (80 %) were university level literate, 64.28 % were non-working women; 65.97 % of the women experiencing post-partum depression lived in urban areas while 100% women of the rural areas were predicted to be positive for postpartum depression. About 47 % of the women in the joint family system experienced PPD whereas 53 % of the women having nuclear family systems had PPD. Observations ascertain that family history, history of miscarriages, abusive relationships, and incorporation of physical activities in daily life played essential roles in the aggravation of post-partum depression. Most of the mothers who were predicted positive for PPD and claimed to have various health issues playing a role in the triggering of PPD ranged between 36-40 years of age. Moreover, the age gap between the children of these women ranged between 6-15 years.

Table 1. Assessment of Relationship of Women by the adapted relationship assessment tool

Type of Relationship		Never (%)	Sometimes (%)	Frequently (%)
	**Argumentative**	9	66	25
	**Insulting**	50	36	14
	**Hurtful**	95	4	1
	**Threatening**	78	17	5
	**Spoken Violence**	60	31	9
	**Physically Abusive**	36	41	23
	**Commanding**	85	12	3
	**Strangled**	80	12	9
	**Empowering**	2	12	81
	**Lacking Communication**	6	17	74

Table 2. Assessment of Postpartum depression by Edinburgh postnatal depression scale (EPDS)

Depression Traits		Never (%)	Sometimes (%)	Frequently (%)
	**Happiness**	14	66	20
	**Social Interests**	5	71	24
	**Self-Accusation**	34	58	8
	**Stress**	38	50	12
	**Fear**	30	52	18
	**Over-thinking**	55	40	5
	**Insomnia**	28	54	18
	**Sadness**	36	47	17
	**Crying**	32	47	21
	**Self-Harm**	9	31	60

The reliability of the Edinburg Postnatal Depression Scale and adapted Relationship Assessment Tool in determining post-partum depression was indicated by Cronbach's alpha values of 0.694 and 0.356 respectively. This indicated that Edinburg Postnatal Depression Scale was a reliable source of predicting postpartum depression whereas the adapted Relationship Assessment Tool was not a very reliable source to analyze PPD.

P-values of the Pearson Correlation test demonstrated that support during the post-partum depression (p=0.001), relationship with the husband (p=0.028)—was assessed by the adapted Relationship Assessment Tool with a cutoff value of 11. The higher values indicated bad marital relationship status of the women-- and depression

level (p=0.000) assessed by Edinburg Postnatal Depression Scale with a cutoff value of 13, indicating depression in those women having score greater than 13 whereas those having depression score (DS) values above 10.5 also had the symptoms of mild depression--were significant contributors of post-partum depression. Moreover, a correlation value of 0.531 depicted a positive correlation between depression score and post-partum depression which meant the higher the depression score by EPDS, the higher the Postpartum Depression. Correlation value of 0.217 for relationship status indicated that the higher the relationship assessment scores depicting a bad relationship, the higher the postpartum depression. Whereas the correlation value of post-partum support (-0.316) manifested that a negative correlation existed between this variable and post-partum depression. This indicated that the higher the level of postpartum support attained by the mother, the lower the development of postpartum depression.

Regression Analysis

The Correlation analysis showed a significant correlation of three factors (depression score, postpartum support score, and relationship assessment score) with postpartum depression. Therefore, Binary Logistic Regression Analysis was performed and the Hosmer-Lemeshow test for goodness of fit was used along with exp (B) with 95% CI to determine the number of times PPD could be affected by various significantly contributing predictors. Hosmer Lemeshow's test for goodness of fit having a p-value of 0.885 indicated that the selected model was a good fit. The analysis predicted that two factors (depression score and postpartum support score) out of those previously determined three correlated factors were the significant predictors of postpartum depression. The probability of acquiring post-partum depression by taking depression score, relationship assessment score, and post-partum support into account came out to be 42.5 %. Depression score (p value=0.000, 95 % CI) and post-partum support (p value=0.032, 95 % CI) were statistically significant in predicting post-partum depression while relationship assessment score (p value=0.742, 95 % CI) was not significant predictor. Exponential B values showed that for every one unit increase in depression score increased post-partum depression 1.223 times and for every woman who did not receive post-partum support, chances of developing postpartum depression were 3.9494 times higher than those who received support postpartum (Table 3).

4. DISCUSSION

This cross-sectional study carried out depicts that a higher rate of postpartum depression could be possibly due to various factors including bad relationship status, abusive marriages, family history of depression, history of miscarriages, gestational age, no family support postpartum, breastfeeding status, no. of children, employment status, family system, physical activities, and history of health issues among women. Our findings are consistent with previously reported studies [8, 31, 32].

The survey analysis aided in the examination of various factors such as depression scores, Relationship assessment scores, support received postpartum, and the probable cause of postpartum depression; family, health, or income problems were the main causes of postpartum depression. The majority of the women who were predicted to be positive for PPD had ages ranging between 30-40 years and the mean marrying age of the women who responded was 24.1942 (SD=3.4699). Most of the women claimed to have experienced postpartum depression with the birth of their first child. 80 % were university-level literate, 64.28 %

Table 3. Significant p-values (<0.000) indicate that Postpartum Support and Depression Score are significant contributors of postpartum depression

	B	Exp (B)	Significant value
Postpartum Support	1.223	3.494	.034
Depression Score	.201	1.223	.000
Relationship Assessment Score	0.004	1.004	.941

were non-working women; 65.97 % of the women experiencing post-partum depression lived in urban areas while 100 % of women in rural areas were predicted to be positive for postpartum depression. About 47 % of the women in the joint family system experienced PPD, whereas, 53 % of the women having nuclear family systems had PPD.

Prevalence of PPD among Pakistani women has been reported at 28-94 % [7, 8, 11, 33]. We investigated that PPD is highly prevalent in Pakistani women with 67.96 % (95 % CI). However, the frequency of PPD calculated in this study may not truly represent the actual incidence because of the small sample size. There could be multiple reasons for the elevated incidence of PPD in Pakistani women. Ideally, the postpartum period is considered a rest period for the new mother. She usually remains at home to recover from the birth for 40 days and is surrounded by family and friends during this time. Her extended family helps to take care of the home and any other children [13, 31]. If the woman perceived herself as not coping well or as not being able to care for her baby or her husband, she felt guilt and reported low self-esteem as she is expected to perform household chores, look after the children, and obey her husband and family diligently. Such women having lesser coping capabilities usually have a lack of care during the postpartum period. This may even have adverse consequences on the children along with the mother causing problems in the proper development of the baby [1, 34]. However, the adapted relationship assessment tool having lesser reliability did not turn out to be a good predictor of postpartum depression based on the relationship status of the women with their spouses.

Despite such higher rates of postpartum depression among Pakistani women, the issue is still neglected. It is the need of the hour to carry out more research to determine the important factors involved in the development and aggravation of PPD so that proper diagnosis, treatment, and preventative measures could be offered to the mothers which can help in the development of healthy mother-child bond and good family relations.

5. CONCLUSION

The outcomes of PPD on the mother and the child are devastating. The prevalence of PPD is much higher than expected in Pakistan. For a more detailed analysis, more participants should be recruited from Pakistan to understand the exact frequency of this condition. Many treatment and management options can opt upon diagnosis. National-level screening setups should be established with the help of clinicians, psychologists, and researchers to carry out research and develop awareness among women regarding PPD.

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