

## Psychosocial correlates of prolonged postpartum depression in mothers of children with movement disorders: cross-sectional study from a paediatric developmental rehabilitation centre in Peshawar

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### Abstract

**Objective:** To identify potential predictors of prolonged postpartum depression in mothers of children with physical disabilities.

**Methods:** The cross-sectional, correlational study was conducted at a paediatric neurodevelopmental rehabilitation centre in Peshawar, Pakistan, from December 9, 2016, to January 23, 2017, and comprised mothers of children with movement disorders born between January, 2014, and June, 2016. Prolonged postpartum depression was defined as onset of maternal depression between 6 and 36 months after birth. Edinburgh Postnatal Depression Scale was used with a cut-off score of 13/30, while a pretested questionnaire examined risk and protective factors predicting prolonged postpartum depression using binary logistic regression. SPSS 20 was used for data analysis.

**Results:** There were 171 subjects with a mean age of  $27 \pm 6.4$  years. Among them, prolonged postpartum depression was found in 95 (55.6%). Six significant predictors of the condition were identified: supportive husband, child's disability having negative effect on social ties, daily physical help in childcare by at least one family member, pregnancy-induced hypertension, mother being blamed for child's disability, and financial problems ( $p < 0.05$  each).

**Conclusion:** The identified predictors specific to local settings played a distinctive role in prolonged postpartum depression occurrence, particularly in the context of disability.

**Keywords:** Postpartum depression, Chronic depression, Risk factors, Psychosocial, Childhood disability. (JPMA 69: 1292; 2019)

### Introduction

The postpartum period is a time which makes mothers vulnerable to psychological disturbance. However, the exact length of the postpartum period is generally not agreed upon, with intervals ranging from a few days to a full year.<sup>1</sup>

Postpartum depression (PPD) is often defined as "an episode of major depressive disorder (sometimes subclinical) that occurs in the postpartum period."<sup>1</sup> With postpartum onset the Diagnostic and Statistical Manual of Mental Disorders version five (DSM-V) assigns a specifier, a temporal criterion to depression episodes that commence within 4 weeks of childbirth.<sup>2</sup> However, substantial research and general clinical practice show

that this definition is excessively limiting as PPD can take up to a year or more after childbirth to manifest.<sup>3,4</sup> There is no consensus regarding what timeframe constitutes the postpartum period, which in turn makes the duration of PPD variable and indistinctly defined. Shorter time periods of PPD are used for biological investigations whereas longer timeframes are used for designing prevention and intervention strategies.<sup>1</sup> Recent and mounting evidence suggests a chronic course of maternal PPD which can last up to 3 years following childbirth.

As PPD is prevalent in the months following birth, it is particularly challenging for new mothers because of the constant care and vigilance needed by the new-born. This round-the-clock care by mothers can easily stretch to decades, if not a lifetime, for a significant number of women when the baby has developmental problems. Prevalence of psychiatric morbidity is considerably higher

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among mothers caring for children with developmental disabilities than those with typically developing children.<sup>5</sup> New evidence also indicates that rates of maternal PPD are relatively higher in developing countries.<sup>6,7</sup> Furthermore, it is the amount of child's exposure to maternal depression (chronicity) rather than PPD itself which plays a more crucial role in predicting future child behavioural outcomes and, thus, contributes to a child's vulnerability to developmental delay.<sup>1,8,9</sup> Such adverse neurocognitive outcomes may be attributed to the tendency of depressed mothers to provide fewer learning opportunities to their children.<sup>10</sup> Maternal depression and inadequate cognitive and social-emotional stimulation have been identified as key risk factors for the world's poorest 200 million children under five years who fail to attain their developmental potential due to poverty and associated health, nutrition and social factors.<sup>11</sup>

Poor maternal psychosocial functioning is a risk factor for an infant's physical health, which, for developing countries, can be translated into heightened risk of gastrointestinal and lower respiratory tract infections and impaired early childhood growth due to malnutrition because of depressed mothers' maladaptive caretaking behaviours such as non-uptake of immunizations, non-sustained breastfeeding, improper weaning practices, and poor care-seeking behaviours when the child is ill.<sup>1,7,12-14</sup> Association of childhood infections with depression makes it an important public health problem, particularly for resource-poor settings in which infectious diseases remain a leading cause of mortality and morbidity for children under five.<sup>15</sup>

It must also be emphasised that disability is intrinsically linked with poverty at both ends of the spectrum; disability is a cause as well as a consequence of poverty.<sup>16</sup> Around 95 million children (5.1%) between 0-14 years live with some form of disability, 80% of whom reside in low and middle-income countries (LMICs).<sup>17</sup> Despite their colossal burden, disability and maternal depression continue to be under-recognised and undertreated in LMICs, partly because of greater priority given to preventing maternal and infant deaths associated with obstetric complications, limiting attention beyond survival.<sup>6,18</sup> Moreover, there is a scarcity of local evidence about common perinatal disorders in over 80% of LMICs (112 countries) and in 90% of the world's least-developed countries.<sup>18</sup> There is a profound

lack of high-quality, standardised / internationally comparable epidemiological data on disability in Pakistan for both comprehensive modelling studies and inclusive policies.

In a resource-constrained country like Pakistan psychosocial factors specific to local settings may play a unique role in the occurrence of PPD. The current study was planned to determine the prevalence of maternal PPD in the context of disability, and to assess predisposing factors that act as contributing or protective factors for chronic course of PPD (6-36 months afterbirth) among mothers of children with physical disabilities.

### Subjects and Methods

The cross-sectional study was conducted at Akbar Kare (AKi), an outpatient paediatric neurodevelopmental rehabilitation centre, in Peshawar, Pakistan, from December 9, 2016, to January 23, 2017. The organisation works for children with neurological developmental disorders and other diagnoses leading to physical deficits. The centre has 10,612 children registered with a range of physical disabilities.

Based on a PPD prevalence of 13%,<sup>4</sup> the sample size was calculated to statistically detect correlations with prolonged PPD at an alpha value of 0.05.

Mothers were first selected through consecutive sampling. The subjects were biological mothers aged at least 17 years of children with movement disorders, and had no history of psychiatric illness, chronic physical illness or learning disability. Also, these were women whose last pregnancy outcome was not a miscarriage or stillbirth.

Movement disorders are neurological syndromes comprising "impaired performance (in the target and velocity) of voluntary movements, dysfunction of posture, the presence of abnormal involuntary movements, or the performance of normal-appearing movements at inappropriate or unintended times."<sup>19</sup> They are generally categorized into two groups: Dyskinesias involve atypical, repetitive, involuntary movements and account for the majority of paediatric motor disorders; and Hypokinetic movement disorders characterized by paucity of movement.<sup>19</sup>

In the next step, list of the disabled children of the selected mothers was obtained from the centre's patient registry. To be eligible, a child had to be born between

January 2014 and June 2016 (range 6-36 months) and diagnosed with movement disorder.

The child age range of 6-36 months was chosen because, apart from severe cases, parents and primary caregivers often first notice signs of disability during this period.

Children were retrospectively identified with a principal diagnosis of paediatric movement disorders via their electronic health records based on birth history and neonatal antecedents (hypoxia-ischaemia or kernicterus, age at onset, drug history, positive family history etc.); recognition of movement patterns based on phenomenology and time of pathological insult (precipitating factors); clinical observations and medical history (if available).

Diagnosis and classification of sub-types of cerebral palsy (CP) were made according to pathways used in the surveillance of CP in Europe (SCPE).<sup>20</sup> In case of diagnostic uncertainty, families were requested for relevant medical investigations, like magnetic resonance imaging (MRI) for CP, creatine phosphokinase test for muscular dystrophies and electromyography (EMG) for acquired motor pathology.

In-person interviews were conducted using a validated, structured questionnaire as the majority of mothers were uneducated. Content validity was established through independent review by three experts in the field. The questionnaire was divided into two parts. The first part, used for examining the association of the included variables with prolonged PPD. They were clustered into five groups: socio-demographic profile; psychosocial factors (stressful life events, social support from husband and family); obstetric factors (history of miscarriages/stillbirths, complications during previous pregnancies); postnatal and neonatal factors (baby's health, infant gender bias, maternity blues); and disability-related factors (number of disabled children, child's temperament and childcare stress, mother blamed for disability, perceived human error involved, and effect on relationship with husband and family subsequent to having a child with disability).

The second part of the questionnaire was used to determine the prevalence of prolonged PPD using the Edinburgh Postnatal Depression Scale (EPDS) with a standard cut-off score of  $\geq 13$  considered indicative of probable major depression.<sup>21</sup> The EPDS has been designed to screen women for PPD at any point from

conception to 36 months postpartum.

Most interviews were conducted in Pashto and occasionally in Urdu. Both parts of the questionnaire were translated into Urdu and Pashto according to standard translation procedures and culturally adapted after testing on a pilot of 20 mothers.<sup>22</sup> The internal consistency of EPDS was determined with Cronbach's alpha value of 0.715.

The outcome variable, prolonged PPD, was defined as onset of maternal depression between 6-36 months after birth in compliance with DSM-V symptomatology for major and minor depressive episodes.<sup>2</sup>

To minimise interviewer bias, two people were assigned to conduct each interview. The first person interviewed mothers only about the potential PPD predictors while the second interviewer only asked questions regarding the EPDS. This ensured that the first interviewer, determining the exposure status, was blinded to the study participant's outcome (prolonged PPD) status and vice versa.

Informed consent was obtained from each participant.

Data was entered into Microsoft Excel spreadsheet and analysed using SPSS 20. The obtained dataset had less than 5% missing values. To address the missing data, multivariate imputation by chained equations (MICE) technique was used, assuming that the data was missing at random. Missing values were appropriately imputed (predicted) after 10 iterations/cycles by creating 10 independent imputed datasets using the regression model.

Predictors were assessed by exploring one-to-one relationship (correlation) of each independent variable with prolonged PPD. This was followed by examining the simultaneous effects of risk/protective factors on prolonged PPD using binary logistic regression.

Bivariate analyses were performed using Pearson's chi-square test of homogeneity and Fisher's exact (2-sided) test to assess dichotomous variables' associations with prolonged PPD. All statistical tests were two-tailed and significance level was set at 0.05. Odds ratios (OR) (unadjusted) were calculated with 95% confidence intervals (CI). For correlations between prolonged PPD with ordinal variables, Cochran-Armitage test of trend was performed to determine whether a linear trend existed between the degree to which relations with husband and social circle were affected by child's disease

and the proportion of mothers who were depressed. Simultaneous effects of risk/protective factors on prolonged PPD were analysed using a multiple regression model. Apart from variables that had a significant effect ( $p < 0.005$ ) the remainder of the predictors in the regression model were included/omitted on the basis of theoretical relevance (even if non-significant) and effect size. A binomial logistic regression was performed to ascertain the effects of variables.

## Results

Of the 179 mothers who met the eligibility criteria, 171 (95.5%) participated (Figure).

Their mean age was  $27 \pm 6.4$  years (range: 17-50 years). Of them, 105 (61.4%) mothers had never been to school, and that was true of their husbands in 55 (32.2%) cases. Besides, 89 (52%) subjects were married before 18 years of age including 46 (26.9%) who were married at a very young age of 12-15 years. The mean age at marriage was  $18.2 \pm 4.2$  years (range: 12-35 years). Overall, 164 (95.9%) women were in a monogamous relationship, 140 (81.9%)

were living with extended families, and 66 (38.5%) were food-insecure.

Of the total, 95 (55.6%) mothers were considered to have depression (95% confidence interval [CI]: 48%-63%). The mean EPDS score was  $13.58 \pm 5.50$  (range: 1-27 out of 30) (95% CI: 12.75-14.41). Also, 35 (20.5%) mothers were classified as having no depression (EPDS 0-8); 52 (30.4%)

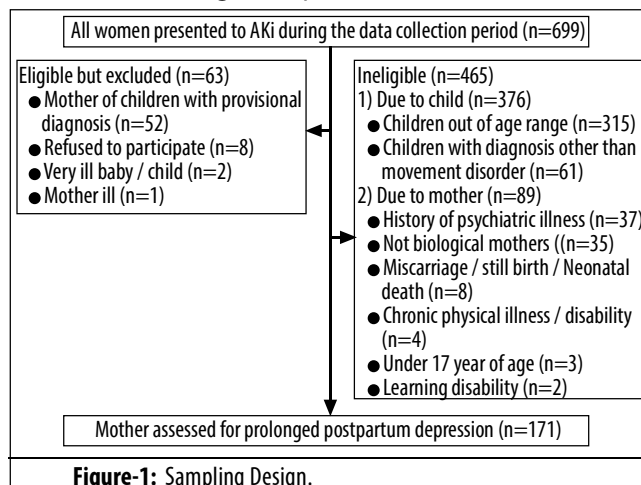


Figure-1: Sampling Design.

Table-1: Socio-demographic and Psychosocial Factors Associated with Prolonged postpartum depression (PPD).

Factors	Not Depressed (n = 76) n (%)	Depressed (n = 95) n (%)	Odds Ratio	95% CI	p-value*
<b>Socio-demographic Characteristics</b>					
Type of Family					
Nuclear	68 (89.5)	72 (75.8)	2.7	1.1 - 6.5	0.021
Extended	8 (10.5)	23 (24.2)			
Husband is the only Breadwinner					
No	59 (77.6)	55 (57.9)	2.5	1.3 - 5.0	0.007
Yes	17 (22.4)	40 (42.1)			
Stressful Life Events					
Financial problems					
No	43 (56.6)	27 (28.4)	3.3	1.7 - 6.2	0.000
Yes	33 (43.4)	68 (71.6)			
Feels happy and comfortable in home					
No	2 (2.6)	23 (24.2)	0.1	0.0 - 0.4	0.000
Yes	74 (97.4)	72 (75.8)			
Unhappy with in-laws					
No	46 (60.5)	42 (44.2)	1.9	1.0 - 3.6	0.034
Yes	30 (39.5)	53 (55.8)			
Social Support					
Husband is supportive					
No	1 (1.3)	19 (20)	0.1	0.01 - 0.4	0.000
Yes	75 (98.7)	76 (80)			
Prohibited to do household work during puerperium					
No	11 (14.5)	33 (34.7)	0.3	0.1 - 0.7	0.003
Yes	65 (85.5)	62 (65.3)			
Daily physical help in childcare by at least one family member					
No	22 (28.9)	54 (56.8)	0.3	0.2 - 0.6	0.000
Yes	54 (71.1)	41 (43.2)			

Only those variables that had significant association  $P < 0.05$  with prolonged PPD in bivariate analysis are shown.

**Table-2:** Obstetric, Postnatal and Disability Related Factors Associated with Prolonged postpartum depression (PPD).

Factors Obstetric and Postnatal	Not Depressed (n = 76) n (%)	Depressed (n = 95) n (%)	Odds Ratio	95% CI	P value*
Antenatal care received					
No	5 (6.6)	17 (17.9)	0.3	0.1 - 0.9	0.038
Yes	71 (93.4)	78 (82.1)			
Type of delivery					
Spontaneous	55 (72.4)	81 (85.3)	0.3	0.1 - 0.8	0.018
Induced	12 (15.8)	5 (5.3)			
Pregnancy induced hypertension					
No	66 (86.8)	65 (68.4)	3.0	1.4 - 6.7	0.005
Yes	10 (13.2)	30 (31.6)			
Baby blues					
No	48 (63.2)	46 (48.4)	1.8	1.0 - 3.4	0.049
Yes	28 (36.8)	49 (51.6)			
Disability					
Mother blamed for disability					
No	57 (75)	44 (46.3)	3.5	1.9 - 7.0	0.000
Yes	19 (25)	51 (53.7)			
How child's disease affected relationship with husband					
Has become better	10 (13.2)	3 (3.2)	9.3	2.1 - 41.1	0.001
Unaffected	64 (84.2)	73 (76.8)			
Deteriorated	2 (2.6)	19 (20)			
How child's disease affected relations with social circle, friends & relatives					
Have become more supportive	2 (2.6)	1 (1.1)	15.5	4.6 - 52.9	0.000
Unaffected	71 (93.4)	57 (60)			
Deteriorated	3 (3.9)	37 (38.9)			

CI: Confidence interval, \*Only those variables that had significant association  $P < 0.05$  with prolonged PPD in bivariate analysis are shown.

**Table-3:** Simultaneous Effect of Risk Factors Predicting Likelihood of Prolonged postpartum depression (PPD) via Logistic Regression.

Risk or Protective Factor	Odds Ratio	95% CI for Odds Ratio (Lower - Upper)	P-value**
Lower education (<10 years of education completed)	1.40	0.42 - 4.60	0.58
Husband is the only breadwinner in family	1.35	0.56 - 3.28	0.48
Financial problems	2.60	1.10 - 6.11	<b>0.02</b>
Husband is supportive	0.10	0.01 - 0.97	<b>0.04</b>
Prohibited to do household work during puerperium	0.71	0.26 - 1.98	0.57
Daily physical help in childcare by at least one family member	0.36	0.16 - 0.81	<b>0.01</b>
Pregnancy-induced hypertension	2.86	1.08 - 7.53	<b>0.03</b>
Desired pregnancy	0.97	0.29 - 3.24	0.99
Mother has been blamed for disability	2.81	1.21 - 6.56	<b>0.02</b>
Effect of child's disease on marital relationship	1.71	0.30 - 9.67	0.77
Effect of child's disease on relations with social circle, friends & relatives	7.44	1.80 - 30.78	<b>0.01</b>

\*\* Significant associations  $P < 0.05$  with prolonged PPD shown in bold, CI: Confidence interval.

mild depression (EPDS 9-13); 48(28.1%) moderate (EPDS 14-18), and 36(21.1%) had severe depression (EPDS >19). Of the 11 predictor variables, only 6 were statistically significant: supportive husband, child's disability having negative effect on social ties, daily physical help in childcare by at least one family member, pregnancy-induced hypertension, mother being blamed for child's disability, and financial problems (Table 3).

### Discussion

Results showed a very high prevalence of PPD at 55.6%, with one in five mothers having severe depression symptoms. This is almost twice as high as the rate reported in a review of longitudinal PPD studies which suggested that about 30% of women diagnosed with PPD meet the criteria for depression at any time between 4-36 months

following birth.<sup>23</sup> The elevated prevalence could perhaps be explained by the selection of a high-risk group involving mothers of only those children who had neurodevelopmental disabilities -generally excluded in studies investigating PPD. Secondly, self-reported questionnaires like the EPDS slightly, although significantly, overrate the prevalence of PPD compared to diagnostic interviews.<sup>4,24</sup>

Women who reported that their child's disability negatively affected relations with their social circle, friends, and relatives were 7.44 times more likely to have prolonged PPD than those who did not. Women with pregnancy-induced hypertension (PIH) were 2.86 times, mothers who were blamed for their child's disability were 2.81 times, and those who had financial difficulties were 2.60 times more likely to exhibit chronic PPD.

However, increasing support of husband and daily physical help in childcare by at least one family member (protective factors) were associated with reduction in the likelihood of exhibiting prolonged PPD.

Support from husband was found to be the strongest (protective) predictor, which for this study, encompassed emotional and instrumental support (practical help with daily tasks and material aid) from the husband, as perceived by a woman who had a child with a movement disorder. This is consistent with a well-established and growing body of evidence from LMICs<sup>6,18</sup> and with studies investigating chronicity of PPD<sup>23,25,26</sup> that indicate spousal support to be a key factor for chronic depression.

Results suggested that depressed mothers were strongly affected by the societal perception of their disabled children and reported: "I do not socialise because of my child's disability" (7.4%); "relatives blame me for my child's disability" (18.9%); "ignored by family/people" (7.4%); and "people talk when they see my baby" (5.3%). These findings indicated that social exclusion is an important determinant of maternal depression<sup>27</sup> but more evidence is needed for its role in PPD's chronicity.

Caring for a child with disabilities involves consistent, increased and extended caregiving demands which can put mothers at an elevated risk of parental stress. Findings revealed that mothers who had daily physical help in childcare by at least one family member were less likely to develop prolonged PPD. It was predominantly an unmarried sister-in-law (husband's sister) in the house who helped with daily childcare. In a review of longitudinal

studies that explored the risk factors accompanying persistent PPD, only four of the 17 studies investigated social support.<sup>23</sup> Two studies found that persistently depressed mothers received less social support than those whose depression had remitted, while the other two studies did not find any such evidence. Additionally, an indigenous study found that lack of help in daily activities was not related to persistent depression.<sup>26</sup> In comparison, a longitudinal study during the first three years after childbirth suggested that mothers with lower social support were at an increased risk for both early and chronic depression.<sup>28</sup>

There is no published corroborative evidence indicating a direct biological mechanism or any relevant epidemiological findings associating PIH with PPD. And because PIH was self-reported instead of relying on medical investigation involving relatively small number of participants, hence, any explanation for the association must be conjectural.

Women who were blamed for their child's disability were at a heightened risk of prolonged PPD. Results showed that the majority of mothers were blamed by other women in the community/village (36%), followed by women in the neighbourhood (28%), sister-in-law, both husband's sister and brother-in-law's wife (21%), and mother-in-law (15%). PPD's aetiology is multifactorial and can occur due to multiple biological, familial, psychological, social and cultural influences.<sup>4</sup> It may be completely understood only when cultural/social factors are taken into consideration along with its biomedical and psychological aspects, and that social and cultural beliefs/practices can be significant contributors to PPD. Despite its importance, few studies have systematically investigated culture-specific influences on PPD.<sup>18</sup>

Women who reported financial difficulties seemed more susceptible to prolonged PPD. In a review of longitudinal studies on chronicity of PPD, of the nine studies that explored the educational and occupational status of mothers, only three reported chronically depressed mothers had a smaller income-to-needs ratio compared to the remitted group.<sup>23</sup> Findings were consistent with three other longitudinal studies which reported poverty, unemployment and low income as risk factors of persistent/chronic PPD at 1, 3 and 4 years postpartum respectively.<sup>25,26,28</sup>

Major limitations of the current study included the absence

of a control group, as the cross-sectional study design makes it unsuitable to infer temporal association between risk factors and PPD. Also, the use of a self-reporting EPDS as a measure of depressive symptomology may not be consistent with clinical diagnoses or reflect the actual PPD prevalence rates in the chosen subgroup. Since our sample was drawn exclusively from a subset of mothers attending one family-centred service in an urban locality of Peshawar, it is a small and statistically unrepresentative sample. The findings, as such, cannot be generalised to the wider population. However, the sample is reflective of the mothers of children with neuromotor disorders wherein the study highlights psychosocial themes in the data regarding chronic PPD that can be generalised to other similar settings.

## Conclusion

Chronic depression appeared to be very common in the study cohort and the identified psychosocial factors specific to local settings may play a distinctive role in PPD's occurrence particularly in the context of disability. The themes identified may be used to develop a sustainable public health strategy in primary healthcare for preventing, identifying and intervening in the early stages of PPD.

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