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### Exploring Postpartum Depression and Its Demographic Correlates among Women: The Mediating Role of Social Support

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#### ABSTRACT

**Background.** While postpartum depression (PPD) is one of the most prevalent postpartum complications, determining factors for the condition are not well understood in low- and middle-income countries where social and economic hardship tend to cluster. **Objective.** This study aimed to explore the relationship between sociodemographic and obstetric factors, perceived social support and postpartum depressive symptoms amongst women in Punjab, Pakistan and to determine whether the perceived social support was a mediating effect between background factors and postpartum depressive symptoms. **Method.** The cross-sectional design included 147 women who were recruited from urban and rural households after they had just given birth. Depressive symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987), and social support was assessed using the Medical Outcomes Study Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991) which had four subscores (Material, Affective, Emotional/Informational, Social Interaction) and a total score. Hierarchical multiple regression and bootstrapped mediation analyses (5,000 resamples) were used to test direct and indirect effects. **Results.** There were high levels of depressive symptoms in the sample ( $M = 14.20$ ,  $SD = 7.91$ ), with subscales of social support having strong, negative correlations with EPDS scores ( $r = -.60$  to  $-.68$ ,  $p < .01$ ). Results showed that family type, parity, mode of delivery, unplanned pregnancy and previous mental-health history were significantly correlated with social support and depressive symptoms, and that social support (total score) significantly mediated the effect of family type, parity, unplanned pregnancy, mode of delivery, monthly household income and previous mental-health history on EPDS scores, which accounted for 60.2% of the variance in depressive symptoms. **Conclusion.** In terms of maternal mental-health care, the importance of family-based and social network-based interventions is highlighted, and perceived social support is found to be a powerful psychosocial pathway between demographic and obstetric vulnerability and postpartum depressive symptoms.

## **Background, Prevalence, and Significance of Postpartum Depression**

Postpartum depression (PPD) is a non-psychotic depressive episode which starts during the pregnancy or in the first months after giving birth in which one experiences a persistent low mood, lack of enjoyment or interest in activities, changes in eating and sleep patterns, excessive guilt and in the most severe cases, thoughts of harming oneself (Cox et al., 1987). PPD is a clinically significant mood disorder that can last for months when left untreated, it impacts on attachment, cognitive development and family functioning, and is different from the “baby blues” (O'Hara & Swain, 1996). The Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987), which is used in this study, was specifically developed to measure this cognitive-affective symptom cluster, without including somatic items that would overlap with normal postpartum physiology and would cause a normal level of prevalence to be under-estimated. It is used as the internationally agreed against standard, against which prevalence is calibrated (Wang et al., 2021).

While the global average prevalence of PPD is estimated at about 17–19% (Hahn-Holbrook et al., 2018; Wang et al., 2021), there is pronounced cross-national variation, with one 56-country meta-regression showing that income inequality, mortality rates for mothers and infants and female labor burden together accounted for 73% of the variation (Hahn-Holbrook et al., 2018). The context of Pakistan is consistently higher-burden, ranging from an estimated 12% to more than 60% across region and sampling frame (Gulamani et al., 2013; Yadav et al., 2020; Yousaf et al., 2025). Mother depression screening is recommended as a standard part of the baby's postnatal care and not only because it is linked to suffering for the mother, it is also associated with poor mother-infant relationships and an increased risk of child anxiety and behavior problems (Dennis & Dowswell, 2013).

## **Risk Factors and Demographic Correlates**

PPD has many contributing factors. Beck's (2001) Metaanalysis found that prenatal depression and anxiety, low self-esteem, life stress, poor social support, marital dissatisfaction, prior depression and low socioeconomic status were consistent predictors. Besides these, some other structural stressors in Pakistan exacerbate these vulnerabilities, including financial strain, low autonomy in large family systems, unplanned pregnancy and poor obstetric access (Ali et al., 2009; Yousaf et al., 2025), while obstetric factors (mode of delivery, complications, parity) modify risk through recovery, pain, and disrupted birth expectations (Yadav et al., 2020). Direct links between household income and education have been inconsistent, which means that they may have indirect effects via relational resources (Hahn-Holbrook et al., 2018). Family structure is specifically relevant in South Asian settings as it can provide practical and emotional support, while also causing interpersonal conflicts, resulting in a complex relationship with maternal mood (Gulamani et al., 2013). The novelty of the role for primiparous women and the caregiving burden for multiparous women, plus the recovery burden for caesarean delivery for the women make parity and mode of delivery complex factors (Yadav et al., 2020).

## **Social Support and the Stress-Buffering Framework**

Social support (Bek, 2001; Dennis & Dowswell, 2013) is one of the most consistently replicated protective factors against PPD. Stress buffering model (Cohen and Wills, 1985) suggests that social resources buffer the psychological effects of stressors by providing instrumental support, appraisal support, and sense of belonging at times when required, which is ideal for the acute stress of early post-partum. This is supported by an ecological perspective on parenting stress, which places the mother in a nested family, community and economic system, such that demographic factors reflect a mother's location in a wider ecological field of resources and demands, but do not

cause depression themselves (Belsky, 1984). Multidimensional instruments like the Medical Outcomes Survey Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991), have been used to measure the four factors of social support: emotional/informational, material, affective, and social-interaction, which have been confirmed in regional adaptations (Griep et al., 2005; Zanini et al., 2018); and intervention research demonstrates that increasing perceived support through peer support, home visitation, or partner-inclusive counselling reduces depressive symptom trajectories compared to usual care (Dennis & Dowswell, 2013).

### **Social Support as a Mediating Mechanism, Research Gap, and Objectives**

Demographic and obstetric features are hard to change, thus the questions being increasingly posed for research are how do they influence mood and not just if. Social support is a natural mediator; it is likely to be a consequence of the woman's demographic situation (joint families or higher parity women may have more social support available to them) and is a proximal factor in mood. This pathway is rooted in family structure: family size and composition can increase the number of people who can provide assistance (Gulamani et al., 2013); income can increase access to paid assistance (Hahn-Holbrook et al., 2018); and negative birth experiences are associated with decreased perceived support, likely because of a lower level of trust in help-seeking (Ali et al., 2009). The association between low socioeconomic status and PPD is generally mediated by support, as can be seen in models with support in the regression models (Beck, 2001); however, a joint quantitative test of the association and the mediation should be conducted using a multidimensional measure of support and bootstrapped indirect-effect confidence intervals, not bivariate association. This gap is important practically, because it means that if there is multiple risk factor convergence, one intervention target point support can be used to tackle several risk factors. The purpose of this study was therefore to (a) describe the profile of this sample, (b) assess bivariate associations of the subscales of social support with PPD symptoms, (c) identify demographic/obstetric correlates of PPD symptoms after controlling for support, and (d) formally test mediation of the relationship between demographic variables and symptoms by social support.

### **Research Hypotheses**

- H1: Sociodemographic and obstetric characteristics (education, household income, family type, parity, mode of delivery, pregnancy planning status, and previous mental-health history) will be significantly associated with postpartum depressive symptoms.
- H2: The same set of characteristics will be significantly associated with perceived social support.
- H3: Perceived social support will be significantly and negatively associated with postpartum depressive symptoms, independent of demographic and obstetric characteristics.
- H4: Perceived social support (total score) will significantly mediate the relationship between demographic/obstetric predictors and postpartum depressive symptoms.

### **Conceptual Framework**

This conceptual model includes a simple mediation model, which stipulates that the indirect (mediated) effect for the relationship between the sociodemographic and obstetric characteristics (X) and postpartum depressive symptoms (Y) should be represented as the product of the direct effect of X on M (path a) and the direct effect of M on Y (path b). This was done for each demographic/obstetric predictor significant in each model (education, monthly household income, family type, parity, mode of delivery, pregnancy planning status, and previous history of mental

health) with social support total score as the mediator in each model, thus capturing both a residual direct effect and a residual indirect effect consistent with a partial mediation framework. Directly and indirectly (via Perceived Social Support): Schematically: *Demographic/Obstetric Characteristics* → *Perceived Social Support* → *Postpartum Depressive Symptoms*, with a direct path also permitted from Demographic/Obstetric Characteristics to Postpartum Depressive Symptoms.

## **Method**

### **Research Design**

The design of this study was quantitative, cross sectional and correlational, which was suitable for the investigation of association between naturally occurring psychosocial and mental-health variables which cannot be manipulated experimentally. Given the stress-buffering theory, the theoretical premise for the ordering of variables (demographic/obstetric characteristics first, social support second, and depressive symptoms third) was set in advance.

### **Participants, Sampling, and Eligibility**

The sample included 147 postpartum women, and all demographic and obstetric data are shown in Table 1. The majority of the sample were aged 25–29 years (34.7%), urban (70.1%), married (89.8%), multiparous (80.3%), and living in nuclear compared to joint/extended households (55.8% vs. 44.2%), and were distributed across all education and income levels. Women who were included were those who were able to complete or have the study measures read to them, were over 18 years of age, had read or completed the EPDS and MOS-SSS measures, and had consented; women who had postpartum psychosis, were currently an inpatient psychiatric patient, and women who did not complete the outcome measures (EPDS, MOS-SSS) were excluded. Commonly, probabilistic sampling frames for postpartum women are not available (cf. Zanini et al., 2018), making it difficult to achieve generalizability; a non-probability convenience sample was recruited from postnatal follow-up visits and community/home-visiting contacts including those in urban and rural areas—to facilitate an efficient, demographically diverse sample.

### **Measures**

A structured demographic/obstetric questionnaire captured maternal age, education, employment, monthly household income (PKR), residence, family type, marital status, number of children, parity, age of youngest child, pregnancy-planning status, mode of delivery, complications, and previous mental-health history. Depressive symptoms were measured with the Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987), a 10-item self-report instrument scored 0–3 per item (range 0–30, five items reverse-scored) that deliberately screens cognitive-affective rather than somatic symptoms and includes a self-harm item (Item 10) warranting immediate referral regardless of total score; internal consistency here was excellent ( $\alpha = .946$ ; Table 2). Perceived social support was measured with the Medical Outcomes Study Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991), a 19-item, 5-point (0–4) instrument yielding a total score and four subscales Material (4 items), Affective (3 items), Emotional/Informational (8 items), and Social Interaction (4 items) consistent with the four-factor structure established in regional adaptations (Griep et al., 2005; Zanini et al., 2018); internal consistency was excellent for the Total ( $\alpha = .967$ ), Material ( $\alpha = .891$ ), and Emotional/Informational ( $\alpha = .938$ ) scores, and good for Social Interaction ( $\alpha = .806$ ) and Affective ( $\alpha = .766$ ; Table 2).

## **Procedure, Ethics, and Data Analysis**

Structured, interviewer-administered and self-administered questionnaires were completed at postnatal clinic visits and community home contacts (15–20 minutes), with informed consent obtained beforehand and, per EPDS guidance, scales completed privately without family members present. A referral protocol ensured any participant endorsing self-harm ideation or scoring at or above the clinical threshold was connected promptly to mental-health follow-up, consistent with standard ethical practice for sensitive research (informed consent, voluntary participation, right to withdraw, confidentiality). Descriptive statistics and Cronbach's alpha characterized the sample and measures; Pearson correlations examined bivariate associations among support subscales and EPDS scores; hierarchical multiple regression tested EPDS scores in three steps (demographic, then obstetric/maternal, then social-support variables); and mediation was tested via first-stage (path a) regressions of each significant predictor on each support subscale/total, followed by simple mediation models (paths a, b, c', and indirect ab) using bootstrapped bias-corrected 95% confidence intervals (5,000 resamples), with indirect effects significant when the CI excluded zero. Because entering Social Support Total alongside its four subscales produced a singular covariance matrix from extreme multicollinearity, final mediation models used the Total score as sole mediator, noted in the results tables.

## **Results**

### **Participant Demographic Characteristics**

The demographic and obstetric composition of the sample is summarized in Table 1. As detailed above, the sample was predominantly urban, married, multiparous, and living in nuclear rather than joint family households, with substantial representation across the full range of educational and income bands, providing adequate variability for the planned regression and mediation analyses.

**Table 1: Demographic and Obstetric Characteristics of Participants (N = 147)**

| <b>Variable</b>          | <b>n</b> | <b>%</b> |
|--------------------------|----------|----------|
| <b>Age group</b>         |          |          |
| 18-24                    | 41       | 27.9     |
| 25-29                    | 51       | 34.7     |
| 30-34                    | 33       | 22.4     |
| 35+                      | 22       | 15.0     |
| <b>Education level</b>   |          |          |
| Primary                  | 16       | 10.9     |
| Secondary                | 27       | 18.4     |
| Intermediate             | 20       | 13.6     |
| Bachelor                 | 52       | 35.4     |
| Master+                  | 26       | 17.7     |
| Other                    | 6        | 4.1      |
| <b>Employment status</b> |          |          |
| Employed                 | 40       | 27.2     |

|                                       |     |      |
|---------------------------------------|-----|------|
| Unemployed                            | 20  | 13.6 |
| Homemaker                             | 80  | 54.4 |
| Self-employed                         | 7   | 4.8  |
| <b>Monthly household income (PKR)</b> |     |      |
| Below 30,000                          | 26  | 17.7 |
| 30,000-60,000                         | 39  | 26.5 |
| 60,001-100,000                        | 34  | 23.1 |
| 100,001-150,000                       | 22  | 15.0 |
| Above 150,000                         | 26  | 17.7 |
| <b>Residence</b>                      |     |      |
| Urban                                 | 103 | 70.1 |
| Rural                                 | 44  | 29.9 |
| <b>Family type</b>                    |     |      |
| Nuclear                               | 82  | 55.8 |
| Joint/Extended                        | 65  | 44.2 |
| <b>Marital status</b>                 |     |      |
| Married                               | 132 | 89.8 |
| Separated/Divorced                    | 11  | 7.5  |
| Widowed                               | 2   | 1.4  |
| Other                                 | 2   | 1.4  |
| <b>Number of children</b>             |     |      |
| 1                                     | 29  | 19.7 |
| 2                                     | 45  | 30.6 |
| 3                                     | 40  | 27.2 |
| 4                                     | 23  | 15.6 |
| 5                                     | 6   | 4.1  |
| 6                                     | 4   | 2.7  |
| <b>Parity</b>                         |     |      |
| Primiparous                           | 29  | 19.7 |
| Multiparous                           | 118 | 80.3 |
| <b>Age of youngest child</b>          |     |      |
| Less than 1 month                     | 25  | 17.0 |
| 1-3 months                            | 52  | 35.4 |
| 4-6 months                            | 39  | 26.5 |
| 7-12 months                           | 31  | 21.1 |
| <b>Pregnancy planned</b>              |     |      |
| Planned                               | 97  | 66.0 |
| Unplanned                             | 50  | 34.0 |

**Mode of delivery**

|           |    |      |
|-----------|----|------|
| Vaginal   | 95 | 64.6 |
| Caesarean | 52 | 35.4 |

**Pregnancy/delivery complications**

|     |     |      |
|-----|-----|------|
| Yes | 29  | 19.7 |
| No  | 118 | 80.3 |

**Previous mental-health history**

|     |     |      |
|-----|-----|------|
| Yes | 19  | 12.9 |
| No  | 128 | 87.1 |

*Note.* PKR = Pakistani Rupees.

**Descriptive Statistics and Reliability**

Table 2 presents descriptive statistics and internal-consistency estimates for the EPDS and MOS-SSS. The sample's mean EPDS score ( $M = 14.20$ ,  $SD = 7.91$ ) exceeded the commonly applied clinical threshold of 9–13 points recommended for referral (Cox et al., 1987), indicating that, on average, this sample reported a clinically meaningful burden of depressive symptomatology, consistent with the elevated prevalence estimates reported elsewhere in Pakistan (Gulamani et al., 2013; Yadav et al., 2020). Perceived social support was moderate to high across subscales, with the Emotional/Informational subscale showing the greatest absolute variability ( $M = 18.20$ ,  $SD = 7.12$ ) and the Affective subscale showing the least ( $M = 8.87$ ,  $SD = 2.19$ ). All scales demonstrated good-to-excellent internal consistency ( $\alpha = .766-.967$ ), supporting their use in subsequent inferential analyses.

**Table 2: Descriptive Statistics and Internal Consistency Reliability for Study Measures**

| Scale                   | k  | $\alpha$ | M (SD)        |
|-------------------------|----|----------|---------------|
| EPDS                    | 10 | .946     | 14.20 (7.91)  |
| MOS-SSS Total           | 19 | .967     | 47.55 (15.14) |
| Material                | 4  | .891     | 8.90 (3.81)   |
| Affective               | 3  | .766     | 8.87 (2.19)   |
| Emotional/Informational | 8  | .938     | 18.20 (7.12)  |
| Social Interaction      | 4  | .806     | 11.58 (2.76)  |

*Note.* EPDS = Edinburgh Postnatal Depression Scale; MOS-SSS = Medical Outcomes Study Social Support Survey; k = number of items;  $\alpha$  = Cronbach's alpha.

**Correlations**

Table 3 presents bivariate correlations among the four MOS-SSS subscales, the MOS-SSS total score, and EPDS total score. All social support indices were strongly and positively intercorrelated ( $r = .793-.982$ ,  $p < .01$ ), reflecting their shared underlying construct, and each was strongly and negatively correlated with EPDS scores. The strongest support-depression association was observed for the Emotional/Informational subscale ( $r = -.678$ ,  $p < .01$ ) and for the Social Support Total score ( $r = -.681$ ,  $p < .01$ ), while the Social Interaction subscale showed the comparatively weakest, though still substantial, association ( $r = -.605$ ,  $p < .01$ ). These findings provide strong preliminary support for Hypothesis 3 and are consistent with the broader literature identifying emotional and informational support as a particularly potent buffer against depressive symptomatology (Beck, 2001; Dennis & Dowswell, 2013).

**Table 3: Bivariate Correlations Among Social Support Subscales and Postpartum Depression Scores**

| Variable                   | 1       | 2       | 3       | 4       | 5       | 6 |
|----------------------------|---------|---------|---------|---------|---------|---|
| 1. Material                |         |         |         |         |         |   |
| 2. Affective               | .825**  |         |         |         |         |   |
| 3. Emotional/Informational | .916**  | .848**  |         |         |         |   |
| 4. Social Interaction      | .849**  | .793**  | .870**  |         |         |   |
| 5. Social Support Total    | .957**  | .896**  | .982**  | .920**  |         |   |
| 6. EPDS Total              | -.657** | -.598** | -.678** | -.605** | -.681** |   |

Note. N = 147. EPDS = Edinburgh Postnatal Depression Scale. \*\*p < .01.

### **Demographic and Obstetric Differences in Postpartum Depression**

Table 4 presents the hierarchical multiple regression predicting EPDS total score. At Step 1, demographic variables accounted for a significant proportion of variance ( $R^2 = .154$ ),  $F(8, 138) = 3.15$ ,  $p < .01$ , with education, monthly household income, family type, and number of children as significant individual predictors; the negative family-type coefficient indicated that women in joint or extended households reported fewer symptoms than those in nuclear households. At Step 2, obstetric and maternal-history variables produced a substantial increase in variance explained ( $\Delta R^2 = .300$ ),  $F(6, 132) = 12.10$ ,  $p < .001$ , cumulative  $R^2 = .454$ , with parity, unplanned pregnancy ( $\beta = .38$ , the strongest single predictor), caesarean delivery, and previous mental-health history all significant, alongside household income and family type. At Step 3, entry of the four social support subscales produced a further significant increment ( $\Delta R^2 = .148$ ),  $F(4, 128) = 11.86$ ,  $p < .001$ , for a final  $R^2$  of .602. In this final model, Emotional/Informational support was the only support subscale to retain independent significance ( $\beta = -.38$ ), alongside unplanned pregnancy ( $\beta = .26$ ) and previous mental-health history ( $\beta = -.21$ ). Notably, several predictors significant in Steps 1–2 household income, family type, parity, caesarean delivery lost significance once social support was entered, a pattern consistent with mediation and motivating the formal analyses below.

**Table 4: Hierarchical Multiple Regression Analysis Predicting Postpartum Depression (EPDS Total Score)**

| Predictor                | Step 1 B ( $\beta$ ) | Step 2 B ( $\beta$ ) | Step 3 B ( $\beta$ ) |
|--------------------------|----------------------|----------------------|----------------------|
| Age group                | -.05 (-.01)          | -.41 (-.05)          | -.31 (-.04)          |
| Education level          | 1.04* (.18)          | .97* (.17)           | .78* (.14)           |
| Employment status        | -.37 (-.04)          | .26 (.03)            | -.11 (-.01)          |
| Monthly household income | -1.21* (-.21)        | -1.08** (-.18)       | -.57 (-.10)          |
| Residence                | .30 (.02)            | -.25 (-.01)          | 1.42 (.08)           |
| Family type              | -2.89* (-.18)        | -2.36* (-.15)        | .59 (.04)            |
| Marital status           | .25 (.01)            | .66 (.04)            | .70 (.04)            |
| Number of children       | -1.09* (-.17)        | .02 (.00)            | -.24 (-.04)          |
| Parity                   |                      | -4.56** (-.23)       | -1.81 (-.09)         |
| Age of youngest child    |                      | -.34 (-.04)          | -.33 (-.04)          |

|                                          |                |                  |                  |
|------------------------------------------|----------------|------------------|------------------|
| Pregnancy (unplanned)                    | planned        | 6.33*** (.38)    | 4.36*** (.26)    |
| Mode of delivery (caesarean)             |                | 3.54** (.21)     | 1.06 (.07)       |
| Pregnancy/delivery complications         |                | -1.80 (-.09)     | -.01 (-.00)      |
| Previous mental-health history           |                | -8.57*** (-.36)  | -5.01** (-.21)   |
| Social Support – Material                |                |                  | -.40 (-.19)      |
| Social Support – Affective               |                |                  | -.08 (-.02)      |
| Social Support – Emotional/Informational |                |                  | -.42* (-.38)     |
| Social Support – Social Interaction      |                |                  | .22 (.08)        |
| R <sup>2</sup> ( $\Delta R^2$ )          | .154 (.154)    | .454 (.300)      | .602 (.148)      |
| F for $\Delta R^2$                       | 3.15** (8,138) | 12.10*** (6,132) | 11.86*** (4,128) |

*Note.* N = 147. Step 1: demographic variables entered. Step 2: obstetric/maternal variables added. Step 3: Social Support subscales added. Reference categories: Pregnancy planned (1 = Unplanned), Mode of delivery (1 = Caesarean). \*p < .05. \*\*p < .01. \*\*\*p < .001.

### **Demographic and Obstetric Differences in Social Support**

Table 5 presents first-stage (path a) regressions of each significant demographic/obstetric predictor on each social support subscale and total score. Education was not significantly associated with any subscale (all  $p > .05$ ). Monthly household income was significantly and positively associated with Material and Emotional/Informational support and the Total score (all  $p \leq .03$ ), consistent with financial resources being convertible into practical and informational assistance. Family type showed the strongest associations of any predictor, with joint/extended status linked to significantly higher scores on every subscale and the Total score (all  $p < .001$ ;  $R^2 = .11$  for the Total model), the largest effect size observed. Parity showed a similarly broad pattern, with multiparous status associated with higher support across all subscales and the Total score (all  $p < .05$ ). Caesarean delivery was associated with significantly lower Affective, Emotional/Informational, and Social Interaction support and the Total score ( $p = .04$ ), though not Material support. Unplanned pregnancy showed the most consistently negative pattern, predicting lower scores on every subscale and the Total score (all  $p < .01$ ), and previous mental-health history was likewise associated with lower support across all subscales and the Total score (all  $p < .001$ ), the second-largest effect size after family type.

**Table 5: Effects of Demographic and Obstetric Predictors on Social Support Subscales (Path a)**

| Predictor / Mediator | B    | SE  | t     | p   | R <sup>2</sup> | F    | df1 | df2 | p (F) |
|----------------------|------|-----|-------|-----|----------------|------|-----|-----|-------|
| <b>Education</b>     |      |     |       |     |                |      |     |     |       |
| Material             | -.24 | .23 | -1.02 | .31 | .01            | 1.05 | 1   | 145 | .31   |
| Affective            | -.17 | .13 | -1.27 | .21 | .01            | 1.61 | 1   | 145 | .21   |

|                                       |         |      |       |     |     |       |   |     |       |
|---------------------------------------|---------|------|-------|-----|-----|-------|---|-----|-------|
| Emotional/Informational               | -.53    | .43  | -1.24 | .22 | .01 | 1.54  | 1 | 145 | .22   |
| Social Interaction                    | -.25    | .17  | -1.48 | .14 | .01 | 2.20  | 1 | 145 | .14   |
| Total                                 | -1.18   | .91  | -1.30 | .20 | .01 | 1.68  | 1 | 145 | .20   |
| <b>Monthly household income</b>       |         |      |       |     |     |       |   |     |       |
| Material                              | .51*    | .23  | 2.23  | .03 | .03 | 4.99  | 1 | 145 | .03   |
| Affective                             | .20     | .13  | 1.48  | .14 | .01 | 2.20  | 1 | 145 | .14   |
| Emotional/Informational               | .99*    | .43  | 2.31  | .02 | .04 | 5.32  | 1 | 145 | .02   |
| Social Interaction                    | .31     | .17  | 1.83  | .07 | .02 | 3.35  | 1 | 145 | .07   |
| Total                                 | 2.01*   | .91  | 2.20  | .03 | .03 | 4.83  | 1 | 145 | .03   |
| <b>Family type (joint/extended)</b>   |         |      |       |     |     |       |   |     |       |
| Material                              | 2.83**  | .59  | 4.80  | .00 | .14 | 23.01 | 1 | 145 | <.001 |
| Affective                             | 1.22**  | .35  | 3.50  | .00 | .08 | 12.24 | 1 | 145 | <.001 |
| Emotional/Informational               | 4.54**  | 1.12 | 4.04  | .00 | .10 | 16.33 | 1 | 145 | <.001 |
| Social Interaction                    | 1.34**  | .45  | 2.99  | .00 | .06 | 8.95  | 1 | 145 | <.001 |
| Total                                 | 9.93**  | 2.38 | 4.17  | .00 | .11 | 17.37 | 1 | 145 | <.001 |
| <b>Parity (multiparous)</b>           |         |      |       |     |     |       |   |     |       |
| Material                              | 2.15*   | .77  | 2.78  | .01 | .05 | 7.74  | 1 | 145 | .01   |
| Affective                             | 1.08*   | .45  | 2.43  | .02 | .04 | 5.92  | 1 | 145 | .02   |
| Emotional/Informational               | 4.55**  | 1.43 | 3.18  | .00 | .07 | 10.11 | 1 | 145 | <.001 |
| Social Interaction                    | 1.32*   | .56  | 2.35  | .02 | .04 | 5.51  | 1 | 145 | .02   |
| Total                                 | 9.11**  | 3.06 | 2.98  | .00 | .06 | 8.88  | 1 | 145 | <.001 |
| <b>Mode of delivery (caesarean)</b>   |         |      |       |     |     |       |   |     |       |
| Material                              | -.88    | .66  | -1.35 | .18 | .01 | 1.82  | 1 | 145 | .18   |
| Affective                             | -.81*   | .37  | -2.18 | .03 | .03 | 4.75  | 1 | 145 | .03   |
| Emotional/Informational               | -2.73*  | 1.21 | -2.25 | .03 | .03 | 5.07  | 1 | 145 | .03   |
| Social Interaction                    | -.98*   | .47  | -2.09 | .04 | .03 | 4.37  | 1 | 145 | .04   |
| Total                                 | -5.41*  | 2.58 | -2.09 | .04 | .03 | 4.39  | 1 | 145 | .04   |
| <b>Pregnancy planned (unplanned)</b>  |         |      |       |     |     |       |   |     |       |
| Material                              | -2.00** | .64  | -3.10 | .00 | .06 | 9.59  | 1 | 145 | <.001 |
| Affective                             | -1.11** | .37  | -2.99 | .00 | .06 | 8.92  | 1 | 145 | <.001 |
| Emotional/Informational               | -3.34*  | 1.21 | -2.76 | .01 | .05 | 7.59  | 1 | 145 | .01   |
| Social Interaction                    | -1.63** | .46  | -3.53 | .00 | .08 | 12.48 | 1 | 145 | <.001 |
| Total                                 | -8.08** | 2.56 | -3.16 | .00 | .06 | 9.98  | 1 | 145 | <.001 |
| <b>Previous mental-health history</b> |         |      |       |     |     |       |   |     |       |
| Material                              | 3.27**  | .90  | 3.63  | .00 | .08 | 13.17 | 1 | 145 | <.001 |
| Affective                             | 1.42*   | .53  | 2.70  | .01 | .05 | 7.31  | 1 | 145 | .01   |
| Emotional/Informational               | 5.86**  | 1.69 | 3.47  | .00 | .08 | 12.05 | 1 | 145 | <.001 |
| Social Interaction                    | 1.93**  | .66  | 2.92  | .00 | .06 | 8.54  | 1 | 145 | <.001 |

|       |         |      |      |     |     |       |   |     |       |
|-------|---------|------|------|-----|-----|-------|---|-----|-------|
| Total | 12.48** | 3.59 | 3.48 | .00 | .08 | 12.10 | 1 | 145 | <.001 |
|-------|---------|------|------|-----|-----|-------|---|-----|-------|

*Note.* N = 147. Each row reports the first-stage (path a) regression of the labeled predictor on the labeled Social Support mediator, df1 = 1, df2 = 145 in all models. Reference categories: Family type (1 = Nuclear), Parity (1 = Primiparous), Mode of delivery (1 = Vaginal), Pregnancy planned (1 = Planned), Previous mental-health history (1 = No). \*p < .05. \*\*p < .01.

### Mediation Analysis

Table 6 presents the simple mediation models testing whether Social Support Total mediates the effect of each significant demographic/obstetric predictor on EPDS total score, using bootstrapped bias-corrected 95% confidence intervals (5,000 resamples). Consistent with Hypothesis 4, the indirect effect was statistically significant (CI excluding zero) for monthly household income, family type, parity, mode of delivery, unplanned pregnancy, and previous mental-health history; only education failed to show a significant indirect effect, consistent with its non-significant path-a association reported above. For family type and parity, the direct effect (c') became non-significant once the indirect path was accounted for, indicating full mediation the entire association between these variables and depressive symptoms was attributable to their influence on perceived support. For household income, mode of delivery, unplanned pregnancy, and previous mental-health history, both direct and indirect effects remained significant, indicating partial mediation.

**Table 6: Simple Mediation Analysis: Social Support Total as a Mediator between Demographic/Obstetric Predictors and Postpartum Depression (EPDS Total Score)**

| Predictor (X)                  | a (X→M)  | b (M→Y) | c (Total) | c' (Direct) | Indirect (ab) | Boot 95% CI    |
|--------------------------------|----------|---------|-----------|-------------|---------------|----------------|
| Education                      | -1.18    | -.35**  | 1.08*     | .67         | .41           | [-.23, 1.07]   |
| Monthly household income       | 2.01*    | -.35**  | -1.28**   | -.58        | -.70*         | [-1.37, -.05]  |
| Family type (joint/extended)   | 9.93**   | -.36**  | -3.43**   | .12         | -3.55*        | [-5.42, -1.83] |
| Parity (multiparous)           | 9.11**   | -.34**  | -4.99**   | -1.85       | -3.13*        | [-5.39, -.99]  |
| Mode of delivery (caesarean)   | -5.41*   | -.36**  | 1.83      | -.10        | 1.93*         | [.18, 3.87]    |
| Pregnancy planned (unplanned)  | -8.08**  | -.33**  | 5.90**    | 3.24**      | 2.67*         | [1.09, 4.28]   |
| Previous mental-health history | -12.48** | -.33**  | 8.59**    | 4.50**      | 4.09*         | [2.23, 6.21]   |

*Note.* N = 147. Mediator (M) = Social Support Total Score. a = effect of X on M; b = effect of M on Y controlling for X; c = total effect of X on Y; c' = direct effect of X on Y controlling for M; Indirect = ab. Bootstrap 95% CIs are bias-corrected, based on 5,000 resamples; an indirect effect is significant when its CI does not contain zero (marked with \*). Reference categories as in Table 5. \*p < .05. \*\*p < .01.

### Direct, Indirect, and Total Effects: Model Summaries

Table 7 summarizes the model-fit statistics underlying Table 6. Across all seven predictors, the path b/c' model (X and Social Support Total jointly predicting EPDS) explained substantially more variance ( $R^2 = .46-.50$ ) than the corresponding path a model alone ( $R^2 = .01-.11$ ), and this consistency across predictors indicates that, once support is included, the specific demographic variable chosen adds little incremental explanatory power reinforcing that social support, rather than demographic status per se, is the more proximal determinant of postpartum depressive symptoms.

**Table 7: Model Summary Statistics for the Regression Equations Underlying Table 6**

| Predictor (X)                  | Model 1<br>R <sup>2</sup> (X→M) | Model 1<br>F, df, p | Model 2<br>R <sup>2</sup> (X+M→Y) | Model 2<br>F, df, p |
|--------------------------------|---------------------------------|---------------------|-----------------------------------|---------------------|
| Education                      | .01                             | 1.68, 1/145, .197   | .48                               | 65.65, 2/144, <.001 |
| Monthly household income       | .03                             | 4.83, 1/145, .030   | .47                               | 64.70, 2/144, <.001 |
| Family type (joint/extended)   | .11                             | 17.37, 1/145, <.001 | .46                               | 62.26, 2/144, <.001 |
| Parity (multiparous)           | .06                             | 8.88, 1/145, .003   | .47                               | 64.35, 2/144, <.001 |
| Mode of delivery (caesarean)   | .03                             | 4.39, 1/145, .038   | .46                               | 62.26, 2/144, <.001 |
| Pregnancy planned (unplanned)  | .06                             | 9.98, 1/145, .002   | .50                               | 71.76, 2/144, <.001 |
| Previous mental-health history | .08                             | 12.10, 1/145, <.001 | .50                               | 71.29, 2/144, <.001 |

*Note.* N = 147. Model 1 is the path a regression (X predicting Social Support Total). Model 2 is the path b/c' regression (X and Social Support Total jointly predicting EPDS Total Score). Model 1 R<sup>2</sup>/F values match the "Total" row of Table 5 for the same predictor.

## Discussion

### Summary and Interpretation of Findings

This study explored the social and obstetric factors associated with postpartum depressive symptoms among 147 women in Punjab, Pakistan and explored the potential of perceived social support as a mediator between these factors. Depressive symptoms were higher than usual screening thresholds and social support in all four dimensions measured was significantly and negatively correlated with depressive symptoms. A substantial 60.2% of the variance in EPDS scores was accounted for by a hierarchical regression model that included demographic, obstetric and social-support variables, with the most powerful independent predictors being unplanned pregnancy, a previous mental-health diagnosis and Emotional/Informational support. All family type, parity, household income, mode of delivery, unplanned pregnancy, and previous mental-health history were significantly associated with perceived social support and formal mediation analyses confirmed that social support significantly mediated each of these 6 pathways, with complete mediation for family type and parity and partial mediation for household income, mode of delivery, unplanned pregnancy and previous mental-health history.

The counterintuitive result of women's reporting of higher levels of support and indirectly, lower levels of depression symptoms in joint or extended households adds a nuance to the long-standing ambivalence regarding the role of joint living in the South Asian family-structure literature, which has been viewed both as a risk factor (loss of autonomy, interpersonal friction) and a protective factor (shared caregiving) (Gulamani et al., 2013). The protective pathway dominated here: There was a single largest association between family type and perceived support and this accounted for all the association between family type and depressive symptoms, and the association between parity and depressive symptoms was similarly fully mediated by perceived support, plausibly reflecting the normalizing of caretaking roles and routines that multiparous women contribute to the postpartum period. In contrast, unplanned pregnancy, caesarean delivery, and a prior mental-health history had partial rather than full mediation, suggesting that these experiences have a further psychological weight, in the sense of ambivalent feelings about the pregnancy, altered birth expectations, and compound vulnerability due to a prior psychiatric history, which does not solely stem from the loss of perceived support (Yadav et al., 2020). This continued direct effect of previous mental-health history confirms the known factor of previous depressive or psychiatric

episodes as one of the most significant predictors of recurrence after childbirth, in part because of mechanisms not entirely related to social support per se ( Beck, 2001).

The strong bivariate correlation of Emotional/Informational support with depressive symptoms, and its unique significance in the final regression model, align with theoretical explanations that focus on empathetic listening and guidance rather than simply physical help as most proximally related to mood (Cohen & Wills, 1985), and with item-level MOS-SSS evidence showing that the items associated with confiding and advice-seeking were most discriminating (Zanini et al., 2018). Material and Affective support were highly correlated with symptoms bivariately, and did not maintain their predictive strength when Emotional/Informational support was added, but rather appear to be measuring a similar factor, as evidenced by the high intercorrelations among the subscales ( $r = .793-.916$ ; Table 3), which may indicate that these two are not independent of one another. The addition of social support with each of the demographic predictors was also responsible for substantial additional explained variance in depressive outcomes, as shown in model-fit comparisons in Table 7, such that the path b/c' models accounted for about four to five times more variance than the demographic predictors alone.

### **Comparison with Previous Research and Theoretical Implications**

This study, along with other research, provides implications for theory and practice.

The findings are consistent with the international literature, which has consistently identified social support as one of the most important protective factors against PPD (Beck, 2001; Dennis & Dowswell, 2013) and extend the regional Pakistani literature which reported primarily bivariate associations between low social support and high risk of PPD ( Ali et al., 2009; Yousaf et al., 2025) without testing the mediation. The portion of variance explained here (60.2%) is higher than what is generally reported in studies with a single predictor (15 – 25%) in the region (Yadav et al., 2020) which highlights the importance of a validated multidimensional support measure, while a higher mean EPDS score ( $M = 14.20$ ) is broadly consistent with the higher end of Pakistani prevalence estimates (Gulamani et al., 2013). Theoretically, the results extend the stress-buffering model (Cohen & Wills, 1985) to a non-Western, collectivist context in which family-based networks rather than individual or peer networks are primary, and the full mediation in the case of family type suggests that a structural, largely fixed demographic characteristic can operate on mood entirely through a modifiable psychosocial mechanism precisely the pattern the buffering hypothesis predicts if family type is viewed as serving as a proxy for available support rather than a direct stressor. This is consistent with an ecological perspective of maternal mental health (Belsky, 1984) that demonstrated that a woman's status in nested family and economic systems translates into the proximal, psychosocial resources which influence outcomes. Culturally, for many families, the extended family is the main unit of social organization, and when these social support mechanisms are intact and viewed as available, they provide an important level of protection: those women who do not receive their families' support because they have moved to a nuclear household, because of previous psychiatric difficulties, or because of a complicated or unplanned birth seem to be at compounded and less fully buffered risk than those who do receive support, and the caution is to not take the concept of “family involvement” as a single and monolithic protective factor.

### **Practical Implications**

As there was a high mean EPDS score for this sample, and the EPDS recommends immediate referral for any woman with a score of 9 or above, and/or an endorsement of self-harm ideation on Item 10, routine screening of the EPDS at postnatal visits with a clear pathway to referral should

be considered a standard of maternal care rather than an optional. Interventions that build the emotional/informational dimension of a new mother's confiding relationships would be expected to benefit symptoms, and could be expected to produce disproportionate benefit compared to purely material or logistical support, as social support, and in particular its emotional/informational aspect, proved to be the most proximal and modifiable determinant of symptoms: structured partner- and family-inclusive psychoeducation during antenatal care, peer-support "mother's circle" programs, community health workers trained in brief, empathetic listening-based home-visit contact are all consistent with the demonstrated efficacy of psychosocial and peer-based interventions (Dennis & Dowswell, 2013). Unplanned pregnancy, operative delivery and prior mental-health history should also be considered as additional risk markers that should be monitored, as these are independently linked to decreased support and increased risk of depression, respectively, and should be taken into account by obstetric and primary-care providers. Findings suggest that programs that include a formal role for mothers-in-law, a sister or other kin rather than assume a nuclear, mother only caregiving model are more likely to be successful, and at a policy level that suggests a way to incorporate maternal mental-health screening into existing community midwifery and Lady Health Worker service structures, and to help alleviate financial strain during the postpartum period, due to the role of household income.

### **Strengths, Limitations, and Future Research**

The strengths of this study are that we used two instruments that are well validated with high internal reliability, a multidimensional support measure instead of only one, and a formal bootstrapped mediation analysis which separated the direct pathway from the indirect pathway from the bivariate association. There are several caveats to these results. The cross sectional design does not allow for the strong inference of causality; the temporal ordering of the mediation model was theoretically reasoned, but depression symptoms could be expected to decrease perceived support instead of, or in addition to, the reverse. The small size of a non-probability convenience sample and the inclusion of self-report measures (which add shared-method variance and potential social-desirability bias for self report measures that might be sensitive to such effects such as self-harm ideation) limit the generalizability of conclusions. The matrix obtained with Social Support Total, along with its four subscales was singular as a result of extreme multicollinearity; using only the Total score as a single mediator circumvented this issue but did not allow for formal testing of subscale-specific mediation pathways. Finally, the sample size is sufficient for the models presented here but does not provide adequate power for more complex models such as multiple-mediator or moderated-mediation models. For future research, it is recommended to use longitudinal designs to better establish the temporal and causal nature of the relationship between support and mood; to use larger samples in order to employ parallel or serial multiple-mediator models such as structural equation modeling, which are robust against subscale collinearity; to use qualitative studies to better understand the nature of the support-mood relationship in this cultural context; and to conduct intervention trials that would manipulate perceived support and test the causal claims that can be made from the present model.

### **Conclusion**

This study shows the importance of perceived social support as an intervening variable between sociodemographic and obstetric factors and postpartum depressive symptoms among women in Punjab, Pakistan. Family type and parity correlated with depressive symptoms only through the variable of perceived support; whereas household income, mode of delivery, unplanned pregnancy and past mental-health history had both direct and support-mediated effects, with perceived support accounting for the greatest amount of variance in the final model. The results add a new

dimension to a disparate set of demographic risk factors, narrowing them to one common clinically-relevant target: improving women's perceived availability of emotional, informational and material support in the postpartum period. Given a context of limited resources for individual psychiatric treatment, family and community-based approaches that intentionally foster social support, and that are based on theory, and feasible in practice, appear to be a viable way of reducing the significant burden of postpartum depression that has been previously documented in this sample and in previous samples conducted in Pakistan.

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