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Original research article

MATERNAL STRESS AND NEWBORN BEHAVIOR, MATERNAL DEPRESSION AND NEWBORN COGNITION

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Abstract: *The objective of this study is to determine the relationship between maternal stress, maternal depression, and newborn behavior/cognition. This cross-sectional study included 60 participants and their newborn babies. Maternal depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS), while the Perceived Stress Scale (PSS-10) was used to measure stress levels. The newborn behavior/cognition was measured using the BSID-III Screening Test scores. Data was collected from January 2023 to June 2023. Mothers had an average age of 35.63± 7.22 years, while the newborn infants had an average of 8.61± 3.27 years. Among the newborns, 56.7% were male infants, while 43.3% were female infants. The study determined the characteristics of enrolled patients and their newborn infants. The correlations between BSID-III Screening Test scores and maternal depression, as well as maternal stress, were also presented. The study showed that there was a correlation between cognitive development and maternal depression, with an R-value of 0.19 and an insignificant P-value of 0.14. Similarly, a correlation was found between cognitive development and maternal stress, with an R-value of 0.17 and an insignificant P-value of 0.17. The study concluded that maternal stress during pregnancy can impact newborn behavior, highlighting the importance of addressing maternal stress and depression, not only for the well-being of the mothers but also for fostering healthy newborn behavior and cognitive development.*

Keywords: Maternal stress, newborn behavior, maternal depression, and newborn cognition, Edinburgh Postnatal Depression

Introduction

Maternal depression is recognized as a contributing factor to the socioemotional and cognitive development risk in children (Hentges et al., 2021). Numerous research studies have shown that maternal depression during pregnancy and the postpartum period can have significant and lasting effects on children's development (Lefkovics et al., 2014). The relationship between maternal stress and newborn behavior, as well as maternal depression and newborn cognition, is a subject of significant research interest in the field of child development and maternal health. Maternal depression during pregnancy can potentially impact newborn cognition (Brummelte and Galea, 2016). Some studies suggest that prenatal exposure to maternal depression may be associated with subtle cognitive deficits in infants, such as delays in attention or information-processing skills. The prevalence of depression in Pakistan was estimated to be around 6%, which is in line with the global average (Muhammad Gadit and Mugford, 2007). The prevalence of depression in Pakistani women was estimated to be relatively high (Asad et al., 2010; Bhamani et al., 2013). Depression is a global concern, and it affects people of all genders and age groups (Üstün et al., 2004). In many societies, including Pakistan, cultural, social, and economic factors can contribute to varying rates of depression among women. Women of reproductive age face a heightened vulnerability to depression, with a significant proportion grappling with elevated social burden and depressive indicators that frequently go unnoticed and untreated (Seyfried and Marcus, 2003). Mothers who are already prone to depression are particularly vulnerable during the initial postpartum months.

Mother-infant interactions are fundamental social exchanges between a mother (or primary caregiver) and her infant child. These interactions are crucial to the infant's physical, emotional, and cognitive development.

Infants frequently partake in interactive routines with their mothers throughout the day. Maternal sadness, manifested through either intrusive or withdrawn behaviors, hinders the dyad's capacity to collaboratively regulate their interaction. Intrusive mothers have a harsh demeanor and interfere with their child's activities. The infants experience distress, distance themselves from the mother to reduce her interference, and adopt an internalized, defensive coping mechanism marked by anger.

Emotionally distant mothers exhibit disengagement, lack of responsiveness, emotional detachment, and minimal effort in promoting the infant's engagement (Dix, 1991). The infants struggle to self-regulate or cope with this negative state and exhibit inactivity, disengagement, and self-regulating behavior (such as looking away or sucking on their thumbs). Mother-infant interactions promote the formation of a strong emotional bond and attachment between the mother and her baby. This attachment is essential for the infant's sense of security and trust.

Cognitive development pertains to the advancement and maturation of an individual's thinking, capacity for problem-solving, memory, language skills, and information-processing capabilities (Lutz and Huitt, 2003). It is a complex and multifaceted process that occurs from infancy through adulthood. Both genetic factors and environmental experiences influence cognitive development. According to reports, the attention and

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arousal patterns of babies of postnatally depressed moms are dysregulated (Bernard-Bonnin et al., 2004). Even after adjusting for other factors, in Murray's investigation (Stanley et al., 2004), where newborns from 61 mothers who experienced postnatal depression were compared to infants from 42 non-depressed mothers, it was observed that children of postnatally depressed mothers exhibited diminished cognitive performance in terms of recognizing the independent existence of objects.

Thus, this study aimed to assess the relationship between maternal stress, maternal depression, and newborn behavior/cognition.

Methodology

This study was conducted at the Department of Psychiatry and Behavioral Science, Jinnah Post-Graduation Medical Centre Karachi, between January 2023 and June 2023. The selection criteria for participants were as follows: inclusion criteria were patients with stress and depression and mothers over the age of 20 who were married and had a newborn baby. Exclusion criteria were unmarried mothers, patients with intended therapeutic termination of pregnancy, and psychotic patients.

After obtaining approval from the hospital's ethical committee, eligible patients were enrolled in the study. Informed consent was obtained from all participants, guardians, and the researcher. Depressive symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS), which is a screening tool designed to evaluate depressive symptoms in perinatal women. Higher scores indicate greater severity of depressive symptoms. All participants were also given the Perceived Stress Scale (PSS-10) to measure stress levels, and for newborns, the BSID-III Screening Test scores were used to assess behavior and cognition. The data was entered into a pre-designed questionnaire and analyzed using the Statistical Package for Social Sciences (SPSS) version 23.

Results

The participants in the present study comprised mothers and their newborn infants, with data collected between January 2023 and June 2023. The mean mother and newborn infant age were 35.63± 7.22 and 8.61± 3.27 years respectively (Table 1). 56.7% of newborns were male infants, and 43.3% were female infants (Figure 1). Characteristics of enrolled patients and their newborn infants (Table 2). The correlation of BSID - III Screening Test scores with maternal depression and maternal stress was given in Table 3 and Table 4.

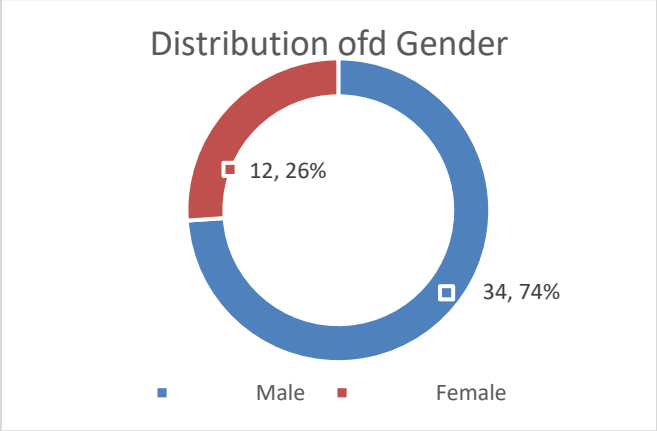

Figure 1: Newborn distribution based on gender.

Table 1: Patient characteristics of enrolled patients *(n=60)*

Variables	Mean ±SD
Mother Age (Years)	35.63± 7.22
Newborn age (Month)	8.61± 3.27

Table 2: Characteristics of enrolled patients and their newborn infants *(n=60)*

Variables	Mean ±SD
Depression	11.16± 3.2
Stress	20.10±5.93
BSID- III Screening Test scores	
Gross motor	24.6±2.4
Fine motor	22.1±1.9
Cognitive	27.53±2.4
Problem-solving	12.73±1.16
Receptive language	20.71±1.3
Expressive language	20.56±1.2

Table 3: Correlation of BSID- III Screening Test scores with maternal depression.

Variable	R-Value	P-Value
Grass motor	0.01	0.8
Fine motor	0.09	0.4
Cognitive	0.19	0.14
Problem-solving	0.1	0.4
Receptive language	1.0	0.2
Expressive language	0.1	02

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Table 4: Correlation of BSID- III Screening Test scores with maternal stress.

Variable	R-Value	P Value
Grass motor	-0.01	0.7
Fine motor	-0.08	0.4
Cognitive	0.17	0.17
Problem-solving	-0.047	0.7
Receptive language	-0.102	0.4
Expressive language	-0.029	0.8

Discussion

In the present study, we want the relationship between maternal stress, maternal depression, and newborn behavior/cognition. The present study's mean maternal age was 35.63± 7.22 years, and the Newborn was 8.61± 3.27 years. A study conducted by Lauren C Shuffrey et al. stated that the mean maternal age was 25.26±5.91 years. (Shuffrey et al., 2022) In our study, most newborn children were male (56.7%), and 43.3% were female. Maternal depression can have a significant impact on children, regardless of their sex. It's essential for individuals experiencing maternal depression to seek support and treatment to improve their well-being and provide a more stable and nurturing environment for their children. A number of studies stated that boys were more sensitive to maternal stress as compared to girls (Hay et al., 2001; Murray, 1992; Sharp et al., 1995). In our study, the male newborns were dominant. It has been demonstrated that mothers experiencing depression tend to make more negative assessments of their children's behaviors, experience reduced confidence in their parenting abilities, and employ maladaptive parenting strategies more frequently(Downey and Coyne, 1990; Field et al., 1993).

In the comparison between children born to mothers without prenatal depression or trait anxiety and those born to mothers with both prenatal depression and trait anxiety, it was evident that the latter group displayed more pronounced social-emotional difficulties. Subsequently, children born to mothers with only prenatal maternal trait anxiety were examined, and lastly, those born to mothers with only prenatal maternal depression were considered in the minimally adjusted models. These relationships held in fully adjusted models, and the group with co-occurring prenatal maternal depression and trait anxiety showed the most severe child social-emotional problems. The effects of postnatal maternal depression alone (from birth to 60 months), prenatal maternal depression alone (from conception to delivery), and recurring prenatal and postnatal maternal depression were studied in a recent comprehensive home-visiting intervention research in Cape Town. As it relates to children's social behaviors, language abilities, and cognitive development, this study also took into account several additional risk variables, such as alcohol use, HIV status, and intimate partner violence. Notably, no associations between maternal depression at any time and the linguistic or cognitive development of children at 36 or 60 months of age were found (Gordon et al., 2021). Several studies have detailed a range of biological mechanisms that can elucidate previous research findings, as well as our present results, which establish a connection between prenatal maternal depression and anxiety and child social-emotional behaviors and cognitive development. These mechanisms include heightened prenatal maternal inflammation, increased cortisol production, and potential epigenetic alterations.(Bergdolt and Dunaevsky, 2019; Bland et al., 2010; Ghassabian et al., 2018; Money et al., 2018; Ruiz and Avant, 2005; Short et al., 2010). The social-emotional and cognitive development of children is more significantly impacted by prenatal maternal depression and persistent stress.

Conclusion

It has been concluded that maternal stress during pregnancy can influence newborn behavior. These findings emphasize the importance of maternal well-being during pregnancy and its potential repercussions on newborns. Addressing maternal stress and depression can be crucial not only for maternal health but also for promoting optimal newborn behavior and cognitive development. Further research and interventions may be needed to better understand and mitigate these effects.

Declarations

Data Availability statement

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

Ethics approval and consent to participate.

Approved by the department Concerned.

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared an absence of conflict of interest.

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