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Biological, Psychosocial and Maternal-Neonatal Factors as Predictors of Postpartum Depression among Breastfeeding Mothers Attending Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka

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Abstract

Postpartum depression is a serious but neglected mental health issue that affects women after childbirth, with characterized persistent feelings of sadness, hopelessness or emptiness, anxiety, worry, fear, mood swings, feeling disconnected from baby and irritability. It affects mother and child bonding, brings about suicidal thoughts, and thoughts of harming baby. Postpartum symptoms can last from a few weeks to several months or longer.Severity can vary from mild to severe. This can be caused by various underlying predictors like biological, psychosocial and maternal-neonatal factors. Therefore, this study was carried out to find out if biological, psychosocial and maternal-neonatal factors are predictors of postpartum depression among breastfeeding mothers of Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Anambra State. The purpose of the study was specifically to find out if these factors can predict postpartum depression. Six null hypotheses guided the study. The research design adopted for this study was a correlational research design because it is used to identify patterns and predict outcomes. The population of the study was 440 breastfeeding mothers attending COOUTH, Awka, also the sample size was 209 breastfeeding mothers of COOUTH, Awka, Anambra State. However, only 173 copies of the questionnaires were correctly filled and used for the study. Data were collected using a standardized questionnaire titled Edinburgh Postnatal Depression scale and a structured questionnaire titled Predictors of postpartum depression. This instrument was also validated by three experts all from Nnamdi Azikiwe University, Awka. The internal constituency was established using Kudder Richardson 0.73, 0.67, 0.67, 0.69, 0.77, 0.68 and 0.75 respectively. The research questions were analyzed using simple logistics regression. Null hypotheses were analyzed using regression at 0.05 level of significance. Findings based on the research questions revealed that biological, psychosocial and maternal-neonatal factors are significantly high predictors of postpartum depression. The findings of the hypotheses tested revealed that there was a positive significant difference in the logistics regression with the predictors, therefore the null hypothesis was rejected. Based on the findings it was recommended that there should be personalized mental health support, adequate sleep management strategies, practice of stress reduction technique, establish trauma informed care training and building of community initiatives.

Keywords: Postpartum depression, breastfeeding, stress, social isolation and depression.

Introduction

Postpartum depression (PPD) represents a significant public health concern that affects millions of women globally during one of the most crucial periods of their lives - the transition to motherhood. This complex mood disorder extends beyond the common "baby blues" and can have profound implications for maternal well-being, infant development, family dynamics, and societal health outcomes. According to the World Health Organization (2020), approximately 10-15% of women who give birth experience postpartum depression, making it a common and severe mental health issue.

According to Carlson et .al (2024), postpartum depression is a mood disorder affecting individuals within the first year after childbirth. Also, according to the diagnostic and statistical manual of mental disorders, 5th Edition (DSM-5), a manual used to diagnose mental disorders, postpartum depression is a form of major depression that begins within four weeks after delivery. It is now included in the term perinatal depression (Serati, Redaellim, Buuoli and Altamura, 2016). Furthermore, postpartum depression affects women of all works of life, it is a silent killer that has eaten deep into our present-day society. Postpartum depression has a significant impact on the mother and long-term consequences on the cognitive and emotional development of most children whose mothers are affected. (World Health Organization, 2019). Many women conceal their feelings due to stigmatization and fear of being mocked for their condition, not knowing the adverse effect this can cause on their mental and physical health as well as that of the baby.

One in eight new mothers report experiencing symptoms of postpartum depression in the year after childbirth.According to Liu, Wang and Wang, (2022), depression symptoms include persistent sadness,lack of interest, low self-esteem, sleep disturbances, loss of appetite, anxiety, irritabilitywith a hostile attitude towards infants, self-blame and feelings of humiliation characterize postpartum depression. People with postpartum depression may also experience changes in eating and sleeping patterns, difficulty bonding with their baby, feelings of hopelessness or worthlessness, recurrent thoughts of death or suicidal ideation. There is no known cause of postpartum depression, but genetics, physical changes, and emotional issues may play a role.It is generally assumed that childbirth means joy and hopebut identifying or recognizing depression is not always easy for the mother herself or the caring professionals. It is important to know more about the time of onset and the cause of the depression. Recognizing symptoms and knowing about risk factors are also critical in the detection of PPD, more awareness of these helps in prevention and treatment. There are three common forms of postpartum affective illnesses, and they include baby blues, postpartum depression, and postpartum psychosis. (National Health Services, 2021.).

On the other hand, some women are not able to cope with the emotional upsurges during their postnatal period and this may result in depressive episodes or mood disorders amongst them. (American Psychiatric Association, 2020). Postpartum depression can impair a woman's ability to care for herself and her infant. Studies done by some researchers, have identified numerous risk factors for PPD, including prior depression, anxiety, stressful life events, lack of social support, and breastfeeding difficulties (Norhayati, Hazlina, AsreneeandEmilin, 2015). It usually develops within the first four weeks after childbirth but can occur several months following birth. Postpartum depression is associated with negative

effects on the mother-infant relationship and those affected women are more likely to stop breastfeeding early. (Brown, Ranceand Bennet, 2016).

Breastfeeding provides well-established health benefits for both mothers and babies, including reduced risk of breast and ovarian cancer and reduced infections and obesity for infants (Victoria, Barros, França, et.al. 2016). However, breastfeeding requires significant time and effort from mothers, and difficulties establishing or maintaining breastfeeding have been associated with increased Postpartum depression symptoms such as mood swings, sadness, and fatigue. (Dias and Figueredo, 2015). Breast-feeding has been explored extensively both as a potential risk factor and protective factor for PPD. The relationship is complex, as breastfeeding difficulties may exacerbate depressive symptoms, yet breastfeeding also enhances maternal-infant bonding which can mitigate risk. The risk of postpartum depression is great if the mother has previously suffered from depression. Still, there is some evidence that a certain subgroup of women for example only experience depression during the postpartum period. Breastfeeding and postpartum depression are intertwined issues requiring compassionate understanding and support. Breastfeeding poses particular challenges, as it can be difficult to leave the feeding newborn frequently. Infants of mothers with depression have a greater chance of negative outcomes in development, especially when the mother's symptoms are severe or becoming chronic, which may be caused by some predictive factors. (Netsi, Pearson, Murray, Cooper, Craske, and Stein, 2018).Therefore, by acknowledging the complex relationship between breastfeeding and PPD, healthcare providers, partners, and families can work together to break the silence surrounding these critical women's health issues.

PPD is a debilitating mental disorder with a high prevalence between 5 percent and 60. 8 percent. Prior studies have shown that the worldwide prevalence of PPD until 2017 would range from 9.5 percent in high-income countries to 20.8 percent in middle-income regions and around 25.8 percent in low-income nations. (Hahn-Holbrook, Cornwell-Hinrichs and Anaya, 2017). According to Shorey, Chee, Chan, Tam and Chong, (2018) conducted a systematic review and meta-analysis which included 58 articles from all regions of the world, the incidence of postpartum depression was 12 percent. In contrast, the overall prevalence of postpartum depression was 17 percent among healthy mothers without a prior history of depression and who gave birth to healthy full-term infants.Another systematic review and meta-analysis studies were also carried out in Africa which reported an overall pooled prevalence of postnatal depression of 16.84 percent. (Dadi, Akalu, Barak andWolde, 2020). According to the largest meta-analysis of postpartum depression to date, the global prevalence of postnatal depression is 17.22 percent.(Wang, Liu, Shuai, Cai, Fu et.al, 2021). The frequency of PPD varies between African countries, albeit higher than values found in high-income settings.

In Nigeria, rates ranging from 10.7 percent to 44.39 percent have been documented in various sub-geographical regions. (Abba, Babandi, Usman, Habib, Owolabi, et al. 2023). A study from South East, Nigeria carried out in Anambra State,reported a prevalence of 22.5 percent. (Tunchama, Nwankwo, Udegbunam, OkonwoandOnyebueke, 2018).

There are many predictive factors which could determine the prevalence of postpartum depression, they could be categorized as biological, psychosocial and maternal neonatal factors. Predictive factors such as reproductive hormones, sleep disturbances, new

motherhood stress, traumatic delivery experiences, social isolation, and infant-related problems, consistently emerged as contributions to the risk of postpartum depression. However, several other factors like effect sizes and association varied substantially, probably due to methodological differences such as instrument, way of assessment, and the interval between birth and assessment.According to Hutchens and Kearney (2020), several articles and several systematic meta-analyses on risk factors on postpartum depression published, shifted a focus, from the broader perspective to specific risk factors like reproductive hormones, sleep disturbances, traumatic delivery experiences, new motherhood stress, etc..

The predictive factors of postpartum depression are explained below. The first predictive factor is reproductive hormone which is greatly affected during and after pregnancy. Pregnancy is accompanied by a rise in estradiol, progesterone, and cortisol, but after delivery dramatic declines in reproductive hormones, including estrogen, progesterone, oxytocin, and allopregnanolone occur immediately after childbirth and are implicated in postpartum mood disorder (Schiller, Meltzer-Brody and Rubinow, 2015). Estrogen and Progesterone levels surge during pregnancy, supporting fetal growth and development. (Guintivano et al., 2020). The precipitous drop in these hormone levels after delivery is analogous to withdrawal, which may precipitate or contribute to depressive symptoms. Oxytocin often called the "love hormone" plays a crucial role in social bonding, attachment, and emotional regulation. It stimulates milk ejection during breastfeeding, which also influences mood and social behaviors. Lower Oxytocin levels have been identified in depressed postpartum mothers (Feldman, Weller, Zagoory-Sharon and Levine, 2022).

The second predictive factor is sleep disturbances which is extremely common during the postpartum period and is deemed to be a robust predictor of PPD. Frequent overnight breastfeeding further disrupts sleep. A dose-response relationship exists whereby maternal sleep deficiency increases PPD risk. Prolactin increases throughout pregnancy. In breastfeeding women prolactin remains elevated, while estrogen levels are suppressed during lactation amenorrhea. Higher basal levels of prolactin may be protective against PPD onset because prolactin has anxiolytic properties and is thought to contribute to the stress-buffering effects of lactation (Yim et al ,2015). Oxytocin increases just before parturition and breastfeeding sessions trigger increases in oxytocin. Optimizing sleep is crucial for PPD prevention among breastfeeding mothers, allowing partners to bottle feed overnight and pumping before bedtime represent potential strategies.

The third predictive factor is new motherhood stress such as the inability to meet the needs and demands of a newborn, societal pressure, etc. pose a threat to PPD, the demands of new motherhood constitute a major life stressor. Adjusting to altered sleep patterns caring for a new person's unrelenting needs, recovering from childbirth, embracing a transformed identity, and adopting new responsibilities necessitates remarkable adaptation. This transition occurs alongside the biological vulnerabilities of a new mother. Unmet expectations such as low milk supply, latch issues, etc. surrounding breastfeeding and infant care often compound stress. There ought to be support from healthcare providers, families, and partners to help women navigate this challenge. PPD preventative strategies must address maternal psycho-social health, especially for breastfeeding mothers.

Traumatic delivery experiences is another factor that contributes to PPD, women who experience traumatic childbirths or unfulfilled birth expectations face amplified PPD vulnerability (Dikmen, Ayers, and Phillips, 2017). Trauma might involve a perceived lack of agency, physical harm or violation of bodily integrity, and severe pain or humiliation (Ayers, Bond, Bertullies, and Wijma, 2016). Screening women for traumatic reactions to childbirth and providing early intervention when needed are prudent measures.

Social isolation is a PPD factor whereby new mothers often feel profoundly lonely and disconnected from their former support systems. During the postpartum period, social isolation can be particularly detrimental, increasing the risk of PPD. Modern nuclear family structures and distant kinship networks contribute to postpartum isolation. Family support goes a long way in curbing the negative effects of postpartum depression. Social isolation undermines maternal emotional wellbeing and PPD prevention initiatives should aim to cultivate community support. Postpartum doulas, support groups, and community outreach programs represent evidence-based strategies (Tully and Stuebe, 2017). Social support is thought to facilitate a woman's transition to motherhood.

Lastly infant-related problem is another predictive factor of postpartum depression. Mothers of premature infants, mothers of infants with illnesses, disabilities, and distresses, mothers of infants that are temperamentally demanding, and mothers who experience stress in child care and lack child care knowledge are at risk of developing PPD. Specifically in developing countries, medical illnesses, and difficult temperaments are problems in developing countries, and lack of childcare knowledge and worries about infants' health are suggested to be a powerful predictor of postpartum depressive symptoms.(Norhayati et al 2015). The understanding of this is also easy from an evolutionary perspective: the survival of the infant is most important to mothers (Rantala, Luoto, Krams, and Karlsson, 2018). The relationship between problems with infant and mother depression is likely to be complex; for example, the poorer than expected infant health outcomes, early parental stress, and dysfunctional mother-infant interaction. Moreover, admission to a neonatal intensive care unit is associated with PPD, specifically with recurrent depression, the amount of crying by infant is associated with tiredness and fatigue, this further diminishes the mother's ability to concentrate, burdens mother-child interaction, and triggers depressive symptoms.

Additionally, postpartum depression (PPD) in breastfeeding mothers arises from a combination of factors, including hormonal changes, sleep disturbances, traumatic childbirth experiences, social isolation, and challenges related to the infant. No single etiological pathway accounts for PPD's development, instead, its origin is multifaceted and encompasses biological, psychosocial, and maternal-neonatal factors that converge to overwhelm maternal emotional coping capacities. Effective screening, prevention, and treatment approaches must similarly address both biomedical contributors and maternal psychosocial health in the context of her experiences. Healthcare providers, social support networks, and policy initiatives all have invaluable roles to play in promoting maternal and child well-being during the postpartum period.

There is a need for further research to elucidate breastfeeding complex relationships with postpartum mental health. As breastfeeding offers indisputable benefits for mothers and infants, interventions must proactively sustain breastfeeding while simultaneously safeguarding maternal emotional health. This will require open communication, stigma

reduction, improved screening tools, and evidence-based treatment protocols tailored to breastfeeding mothers. With empathy, and woman-centered care, optimal outcomes for both mothers and babies are achievable.

Based on this, the study aims to address this gap through an in-depth investigation of potential predictors of PPD among breastfeeding mothers seeking care at Chukwuemeka Odumegwu Ojukwu Hospital, Awka, Anambra State, Nigeria.The researcher explored the complex interrelationships among biological, psychosocial and maternal neonatal factors that predicts postpartum depression among breastfeeding mothers in ChukwumekaOdumegwu Ojukwu University Teaching Hospital, Awka.

1.2 Statement of the Problem

The predictors of postpartum depression PPD are diverse and multifaceted, including biological, psychological, and maternal-neonatal factors. Postpartum depression is a mental disorder that poses significant and often overlooked challenges to maternal mental health, impacting women during the delicate period following childbirth. It can have a long lasting negative effects on the mother and her child, including disruptions in the mother-child bond, poor infant growth, and increased maternal stress.According to the World Health Organization, (2020) approximately 10-15% of women who give birth experience PPD, making it a common and severe mental health issue. PPD can have long-lasting negative effects on the mother and her child, including disruptions in the mother-child bond, poor infant growth, and increased maternal stress.

The occurrence of postpartum depression among breastfeeding mothers within the setting of Chukwuemeka OdumegwuUniversity Teaching Hospital, Awka, Anambra State presents a critical area of concern. Despite the crucial role of breastfeeding in maternal and infant health, there is a paucity of research exploring the specific predictors of postpartum depression in this population. However, the specific biological, psychosocial, and maternal-neonatal factors that predict PPD among breastfeeding mothers remain poorly understood. This situation speeds down and there is grave danger if this issue is not mitigated. The lack of comprehensive studies on the predictors of postpartum depression underscores the need for focused research which this study intends to investigate.

In light of the above, various policies and intervention programs and strategies such as (National Health Policy 2016, National Mental Health Policy 2013, National Primary Health Care Development Agency 1992 (NPHCDA), and the Postpartum Support Network Africa 1987 (PSNA) amongst others, were aimed at enhancing the reduction of PPD prevalence to bring about healthy mother and child bonding as well as improved mental health of breastfeeding mothers. However, despite the provision of these policy documents, PPD among breastfeeding mothers has not been fully eradicated or conquered, rather PPD prevalence is on the increase.

For instance, postpartum depression affects a great number of women worldwide, it has been linked to suicide, and impaired mother-and-child bonding, which in turn affects the cognitive, physical, and emotional well-being of the newborn and the community. Although several studies have been conducted on this subject, this critical issue remains unresolved.

Despite the importance of breastfeeding for both maternal and infant health, many mothers experience PPD, which can adversely affect their well-being and the breastfeeding experience itself and this fact, underscores the need for the study. This research aims to investigate the predictors of PPD in this specific population, focusing on the interplay between biological, psychosocial, and maternal-neonatal factors. Understanding how these indices contribute to the prevalence and severity of PPD among breastfeeding mothers is crucial for developing targeted interventions that can improve maternal mental health and enhance breastfeeding mothers breastfeeding practices in Anambra State.The findings of this study will be beneficial to women (married, unmarried, pregnant, intending mothers, breastfeeding), public health educators and nurses, mental and psychiatric hospitals, the society, ministry of health and future researchers.

1.3 Purpose of the Study

The purpose of this study is to determine the predictors of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka. Specifically, the study determined if:

1. Reproductive hormone is a predictor of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.
2. Sleep disturbances are a predictor of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.
3. New motherhood stress is a predictor of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.
4. Traumatic delivery experiences are a predictor of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.
5. Social isolation is a predictor of postpartum depression among breastfeeding mothers in Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.
6. Infant-related problems are a predictor of postpartum depression among breastfeeding mothers inChukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka.

Research Hypotheses

The following null hypotheses have been formulated to guide the study and will be tested at 0.05 levels of significance.

1. Reproductive hormones will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka Ojukwu OdumegwuUniversity Teaching Hospital, Awka.

2. Sleep disturbances will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka Ojukwu OdumegwuUniversity Teaching Hospital, Awka.

3. New motherhood stress will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka Ojukwu OdumegwuUniversity Teaching Hospital, Awka.

4. Traumatic delivery experiences will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka Ojukwu OdumegwuUniversity Teaching Hospital, Awka.

5. Social isolation will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka OdumegwuOjukwu University Teaching Hospital, Awka.

6. Infant-related problems will not significantly predict postpartum depression among breastfeeding mothers in Chukwuemeka Ojukwu OdumegwuUniversity Teaching Hospital, Awka.

Methodology

The research design adopted for the study was a correlational research design.The study was conducted in Awka, Anambra state,the researcher considered the study area because a good number of women attend the hospital for maternal and child health care services,The population for this study was 440 breastfeeding mothers attending Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka, Anambra State.The sample size of the study was 209 breastfeeding mothers using taro yamen formula. The researcher adoptedthe Edinburgh Postnatal Depression Scale (EPDS), which was developed by Cox, Holder, and Sagovsky, (1987) and was administered to women participants of the study for data collection,The researcher also used a 60 item structured questionnaire which was divided into two sections, titled "Predictors of Postpartum Depression among Breastfeeding Mothers"(PPDBM). The facevalidity of the instrument was determined using the opinions of three experts. The reliability co-efficient was established using the Kuder-Richardson statistic, the coefficient values obtained were 0.67, 0.67, 0.69, 0.77, 0.68 and0.75.The researcher administered the instrument to the research participants with the help of three research assistants. With regards to the response rate, out of the 209 questionnaires distributed to the targeted respondents, 200 were retrieved.The returned questionnaires were subjected to careful checking and 27 copies were excluded and regarded as not suitable for statistical analyses because they do not meet the conditions and criteria of answering and filling the questionnaire, hence, the total number of usable returns was 173. Logistics regression (simple and multiple regression) was used to analyze the study.Regression analysis was used to analyze data for the study and$P$-value was used to determine the significance of the prediction for the six hypotheses, since the p-value was less than 0.05 level of significance, the null hypothesis was rejected.

Ethical Consideration

Ethical approval (approval no: Ref: COOUTH/CMAC/ETH.C/Vol.1/FN:04/335) for the study was obtained from Chukwuemeka Odumegwu Ojukwu University Teaching Hospital, Awka Health Research and Ethics Committee (HREC) and inform consent was obtained verbally from all the participants.'

Results and Discussions

Hypothesis One: Reproductive hormones will not significantly predict postpartum depression among breastfeeding mothers.

Table 1: *Summary Test of Significance of Logistic Regression with Reproductive Hormones as Predictor of Postpartum Depression Among Breastfeeding Mothers (n=173)*

Predictor	B	S.E.	Exp(B) Odds Ratio	Wald (W1)	*P*	Remark
Constant	-1.35	0.36	0.26	14.25	0.000	
Reproductive Hormones	0.36	0.09	1.43	17.12	0.000	Significant

Note. $R^2 = 0.14$ (Nagelkerke). p = 0.000.

Table 7 shows that reproductive hormones were a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.36, s.e.= 0.09, W (1) = 17.12, *p* = 0.000. The null hypothesis was rejected since the p-value was less than 0.05 level of significance.

Hypothesis Two: Sleep disturbances will not significantly predict postpartum depression among breastfeeding mothers.

Table 2: *Summary Test of Significance of Logistic Regression with Sleep Disturbance as Predictor of Postpartum Depression Among Breastfeeding Mothers (n=173)*

Predictor	B	S.E.	Exp(B) Odds Ratio	Wald (W,1)	*p*	Remark
Constant	-0.97	0.47	0.38	4.17	0.041	
Sleep disturbances	0.20	0.10	1.22	4.30	0.038	Significant

Note. $R^2 = 0.04$(Nagelkerke)., p = 0.038.

As shown in Table 8, sleep disturbances were a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.36, s.e.= 0.09, W (1) = 17.12, *p* =

0.000. The null hypothesis was rejected since the p-value was less than 0.05 level of significance.

Hypothesis Three: Stress will not significantly predict postpartum depression among breastfeeding mothers.

Table 3: *Summary Test of Significance of Logistic Regression with New Motherhood Stress as Predictor of Postpartum Depression Among Breastfeeding Mothers (n=173)*

Predictor	B	S.E.	Exp(B) Odds Ratio	Wald (W,1)	p	Remark
Constant	-1.65	0.37	0.19	24.02	0.000	
Stress	0.40	0.08	1.49	19.38	0.000	Significant

Note. $R^2 = 0.21$(Nagelkerke), p = 0.000.

The summary of logistic regression displayed in Table 9 shows that stress was a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.40, s.e.= 0.08, W (1) = 19.38, *p* = 0.000. The null hypothesis was rejected since the p-value was less than 0.05 level of significance.

Hypothesis Four: Traumatic delivery experiences will not significantly predict postpartum depression among breastfeeding mothers.

Table 4: *Summary Test of Significance of Logistic Regression with Traumatic Delivery Experiences as Predictor of Postpartum Depression Among Breastfeeding Mothers (n=173)*

	B	S.E.	Exp(B) Odds Ratio	Wald (W1)	P	Remark
Constant	-1.12	0.33	0.32	11.36	0.00	
Traumatic delivery experiences	0.30	0.08	1.34	13.59	0.00	Significant

Note. $R^2 = 0.11$(Nagelkerke), p = 0.000.

The summary of logistic regression displayed in Table 10 shows that traumatic delivery experiences were a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.30, s.e.= 0.08, W (1) = 13.59, *p* = 0.000, therefore, the null hypothesis was rejected since the p-value was less than 0.05 level of significance.

Hypothesis Five: Social isolation will not significantly predict postpartum depression among breastfeeding mothers.

Table 5: *Summary Test of Significance of Logistic Regression with Social Isolation as Predictor of Postpartum Depression Among Breastfeeding Mothers(n=173)*

	B	S.E.	Exp(B) Odds Ratio	Wald (W1)	p	Remarks
Constant	-1.16	0.28	0.31	17.52	0.000	
Social Isolation	0.41	0.08	1.51	23.56	0.000	Significant

Note. $R^2 = 0.21$(Nagelkerke), p = 0.000.

The summary of logistic regression displayed in Table 11 shows that social isolation was a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.41 s.e.= 0.08, W (1) = 23.56, p = 0.000. Since the p-value was less than 0.05 level of significance, the null hypothesis was rejected.

Hypothesis Six: Infant-related problems will not significantly predict postpartum depression among breastfeeding mothers.

Table 6: *Summary Test of Significance of Logistic Regression with Infant-related Problems as Predictor of Postpartum Depression Among Breastfeeding Mothers (n=173)*

	B	S.E.	Exp(B) Odds Ratio	Wald (W1)	p	Remark
Constant	-1.58	0.21	0.21	17.16	0.000	
Infant-related problems	0.41	1.50	1.50	20.16	0.000	Significant

Note. $R^2 = 0.17$(Nagelkerke) p = 0.000.

As shown in Table 12, infant-related problems were a positive and significant predictor of postpartum depression among breastfeeding mothers, b=. 0.41 s.e.= 0.08, W (1) = 20.16, p = 0.000. Since the p-value was less than 0.05 level of significance, the null hypothesis was rejected.**Discussion of Findings**

The findings of the study are discussed as follows:

Reproductive Hormones as a Biological predictor of Postpartum Depression

The study underscores the significant role that reproductive hormones play as predictors of postpartum depression. The marked hormonal fluctuations experienced during and after childbirth seem to have profound effects on breastfeeding mothers. As identified in previous research by Parasian (2020), these hormonal changes, including declines in

estrogen, progesterone, prolactin, norepinephrine, and drops in dopamine and serotonin levels, are linked to a higher incidence of PPD. Also, Feldman et.al (2022) opined that lower oxytocin levels have been identified in depressed postpartum mothers. This finding reinforces the notion that biological factors, particularly hormonal imbalances, are critical in understanding postpartum mental health.

The findings of this study also agree with Osman andBahri, 2019 who reported that pregnancy and postpartum breastfeeding mothers exhibited significant increments in estrogen, progesterone, prolactin, and norepinephrine levels accompanied by a significant decline in dopamine and serotonin.

Sleep Disturbances as a Psychosocial Predictor of Postpartum Depression

Another notable finding is the impact of sleep disturbances on postpartum depression. The findings indicate that many breastfeeding mothers experience high levels of fatigue and poor sleep quality, which significantly elevate their risk of developing PPD. Research conducted by Baattaial et al. (2023) supports this observation, noting that chronic sleep deprivation and insomnia can exacerbate mood disorders in the postpartum period. Similarly, Okun and Lac (2023) highlighted the correlation between poor sleep quality and increased instances of PPD among breastfeeding mothers. These results emphasize the urgent need for interventions targeting sleep quality to mitigate the risk of postpartum depression.

This supports the report of APA (2020), which stated that PPD is a major depressive episode with peripartum onset, occurring during pregnancy or within four weeks following delivery, characterized by persistent feelings of sadness, anxiety, emptiness, and changes in sleep, appetite, and energy levels that interfere with daily functioning and bonding with the baby.

New Motherhood Stress as a Psychosocial Predictor of Postpartum Depression

The study also found that new motherhood stress serves as a critical psychosocial predictor of postpartum depression. The transition to motherhood is often fraught with challenges and emotional strain, which can lead to heightened levels of stress. This stress negatively impacts the psychological well-being of breastfeeding mothers, making them more susceptible to PPD.

This agrees with the study of Gila-Diaz, Carrrillo, Lopez de Pablo, Arribasand Ramiro- Cortijo, (2020), which revealed that women with mixed breastfeeding exhibited higher perceived stress and postpartum depression compared to those with exclusive breastfeeding and no difference in dispositional optimism. This supports the report of Yakubu, Odesanya, Abbas and Lawal, (2023) which revealed that exclusive breastfeeding can be altered by insufficient milk, the belief that infants require extra fluid, fear of alteration in the breast figure, cultural practices, and societal beliefs were identified as the most common barriers to the practice of exclusive breastfeeding which when practice effectively can reduce new motherhood stress.

Traumatic Delivery Experience as a Psychosocial Predictor of Postpartum Depression

Experiences of a traumatic delivery further compound the risks associated with postpartum depression. Many mothers face psychological repercussions from difficult or traumatic childbirth, contributing to feelings of anxiety and depression. Addressing these experiences is essential for supporting maternal mental health in the postpartum period.This agrees with Anosike, Osefo, Isiogugu, Nwachukwu, Agu, NwajiandOgbu, (2024), which reported that women who did not have complications during childbirth were about two times less likely to develop symptoms of PPD than women who experienced birth complications. Also, Yin, Shi, Heinonen, and Raisanen, (2024), revealed that a high level of fear of childbirth during the third trimester was associated with increased postpartum mental health symptoms and reduced breastfeeding establishment.

Social Isolation as a Psychosocial Predictor of Postpartum Depression

Social isolation emerged as another key predictor of postpartum depression among breastfeeding mothers. The lack of social support networks can intensify feelings of loneliness and despair, making it difficult for mothers to cope with the demands of new motherhood. Fostering connections and providing support to breastfeeding mothers can significantly reduce the risk of developing PPD. This agrees with Ruanand Wu, (2024), which revealed that PPD during breastfeeding was associated with marital harmony, newborn health, stress communication, mutual support, negative support, and joint support. Also, Qi, W, Liu, Y, H, et al (2022), revealed that interpersonal relationships with family members play important roles in PPD, improving the relationship between new mothers and their husbands or mother-in-law and then enhancing social support might reduce postpartum depression.

Infant-Related Problems as a Maternal-Neonatal Predictor of Postpartum Depression

Lastly, infant-related problems, such as feeding issues or health concerns, were identified as significant predictors of postpartum depression. The stress and anxiety associated with caring for a newborn experiencing difficulties can overwhelm mothers, increasing their vulnerability to PPD. Understanding these challenges and providing comprehensive support can help mitigate their impact.This agrees with Oyetunjiand Chandra (2023), which revealed that there is a shred of strong evidence that correlates postpartum stress to infant outcome, mediated through many external factors. Also, Kawafha, Maghaireh, Shawish, Hamadad, Hamadah, et al (2023), revealed that infant characteristics such as gestational age, medical condition classification, and birth weight are found to be significant factors that influence depression among mothers.

Conclusion

In summary, the findings underscore the multifaceted nature of postpartum depression among breastfeeding mothers, highlighting biological, psychosocial, and maternal-neonatal factors. Addressing these predictors through targeted interventions and support systems is vital for enhancing the mental health and well-being of mothers during this crucial period.

With this understanding, the researcher concluded that mothers who are exposed to these varying predictors need to be sensitized and utilize the various mental health strategies for effective management of postpartum depression to help them manage their mental health for mother and child bonding as well as a reduction in suicidal ideation.Further research is warranted to explore effective models of support for breastfeeding mothers at risk of postpartum depression.

Recommendation

Given the significant predictors of postpartum depression identified in this study specifically, reproductive hormones sleep disturbances, new motherhood stress, traumatic delivery experiences, social isolation, and infant-related problems, the following recommendations were made:

1. Health Educators and Psychologists should, provide tailored mental health resources for breastfeeding mothers that address individual experiences and challenges related to hormonal changes, sleep issues, and stress. This can include access to counselors or psychologists who specialize in postpartum care.

2. Health Educators, Nurses and Health Care Providers shouldintegrate sleep management workshops into postpartum care that equip mothers with practical strategies to improve sleep quality, such as relaxation techniques and scheduling rest periods, while also educating family members about the importance of supporting new mothers' sleep needs.

3. Health educators and health care providers should also proffer stress reduction techniques:

  - Offer stress reduction programs that teach mindfulness, relaxation exercises, and time management skills aimed at reducing new motherhood stress. Encouraging participation in activities such as yoga or meditation can help alleviate anxiety and improve overall mental wellness.

4. Encourage Trauma-Informed Care Training:

  - Incorporate trauma-informed care principles into healthcare practices for new mothers. Training healthcare providers to recognize and address the impact of traumatic delivery experiences can create a more supportive environment for healing and mental health.

5. Federal and State Government should Establish Community Building Initiatives:

  - Establish community-based support networks that reduce social isolation. Initiatives such as moms' groups, postpartum support networks, or online forums can facilitate connections among mothers, fostering shared experiences and emotional support.

By addressing these specific predictors of postpartum depression, the proposed support programs can significantly enhance the mental health and well-being of breastfeeding mothers, ultimately contributing to healthier outcomes for both mothers and their infants.

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