



Research Article

Risk Factors influencing Post-Partum Depression Severity in Iraqi Women

Ahmed Al-Imam^{1*}, Aneta Haligowska², Marek A. Motyka³, Marwa A. Al-Abadi⁴, Malak M. Hameed⁴, Mohaimen J. Al-Haideri⁴, Nesif Al-Hemiary^{5,6,7}

¹ Department of Anatomy and Cellular Biology, College of Medicine, University of Baghdad, Baghdad, Iraq

² Doctoral School, University of Rzeszow, 35-959 Rzeszów, Poland;

³ Institute of Sociological Sciences, University of Rzeszow, 35-959 Rzeszów, Poland

⁴ College of Medicine, University of Baghdad, Baghdad Iraq

⁵ Department of Psychiatry, College of Medicine, University of Baghdad, Baghdad, Iraq

⁶ Director of Psychiatry Council, the Iraqi Board for Medical Specializations, Baghdad, Iraq

⁷ Baghdad Medical City Teaching Complex, Baghdad, Iraq

Note: These authors have equal contributions

* Corresponding author's email: ahmed.mohammed@comed.uobaghdad.edu.iq

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ABSTRACT

Background: Post-partum depression (PPD) is a form of postnatal depression that affects mothers. Clinical manifestations usually appear within six months after delivery. Risk factors that influence the severity of post-partum depression are not fully known in the Iraqi population.

Objectives: to evaluate the risk factors and identify potential predictors that may influence the symptom levels (severity) of post-partum depression among Iraqi women from Baghdad.

Subjects and Methods: The current study is cross-sectional, and we used the Edinburgh Postnatal Depression Scale (EPDS) and a cut-off value of 13 to differentiate patients into two groups, those with lower symptom levels (LSL) and others with higher symptom levels (HSL). We also explored patients' attributes, newborn-related parameters, and socio-demographics.

Results: The total sample included one hundred and one patients (n=101), including females with lower symptom levels (EPDS≤13, 48.51%) and others with higher symptom levels (EPDS>13, 51.49%). There were two significant risk factors of PPD, including marital problems (OR=3.60, 95% CI=1.54 to 8.41, p=0.003) and perinatal mood disturbances (OR=3.23, 95% CI=1.40 to 7.46, p=0.005). The former results are congruent with our multivariable ordinal regression, while path analysis and structural modeling conveyed an additional risk factor: the personal history of depression. ROC analysis did not convey any significant difference between the two groups (LSL versus HSL) based on age. However, mothers with HSL were older than the other group (29.19±0.88 versus 27.08±0.79, p=0.099).

Conclusion: Post-partum depression with higher symptom levels is prevalent among Iraqi mothers. Healthcare institutes should be vigilant concerning the underlying risk factors. Intervention requires integrating the role of social workers to understand the patient's family dynamics.

Introduction

Depression is a common mental disorder, and according to the WHO, it affects around 3.8% of people worldwide, including 5% of the adult population [1]. According to Guo and coworkers (2018), women are more susceptible to depression during their reproductive age, and the prevalence of major and minor depression was 4.8% and 4.3%, respectively [2]. Depression commonly affects women after delivery, i.e., during the post-partum period, and authors described it as "the thief that steals motherhood" by depriving the mother of the joy of the newborn [3]. The National Health Service (NHS) defined postnatal depression as "a type of depression many parents experience after having a baby", and according to the NHS, it is a common problem that affects more than one-tenth of women within a year of giving birth, but it can also affect fathers, partners, and significant others [4].

Post-partum depression (PPD) is a form of postnatal depression that can occur anytime during the first postnatal year, although it mainly occurs during the first four weeks after labor, while its incidence declines three months after birth [5]. PPD is a common problem affecting the quality of life (QoL) of the mother and the newborn, and some researchers recommended incorporating PPD screening into routine postnatal care [6]. The pathophysiology of PPD may relate to the changes that take place during pregnancy, labor, and the immediate post-partum period, including physical (somatic), hormonal, biochemical, and emotional changes, among others, and these changes relate to a collective and series of neurochemical events that the hypothalamic–pituitary–adrenal axis and the amygdala orchestrate [7,8].

The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) does not explicitly include PPD as a standalone diagnosis, but it lists the major depressive disorders with the specifier "with peripartum onset" [9,10]. Several risk factors that might trigger or potentiate PPD exist, which are ambiguous in the Iraqi population. A study in Turkey concluded that PPD was significantly higher among younger mothers, those with unemployed husbands, mothers from lower-income families, those with health problems affecting their children, and mothers who do not breastfeed their babies [11]. Concerning the prevalence of PPD in the Arab world, researchers found it higher than in the western world. Ayoun and coworkers (2020) reported in their systematic review a high prevalence even in high-income Arab countries, such as the Gulf Cooperation Council countries [12]. On the other hand, there are no studies among Iraqi Arab women exploring the prevalence, symptom levels and severity, risk factors, and potential predictors of PPD.

Researchers use several validated psychometric tools (instruments) to survey, diagnose, and categorize the severity of depression, including postnatal and post-partum depression. A reliable tool is the Edinburgh Postnatal Depression Scale (EPDS) that Cox et al. (1987) designed in the Scottish healthcare centers of Edinburgh and Livingston [13]. Levis et al. (2020) – from the DEPRESSION Screening Data (DEPRESSD) EPDS Group – recommended an EPDS cut-off value of 13 to identify post-partum women with higher symptom levels, i.e., more severe PPD, and they found that a cut-off value of 13 or higher was less sensitive but more

specific [14]. The EPDS has four categories: none or minimal depression, mild depression, moderate depression, and severe depression [15,16].

The history of post-partum depression in medicine

The etiology of psychiatric problems after childbirth has been the subject of inquiry for centuries. As early as the 4th century BC, Hippocrates attempted to describe a disease of women who experienced mental disorders after childbirth, including delirium and coma ending in death [17]. In the modern history of medicine, the French psychiatrist Jean-Étienne Dominique Esquirol published a paper in 1838 discussing psychiatric problems after childbirth based on 92 cases he observed. The topic was also tackled by other researchers trying to figure out the causes of mental disorders in women who became mothers and often experience mania. At the same time, manifestations of impending illness include loss of strength, restlessness, insomnia, irritability, headaches, fatigue, insomnia, excessive sleepiness, dizziness, decreased blood pressure, changes in hair and skin, constipation, changes in appetite, and decreased sexual reactivity [18].

Recent studies and meta-analyses: Prevalence, risk factors, and clinical manifestations

In recent decades, there have been many research efforts and reviews to understand and manage post-partum depression and anxiety disorders, as these conditions are among women's most common psychiatric disorders during the post-partum period. Post-partum depression is often defined as a depressive episode that occurs immediately after the birth of a child, and it is usually associated with women. However, numerous studies have shown that fathers can also experience it, negatively affecting the parents, the child, and the entire family [19]. Research data show that PPD can affect approximately 15% of mothers after childbirth and about 8% of fathers [20,21].

The Diagnostic and Statistical Manual of Mental Disorders defines PPD as a condition in which mothers experience insomnia, feelings of hopelessness or guilt, and suicidal thoughts, making it a significant health problem in modern society with varying incidences worldwide [22]. During the second half of the 20th century, B. Pitt described PPD as "atypical", that is, differing from classical (endogenous) depression by a greater intensity of neurotic symptoms overshadowing other symptoms [23]. The duration of PPD is debatable, but it can last from 2 weeks to 6 months post-partum and is mainly diagnosed at 4 or 6 weeks post-partum [23,24]. Psychosocial factors that can cause PPD include stressful events during pregnancy and the immediate post-partum period, poor child health, marital problems, inadequate social support, and previous psychiatric disorders [23].

It is not uncommon for women to manifest temporary mood disorders, fear, or confusion immediately after childbirth. These symptoms are often called maternity blues; nearly 20% of women experience them in the first year following birth. A study on a sample of 853 German women found that 55.2% experienced it, and

there were significant associations between maternity blues, the onset of post-partum depression, and drug-related disorders [25]. On the other hand, post-partum depression is such a powerful and adverse experience that many mothers compare it to living in a swamp, in which they view the moment of childbirth not as the happiest period of their lives but as a time when they experience: a sense of inability to function normally, a strong sense of anxiety and hopelessness, and suicidal ideations. Therefore, preventive research is essential to identify and predict women at risk of PPD to deliver appropriate and prompt medical and psychological care immediately after delivery [26].

Mughal, Azhar, and Siddiqui (2022) reported that about one in seven women might be at risk of developing post-partum depression (PPD), which tends to be long-lasting due to the inability to function normally in everyday life and also because PPD negatively affects the dynamic mother-infant relationship [27]. In 2018, Anokye and collaborators conducted a study among 257 mothers and 56 health workers at the Komfo Anokye Clinical Hospital in Ghana. They concluded that post-partum depression affected 7% of all mothers, while their average age was 27 years. The condition's severity ranged from minimal symptoms to severe, and the main risk factors of PPD included childcare stress, prenatal anxiety, and a previous episode of PPD. They also concluded that psychosocial support was the most effective intervention in reducing depressive symptoms compared to psychotherapy and cognitive therapy [28].

Slomian et al. (2019) conducted a systematic review based on 122 studies on PPD consequences. The researchers concluded that PPD creates an environment that negatively affects the personal development of mothers and children. Mothers tend to have low self-esteem, be angry, might conceptualize suicidal ideations, experience homelessness more often, and have disrupted relationships with their partners. On the other hand, infants experience higher mortality, psychomotor retardation, illnesses (such as diarrheal diseases), and may lack proper mother-child bonding. The former can cause mothers to discontinue breastfeeding earlier and become less concerned about the baby's safety, physiological needs, and emotional development [29].

Results from the Czech part of the European Longitudinal Study of Pregnancy and Childhood (ELSPAC) showed that the main risk factors for PPD are: the personal and family history of depression, socioeconomic factors, the number of children, the child's gender, attitudes toward pregnancy, the child's feeding modality. The study indicated a high correlation between PPD and the previous history of depression in the family, lack of social and family support, and the feeding modality. The researchers concluded that women using artificial feeding were more likely to suffer from PPD [30]. Another research considering the role of physical activity during pregnancy was conducted by Kolomanska-Bogucka and Mazur-Bialy (2019). The authors analyzed 16 articles indexed in the PubMed database and published between 2000 and 2018, and they concluded that physical activity (before and during pregnancy) could be an essential protective factor against depressive disorders in women during the post-partum period [31].

Paternal postnatal depression

The phenomenon of PPD has also been considered in terms of how fathers experience it. A Danish researcher, Sarah Pedersen from Aarhus University, conducted extensive interviews with eight fathers suffering from PPD aged between 29 and 38 years, and the study showed that the central experiences that men suffering from PPD included: feelings of overwhelm, helplessness, or inadequacy, which sometimes turned into anger and frustration. Many subjects experienced a discrepancy between their expectations and the reality of fatherhood, and they felt inadequate, disappointed in themselves, and ashamed; some experienced intrusive suicidal thoughts or thoughts about hurting their children. The researchers also concluded that men faced many barriers to accurately recognizing PPD symptoms and finding appropriate professional help [32]. A similar study on the prevalence of paternal depression reported that it occurred in around 8% of men. Cameron, Sedov, and Tomfohr-Madsen (2016) analyzed 74 studies from 1980 to 2016 involving 41,480 participants, and they concluded that paternal depression affected fathers during their transition to parenthood, with prevalence ranging from 1% to 46%. The researchers indicated that depression negatively affects parental responsibilities and satisfaction with the intimate relationship, and they also pointed out a strong correlation between paternal and maternal depression, which can disrupt the whole family dynamics [21].

Postpartum depression as a societal problem

Although PPD is an adverse mental health symptom, only a small percentage of mothers seek help from specialized healthcare facilities, and the reason for that might be that many women treat such symptoms as usual and ordinary. Studies reported that approximately 12% of mothers visit specialized medical institutions, undergoing screening with the Edinburgh Post-partum Depression Scale (EPDS), which can help detect PPD risk. In Japan, as pregnant mothers approach their due delivery date and shortly after, many of them choose to move in with their parents, which indicates that in Japan, mothers who manifest lowered moods seek support first from their parents and only later from their partner. On the contrary, European mothers seek support from their partners first and then from distant and closer relatives, while partner support is a potent factor in alleviating depressive states [33].

Post-partum depression could be more common among teenage mothers. Therefore, diagnosing PPD among vulnerable younger mothers can be problematic because teenage mothers want to show the outside world that they can handle the challenges of maternity. Healthcare professionals should be aware of such behavior and inform teenage mothers about the signs and symptoms of depression and available support resources. It is also vital for medical personnel and social services to offer the appropriate support for teenage mothers that corresponds to their personalized needs [34].

To the best of the authors' knowledge and per the systematic literature review, the present study is the first to explore the symptom levels of post-partum depression among Iraqi women using the EPDS. We also aim to identify the risk factors and potential predictors that may influence the symptom levels (severity) of post-partum depression.

Subjects and Methods

Ethical considerations and data collection

The ethics committee at the department of community medicine and public health approved the study (College of Medicine, University of Baghdad). The current study abided by the Declaration of Helsinki of the World Medical Association and the ethical principles of the Framingham Consensus of 1997. Informed consent was obtained from each of the study participants. The current study is cross-sectional and implemented convenience sampling. In August 2022, we conducted structured personal interviews with females during the post-partum period, who were recruited from two venues: (1) the gynecology ward (department of gynecology) in Baghdad Teaching Hospital at Baghdad Medical City Teaching Complex; (2) an outpatient gynecology clinic at Al-Sadr City in Baghdad.

The Edinburgh Postnatal Depression Scale

The researchers implemented the Edinburgh Postnatal Depression Scale (EPDS) psychometric tool (instrument), a 10-item questionnaire with a scale ranging from zero to thirty. A pilot survey among the current study participants indicated a relatively high prevalence of severe post-partum depression. Therefore, we adopted an EPDS cut-off value of 13 (sensitivity=0.66; specificity=0.95) in compliance with the recommendations of Levis and coworkers' meta-analysis [14]. The EPDS has four categories, including none or minimal depression (EPDS score of 0–6), mild depression (7–13), moderate depression (14–19), and severe depression (19–30) [15,16]. We also collected other parameters, representing patients' attributes, newborn-related parameters, and socio-demographics, among others, including age, residence, religious affiliations, number of children, current child's gender, feeding modality, presence of birth deformities, previous child's date of birth, family income, marital problems, perinatal mood disturbances, personal history of depression, and family history of post-partum depression.

Data analysis and statistical packages

The researchers tabulated the raw data using Microsoft Excel 2016 and analyzed the data using IBM-SPSS and IBM-SPSS Amos version 26. An alpha (α) value of 0.05 was considered as the cut-off margin for statistical significance in hypothesis testing, corresponding to a 95% confidence interval (95% CI). Bonferroni correction was implemented to adjust the p-value for multiple comparisons. The statistician ran descriptive statistics, correlation matrices using Spearman's bivariate correlation (Spearman's Rank-Order Correlation), inferential statistics using Pearson's Chi-squared test of independence (or Fisher's exact test), receiver operating characteristic curve (ROC) analysis, and multivariable ordinal regression. Amos statistical package was used for path analysis as part of structural equation modeling (SEM) to extrapolate an inference concerning the effect of multiple independent variables (multivariable analysis) on the PPD's symptom levels.

Results

Patients' attributes, neonate-related parameters, and socio-demographics

The total sample included one hundred and one participants ($n=101$), and according to the cut-off value (EPDS=13), females

included those with lower symptom levels (LSL; EPDS \leq 13), i.e., less severe PPD (49, 48.51%) and those with higher symptom levels (HSL; EPDS $>$ 13), i.e., more severe PPD (52, 51.49%), while none of the mothers scored zero on the EPDS scale. Concerning age, we calculated the mean and its standard error. Most females were in the third decade of life (28.17 ± 0.60 , 95% CI=26.98 to 29.35), while those with HSL were slightly older by two years compared to those with LSL (29.19 ± 0.88 versus 27.08 ± 0.79). Nonetheless, age did not differ significantly between the two groups per the Mann-Whitney U test (U statistic=1.65, $p=0.099$), although it is significant at the 90% confidence interval.

Concerning age, patients included three age groups: youth (between 20–40 years, 89.1%), adolescents (younger than 20 years, 8.9%), and middle age (older than 40 years, 2%). Most participants were Muslims (98%), while the remaining were Christians. They lived in urban (92.1%) or rural areas (7.9%). The number of children ranged from one to nine (Supplementary Material). Mothers who had more than two children represented more than half of the participants (56.4%), while those who had one child only (22.8%) or two children (20.8%) were a minority. Almost two-thirds of the mothers had the date of birth of the previous child within one year from the birth of the current child (64.4%), while the remaining were either beyond two years (24.8%) or within two years (10.9%). The current child's gender assumed almost equal proportions of males (50.5%) and females (49.5%). Preterm babies and neonates with birth deformities represented almost one-tenth (9.9%). Concerning the feeding modality, few had exclusive breastfeeding (21.8%), others had exclusive bottle feeding (30.7%), and almost half had a mixed modality of feeding (47.5%). Almost half of the participants were affiliated with middle-income families (49.5%), while one-third were from high-income families (33.7%), and the remaining were from low-income families (16.8%). Further, almost two-thirds of the patients had no marital problems (60.4%), while the remaining had either occasional (23.8%) or frequent marital problems (15.8%). Females with perinatal mood disturbances represented two-fifths of the participants (40.6%).

When stratifying the sample according to the PPD status (symptom levels), i.e., HSL versus LSL, we found a somewhat variegated distribution across the age groups. Nevertheless, both groups contributed equally (nine-tenths) to the youth category (89.8% vs. 88.5%). More females with HSL inhabited urban areas (96.2% vs. 87.8%). On the other hand, there was a similar distribution of patients with lower and higher symptom levels concerning the current child's gender, number of children, and previous child's date of birth. In contrast, patients with higher symptom levels had more frequent birth deformities (11.5% vs. 8.2%). There were almost similar feeding modalities between the two groups concerning: mixed feeding (48.1% vs. 46.9%) and exclusive bottle feeding (32.7% vs. 28.6%), but they differed concerning exclusive breastfeeding (19.2% vs. 24.8%). Further, the two groups had a similar distribution across each category of family income, including middle (50% vs. 49%), high (32.7% vs. 34.7%), and low-income (17.3% vs. 16.3%). However, the two groups had a substantial disparity concerning marital problems. Patients with higher symptom levels had a higher occurrence of marital problems

(frequent problems: 23.1% vs. 8.2%; occasional problems: 30.8% vs. 16.3%). Further, mothers with higher symptom levels of PPD also had much higher perinatal mood disturbances (53.8% vs. 26.5%) and personal history of depression (7.7% vs. 0%), yet the two groups had a comparable family history of PPD (5.8% vs. 4.1%).

Univariable hypothesis testing: Bivariate correlations, Chi-squared test, and ROC analysis

The EPDS score correlated significantly with marital problems (Spearman's $\rho=0.31$, $p=0.002$), personal history of depression ($\rho=0.28$, $p=0.005$), perinatal mood disturbances ($\rho=0.21$, $p=0.035$), and the number of children ($\rho=0.20$, $p=0.049$). In summary, mothers who suffer from frequent marital problems, possess a history of depression, experience perinatal mood disturbances, and have more children are more likely to experience severe post-partum depression.

According to the Chi-squared test of independence, we found a significant association between the PPD symptom levels and two parameters only, including marital problems ($\chi^2=9.36$, $df=2$, $p=0.009$) and perinatal mood disturbances ($\chi^2=7.81$, $df=1$, $p=0.005$) (Table 1 and Figure 1). On the other hand, PPD symptom levels did not vary significantly based on the personal history of depression ($\chi^2=3.93$, $df=1$, $p=0.118$) or the remaining parameters. Further, we reduced some variables by transforming the number of categories within each into two only (dichotomous). The former variables included age (<20 vs. ≥ 20 years), the number of children (≤ 2 vs. > 2 children), the previous child's date of birth (within two years vs. beyond two years), feeding modality (exclusive vs. non-exclusive breastfeeding), family income (low-income vs. middle and high income), and the marital problems (with vs. without marital problems). Nonetheless, testing still conveyed the same significant associations with PPD status concerning marital problems (OR=3.60, 95% CI=1.54 to 8.41, $p=0.003$) and perinatal mood disturbances (OR=3.23, 95% CI=1.40 to 7.46, $p=0.005$).

Table 1: Chi-Squared test of independence for risk factors of PPD severity

Independent Variable	χ^2	df	p-value
Age	2.07	2	0.356
Religious Affiliations	1.92	1	0.495
Residence	2.44	1	0.116
Number of Children	3.51	2	0.173
Previous Child's Date of Birth	2.36	2	0.307
Current Child's Gender	0.48	1	0.488
Birth Deformities	0.32	1	0.742
Feeding Modality	0.47	2	0.792
Family Income	0.05	2	0.975
Marital Problems	9.36	2	0.009
Perinatal Mood Disturbances	7.81	1	0.005
Personal History of Depression	3.93	1	0.118
Family History of PPD	0.15	1	1.000

† Significant p-values are in bold fonts.

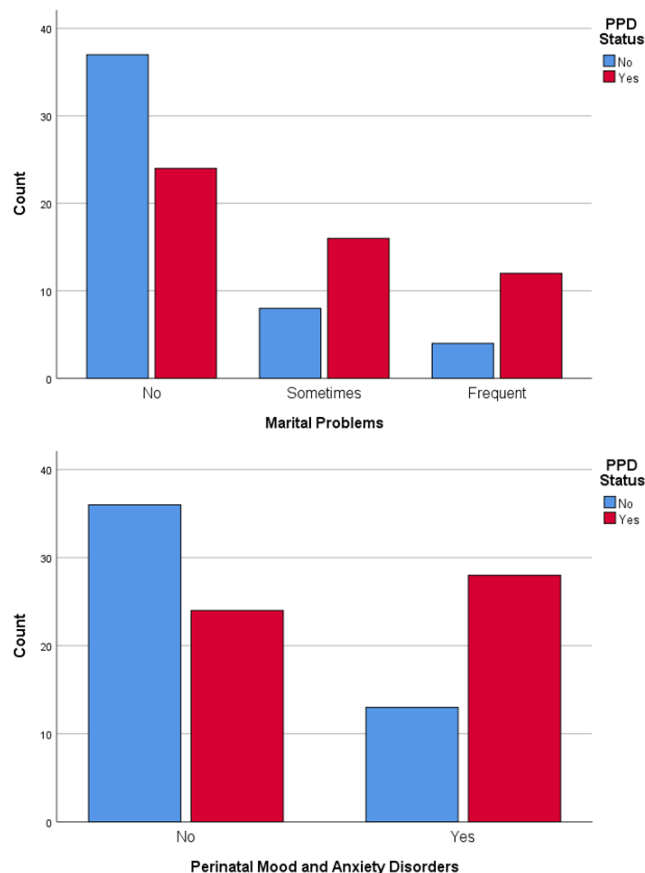


Figure 1: Risk factors for postpartum depression

† PPD Status=symptom levels; yes (higher symptom levels), no (lower symptom levels).

The former analyses did not indicate any significant effect concerning the age or the number of children on the PPD symptom levels. In the pre-study hypothesis, we expected the mother's age and the number of children might influence the symptom levels. Therefore, we ran a ROC analysis to test the former assumption (Figure 2). However, there was no significant effect for age (AUC=0.595, $p=0.093$, overall model quality=0.50) nor the number of children (AUC=0.608, $p=0.054$, model quality=0.48) on the symptom levels of PPD.

Multivariable hypothesis testing: Ordinal regression

Each of the former analyses represents a univariable analysis that did not explore the interaction between different variables on the symptom levels. Therefore, we conducted an ordinal regression incorporating all variables, i.e., a multivariable model. Concerning the model-fitting information, there was an overall significance (Nagelkerke's $R^2=0.32$, $p=0.046$), and only two parameters: the marital problems (OR=2.92, $p=0.029$) and perinatal mood disturbances (OR=3.59, $p=0.009$).

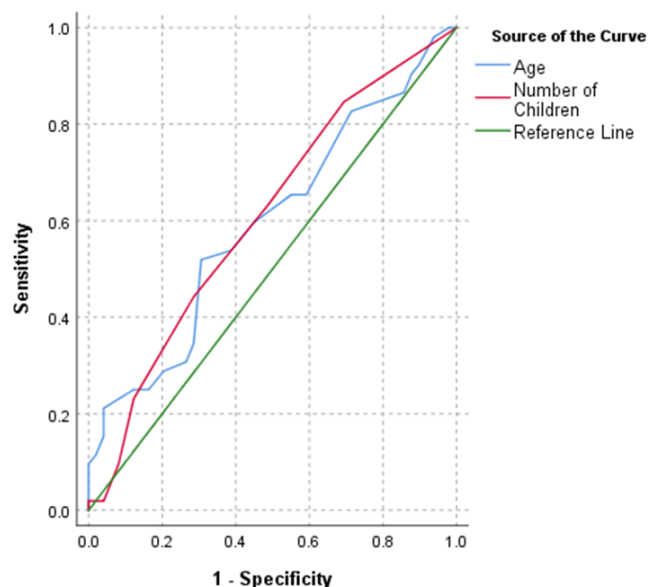


Figure 2: ROC analysis for age and the number of children

Multivariable hypothesis testing: Path analysis and structural modeling

Finally, we conducted a path analysis and structural modeling while considering the results from the former analyses. We integrated three independent variables, including marital problems, perinatal mood disturbances, and the personal history of depression. We incorporated the personal history of depression because the Chi-squared testing and ordinal regression results were equivocal at the 90% confidence interval (α value=0.10). Besides, the personal history of depression was significantly associated with the EPDS score ($p=0.28$, $p=0.005$) and the PPD symptom levels (0.197, $p=0.048$) per the bivariate correlations. Our path analysis confirmed that all predictors had a significant effect on the EPDS score, including personal history of depression (standardized $\beta=0.25$, $p=0.010$), marital problems ($\beta=0.24$, $p=0.012$), and perinatal mood disturbances ($\beta=0.21$, $p=0.024$). We also conducted a second path analysis, and again, the three predictors had a significant effect on the PPD symptom levels, including the perinatal mood disturbances ($\beta=0.31$, $p<0.001$), marital problems ($\beta=0.26$, $p=0.006$), and personal history of depression ($\beta=0.19$, $p=0.048$). Each of the path analyses had good model fitness ($\chi^2/df<3$ and $RMSEA<0.05$) (Figure 3).

Discussion

According to the EPDS cut-off value, patients with LSL included individuals with minimal or mild post-partum depression, while the other group (HSL) included individuals with moderate or severe PPD. The current study included mothers with lower symptom levels (48.51%) and others with higher symptom levels (51.49%). We inferred the existence of two significant risk factors influencing the symptom levels: marital problems (OR=3.60, 95% CI=1.54 to 8.41, $p=0.003$) and perinatal mood disturbances (OR=3.23, 95% CI=1.40 to 7.46, $p=0.005$). The former results were congruent with the multivariable ordinal regression, while path

analysis conveyed an equivocal additional risk factor: the personal history of depression. Further, ROC analysis did not imply any significant effect of the mother's age or the number of children on the symptom levels of post-partum depression. Nonetheless, mothers with HSL were older by approximately two years (29.19 ± 0.88 versus 27.08 ± 0.79 , $p=0.099$), which is significant at a 90% confidence interval.

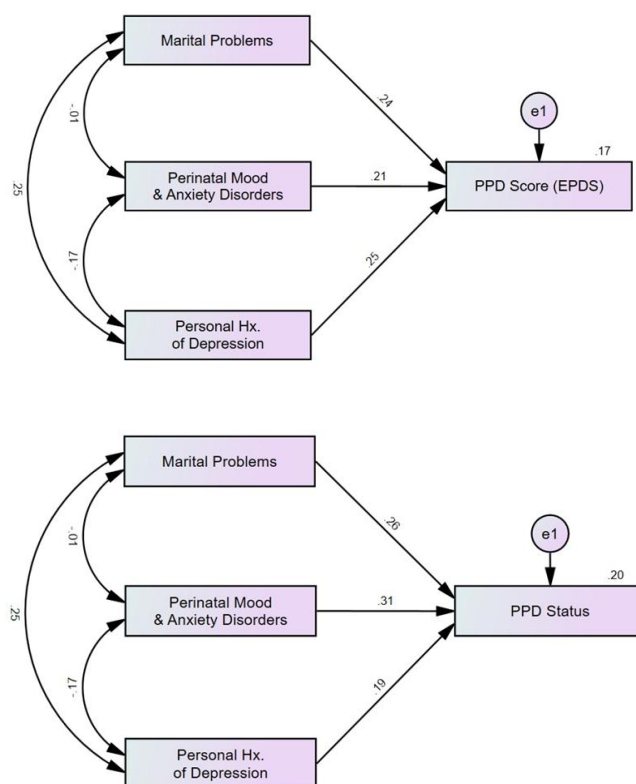


Figure 3: Multivariable path Analysis and structural modeling. † Path analysis for EPDS score (upper graph) and the PPD symptom levels (lower graph).

The high prevalence of women experiencing PPD and its consequences indicate that it represents a critical public health problem. Several studies indicated that one of the many factors causing the risk of PPD is low levels of social support, stress in everyday life, low financial income, and marital problems. A study of Japanese women found that a lack of social support from a partner and socially strict and isolated families results in a 7-fold higher risk of PPD among women. On the contrary, the researchers concluded that women who have strong family and social ties with people with whom they can share their childcare challenges and difficulties have a lower risk of adverse mental health problems as the support they receive from loved ones represents a crucial protective factor against post-partum depression [35].

In addition, experiencing isolation and loneliness may further potentiate post-partum depression. In a study aimed at determining the impact of pandemonium on women's mental health after childbirth (March-September 2021) in two gynecology and obstetrics departments in Bialystok and one in Biala Podlaska in

Poland, researchers observed an interaction effect of experiencing loneliness due to reduced family visits and feelings of anxiety about one's own and the newborn's health on the onset of post-partum depression. In the study group of 363 women hospitalized after childbirth, Kulak-Bejda and coworkers (2022) found that 30% of the subjects showed a risk of post-partum depression. The study's results confirm the importance of emotional support women needs after childbirth. Female respondents who were at risk of post-partum depression and received support from midwives, nurses, and doctors showed a significant decrease in the risk of post-partum depression and were better perceived by their families [36].

Further, a study conducted among Iraqi medical students in 2022 showed that suicidal thoughts are pervasive in this group [37]. It is evident here that even education, which offers much more excellent prospects than the participants in our study, is not a factor in protecting oneself from experiencing negative emotional states. Experiencing isolation and a sense of loneliness are additional strong predictors of a dark perception of reality.

Study limitations

Our study has limitations, including the relatively small sample size. The statistician calculated the sample size for population proportion based on the finite population formula while considering a confidence interval for hypothesis testing (95%), a margin of error (5%), and a prevalence of post-partum depression (28.4%) reported by Ahmed and coworkers (2012) in the Greater Kurdistan region [38]. The minimum sample size was 385. However, the current study recruited only 101 patients based on convenience sampling from Baghdad Medical City and Al-Sadr City. Another limitation relates to the inherent characteristics of the observational cross-sectional study design, as these studies cannot assess the incidence or reliably establish a causal inference between an exposure and an outcome.

Conclusion

Post-partum depression with higher symptom levels is common among Iraqi women from Baghdad, and more than half of the surveyed mothers suffered severely from it. The current study inferred two significant risk factors: marital problems and perinatal mood disturbances. A third and equivocal risk factor, the personal history of depression, should be further investigated in larger samples of the Iraqi population. Our results highlight three messages: (1) Healthcare providers should focus not only on post-partum depression but also on its severity while paying particular attention to mothers with higher symptom levels; (2) Psychiatric counseling should be tentative concerning mood disturbances and neurotic conditions that the mothers manifest around the time of delivering their newborn babies, and not to forget about surveying the past personal history of depression in those individuals; (3) Social workers, family physicians, and psychiatric counselors should collaborate from an interdisciplinary perspective and pay particular attention to the household environment, including the family dynamics, and especially to the marital problems that may instigate or potentiate the symptom levels leading to more severe post-partum depression which might be challenging to manage, while manifesting as an additional burden on the already troubled healthcare system in Iraq.

Ethical considerations

The ethics committee at the department of community medicine and public health approved the study (College of Medicine, University of Baghdad). The current study abided by the Declaration of Helsinki of the World Medical Association and the ethical principles of the Framingham Consensus of 1997. Informed consent was obtained from each of the study participants.

Source of funding

The authors have self-funded the study.

Competing interests

The authors declare that there are no competing interests.

Contribution of authors

Ahmed Al-Imam developed the study design, conceptualized the pre-study hypotheses, conducted the data analyses, wrote the first draft of the manuscript, allocated tasks for other coauthors, and led the research team. Aneta Haligowska and Marek Motyka developed the discussion section and provided critical analysis concerning other sections. Marwa A. Al-Abadi, Malak M. Hameed, and Mohaimen J. Al-Haideri distributed the translated EPDS questionnaire to the patients, collected the data, and contributed to writing the introduction and methods sections. Nesif Al-Hemiary provided critical analysis concerning the EPDS scale and supervised the research team.

ORCID

Ahmed Al-Imam	0000-0003-1846-9424
Aneta Haligowska	0000-0003-2192-0087
Marek A. Motyka	0000-0001-6967-0035
Nesif Al-Hemiary	0000-0002-5347-8820

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