Original Research Article

PREVALENCE AND CORRELATES OF POSTPARTUM DEPRESSION IN OSOGBO, NIGERIA

ABSTRACT

Background: Postpartum depression is the most prevalent postpartum mental health problem. It is associated with subsequent low adherence to child healthcare. In severe depression, especially in the presence of psychotic symptoms, there is a substantial risk of suicide and of infanticide.

AIM: This study aimed to assess the prevalence, pattern and correlates of postpartum depression among women attending postnatal and infant welfare clinics at a teaching hospital in Nigeria.

Study Design: This was a cross-sectional study.

Place and Duration of Study: This study was conducted at LTH, Osogbo Nigeria between September and November 2015.

Methodology: Data were obtained from 220 consenting postpartum women using the Edinburgh Postnatal Depression Scale (EPDS) and a socio-demographic questionnaire. All respondents found to be EPDS positive for depression as well as 10% of those negative for depression were further assessed with the MINI International Neuropsychiatric Interview (MINI) (depression subscale). Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 21. The level of statistical significance was set at a p-value of less than 0.05.

Results: Prevalence of postpartum depression was 9.5% using the MINI. Postpartum depression was significantly associated with age ($\chi2=4.767$, $p=0.035$), suicidal ideation ($\chi2=17.292$, $p < 0.01$), support from respondent's partner during pregnancy ($\chi2= 6.593$, $p= 0.010$), support from partner's relatives ($\chi2= 4.403$, $p=0.036$), number of children ($\chi2=4.247$, $p=0.039$) and partner's religion ($\chi2= 7.746$, $p= 0.010$). Unemployed mothers had significantly higher EPDS scores than those who were employed ($F=3.020$, $p< 0.05$).

Conclusion: The prevalence of postpartum depression is high. An increased media campaign about postpartum depression and preventive measures is urgently needed. Screening for depression

throughout the perinatal period is important for early diagnosis and prompt intervention in order to improve clinical outcome.

Key words: Postpartum depression, Postpartum women, Osogbo, Prevalence, Correlates, Nigeria

INTRODUCTION

Postpartum depression (PPD) is the most prevalent postpartum mental health problem.(1) Postpartum depression is a clinically significant depressive episode that begins in the postpartum period, lasts two weeks or more and requires medical attention. (2,3) Depression in the postnatal period contributes to several problems for the individual, family and society (1). It has been associated with early breastfeeding discontinuation, mother-child bonding impairment, a reduction of positive parenting behaviors(1) and the presence of thoughts of harm(4, 5) Maternal depression is also associated with poor adherence to preventive child health, including vaccinations.(6) Moreover, impaired interactions between mothers and children due to depression in mothers have been associated with long-term impairment in children's cognitive and emotional development.(7) In severe depression, especially in the presence of psychotic symptoms, there is a risk of suicide and infanticide(8)

The International Classification of Diseases by WHO in subsection F32 defines depression by the following criteria; presence of depressed mood, loss of interest and enjoyment, and reduced energy leading to increased fatigability and diminished activity, marked tiredness after only a slight effort (these are usually regarded as typical symptoms of depression).(9) Other common symptoms are: reduced concentration and attention, reduced self-esteem and self-confidence, ideas of guilt and unworthiness, bleak and pessimistic views of the future, ideas or acts of self-harm or suicide, disturbed sleep and diminished appetite.(9) The lowered mood varies little from day to day, and is often unresponsive to circumstances, yet may show a characteristic diurnal variation as the day goes on.(9) Based on severity, it can be classified as a mild depressive episode (F32.0), a moderate depressive episode (F32.1) or a severe depressive episode (F32.2 &F32.3).(9) For depressive episodes of all the three grades of severity, a duration of at least two weeks is usually required for diagnosis, but shorter periods may qualify if symptoms are unusually severe and of rapid onset.(9)

The Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) defines depression by nine criteria where at least five need to have been present for most of the day, nearly every day for at least two weeks.(10) In addition, the symptoms need to cause clinically significant distress or impairment in social or occupational functioning, and should not be better explained by a general medical condition, by the physiological effects of a substance or by bereavement.(10) The DSM criteria for depression include at least one of the following: persistent depressed mood or feeling of sadness, markedly diminished interest or pleasure in nearly all activities. Additional criteria: change in weight or appetite, either decreased or increased, insomnia or hypersomnia, psychomotor retardation or agitation fatigue or loss of energy, difficulty concentrating or indecisiveness, guilt or low self-esteem, recurrent thoughts of death or suicide.(10)

Diagnostic Classification of Depression in the Postpartum Period

The ICD also classified depression under the following categories in subsection F31-33 and F53: Bipolar and recurrent depressive disorder (subsection F31-33) and Mental and Behavioural disorders associated with the puerperium not elsewhere classified, which includes postpartum depression (subsection F53.0).(9)

Postpartum depression is diagnosed if the symptoms of depression occur within the first four or six weeks after delivery (DSM 5 and ICD-10 respectively)(9, 10) and do not fulfill criteria for other psychiatric disorders.(9) This wording in ICD-10 therefore leaves considerable room for individual clinical judgment by professionals.(11) Some may classify a depressive episode that occurs within 6 weeks after delivery under F53.0, whereas others may prefer to use the points from F31 to F33 to be able to describe the depressive condition in more detail depending on the criteria used.(11)

This problem is avoided in the DSM 5 as it does not have a specific category for postpartum depression.(10, 11) Instead, there is a specifier called “With postpartum onset” that can be added to a range of mood disorders.(10, 12) The onset of the disorder in DSM5 is within four weeks after delivery.(10)

Duration of the Postpartum Period

There is disagreement as to the length of time after delivery that can be considered “postpartum”.(11) According to the current psychiatric diagnostic systems, onset of depression has to be within 4 weeks (Diagnostic and Statistical Manual of Mental Disorders – 5th edition; DSM 5)(10) or within 6 weeks (International Classification of Diseases, version 10; ICD-10)(9) after delivery to be labeled postpartum depression.(11) However, many epidemiological studies, refer to depression that arises within 3 months of delivery.(2, 11, 21)

A large population-based register study from Denmark found an increased risk of admission for major depressive disorder among primiparous mothers through the first 5 months after delivery, compared with 11 to 12 months later.(11, 22) First-time mothers have a more than twofold risk of needing mental health care during the first months after delivery as compared to a year later, and the increased risk of depression lasts over the first five postpartum months.(23) For the purpose of this study, the postpartum period was defined as six month post delivery(3) because evidence shows that women are more vulnerable within the first six months compared to later.(2, 21, 22)

Prevalence of Postpartum Depression

The prevalence of depression in the postpartum period is estimated to range between 5-20 % (11, 24, 25) This wide range might be due to cross-cultural variables, reporting style, differences in perception of mental health and its stigma, differences in socio-economic environments and biological vulnerability.(11, 25) In Nigeria, the prevalence of postpartum depression has been found to be comparable to that of the western world (14.6%).(17)

Few prior studies have examined the prevalence and correlates of postpartum depression in Nigeria especially in the catchment area of this study.

MATERIALS AND METHODS

Study Location

The study was conducted at the infant welfare and postnatal clinics of Ladoke Akintola University of Technology (LAUTECH) Teaching hospital (LTH) Osogbo, Osun State. This is a 310 bed capacity hospital which provides primary, secondary and tertiary health care services in all specialties of medicine. It is located at the centre of Osogbo and is a referral centre to surrounding hospitals. The hospital provides services for patients mainly from Osun state and neighbouring states like Oyo, Ondo and Ekiti.

Recruitment

The number of mothers attending the postnatal and infant welfare clinics at this hospital was estimated to be about 15 per day. Mothers who fell within the age range of 18-45 years were included in the study. The recruitment for the study lasted 8 weeks.

Women attending these clinics were consecutively approached and those who met the inclusion criteria and gave informed consent were recruited for the study until the predetermined sample size was achieved. A removable identification sticker was left on all patients' card until the completion of the study to avoid a repeat selection. Completion of the questionnaires per participant lasted about 20 minutes. A resident doctor in the psychiatry department who speaks and writes in Yoruba and English was recruited as a research assistant in order to help administer questionnaires to those who could not read in Yoruba or English. She was trained in the administration of the questionnaires for over 6 hours in 3 divided sessions each lasting 2 hours on 3 consecutive days prior to data collection.

The self-administered questionnaires were filled by all mothers who met the inclusion criteria. For those who were not able to read in Yoruba or English, the research assistant helped to administer the questionnaire. She collected the questionnaires, scored the Edinburgh Postnatal Depression Scale (EPDS) and those with a cut-off score of 10 or higher were interviewed with the Mini International Neuropsychiatric Interview (M.I.N.I) depression module by the researcher. The interview was conducted in a private office, the respondents were first put at ease and rapport was established before administration of the instrument. The questionnaires administration and completion was built into the normal waiting time for clinic.

Measures

Data collection was done using the following instruments:

1. Socio-demographic Questionnaire: The socio-demographic information of respondents, included age, residence, marital status, number of husband's wives, position among husband's wives, family settings, family size, sex of index child, sex of previous children, level of education of both participant and partner, employment status of respondent and partner's monthly income.

2. Questions on Pregnancy-Related Factors: This aspect of the questionnaire enquired about support during pregnancy, mode of delivery, duration of delivery and number of weeks since delivery

3.**Edinburgh Postpartum Depression Scale (EPDS)**: The Edinburgh Postpartum Depression Scale has been used as a screening tool for assessment of depression in a variety of clinical settings.(2) It is a self-administered questionnaire which consists of 10 questions with four response categories scored from 0 to 3, whereby the greatest values represent depressed moods.(47) The range of scores for EPDS is from 0 to 30. Mothers who obtain an EPDS total score of 10 or greater are considered to have postpartum depression.(48) Since its publication in the 1980s, this scale has been used in a growing number of studies across a variety of patient groups.(2, 17, 49) It has been validated in Nigeria.(48, 49)Sensitivity is reported as 75% and specificity as 97%.(49) The reliability of the EPDS has been reported as 0.83 using Cronbach's alpha.(49)

4. Mini International Neuropsychiatric Interview (M.I.N.I)

Depression module:

The M.I.N.I is a short structured diagnostic interview developed jointly by psychiatrists and clinicians in the United States and Europe in 1990 for DSM-IV and ICD-10 psychiatric disorders. It has acceptably high validation and reliability scores when compared with other structured diagnostic interview schedule, but can be administered in a much shorter period of time. It can be used by clinicians, after a brief training session. Lay interviewers require more extensive training. Administration time is approximately 15 minutes.

The M.I.N.I is divided into modules identified by letters each corresponding to a diagnostic category. The Major Depressive Episode module has six sections A1 to A6. In this study questions only A1 to A3 were

used since the study assesses major depressive episode (current) and women with previous history of depression have been excluded from the study.

Data Analysis

All data collected were analyzed using the Statistical Package for Social Sciences (SPSS) software (version 21). Results were presented using frequency distribution tables and relevant statistics such as percentages, means and standard deviations. Cross tabulations were done to compare the outcome variables for Postpartum Depression. Chi square statistic, student t-test, ANOVA and logistic regression were used to evaluate the association between variables. Statistical significance was set at $P< 0.05$.

RESULT

Socio-Demographic Characteristics of the Respondents

Two hundred and twenty questionnaires were administered to the study group and all the questionnaires were completed, giving a response rate of 100%.

Table 1: Socio-Demographic Characteristics of the Respondents (N = 220)

	Frequency (n=220)	Percentage
Age (years)		
≤ 20	2	0.9
20 -29	89	40.4
30 -39	124	56.4
≥40	5	2.3
Mean age 30.12 (± 4.76)		
Marital Status		
Cohabiting	25	11.4
Married	195	88.6
Marriage/ Cohabitation pattern		
Monogamous	200	90.9
Polygamous	20	9.1
Employed		
Yes	167	75.9
No	53	24.1
Level of Education		
No formal education	1	0.5
Primary	11	5.0
Secondary	57	25.9
Tertiary	151	68.6

Tribe		
Yoruba	216	98.2
Igbo	3	1.3
Others Specified (Ishan)	1	0.5
Place of Residence		
Urban	214	97.3
Rural	6	2.7
Religion		
Christianity	140	63.6
Islam	79	35.9
Traditional	1	0.5
Income pattern		
Income<18000	117	53.2
Income≥18000	103	46.8

The socio-demographic characteristics of the respondents are shown in Table 1. The mean age of the respondents was 30.12 (± 4.76) years. The respondents were mainly urban dwellers of Yoruba ethnic group from monogamous family settings. Women whose ages ranged between 30 and 39 years constituted more than half of the entire respondent population. Christians constituted about two-third of the respondents. The majority of the women had received education beyond the primary school level. Three-quarter of the respondents were employed. More than half of the respondents earned less than the current minimum wage of 18,000 Naira.

Prevalence of Postpartum Depression

Screening for postpartum depression using EPDS

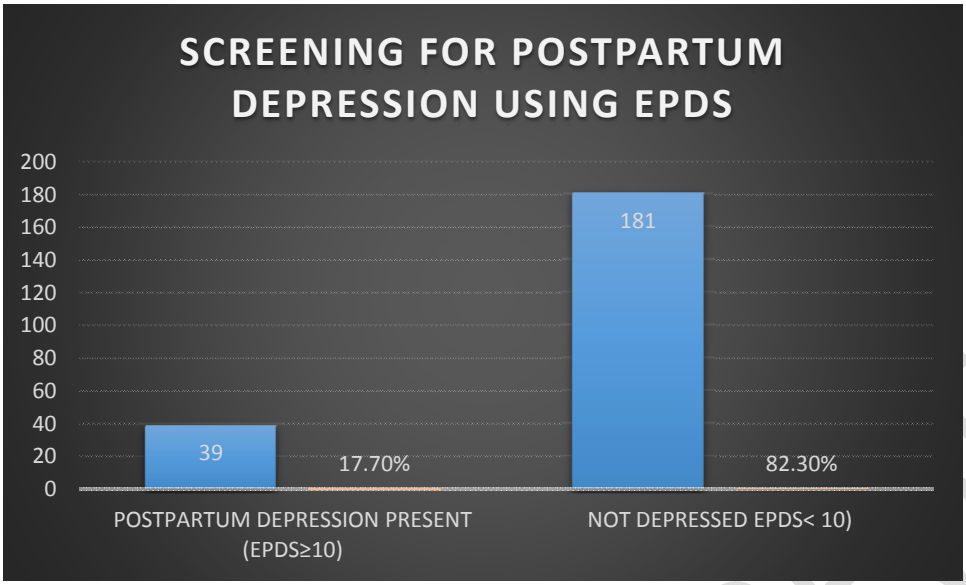

Figure 1: Screening for Postpartum Depression using EPDS

The mean EPDS score was 4.31 (5.34), median was 2.00 while the range was 20.00. The mean value for respondents with score greater or equal to 10 was 13.89 (2.77), median was 14.00 while the range was 10. Furthermore, the mean score for respondents with EPDS score less than 10 was 4.31 (5.34), median was 2.00 while range was 9.00.

Screening for postpartum using EPDS is as highlighted in figure 1 above. Among the respondents, 39 (17.7%) were considered depressed (EPDS score ≥10).

Prevalence of Postpartum Depression Using MINI

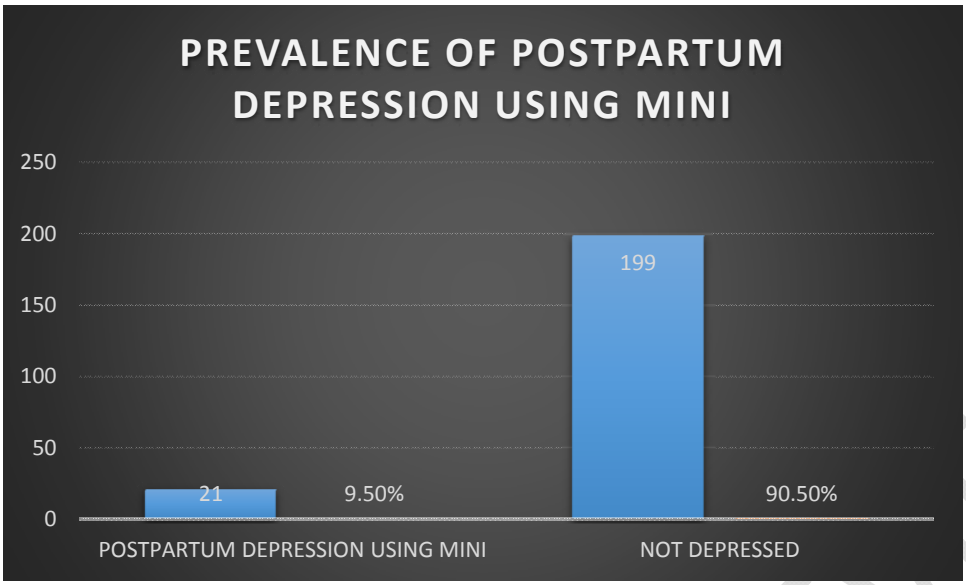

Figure 2: Prevalence of postpartum depression using MINI.

Figure 2 above depicts the prevalence of postpartum depression using MINI. Among the 57 respondents (39 EPDS positive and 18 EPDS negative) on whom MINI were administered, 21 respondents (9.5%) met criteria for the diagnosis of major depressive episode. Sensitivity and specificity were 100% and 90.95% respectively while positive predictive and negative predictive values were 53.84% and 100% respectively. For the calculation of true prevalence, each of the participants in phase 1 represents 1 while each of those who screened negative in phase 2 represents 10 participants (since only 10% of those who screened negative were randomly chosen)

$$\text{To calculate prevalence} = \frac{\sum wiyi\ (+ve) + \sum wiyi\ (-ve)}{\text{Sample size}}$$

$$= \frac{\sum wiyi\ (+ve) + \sum wiyi\ (-ve)}{220}$$

$$= \frac{21 + 0}{220}$$

$$= 9.5\%$$

The Spreadsheet for the calculation is in the Appendix

Table 2: Association of Postpartum Depression with Socio-demographic and Clinical Characteristics of Respondents

Variables	Postpartum depression		*χ2*	*Df*	*p* value
	Yes n%	No n%			
Age (years)					
<30	4 (4.4)	87 (95.6)	4.767#	1	0.035*
≥30	17 (13.2)	112 (86.8)			
Marital Status					
Cohabiting	3 (12)	22 (88.0)	0.197#	1	0.715
Married	18 (9.2)	177 (90.8)			
Religion					
Christianity	12 (8.6)	128 (91.4)	0.571#	2	0.534
Islam	9 (11.4)	70 (88.6)			
Traditional	0 (0)	1 (100)			
Educational Status					
Primary education or less	2 (16.7)	10 (83.3)	0.745#	1	0.321
Secondary education and more	19 (9.1)	189 (90.9)			
Employment Status					
Employed	14 (8.4)	153 (91.6)	1.084	1	0.298
Unemployed	7 (13.2)	46 (86.8)			
Monthly income (Naira)					
Less than 18000	13 (11.1)	104 (88.9)	0.709	1	0.400
18000 and more	8 (7.8)	95 (92.2)			
Sex of Index Child					
Male	8 (8.1)	91 (91.9)	0.447	1	0.504
Female	13 (10.7)	108 (89.3)			
Support During Pregnancy					
No	2 (14.3)	12 (85.7)	4.116#	2	0.119
Moderate	16 (12.2)	115 (87.8)			
High	3 (4.0)	72 (96.0)			
Support from Partner					
Yes	14 (7.4)	174 (92.6)	6.593	1	0.010*
No	7 (21.9)	25 (78.1)			
Support from partner's relatives					
Yes	7 (5.8)	114 (94.2)	4.403	1	0.036*
No	14 (14.1)	85 (85.9)			

Support from Own Relatives					
Yes	9 (7.9)	105 (92.1)	0.747	1	0.388
No	12 (11.3)	94 (88.7)			

Table 2 (CONT'D)

Variables	**Postpartum depression**		***χ2***	***df***	***p* value**
	Yes n%	**No n%**			
Number of Children					
One Child	4 (4.5)	84 (95.5)	4.247#	1	0.039*
Two or more children	17 (12.9)	115 (87.1)			
Family history of mental illness					
Yes	2 (40.0)	3 (60.0)	5.496#	1	0.073
No	19 (8.8)	196 (91.2)			
Witness sexual abuse while growing up					
Yes	2 (50.0)	2 (50.0)	7.722#	1	0.046*
No	19 (8.8)	197 (91.2)			
Experienced sexual abuse while growing up					
Yes	1 (16.7)	5 (83.3)	0.362#	1	0.456
No	20 (9.3)	194 (90.7)			
Mode of Delivery					
Vaginal delivery	19 (10.4)	163 (89.6)	0.976#	1	0.543
CS	2 (5.3)	36 (94.7)			
Grouped Hours of delivery					
0 to 12 hours	20 (9.6)	189 (90.4)	0.003#	1	1.000
Greater than 12 hours	1 (9.1)	10 (90.9)			
Duration since delivery					
0 to 6 weeks	7 (8.9)	72 (91.1)	0.314	2	0.855
7 to 12 weeks	8 (9.0)	81 (91.0)			
13 to 24 weeks	6 (11.5)	46 (88.5)			
Treatment for Chronic Illness					
Yes	0 (0.0)	4 (100.0)	0.430#	1	1.000

No	21 (9.7)	195 (90.3)			
Previous Infertility Problem					
Yes	0 (0.0)	17 (100)	1.944[#]	1	0.381
No	21 (10.3)	182 (89.7)			
Presence of Suicidal Ideation					
Yes	5 (45.5)	6 (54.5)	17.292	1	0.0001*
No	16 (7.7)	193 (92.3)			

*Significant [#]Fisher's test used

Table 2 shows the socio-demographic and clinical factors associated with postpartum depression among respondents. There was a significant association between postpartum depression and age of the respondents. Seventeen (13.2%) of those whose ages were 30 years and above had postpartum depression while only 4(4.4%) of those whose ages were 30 years and below had postpartum depression ($\chi 2=4.767$, $p=0.035$).

There was also statistically significant association between postpartum depression and suicidal ideation among the respondents. Five (45.5%) respondents who had suicidal ideation had postpartum depression while 7.7% of those who had no suicidal ideation had postpartum depression ($\chi 2=17.292$, $p=0.0001$).

There was a significant association between postpartum depression and support from partner during pregnancy. Twenty two percent of those without husband's support had postpartum depression compared to 7.4 % of those with support from husband ($\chi 2=6.593$, $p=0.010$). Likewise, support from partner's relatives during pregnancy was also found to be significantly associated with postpartum depression. Fourteen (14.1%) of those that were not supported by partner's relatives during pregnancy had postpartum depression while only seven (5.8%) of those whose partner's relatives supported them had postpartum depression. This difference was also statistically significant ($\chi 2=4.403$, $p=0.036$).

There was also a significant association between postpartum depression and number of children. Four (4.5%) respondents who had one child were depressed compared to 17 (12.9%) respondents who had two or more children ($\chi 2=4.247$, $p=0.039$).

The association between postpartum depression and witnessing sexual abuse while growing up was also significant. Two (50%) respondents who witnessed sexual abuse while growing up had postpartum depression while only 8.8% of those who did not witness sexual abuse 0while growing up had depression ($\chi 2= 7.722$, $p=0.046$).

The mean score of EPDS across the occupational status of the respondents revealed a significant difference (not tabulated). The unemployed respondents were observed to have significantly higher EPDS scores than others implying that they had higher depressive symptoms ($F=3.020$, $p< 0.05$).

There were no statistically significant associations between postpartum depression and other variables such as marital status, religion, educational status, employment status, monthly income, sex of the index child, previous infertility problem, mode of delivery, duration since delivery, treatment of chronic illness, family history of mental illness and experience of sexual abuse while growing up.

Table 3: Postpartum depression and Socio-demographic Characteristics (Continuous variables) of respondents

Variable	Postpartum Depression		*t*	*df*	*P*
	Present (N=21) Mean (SD)	Absent (N=199) Mean (SD)			
Age of partner (years)	36.47 (3.501)	35.18 (5.651)	1.495	218	.145
Weeks since delivery	11.51 (8.003)	10.05 (6.251)	.987	218	.325

As shown in Table 3 above, the continuous variables of "age of participant's partner" and "weeks since delivery" were compared across those that had postpartum depression and those that did not have postpartum depression using student t-test. There was no significant difference between the mean age of participants' partners who had postpartum depression compared to mean age of partners of those who did not have postpartum depression (p=0.145). Although the mean postpartum period (weeks since delivery) in those with postpartum depression was slightly higher than those who did not have postpartum depression, the difference was not statistically significant (p=0.325).

Table 4: Association between postpartum depression and other variables in respondents using logistic regression

Variables	B	Odds ratio	P value	95% CI for EXP (B) Lower	Upper
Age (years)					
< 30 (ref)	1	1			
≥30	1.169	3.218	0.060	0.950	10.901
Number of Children					
1 (ref)	1	1			
≥2	0.824	2.322	0.171	0.695	7.763
Mode of delivery					
Vaginal(ref)	1	1			
CS	-0.807	0.446	0.327	0.089	2.243
Witnessed sexual abuse					

while growing up					
No (ref)	1	1			
Yes	1.839	6.290	0.176	0.439	90.233
Support from Husband's relatives					
No (ref)	1	1			
Yes	-0.733	0.481	0.152	0.176	1.310
Support from Husband					
No (ref)	1	1			
Yes	-1.183	0.306	0.043	0.096	0.977
Hours of delivery					
0 to 12 hours(ref)	1	1			
>12 hours	0.691	1.995	0.547	0.211	18.891

ref reference point which is the variable to which others are being compared

Association between postpartum depression and other variables in respondents using logistic regression are as shown in Table 4 above

Variables were individually entered into a binary logistic regression model with postpartum depression as the outcome variable and the significant predictor of postpartum depression is as depicted in Table 4 above.

DISCUSSION

Risk Factors for Postpartum Depression

Pregnancy and childbirth are complex events involving profound biological, social and emotional transitions (2) Although reactions of anxiety and sadness are common during pregnancy, most women navigate this transition without major psychopathology.(2)

There are complex and currently incompletely understood interactions between stress, hormones and depression.(33) Individuals with exposure to early life stress may be more vulnerable to psychosocial stress in the perinatal period, due to previous alterations in the regulation of the hypothalamic-pituitary-adrenal (HPA) axis.(34)

Psychological distress and stressful life events during the previous year increases the risk of postpartum depression.(12) The woman's relationship to her partner is important. Poor relationship increases the risk of depression.(12, 25) Absence of social support or social isolation has also been found to be risk factors for developing depression in the postpartum period.(27, 35) Marital status in itself does not seem to be related to depression(25) but single mothers may receive less social support or have a more deprived socio-economic situation. Women who have experienced previous or current abuse are at high risk for postpartum depression.(36)

Unemployment, having a low income, or unplanned pregnancy have been associated with increased risk of postpartum depression.(28, 37) Maternal age, parity and education do not seem to be related to risk of postnatal depression.(38) Current somatic illnesses have been shown to be associated with depression after delivery.(39)

Most studies of postpartum depression have been conducted in industrialized countries, therefore, less is known about risk factors specific to developing countries.(11) Recently, however, more studies are emerging from these parts of the world.(17) Studies from South Africa, Nigeria, Pakistan, India, Turkey and China have all found risk factors similar to the ones described above, including previous depressive episodes, poor social and family support and economic difficulties.(11, 40-42) A documented risk factor from low and middle income countries of Nigeria, India, Turkey and China is female gender of the newborn due to a traditional preference for a child of the male sex.(11, 40-42)

Postpartum depression has a profound impact on maternal health and wellbeing and both short-term and long-term implications for the developing child and the larger family.(2) It affects the woman's feelings about herself, the couple relationship, her interpersonal relationships, the mother-baby relationship, relationship with older children and the larger family.(43) Postpartum depression has been identified as a risk factor that disrupts healthy development of children.(44)

Longitudinal studies have shown that postpartum depression has a negative impact on cognitive development, including language development and intelligence of the child.(45) Infants of depressed mothers had poorer growth than infants of non-depressed mothers.(44) Depressed mothers were more

likely to stop breastfeeding earlier and their infants are more likely to have episodes of diarrhea and other infectious illnesses.(44)

In this study, the prevalence of postpartum depression was 9.5% squarely in the centre of the global range of prevalence of postpartum depression.(11, 24, 25) It is close to the 14.6% that was observed by Adewuya et al(17)

There was a statistically significant association between support from husband during pregnancy, support from husband's relatives and postpartum depression. In a Norwegian study on depression and sleep in postpartum period, one of the variables most strongly associated with depressive symptoms was being discontent with the relationship with the partner.(11) Absence of social support or social isolation has also been found to be risk factors for developing postpartum depression.(27, 35)Poor partner relationship has previously been found to be associated with depression both among Indian(61) and Norwegian postnatal women.(12) In a qualitative study from India, women reported poor marital relationship as an important cause of their postnatal depression.(62)

An alternative interpretation of the association is that a woman's depression may influence the marital relationship negatively. Depressed women may rate marital difficulties more negatively than non-depressed women. However, a longitudinal study of immigrant women in Canada found lower scores on the marital adjustment scale in pregnancy to be predictive of depressive symptoms two months after delivery.(63)

Given assertions that strong, trusting partner relationship may be vital for a woman's psychological health during the postpartum period,(64) it makes sense that IPV during pregnancy may have a strong detrimental effect on women's mental health.(65) Lack of social support contribute to high rates of mental health problems after childbirth.(66) Findings from Coker et al indicate that the risk of negative mental health outcomes declines significantly among abused women who report receiving social support.(59) In Nigeria, Fatoye et al in a study on emotional distress and its correlates among Nigerian women in late pregnancy also found that lower spousal support contributes to mental health problems in women.(67)

There was also a significant association between postpartum depression and number of children. Respondents with two or more child children reported higher levels of depression compared with respondents who had one child. This finding agrees with another study by Mapayi et al.(36) However another study by Ludemir et al found no significant association between parity and postpartum depression.(68) A possible explanation for this is the fact that in a country like Nigeria where resources are limited, an extra child might well contribute to an increased stress level of the mother.

There was also a statistically significant relationship between suicidal ideation and postpartum depression. About half (45.5%) of those who had suicidal ideation had postpartum depression compared to 7.7% of those without suicidal ideation. This is in keeping with findings from other studies in which suicidal ideation has been found to be an integral part of postpartum depression.(69, 70)Findings from a postpartum depression screening program of 10,000 women, indicated postpartum women who screened positive for depression had high rates of suicidal ideation.(71) Suicidal ideation is a recognized symptom of depression(9) and may represent an aspect of hopelessness which is also a manifestation of depression.(9) Depression has been described as the single largest risk factor for suicidal ideation.(72)

There was no statistically significant relationship between maternal age, educational status, marital status and postpartum depression. This is in keeping with other studies in which maternal age, education and marital status do not seem to be related to depression.(25, 68)

There was no statistically significant association between family history of mental illness and postpartum depression. This is not in agreement with other studies that have shown that risk factors for postpartum depression can be familial and genetic.(11, 30) The respondents may have been unaware or unwilling to disclose a history of psychiatric illness in the family.

There was a statistically significant relationship between employment status and postpartum depression in this study. Also, respondents' income was negatively correlated with postpartum depression. This is similar to what was obtained in similar studies.(28, 37) Most studies showed a statistically significant associations between employment, low income and postpartum depression.(25, 73) This may be

attributed to the increased amount of stress placed on a mother due to financial means necessary for raising an infant.

Strengths of the study

100% questionnaires filled; good training of research assistant; tertiary hospital

Limitations

1. The study is subject to both recall and reporting bias because instruments used were based on self-report.

2. The study population was drawn from one hospital, and may therefore not reflect the characteristics of postnatal depression of the general population of Nigeria.

No statistical correction for multiple variables

CONCLUSION

The prevalence of postpartum depression in this study shows the high burden of the disorder. Increased media campaign about postpartum depression and preventive measures is urgently needed. Screening for depression throughout the perinatal period is important for early diagnosis and prompt intervention to improve the clinical outcome of women affected.

COMPETING INTEREST: NONE DECLARED

CONSENT: All participants gave written informed consent

ETHICS

Approval to undertake the study was obtained from the Ethics and Research Committee of LAUTECH Teaching Hospital to ascertain that the methodology does not contravene guidelines for research involving human subjects. Ethical issues like non-disclosure to others, opportunity to decline interview at any stage and non-exposure to risk were discussed with each respondent. The participants bore no financial burden for the study.

The respondents with depression were properly counseled on the need for help and were referred appropriately to a psychiatric facility for expert management.

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APPENDIX I: SPREADSHEET FOR THE CALCULATION OF TRUE PREVALENCE

Participants (i)	EPDS status	Sampling Weight (wi)	Interview status (yi)	Wiyi
1	1	1	1	1
2	1	1	1	1
3	1	1	1	1
4	1	1	1	1
5	1	1	0	0
6	1	1	0	0
7	1	1	0	0
8	1	1	0	0
9	1	1	0	0
10	1	1	1	1
11	1	1	0	0
12	1	1	0	0
13	1	1	0	0
14	1	1	1	1
15	1	1	1	1
16	1	1	1	1
17	1	1	1	1
18	1	1	1	1
19	1	1	1	1
20	1	1	0	0
21	1	1	1	1
22	1	1	1	1
23	1	1	1	1
24	1	1	0	0
25	1	1	1	1
26	1	1	1	1
27	1	1	0	0
28	1	1	0	0
29	1	1	0	0
30	1	1	0	0
31	1	1	0	0

32	1	1	1	1
33	1	1	1	1
34	1	1	0	0
35	1	1	1	1
36	1	1	0	0
37	1	1	0	0
38	1	1	1	1
39	1	1	1	1
40	0	10	0	0
41	0	10	0	0
42	0	10	0	0
43	0	10	0	0
44	0	10	0	0
45	0	10	0	0
46	0	10	0	0
47	0	10	0	0
48	0	10	0	0
49	0	10	0	0
50	0	10	0	0
51	0	10	0	0
52	0	10	0	0
53	0	10	0	0
54	0	10	0	0
55	0	10	0	0
56	0	10	0	0
57	0	10	0	0
Total	39	220	21	21

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