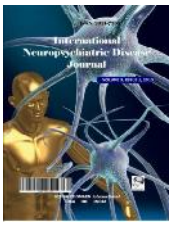

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Prevalence and Correlates of Postpartum Depression in Osogbo, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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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

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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 ($\chi2= 4.403$, $p=0.036$) and number of children ($\chi2=4.247$, $p=0.039$). 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.

Keywords: Postpartum depression; osogbo; prevalence; correlates; nigeria

1. 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 breast-feeding discontinuation, mother-child bonding impairment, a reduction of positive parenting behaviors [1] and the presence of thoughts of harm [2,3].

Maternal depression is also associated with poor adherence to preventive child health, including vaccinations [4]. 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 [5]. In severe depression, especially in the presence of psychotic symptoms, there is a risk of suicide and infanticide [6].

The prevalence of depression in the postpartum period is estimated to range between 5-20 % [7-9] 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 [8,9]. In Nigeria, the prevalence of postpartum depression has been found to be comparable to that of the western world (14.6%) [10].

Factors for development of postpartum depression are psychological distress and stressful life events during the previous year [11], poor relationship with partner [8], absence of social support [12,13], previous or current abuse, unemployment, having a low income or unplanned pregnancy [14]. Maternal age, parity and education do not seem to be factors associated with postpartum depression [15].

There is a need to detect and manage mothers with postpartum depression in order to reduce the negative effects it could have on care of babies. Identification of associated factors is also important in order to facilitate adequate preventive measures. However, there is dearth of studies in this part of the country and hence the need for this study.

2. MATERIALS AND METHODS

2.1 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.

2.2 Study Population

The study population comprised of women of age group 18-45 years who were in the postpartum period attending postnatal and infant welfare clinics of the hospital.

2.3 Inclusion Criteria

1. Subjects aged 18 years to 45 years.
2. Women within 6 months postpartum.

2.4 Exclusion Criteria

1. Women without live birth.
2. Women with previous history of depression.

2.5 Study Design

This was a hospital based cross-sectional descriptive survey.

2.6 Sample Size Estimation

The prevalence of postpartum depression in a study by Adewuya et al was 14.6% [10]. This was used to calculate the minimum sample size for the study.

The minimum sample size for the study was calculated using

Sample size (n) = Z^2pq/d^2 (Sample size for population > 10,000) [16]

Where

n = sample size

Z = standard normal deviation = 1.96 corresponding to 95% confidence interval

p = the estimated proportion of an attribute that is present in the population (i.e known prevalence of the condition being studied) = 14.6% (0.146)

q = 1.0 – P

d = degree of accuracy desired, set at 0.05

n = $[1.96]^2$x0.146x0.854/$[0.05]^2$ =191.6 approximately 192

An attrition rate of 10% gives 192 x 10/100 = 19.2

192 +19= 211

However, because the study population is below 10,000, the true sample size (nf) is estimated from the above, as follows:

n_f = n /1 + (n) / (N) [16]

Where

n_f = the desired sample size when population is less than 10,000.

n = the desired sample size when the population is more than 10,000

N = the estimate of the population size, with the value of 1000, which is the population of postpartum women from the age of 18 to 45 years in 2014 at the postnatal clinic and infant welfare clinic of LAUTECH Teaching Hospital.

n_f = 211/1 + (211)/(1000) = 174

n_f = 174

The sample size was increased to 220, to increase the power of the study.

2.7 Sampling Method

Women attending postnatal and infant welfare 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. 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.

2.8 Instruments

Data collection was done using the following instruments:

2.8.1 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.

2.8.2 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.

2.8.3 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 [17]. 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 [18]. 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 [19]. Since its publication in the 1980s, this scale has been used in a growing number of studies across a variety of patient groups [10,17,20]. It has been validated in Nigeria [19,20]. Sensitivity is reported as 75% and specificity as 97% [20]. The reliability of the EPDS has been reported as 0.83 using Cronbach's alpha [20].

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

2.9.1 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.

2.10 Ethical Consideration and Consent

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 international guidelines for research involving human subjects. Informed consent was obtained from all subjects after explaining the aim and objectives of the study to them. 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.

Number of Authorization of the protocol by the committee is LTH/EC/2015/03/206

2.11 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 $P< 0.05$.

3. RESULTS

3.1 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%.

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.

3.2 Prevalence of Postpartum Depression

3.2.1 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.

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

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

3.2.2 Prevalence of Postpartum Depression Using MINI

Fig. 2 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).

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 ($\chi2=17.292$, $p=0.0001$).

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 ($\chi2=6.593$, $p=0.010$). 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 ($\chi2=4.403$, $p=0.036$).

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 ($\chi2=4.247$, $p=0.039$).

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 ($\chi2 = 7.722$, $p=0.046$).

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, educational status, monthly income, family history of mental illness and experience of sexual abuse while growing up.

As shown in Table 3, 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 ($p=0.325$).

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

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.

4. DISCUSSION

In this study, the prevalence of postpartum depression was 9.5% squarely in the centre of the global range of prevalence of postpartum depression [7-9]. It is close to the 14.6% that was observed by Adewuya et al. [10]. The rate is also comparable to studies from other parts of the world [21,22]. An Australian study among new mothers found a prevalence rate of 7.5% [21], likewise a community based study, where the rate was found to be 5.5% [22]. The rate was however lower than 22% reported among Jordanian women in primary care setting [23] and 27.2% found at 6 weeks postpartum in a survey of 206 women using EPDS [24]. These differences could be as a result of methodological differences considering the fact that only screening instrument was used in the studies.

There was a statistically significant association between maternal age and postpartum depression. Women who had postpartum depression were more likely to be older. This is similar to the findings by Kheirabadi et al who also found an association between postpartum depression and advanced maternal age [25]. It is however different from a study by Abiodun et al who found association between younger maternal age and postpartum depression [26]. It is also not in keeping with other studies in which no association was found between maternal age and postpartum depression [10,27,28]. This finding further emphasizes the importance of routine screening for postpartum depression especially in mothers who are more than 30 years.

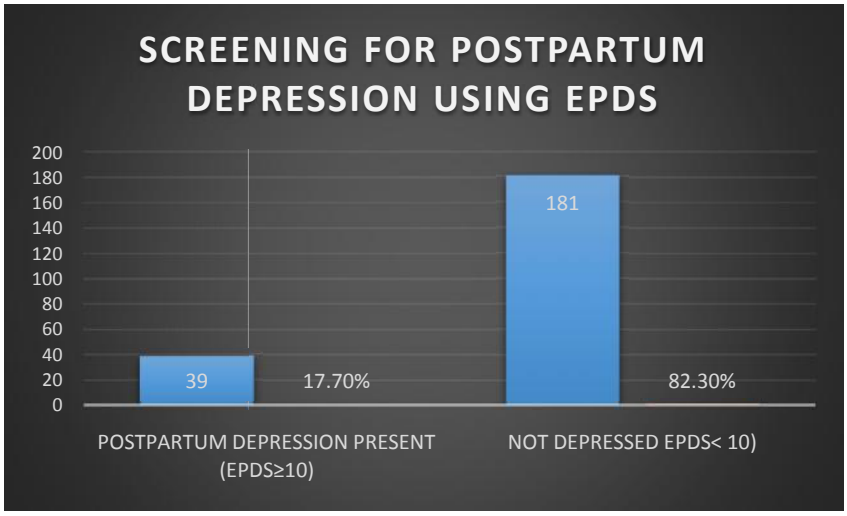

Fig. 1. Screening for postpartum depression using EPDS

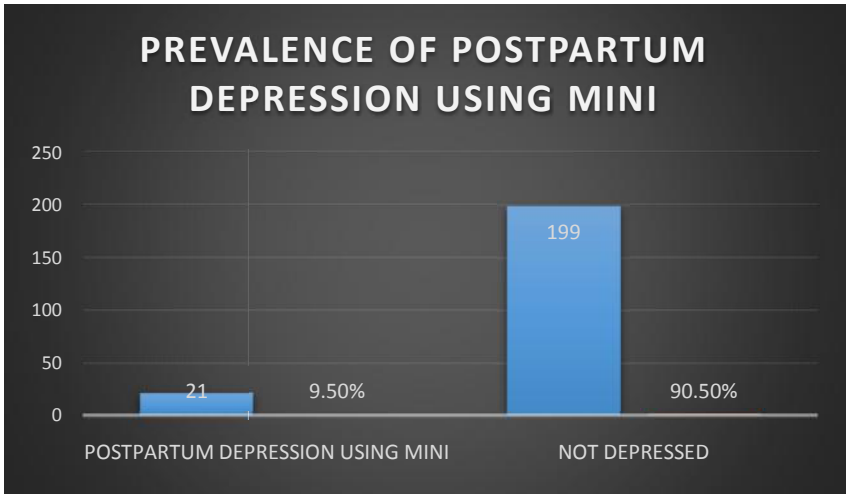

Fig. 2. Prevalence of postpartum depression using MINI

There was no statistically significant association between marital status and postpartum depression. This is in keeping with other studies in which marital status does not seem to be related to depression [8,29]. However, it is unlike a study by Segre et al in which higher prevalence of postpartum depression was found among unmarried postpartum women [30]. Marital status in itself may not be related to depression but single mothers may receive less social support or have more deprived socio-economic situation. Considering the fact that majority of the respondents were married, this may not reflect the true status of the community, hence complementary community based studies may be needed to give the complete picture among the women in the community.

There was a statistically significant relationship between employment status and postpartum depression in this study. This is similar to what was obtained in similar studies [14,31]. Most studies showed statistically significant associations between employment status and postpartum depression [8,14,32]. Unemployment predicts low socioeconomic status and has been found to be associated with the development of postpartum depression [33]. This may be attributed to the increased amount of stress placed on a mother due to financial means necessary for raising an infant.

There was no statistically significant relationship between educational status and postpartum depression which is in keeping with a study by

Owoeye et al but in contrast to findings by Ozdemir et al who found that low educational level predicted postpartum depression [14,28]. In this study, majority of the respondents (94.5%) had post-primary school education. The high literacy level may not give a true representation of the educational status of the community. Hence complementary community based studies may be needed to give the complete picture among the women in the community.

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)			
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)			
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)			
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)			
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 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

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

There was also a significant association between postpartum depression and number of children. Respondents with two or more children reported higher levels of depression compared with respondents who had one child. This finding agrees with some other studies [22, 34], however a study by Ludemir et al found no significant association between parity and postpartum depression [29]. 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. Furthermore, new mothers who need to care for more young children at home may experience more stress which may predispose to postpartum depression.

There was a statistically significant association between support from husband during pregnancy and postpartum depression. Women who reported a lack of support from husband were more likely to develop postpartum depression. This is in keeping with other studies where lack of husband's support was found to be associated with postpartum depression [35,36]. 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 [9]. Also, women who had support from husband's relatives were less likely to have postpartum depression which is in keeping with a study by Mohammad et al. [23]. Absence of social support or social isolation has also been found to be risk factors for developing postpartum depression [12,13]. Poor partner relationship has previously been found to be associated with depression both among Indian [37] and Norwegian postnatal women [11]. In a qualitative study from India, women reported poor marital relationship as an important cause of their postnatal depression [38].

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 [39]. Given assertions that strong, trusting partner relationship may be vital for a woman's psychological health during the postpartum period [40], it makes sense that

intimate partner violence during this period may have a strong detrimental effect on women's mental health [41,42]. Lack of social support contribute to high rates of mental health problems after childbirth [43]. Findings from Coker et al indicate that the risk of negative mental health outcomes declines significantly among abused women who report receiving social support [44]. 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 [45].

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 [9,46]. The respondents may have been unaware or unwilling to 0disclose a history of psychiatric illness in the family.

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 [47, 48]. 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 [49]. Suicidal ideation is a recognized symptom of depression [50] and may represent an aspect of hopelessness which is also a manifestation of depression [50]. Depression has been described as the single largest risk factor for suicidal ideation [51].

5. 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.

6. STRENGTHS OF THE STUDY

100% questionnaires filled; screening and diagnostic instrument used; good training of research assistant; tertiary hospital

7. 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.

CONSENT

All participants gave written informed consent.

ETHICAL APPROVAL

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.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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