# <sup>1</sup> <u>Original Research Article</u> <sup>2</sup> PREVALENCE AND CORRELATES OF POSTPARTUM DEPRESSION IN OSOGBO,

### 3 NIGERIA

### 4 ABSTRACT

AIM: Postpartum depression is the most prevalent postpartum mental health problem. Postpartum depression is associated with fewer adherences to child health promotion, including vaccinations. In severe depression, especially with psychotic symptoms, there is risk of suicide and infanticide. The study aimed to assess the prevalence, pattern and correlates of postpartum depression among women attending postnatal and infant welfare clinics of LAUTECH Teaching Hospital (LTH), Osogbo.

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

**Results:** Prevalence of postpartum depression was 9.5% using MINI, Postpartum depression was significantly associated with age of respondents ( $\chi$ 2= 4.767, p=0.035), suicidal ideation ( $\chi$ 2= 17.292, p < 0.01), support from respondents' partner during pregnancy ( $\chi$ 2= 6.593, p= 0.010), support from partners' relatives ( $\chi$ 2= 4.403, p= 0.036), number of children ( $\chi$ 2=4.247, p= 0.039) and partner's religion ( $\chi$ 2= 7.746, p= 0.010) and the mean score of EPDS across the occupational status of the respondents revealed a significant difference. The unemployed were observed to have significantly higher EPDS scores than others implying that they had higher depressive symptoms (F=3.020, p< 0.05)

26 Conclusion: The prevalence of postpartum depression in this study shows the huge burden of the 27 disorder. Increased media campaign about postpartum depression and preventive measures is urgently needed. Screening for PPD throughout the perinatal period is important for early diagnosis and prompt
 intervention to improve the clinical outcome of women affected.

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

#### 31 INTRODUCTION

32 Postpartum depression (PPD) is the most prevalent postpartum mental health problem.(1)Postpartum 33 depression is a clinically significant depressive episode that begins in the postpartum period.(2) It is a 34 disorder lasting more than two weeks and requires medical attention.(3) Depression in the postnatal 35 period contributes to several problems in the individual, family and society(1). Postpartum depression has 36 been associated with early breastfeeding discontinuation, bonding impairment, fewer positive parenting 37 behaviors(1) and thoughts of harming infants.(4, 5) Maternal depression is also associated with less adherence to child health promotion, including vaccinations.(6) Moreover, impaired interactions between 38 39 mothers and children have been associated with long-term impairment in children's cognitive and emotional development.(7) In severe depression, especially with psychotic symptoms, there is a risk of 40 41 suicide and infanticide(8)

42 The International Classification of Diseases by WHO in subsection F32 defines depression by the 43 following criteria; presence of depressed mood, loss of interest and enjoyment, and reduced energy 44 leading to increased fatigability and diminished activity, marked tiredness after only a slight effort (these 45 are usually regarded as typical symptoms of depression).(9) Other common symptoms are: reduced 46 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 47 48 diminished appetite.(9) The lowered mood varies little from day to day, and is often unresponsive to 49 circumstances, yet may show a characteristic diurnal variation as the day goes on.(9) sBased on severity, 50 it can be classified into mild depressive episode (F32.0), moderate depressive episode (F32.1) and 51 severe depressive episode (F32.2 &F32.3).(9) For depressive episodes of all the three grades of severity, 52 a duration of at least two weeks is usually required for diagnosis, but shorter periods may be reasonable if symptoms are unusually severe and of rapid onset.(9) 53

54 The Diagnostic and Statistical Manual of mental disorders fifth edition (DSM-5) defines depression by 55 nine criteria where at least five need to have been present for most of the day, nearly every day for at 56 least two weeks.(10) In addition, the symptoms need to cause clinically significant distress or impairment 57 in social or occupational functioning, and should not be better explained by a general medical condition, 58 by the physiological effects of a substance or by bereavement.(10) The DSM criteria for depression includes at least one of these: persistent depressed mood or feeling of sadness, markedly diminished 59 interest or pleasure in nearly all activities, additional criteria: change in weight or appetite, either 60 decreased or increased, insomnia or hypersomnia, psychomotor retardation or agitation fatigue or loss of 61 energy, difficulty concentrating or indecisiveness, guilt or low self-esteem, recurrent thoughts of death or 62 63 suicide.(10)

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#### 65 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 should occur within the first four or six weeks after delivery (DSM 5 and ICD-10 respectively)(9, 10) and must 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 has to be within four weeks after delivery.(10)

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#### 81 Duration of the Postpartum Period

The literature, the diagnostic classification systems and clinical practice have different definitions of the length of time after delivery termed "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.(11) However, according to epidemiological studies, depression typically arises within 3 months after 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 mothers 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 the first five postpartum months.(23) For the purpose of this study, the postpartum period will be defined as six months(3) because evidence shows that women are more vulnerable within the first six months compared to 11 to 12 months later.(2, 21, 22)

#### 95 Postpartum Depression

Postpartum depression is clinically significant depressive episode, temporally related to childbirth, occurring in 10-15% of women within six months postpartum (peaks 3-4 weeks) and requires medical attention.(3) The clinical features are similar to other depressive episodes, although thought content may include worries about the baby's health or her ability to cope adequately with the baby.(3) There may be significant anxiety component. About 90% of cases last less than one month, 45%, greater than one year.(3)

Symptoms include prolonged sadness, irritability, sleep and appetite disturbance, guilt, decreased concentration, and thoughts of harming self or the child.(3) These symptoms can last weeks or up to one year after childbirth and affects an estimated 6.5-12.9 percent of mothers.(24)

#### 105 Prevalence of Postpartum Depression

The prevalence of depression in the postpartum period was 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) High prevalence rates of depression among postpartum women have been found also in developing countries, including India (11% and 23%)(26) and Pakistan (40%).(6, 11) In Nigeria, prevalence of postpartum depression was found to be comparable to that of the western world (14.6%).(17)

#### 112 Risk Factors for Postpartum Depression

Pregnancy and childbirth are complex events involving profound biological, social and emotional transitions and thus packed with physical and psychological incidents.(2) Although reactions of anxiety and sadness are common during pregnancy, most women navigate this transition without major psychopathology.(2) Becoming a mother is a major life event and has great importance not only for the individual family but also for the society and the survival of mankind.(2)

The prevalence of major depressive disorder is twice as high in females as in males.(18, 19) Major depression is often associated with a disturbed family environment or exposure to traumatic events or major adversities.(27) It is also associated with marital difficulties,(28) recent stressful life events and other problems, which in most cases, women from developing countries are exposed to.(29)

Risk factors can be familial and genetic risk factors as well as psychosocial risk factors.(11)An Australian twin study found that genetic components explained 25-38% of the variance.(30) Women with previous severe pre-menstrual syndrome have been found to have a higher risk, suggesting a hormonal contribution.(31) An experimental study found that mimicking the hormonal changes related to pregnancy and delivery induced depressive symptoms in women who had previously had postpartum depression, but not in women who had been depressed only outside the perinatal periods.(32)

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-pituitaryadrenal (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)

#### 143 Risk Factors for Postpartum Depression in Developing Countries

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 preference for the male sex.(11, 40-42)

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#### 152 Consequences of Postpartum Depression

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) Postpartum depression 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)

#### 163 Justification

Few studies have examined prevalence and correlates of postpartum depression in Nigeria especially in the catchment area of this study. Therefore, investigating this is essential because it will provide empirical evidence, provide baseline data in our environment and provide the basis for the formulation of preventive strategies aimed at improving maternal and child health.

#### 168 MATERIALS AND METHODS

#### 169 Study Location

The study was conducted at the infant welfare and postnatal clinics of Ladoke Akintola University of 170 171 Technology (LAUTECH) Teaching hospital (LTH) Osogbo, Osun State. LTH was established in 1999 and 172 is one of the two Teaching hospitals jointly owned by Oyo and Osun State. It is a three hundred and ten bed capacity hospital which provides primary, secondary and tertiary health care services in all specialties 173 174 of medicine. It is located at the centre of Osogbo where it is easily accessible to the indigenes. It is 175 situated in Olorunda Local Government area of Osogbo in the South-Western part of Nigeria. Yoruba is the language widely spoken by the people, although other Nigerian tribes are present. LTH is a referral 176 177 centre to other hospitals in the city and its environs. The hospital provides services for patients mainly 178 from Osun state and neighbouring states like Oyo, Ondo and Ekiti.

Osogbo is the capital of Osun State. It is located about 194 km northeast of Lagos, the commercial capital of Nigeria. It shares boundary with Ikirun, Ilesa, Ede, and Iragbiji and it is easily accessible from any part of the state because of its central location. The estimated population of the town is over 355,572 people spread over its two local Government areas. This was calculated from the 2006 census figure of 287,156.(46)

#### 184 Recruitment

185 The infant welfare clinic of LAUTECH Teaching Hospital holds on Monday, Tuesday and Wednesday while the postnatal clinic holds on Friday. The Monday clinic is for age group 6 weeks to 14 weeks, 186 187 Tuesday is for new-borns while Wednesday clinic is for children age 9 months and above. The postnatal 188 clinic is at 6 weeks post-delivery. For the purpose of this study, the Wednesday clinic was excluded 189 because the mothers' postnatal age were more than six months which was the postpartum period chosen 190 for this study. The number of mothers attending the postnatal and infant welfare clinics was estimated to 191 be about 15 per day. Those that fell within the age range of 18-45 years were included in the study. The 192 recruitment for the study lasted 8 weeks.

193 Women attending these clinics were consecutively selected and those who met the inclusion criteria and 194 gave informed consent were recruited for the study until the sample size was achieved. A removable 195 identification sticker was left on all patients' card until the completion of the study to avoid a repeat 196 selection. Completion of the questionnaires per participant lasted about 20 minutes. A resident doctor in 197 psychiatry department who speaks and writes in Yoruba and English was recruited as a research 198 assistant in order to help administer questionnaires to those who could not read in Yoruba or English. She 199 was trained about the administration of the guestionnaires. She was trained over 6 hours in 3 divided 200 sessions each lasting 2 hours on 3 consecutive days before the data collection.

201 The self-administered questionnaires were filled by all mothers that met the inclusion criteria at the same 202 time. For those who were not able to read in Yoruba or English, the research assistant helped to 203 administer the questionnaire to them after obtaining informed consent. The research assistant collected 204 the questionnaires, scored the Edinburgh Postnatal Depression Scale (EPDS) and sent those with a cut-205 off score of 10 or higher to the researcher to be interviewed with Mini International Neuropsychiatric 206 Interview (M.I.N.I) Depression module by the researcher. The interview was conducted in a private office, 207 the respondents were put at ease and rapport was established before administration of the instrument. 208 The questionnaires administration and completion was built into the normal waiting time for clinic. This 209 helped to avoid prolonging the waiting time.

#### 210 Measures

211 Data collection was done using the following instruments:

**1. Socio-demographic Questionnaire:** The socio-demographic information of respondents, including 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 were enquired about.

217 2. Questions on Pregnancy Related Factors: This aspect of the questionnaire enquired about support
 218 during pregnancy, mode of delivery, duration of delivery and no of weeks since delivery

219 3.Edinburgh Postpartum Depression Scale (EPDS): The Edinburgh Postpartum Depression Scale has 220 been used as a screening tool for assessment of depression in a variety of clinical settings.(2) It is a self-221 administered questionnaire which consists of 10 questions with four response categories scored from 0 to 222 3, whereby the greatest values represent depressed moods.(47) Mothers who obtained an EPDS total 223 score of 10 or greater were labeled as having postpartum depression. (48) The range of scores for EPDS 224 is from 0 to 30. Since its publication in the 1980s, it has been used in a growing number of studies across 225 a variety of patient groups.(2, 17, 49) It has been validated in Nigeria.(48, 49)Sensitivity was 75% while specificity was 97%.(49) The reliability of the EPDS was 0.83 using Cronbach's alpha.(49) EPDS is a 226 227 valid screening test for detecting postpartum depression.(48) A cut-off score of 10 or higher on EPDS was 228 found to be the optimum for screening for depression.(48, 49)

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

230 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. The aim is to assist in the assessment and tracking of patients with greater efficiency and accuracy. It is a tool that facilitates accurate data collection. 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. With an administration time of approximately 15minutes and to keep the interview as brief as possible, patients are informed that a more structured interview requiring precise answers of yes or no will be asked.

The M.I.N.I is divided into modules identified by letters each corresponding into a diagnostic category. At the beginning of each diagnostic module (except for psychotic disorders module) screening question(s) corresponding to the main criteria of the disorder are asked. At the end of each module, diagnostic box(es) permit the clinician to indicate whether diagnostic criteria are met. Each module assesses for a diagnostic category.

Major Depressive Episode module of MINI which is grouped as 'A module' has six sections A1 to A6. In this study questions 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.

#### 248 Data Analysis

At the end of data collection, the administered questionnaires were sorted out and coded serially. 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.

#### 255 RESULT

#### 256 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		
Monogamous	200	90.9
Polygamous	20	9.1
Fundavad		
	167	75.0
No	53	75.9
NO	55	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
lgbo	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

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





#### 271 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).

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### 282 Prevalence of Postpartum Depression Using MINI



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284 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 chosen randomly)

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

293		Sample size
294	=	∑ wiyi (+ve) +∑ wiyi (-ve)
295		220
296	=	<u>21 + 0</u>
297		220
298	=	9.5%

299 The Spreadsheet for the calculation is in the Appendix

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

## 301 Characteristics of Respondents

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

Support from

<b>partner's</b> relatives Yes No	7 ( 5.8) 14 (14.1)	114 (94.2) 85 (85.9)	4.403	1	0.036*
Support from Own Relatives Yes No	9 ( 7.9) 12 (11.3)	105 (92.1) 94 (88.7)	0.747	1	0.388
Table 2 (CONT'D) Variables	) Postpartum der	pression	χ2	df	p value
Number of Children	res n%	ΝΟ Π%			
One Child Two or more children	4 (4.5) 17 (12.9)	84 (95.5) 115 (87.1)	4.247 <sup>#</sup>	1	0.039*
Family history of mental illness					
Yes No	2 (40.0) 19 (8.8)	3 (60.0) 196 (91.2)	5.496#	1	0.073
Witness sexual abuse while growing up					
Yes No	2 (50.0) 19 (8.8)	2 (50.0) 197 (91.2)	7.722*	1	0.046*
Experienced sexual abuse while growing					
Yes No	1 (16.7) 20 (9.3)	5 (83.3) 194 (90.7)	0.362#	1	0.456
Mode of Delivery					
Vaginal delivery CS	19 (10.4) 2 (5.3)	163 (89.6) 36 (94.7)	0.976 <sup>#</sup>	1	0.543
Grouped Hours of delivery 0 to 12 hours Greater than 12 hours	20 (9.6) 1 (9.1)	189 (90.4) 10 (90.9)	0.003#	1	1.000
Duration since delivery 0 to 6 weeks 7 to 12 weeks	7 (8.9) 8 (9.0)	72 (91.1) 81 (91.0)	0.314	2	0.855

13 to 24 weeks	6 (11.5)	46 (88.5)			
<b>Treatment for Chronic Illness</b> Yes No	0 (0.0) 21 (9.7)	4 (100.0) 195 (90.3)	0.430 <sup>#</sup>	1	1.000
Previous Infertility Problem					
Yes No	0 ( 0.0) 21 (10.3)	17 (100) 182 (89.7)	1.944 <sup>#</sup>	1	0.381
Presence of Suicidal Ideation					
Yes No	5 (45.5) 16 (7.7)	6 (54.5) 193 (92.3)	17.292	1	0.0001*
"Nightficant "Fishe					

302 \*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.

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

#### 334 respondents

Variable	Postpartum Depression		t	df	Р	Р
	Present (N=21)	Absent (N=199)				
	Mean (SD)	Mean (SD)				
Age of partner	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	

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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).

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

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

sexual abuse

<b>while growing up</b> No (ref) Yes	1 1.839	1 6.290	0.176	0.439	90.233
Support from Husband's relatives	n				
No (ref)	1	1			
Yes	-0.733	0.481	0.152	0.176	1.310
Support from	n				
Husband					
No (ref)	1	1			
Yes	-1.183	0.306	0.043	0.096	0.977
Hours o	of				
delivery					
0 to 1	2 1	1			
hours(ref)					
>12 hours	0.691	1.995	0.547	0.211	18.891
reference point which is the variable to which others are being compared					

346 ref reference point which is the variable to

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Association between postpartum depression and other variables in respondents using logistic regression 348

349 are as shown in Table 4 above

Variables were individually entered into a binary logistic regression model with postpartum depression as 350

the outcome variable and the significant predictor of postpartum depression is as depicted in Table 4 351

352 above.

#### 353 DISCUSSION

#### 354 Prevalence of Postpartum Depression among Respondents

355 In this study, the prevalence of postpartum depression among respondents was 9.5%. This value lies 356 between 5 to 20% which is the global range of prevalence of postpartum depression.(11, 24, 25) This 357 prevalence is similar to 14.6% that was observed by Adewuya et al among postpartum women at 6 weeks 358 postpartum.(17) These observations indicate that postpartum depression is universal, with no respect for boundaries. 359

#### 360 Risk Factors associated with postpartum depression among respondents

361 There was a statistically significant association between support from husband during pregnancy, support 362 from husband's relatives and postpartum depression. In a Norwegian study on depression and sleep in 363 postpartum period, one of the variables most strongly associated with depressive symptoms was being 364 discontent with the relationship with the partner.(11) The woman's relationship with her partner is 365 important, poor relationship increases the risk of depression.(12, 25)Absence of social support or social 366 isolation has also been found to be risk factors for developing postpartum depression.(27, 35)Poor 367 partner relationship has previously been found to be associated with depression both among Indian(61) 368 and Norwegian postnatal women.(12) In a qualitative study from India, women reported poor marital 369 relationship as an important cause of their postnatal depression.(62)

An alternative interpretation of the association is that a woman's depression may influence marital relationship negatively. However, most of the women in the polygamous relationship studied were second wives, thus omitting the possibility of a bad relationship causing the husband to take a second wife. 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.

389 There was also a statistically significant relationship between suicidal ideation and postpartum 390 depression. About half (45.5%) of those who had suicidal ideation had postpartum depression compared 391 to 7.7% of those without suicidal ideation. This is in keeping with findings from other studies in which 392 suicidal ideation has been found to be an integral part of postpartum depression.(69, 70)Findings from a 393 postpartum depression screening program of 10,000 women, indicated postpartum women who screened 394 positive for depression had high rates of suicidal ideation.(71) Suicidal ideation is a recognized symptom 395 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) 396

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) A possible explanation for the finding in this study is that it is difficult to establish a positive family history of mental illness considering the fact that it requires the respondent to be aware of relatives with psychiatric disorders. It is also subjected to their willingness to disclose the information.

There was 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. The greater instability of an impoverished life causes financial strain which could contribute to an increased stress level for the mother.

#### 413 CONCLUSION

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

#### 418 LIMITATIONS OF THE STUDY

- 1. The study is subject to both recall and reporting bias because measures of Postpartum Depression
- 420 were based on self-report, though it is expected that the estimates derived from this study will be no less
- 421 reliable than those of other self-report surveys.
- 422 2. Study population was drawn from a hospital which may not truly reflect characteristics of the general
- 423 populations.

#### 424 COMPETING INTEREST: NONE DECLARED

425 **CONSENT**: All participants gave a written informed consent

#### 426 ETHICAL APPROVAL

427 Approval to undertake the study was obtained from the Ethics and Research Committee of LAUTECH 428 Teaching Hospital to ascertain that the methodology does not contravene guidelines for research 429 involving human subjects. Ethical issues like non-disclosure to others, opportunity to decline interview at 430 any stage and non-exposure to risk were discussed with each respondent. The participants bore no 431 financial burden for the study.

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

#### 434

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#### 611 APPENDIX I: SPREADSHEET FOR THE CALCULATION OF TRUE PREVALENCE

Participants (i)	EPDS status	Sampling Weight (wi)	Interview status (vi)	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

#