(RESEARCH ARTICLE)

Check for updates

The impact of socio-demographic and obstetric characteristics on the prevalence of major depression in the antenatal population in the core Niger delta

Okocha AN [1], Amadi SC [2, *] Abbey M [2], Biralo PK [1], Dickson CI [1] and Imarhiagbe CO [1]

[1] Department of Family Medicine, Rivers State University Teaching Hospital, Port Harcourt, Rivers State, Nigeria.
[2] Department of Obstetrics and Gynaecology, Rivers State University Teaching Hospital, Port Harcourt, Rivers State, Nigeria.

Abstract

Background: Antepartum depression (APD) is also of immense concern because of its grave consequences on the mother, pregnancy outcomes, child development and the family. Its prevalence is under the influence of several factors.

Aim: To determine the impact of patients' socio-demographic and obstetric characteristics on the prevalence of major antenatal depression in Rivers State University Teaching hospital, Nigeria.

Methods: This was a cross-sectional study of 163 pregnant women who were recruited via systematic random sampling in the antenatal clinic of Rivers State University Teaching Hospital over a period of 4 months. Data on socio-demographic and obstetrics characteristics of the patients were obtained with the aid of semi-structured interviewer-administered questionnaire. Screening for and diagnosis of depression was done using the Edinburgh Postnatal Depression Scale (EPDS). Data collected was analyzed using the Statistical Package for Social Sciences (SPSS) version 20 statistical software. Descriptive analysis of all the variables in the study was carried out using frequency tables and bar charts. The associations between depression during pregnancy and the independent variables (socio-demographic, gestational and obstetric characteristics) were assessed using Chi-square test or a Fisher's exact test when the expected cell count was less than five in at least twenty percent of the cells. Level of significance was set at $p < 0.05$.

Results: The mean age of the participants was 29.1±4.53 years with an age range of 20-40 years. Majority of the participants were married (87.1%) from monogamous families (73.6%) and had tertiary level of education (67.5%), Majority were within high social class (56.4%), and did not experience intimate partner violence (92.6%). The prevalence of depression was 44.8%. Educational level showed significant statistical relationship with antepartum depression ($X2=9.773$, $p<0.009$). APD was not shown to have significant association with the age of the mothers ($X2=4.60$, $P<0.203$) and marital status ($X2=0.847$, $p <0.738$). Furthermore, there were no statistically significant differences in the prevalence of major depression among women in the three different trimesters of pregnancy.

Conclusion: The prevalence of antepartum major depression at the RSUTH, Port Harcourt in Nigeria was high. There was statistically significant differences in the prevalence of major depression among different educational categories.

Keywords: Impact; Socio-demographic Charateristics; Obstetric Chararteristics; Prevalence; Antepartum Depression; Antenatal population; Nigeria.

---

* Corresponding author: Amadi SC; Email: amachijio@yahoo.com

1. Introduction

Major depression is the persistent presence for at least two weeks of a sad mood, loss of interest in activities usually experienced as pleasurable, reduced energy (typical symptoms) and at least, two of the other common symptoms which include reduced concentration, reduced self-confidence, ideas of guilt, hopelessness, a bleak and pessimistic view of the future, ideas of self-harm or suicide, disturbed sleep, and diminished appetite.[1] Antenatal or antepartum depression develops during the antenatal period.

Women have a lifetime risk of about 1 in 8, and it is most prevalent during their reproductive years.[2] and its incidence increases with pregnancy.[3] Globally, the World Health Organization estimates that about 10% of pregnant women experience depression while in developing countries the corresponding figure is 15.6%;[4] and 19 to 25% was quoted by the National Institute of Clinical Excellence, United Kingdom.[5] Antenatal depression affects approximately 10% of women during pregnancy[6] and the rates among low-income pregnant women may be as high as 27.6%.[6, 7]

Noteworthy, a systematic review involving thirty-five African studies spanning eight countries, reported a weighted prevalence of 11.3% during pregnancy.[8] Prevalence rates as high as 33% has been reported in Bangladesh among pregnant women[9] which may have been due to a recruitment of women at a later stage of pregnancy, in this case 34-35 weeks, while lower rates of 20% and 18.3% were reported in Pakistan[10] and another study in Bangladesh[11] respectively

Studies in Ghana and Cote d'Ivoire reported prevalence rates of 26.6% and 32.9% respectively.[12] In Ethiopia studies recorded prevalence of antenatal depression of 19.9%,[13] 39%,[14] and 25% respectively.[15] All the studies in Ethiopia used the Edinburgh Postnatal Depression Scale (EPDS) for screening and diagnostic purposes. A study in Malawi showed a prevalence rate of 21%[16] However, a higher prevalence rate of 47% was reported among pregnant women in rural South Africa, which possibly reveals the high burden of antepartum depression among rural settings in Africa. Also, unlike the other studies, the study comprised of HIV positive pregnant women, which could account for the high prevalence rate.[3]

In Nigeria, a study in south-west zone has revealed a rate of 24.5% for antepartum depression.[17] In a study among pregnant women attending antenatal clinics in Abeokuta North Local Government Area, Nigeria, the prevalence of antepartum depression was found to be 24.5%.[17] A hospital-based study of 180 women in Ilesha, a semi-urban town in Western Nigeria gave a 8.3% prevalence of depressive disorders in peri-urban third trimester pregnant women.[6] A cut-off score of six on the EPDS was used in this study (as against 9 or 10 used in most studies). A study done at the college of Health Sciences of Obafemi Awolowo University, Ile-Ife on antepartum depressive symptoms among Nigerian women, gave a prevalence rate of 10.8%.[18] Noteworthy this study employed the hospital anxiety and depression scale for the screening of the participants thus also inculcating those with anxiety and was not particular about depressive illness.

Antepartum depression, is not only associated with tremendous burden but it can lead to several pregnancy complications namely postpartum depression,[17] headache, nausea, vomiting, gastrointestinal problems, and sexual dysfunction. Others are inadequate nutrition, inadequate weight gain, underutilization of prenatal care, increased substance use,[19] more likely to consume alcohol which is associated with abortion, intrauterine growth restriction (IUGR), fetal alcohol syndrome (FAS), and fetal alcohol effects. FAS is characterized by cranio-facial abnormalities, mental retardation, cognitive and behavioural problems/disabilities.[20] Furthermore, antenatal depression has been associated with the following: lower infant birth weight, decreased Apgar scores, prematurity and preterm birth and smaller head circumference, IUGR and low neonatal birth weight,[19, 21, 22] pregnancy induced hypertension (PIH) and pre-eclampsia in untreated cases,[23] and childhood behavioural, cognitive and psychological problems

Depressive symptoms have been linked to less education, less income, single parenthood (unmarried or widowed), and separated parents.[24] Other risk factors are younger age, and polygamy.[25] These factors possibly act by inducing or heightening stress. Nevertheless, some studies found that an older age was positively associated with depression scores during pregnancy.[9, 11] Other studies found that age was not associated with depression or anxiety during pregnancy,[26, 27, 28] Other risk factors of antepartum depression include financial, emotional, socio-economic and family burden,[29] mother's lower socioeconomic status and previous depression symptoms, smoking, low income, and unintended pregnancy.[30] Single or divorced women are also at risk of developing antepartum depression, probably secondary to stigma related to females being single or divorced in our setting.[31]

Total income was also found to be a strong predictor of depression. A significant negative association existed between total income and depression in a Nigerian study ($p = 0.002$).[32] Low income, lower education, single status, and poor relationship with partner were associated with depressive symptoms during pregnancy.[28, 33] Antepartum depression has also been found to be more prevalent in unemployed women[13] and housewives[34] compared with employed women, even if a study did not find any significant association between employment and antepartum depression[35] Furthermore,

women whose partners were unemployed were found to be more at risk of antepartum depression.[21, 36] Some studies have associated low income and financial hardships to antepartum depression.[3, 14, 36]

Lack of education was identified as a risk factor of Antepartum Depression in a study carried out in Abeokuta in Nigeria,[17] [16] and in other studies.[33, 34] Education may possibly function as a protective factor, via enhancing feelings of self-worth and reducing feelings of shame, which in turn may contribute to reduce depressive and anxiety symptoms.[11] Antepartum depression was inversely associated with literacy.[11] Nevertheless, two studies conducted in Malawi[16] and Pakistan[36] found that "more years of schooling" in women was a risk factor to developing antepartum depression. A few studies did not find education to be a significant predictor of antepartum depression.[35, 38]

The prevalence of depression may be affected by the time point in pregnancy at which symptoms are assessed,[11] the age of pregnancy, the parity of a woman, whether the pregnancy was planned or not, and whether the pregnancy was wanted or not.

The prevalence of prenatal depression increased over the trimesters, from 40.5% in the first trimester to 61.4% in the third trimester.[39] A study with 357 pregnant women in Hong Kong showed that the rates of depression in the prenatal period were 22.1%, 18.9%, and 21.6% in consecutive trimesters.[31] This finding was consistent with the results of another study, which found the level of prenatal depression in the third trimester to be significantly higher than that in the second trimester.[40] In other words, the timing of gestational period was a significant factor in prenatal depression.[41] Prenatal depression was also found to be at a higher level in the first and third trimester in one study[41] and in the second and third trimester in another study.[33, 42] Stress is significantly correlated to depression or depressive symptoms.[43] It is imaginable that a higher level of stress such as the saddle of child birth, anticipated burden of childbearing might cause a higher rate of depression in the third trimester.[39]

In a Nigerian study, the prevalence of antepartum depression in first, second, and third trimesters was 27.5%, 25.0%, and 23.5%, respectively.[17] In another Nigerian study, the prevalence rates were 8%, 5.3% and 0% for first, second and third trimester respectively.[44] In the first trimester, major depression was associated with single marital status (p=0.003) and being a student (p=0.02) while the second trimester was associated with preterm delivery (p=0.02).[44] Similar finding was observed by Gavin et al who reported that prevalence of antepartum depression appears to peak in the first trimester. This underscores the need to create awareness and inform pregnant women on the benefits of registering early, especially in the first trimester, as this will provide them the opportunity to be screened for depression and those affected will be selected early for prompt treatment thereby avoiding the associated poor obstetric outcomes and fetal complications.[17, 44]

The paucity of data on the risk factors of antepartum depression in our setting, prompted this study which aimed to determine the impact of the socio-demographic and the obstetric factors on the burden of antepartum depression. The finding of this research will add to the existing body of evidence and enhance care of our women during the antenatal period.

2. Methodology

2.1. Study area

This study was carried out in the antenatal clinic of Rivers State University Teaching Hospital (RSUTH) in Port Harcourt, Rivers State, Nigeria. Port Harcourt, the capital of Rivers State is an industrial and cosmopolitan city. The state is located in the tropical rain forest belt in the South- South geo-political zone of Nigeria and has a population of 7,034,973.[45]

RSUTH is a Rivers State Government owned tertiary healthcare facility with a 350 bed capacity which renders services in various medical disciplines such as Obstetrics and Gynaecology, Paediatrics, Surgery, Internal medicine, Family Medicine, Radiology, Otolaryngology, Ophthalmology, Dentistry. It is a referral centre for most peripheral hospitals and health care centres in the state. There are a minimum of thirty pregnant women daily at the antenatal clinic. The Obstetrics and gynaecology department, part of which is the Antenatal clinic, is fully accredited for training and manned by several consultants, senior registrars, registrars, house officers and trained nurses/midwives all working together to provide primary, secondary and tertiary maternal healthcare services.

2.2. Study design/inclusion/exclusion criteria

The study was of a cross sectional design carried out over 4 months. Pregnant women with no psychiatric illness who consent to participate in the study were recruited. Pregnancy and gestational age were confirmed with ultrasound scan.

Pregnant women that were too ill to participate and those with other chronic diseases such as Diabetes Mellitus, Hypertension, and HIV disease were excluded from the study.

2.2.1. Sample Size

To calculate the minimum sample size for this study, the formula below was used.

n= Z2 (p) (q) / d2

Where;

n=minimum sample size
z=the standard normal deviation usually set at 1.96 which corresponds to the 95% confidence level.
The prevalence of ante partum depression in Nigeria by Esimai was 10.8% .[46]
P = prevalence = 10.8% = 0.108
q= 1-p = 1.0-0.108= 0.892
d=degree of accuracy desired; usually set at 0.05.
Substituting into the equation;

$$n= (1.96)2 (0.108) (0.892)/ (0.05)2= 148$$

10% of the sample size was added to take care of non-response. 148+10% of 148= 148+14.8 =162.8. A total of 163 subjects were recruited into the study.

2.3. Sampling Method

The eligible subjects were selected daily for the study using systematic random sampling method. It entails calculation of sampling interval (Sample frame/ Sample size). Sample frame is the population of patients that met the study inclusion criteria. A minimum of 30 pregnant women attended the antenatal clinic on 5 working days (Monday- Friday). Three months were projected for data collection. There 12 weeks in 3 months. 1 month was projected for data analysis, writing and printing.

Sample size has been calculated to be 163 Therefore;

$$\text{Sampling interval } = \frac{30 \text{ x } 5 \text{ x } 12}{163} = 11.0$$

The first subject was chosen by simple random selection. This was done by blindly picking one out of eleven pieces of paper numbered 1 to 11. The individual represented the index subject for the study. Thereafter every eleventh eligible antenatal patient presenting to the ante natal clinic was recruited until the sample size was achieved. About three persons per day were recruited. The folder of each selected patient was tagged to avoid double selection.

2.4. Study Questionnaire

A five parts semi-structured 48-item questionnaire incorporating validated tools was administered to all the study subjects by the author. It was divided as follows: Section A – Socio-demographic and obstetric data, Section B - Edinburgh postnatal depression scale, Section C - Medical history and Section D - Obstetric findings. Respondents were placed into three income classes based on the definition of the monthly earning of the Nigerian middle class to be ₦75, 000.00 to ₦ 100,000.00.[47] Consequently, those who earned below and above the lower and upper ranges were placed into low income and high-income groups respectively.

2.5. Diagnosis of depression

It is clinical. Beck Depression Inventory (BDI), Hamilton Depression Inventory (HDI), Prime MD Brief Patient Questionnaire, Patient Health Questionnaire – 9, the Edinburgh Postnatal Depression Scale (EPDS), Geriatric Depression Scale and the Epidemiological Studies Depression Scale are some of the available tools for screening for depression. They all help to elicit some depressive symptoms. Those with positive symptoms could be further evaluated with the ICD-10 or DSM-IV for definitive diagnosis.

Most of the screening instruments like EPDS were designed in line with the diagnostic criteria of depression. They are quick and easy to use in the field, in comparison to lengthy interviews.[25, 43] EPDS is the most validated and widely used screening tool for depression during the perinatal period because it does not include questions about somatic

complaints, fatigue and changes in appetite, as these complaints are common during pregnancy and would therefore not help to distinguish depressed from non-depressed women in pregnancy. Therefore, somatic complaints may lead to the over diagnosis of depression during the perinatal period. However, it has also been argued that not considering somatic complaints may interfere with the measure of the severity of the illness. [48]

EPDS is used in the present study

Edinburgh postnatal depression scale [EPDS] is a validated questionnaire which has been used widely to screen for both antenatal and postnatal depression.[43, 49] It has been found to have a sensitivity of 0.867, specificity of 0.915, positive predictive value of 0.684 and negative predictive value of 0.970.[43] The reliability of the scale is satisfactory with a Cronbach alpha coefficient of 0.82. It consists of a 10 item short questions in which women are requested to rate how they felt in the previous days. [7] Each question has four possible responses that are scored 0-3; hence the possible range of 0-3. Questions 1, 2 and 4 are scored 0,1,2, or 3 with the box at the top scored 0 and that at the bottom scored 3. Questions 3, 5-10 are reversed scored with the box at the top scored 3 and the box at the bottom scored 0. It is completed in about 5 minutes. Subjects were grouped as depressed and non-depressed if they scored ≥10 (10 and above) or < 10 (below 10) respectively on the EPDS.

2.6. Data Analysis

Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS) version 20 statistical software. The first part of the analysis was a descriptive analysis of all the variables in the study involving the use of frequency tables and bar charts. Descriptive statistics were run using numbers and/or percentages.

2.7. Ethical Consideration

Ethical clearance was obtained from the ethical review committee of RSUTH. An informed consent was obtained from the study population prior to recruitment into the study in accordance with ethical principles for the guidance of physicians in medical research.

3. Results

The socio-demographic characteristics of participants in the study are shown in table 1. A total of one hundred and sixty-three participants were recruited. There was a response rate of 100%. The prevalence of depression during pregnancy was found to be 44.8%.

3.1. Socio-Demographic Characteristics of Participants in the Study

Their age range was 20 - 40 years with a mean of 29.41 years (SD=4.53) and median age of 30 years.

The highest proportion of the participants were in the age group of 26-30 years, married, had tertiary education, and income range less than N75,000. Married spouse was mostly professional, while most of the single women had middle level occupation.

Table 1 Socio-demographic characteristics of respondents

Variables	Frequency(n=163)	Percentage (%)
Age category		
21 – 25 years	35	21.5
26 – 30 years	71	43.6
31 – 35 years	46	28.2
36 – 40 years	11	6.7
Marital status		
Single	19	11.7

Married	142	87.1
Separated	2	1.2
Educational level		
None	4	2.5
Primary	3	1.8
Secondary	46	28.2
Tertiary	110	67.5
Social class		
High	92	56.4
Middle	62	38.1
Low	9	5.5
Income		
Less than 75,000 75,000-100,000 More than 100,000	67 62 34	41.1 38.0 20.9

3.2. Obstetric Characteristics of Participants in the Study

The highest proportion of the women were nulliparous i.e. Para-0 while the least proportion were Para ≥4. Majority (71.8%) of the participants were in their third trimester while those in their first trimester had the lowest proportion. Most of the pregnancies were planned.

Table 2 Obstetric characteristics of participants

Variables	Frequency (n=163)	Percentage
Parity		
Para 0	63	38.7
Para 1	43	26.4
Para 2	26	16.0
Para 3	28	17.2
Para ≥4	3	1.8
Gestational age		
First trimester	10	6.1
Second trimester	36	22.1
Third trimester	117	71.8
Planned pregnancy		
Planned	120	73.6
Unplanned	43	26.4

3.3 Association between Socio-Demographic Characteristics and Antepartum Depression

Participants in the age category of 26-30 years had the highest proportion of antepartum depression (45.2%) while the least proportion was noted in those aged 36-40 years. The differences in proportions of age categories by antepartum depression were not statistically significant (p=0.203).

Married participants had a higher proportion of ante partum depression (84.9%), while the separated subjects had the least proportion of ante partum depression (1.4%).

The subjects educational level was statistically significant for antepartum depression (p=0.009). Those with tertiary education had a higher proportion of ante partum depression (58.9%), followed by those with secondary education (38.4%), then those with primary education (2.7%). There was no depression found among the uneducated.

Table 3 Association between socio-demographic characteristics and ante-partum depression among participants

Ante-partum depression				
Variables	**Depressed n (%)**	**Not depressed n (%)**	**Total n (%)**	*Chi square/Fisher's exact test* / *p-value*
Age category					
21 – 25 years	13 (17.8)	22 (24.4)	35 (21.5)	*4.608*	*0.203*
26 – 30 years	33 (45.2)	38 (42.2)	71 (43.6)		
31 – 35 years	19 (26.0)	27 (30.0)	46 (28.2)		
36 – 40 years	8 (11)	3 (3.3)	11 (6.7)		
Marital status					
Single	10 (13.7)	9 (10.0)	19 (11.7)	*0.847ª*	*0.738*
Married	62 (84.9)	80 (88.9)	142 (87.1)		
Separated	1 (1.4)	1 (1.1)	2 (1.2)		
Educational level					
None	0 (0.0)	4 (4.4)	4 (2.5)	*9.773ª*	*0.009**
Primary	2 (2.7)	1 (1.1)	3 (1.8)		
Secondary	28 (38.4)	18 (20.0)	46 (28.2)		
Tertiary	43 (58.9)	67 (74.4)	110 (67.5)		
Social Class					
High	40 (54.8)	52 (57.8)	92 (56.4)	*1.804ª*	*0.459*
Middle	27 (37.0)	35 (38.9)	62 (38.1)		
Low	6 (8.2)	3 (3.3)	9 (5.5)		
Income					
Less than 75,000	32(43.8)	35 (38.9)	67(41.1)	*0.450*	*0.978*
75,000-100,000	26(35.6)	36 (40.0)	62(38.0)		
More than 100,000	15(20.5)	19(21.1)	34(20.9)		

Statistically significant   a – Fisher's exact test

3.4 Gestational Age and Antepartum Depression

Participants in the third trimester of pregnancy had the highest proportion of antepartum depression (75.3%), followed by second trimester (19.2%) and the least number was noted in those in their first trimester (5.4%). The differences in the prevalence of major depression in different gestational age categories were not statistically significant (p=0.659). (Table 6)

Table 4 Association between gestational age and ante-partum depression

Ante-partum depression			
Gestational age	Depressed n (%)	Not depressed n (%)	Total n (%)
First trimester	4 (5.4)	6 (6.7)	10 (6.1)
Second trimester	14 (19.2)	22 (24.4)	36 (22.1)
Third trimester	55 (75.3)	62 (68.9)	117 (71.8)
Total	73 (44.8)	90 (55.2)	163 (100.0)

Fisher's exact test = 0.833; p-value = 0.660

4 Discussion

The prevalence of depression during pregnancy in this study was found to be 44.8%. This value was lower than the findings in a similar study carried out in rural populations in South Africa by using the short and ultrashort versions of the Edinburgh postnatal depression scale which had a prevalence of 47%.[50] It was however higher than the 20% seen in a antenatal population in Pakistan,[10] 33% obtained in Bangladesh in a community based study,[9] 26.6% and 32.9% obtained in Ghana and Cote d'Ivoire respectively.[12] These dissimilarities in the findings possibly reveal socio-cultural and regional differences of antepartum depression. The economic hardship in the Niger Delta during the period of the study could have influenced the high prevalence in the index study as compared to findings in other countries.

The high prevalence of major depression in the present was also higher than the results of other studies in Nigeria, namely 42% in a study South Western Nigeria,[6] 10.8% in a study done at the College of Health Sciences of Obafemi Awolowo University, Ile-Ife, 24.5% in Abeokuta North Local Government Area, Ogun State,[17] and also the 11.3% reported in a systematic review involving African women by Sawyer et al.[8]

In this study, the association between sociodemographic characteristic and Antepartum Depression varied from other studies. The age groups that were considered in the study were 21 – 25 years, 26 – 30 years, 31 – 35 years and 36 – 40 years. APD was not shown to have significant association with the age of the mothers in this study ($X2=4.60$, $P<0.203$). The finding was similar to two studies carried out in Nigeria by Awopetu et al among pregnant women in Markudi metropolis, Benue State, Nigeria[26] and Fatoye et al in their study on emotional distress and its correlates among Nigerian women in late pregnancy.[27]

However, several other studies found a significant association with maternal age,[9, 14, 51] particularly, significant association was found between young age and depression during pregnancy.[17, 43] Rich-Edwards et al noted not only significant association between young age of women and antepartum depression but also statistically significant association with economic uncertainties, domestic violence and increased responsibilities among the younger women. Nevertheless, some other studies found that an older maternal age was positively associated with depression during pregnancy.[9, 11] These findings along with the index study possibly reiterate the need to routinely screen for antepartum depression irrespective of the age of the pregnant woman.

Marital status was also not significantly associated with depression in this study ($X2=0.847$, $p<0.738$). The finding was similar to that found among Chinese pregnant women in Shanghai by Qiao et al.[37] However some studies found that single motherhood predisposed to antepartum depression.[6, 19, 51] On the other hand, a study by Bilszta et al on antenatal mental health showed that single mothers had lower prevalence of depressive symptoms when compared to women with unsupportive spouses.[52] It was therefore important to consider not only marital status but also the quality of the relationship as being a single mother may be better than having a difficult and unsupportive relationship.[52] Unfortunately, the index study did not assess the quality of relationship among the participants.

A study by Marcus et al on depression during pregnancy established that single motherhood and a polygamous relationship were stressors for ante-partum depression.[19] Adewuya et al in their study on the prevalence and correlates of depression in late pregnancy among Nigerian women also noted that polygamy was significantly associated with antepartum depression in Nigeria.[6] This led some researchers to conclude that the polygamous family structure has an impact on children's and wives' psychological, social and family functioning,[25] but the specific psychosocial domains of

affectation are yet to be fully elucidated. Unfortunately, polygamy as a social-demographic entity was not considered in the present study.

Regarding educational status, none, primary, secondary and tertiary education were considered. The study revealed that there were statistically significant differences in the prevalence of major depression among different educational categories (X2=9.773, p<0.009). There was no case of depression among those with nil education in the study. However, the highest proportion of ante partum depression was noted among women with tertiary education and the least among women with primary levels of education. Stewart et al in a cross-sectional study of antenatal depression and associated factors in Malawi and Karmaliani et al in a cross-sectional study titled prevalence of anxiety, depression and associated factors among pregnant women of Hyderabad, Pakistan reported that "more years of schooling" in women was a risk factor for developing antepartum depression.[16, 36] The findings were in agreement with the index study.

On the other hand, other studies found depression in pregnancy to be common among women with lower educational status.[33, 34] Yanikkerem et al in a hospital based study carried out in Turkey on antenatal depression: prevalence and risk factors noted that Low education status limits employment opportunities and position in society thus depriving individuals of life fulfilment in various domains of life.[34] This may in turn lead to feelings of despondency and low esteem which are constituents of depression. Hence it was advocated that the government should introduce mass educational programmes that will help to reduce illiteracy among the populace. Agostini et al in a study on antenatal depressive symptoms associated with specific life events and sources of social support among Italian women and Luke et al in a study titled risk factors for major antenatal depression among low-income African American women did not find education to be a significant predictor of antepartum depression.[35, 38]

Income was not found to be significantly associated with antepartum depression in the index study. That mirrored other studies conducted in Nigeria by Awopetu et al in Markudi metropolis, Benue state, titled demographic variables predicting psychological distress among pregnant women and a study on the emotional distress and its correlates among Nigerian women in late pregnancy by Fatoye et al.[26, 27] However, various studies in other non-African countries found low family income to be significantly associated with depression in pregnancy.[3, 11, 14, 36, 37] The differences may not be unconnected with the type of antepartum patients seen in the study location where most of the patients who live in the town and patronize the hospital are of good economic standing as compared to the poor that live at the waterfronts and the outskirt of the town and attend the primary health centers.

The role of parity in increasing the risk of antepartum depression had given varied results. Yanikkerem et al in a study on antenatal depression in Turkey reported that multiparous women are at increased risk of developing antepartum depression [34] while Räisänen et al in a population-based analysis in Finland[9 53] reported that nulliparous or primiparous women were more at risk than multiparous women. A study by Dibaba et al conducted in rural southwestern Ethiopia on the association of unwanted pregnancy and social support with depressive symptoms in pregnancy[13] along with other studies did not find any important association between parity and antenatal mental health[26, 27] as in the present study.

The prevalence of major depression was observed to be highest in the third trimester and lowest in the first trimester but the differences in each of the trimesters were not statistically significant (0.833; p-value < 0.660). That was at variance with other studies by Lee et al on the prevalence, course, and risk factors for antenatal anxiety and depression [31] and another study by Ibrahim et al the pattern of distribution and correlates of major depressive disorder among pregnant women in a South Western hospital in Nigeria [54] which suggested decreasing rates of depression as the gestational age increases, with the first trimester having the highest peak. A study on Korean women by Park et al titled prevalence of and risk factors for depressive symptoms throughout pregnancy and in postpartum period noted increasing rates of depression as pregnancy progressed suggesting that the burden of delivery, anticipation of childrearing, may lead to higher rates of depression in the later stages of pregnancy.[39] Nevertheless, a study by Lancaster et al[33] on the risk factors for depressive symptoms during pregnancy reported findings similar to the findings in this study in which no significant association in the prevalence of depression with different stages of pregnancy was found.

5 Conclusion and Recommendations

Educational status was found to be significantly related to the occurrence of antepartum depression as those with tertiary education had the highest rate of the condition. There were no statistically significant differences in the prevalence of major depression among women in the three trimesters of pregnancy, in women of different parity, age categories, marital status and income brackets. The above knowledge will be of immense benefit to health care workers as the authors advocate universal screening in each trimester and on admission into hospital of antenatal women for major and also improving the psychological wellbeing of pregnant women, thus preventing the untoward effects of

antenatal and the sequel postnatal depression. Further study was recommended; especially a community based one, to determine the gravity of antepartum depression in the Niger Delta and Nigeria at large.

Limitations of the Study

The Edinburgh Postnatal Depression Scale (EPDS) is a screening tool and not a diagnostic tool. Thus, there should be teamwork between obstetric practitioners, family physicians and psychiatric team for the proper management of antepartum depression. It was not possible to determine causal relationships between depression and risk factors. That was due to the fact that the research was a cross-sectional study. This research may have been prone to the limitations of human memory, underestimation, and overestimation of some experiences reported by the respondents but this was minimized by employing them to provide truthful responses and reassuring them that the information would be kept confidential and used for the purpose of the study alone. The study was hospital-based. It could therefore limit the extrapolation of the findings of this study to the general population.

Compliance with ethical standards

Acknowledgement

We acknowledge the staff of the antenatal clinic of the Rivers State University Teaching Hospital for their support and cooperation during the period of the study.

Disclosure of conflict of interest

No conflict of interest to disclose.

Statement of informed consent

Ethical clearance was obtained from the ethical review committee of Rivers State University Teaching Hospital. An informed consent was obtained from the study population prior to recruitment into the study in accordance with ethical principles for the guidance of physicians in medical research.

References

[1] Manderscheid RW, Ryff CD, Freeman EJ, McKnight-Eily LR, Dhingra S, Strine TW. Peer reviewed: Evolving definitions of mental illness and wellness. Preventing Chronic Disease. 2010;7

[2] Rachel R. The agony of pre-natal depression: It strikes one in eight pregnant women, but many of us don't even know it exists. Mail (London). 2012

[3] Rochat TJ, Tomlinson M, Bärnighausen T, Newell M-L, Stein A. The prevalence and clinical presentation of antenatal depression in rural South Africa. J Affect Disord 2011;135:362-373

[4] World Health Organisation. Maternal mental health and child survival, health and development in resources constrained settings: Essential for achieving the millennium development goals. Geneva. World Health Organisation; 2007.

[5] NICE. Nice clinical guideline. Depression in adults: Recognition and management. 2009

[6] Adewuya AO, Ola BA, Aloba OO, Dada AO, Fasoto OO. Prevalence and correlates of depression in late pregnancy among Nigerian women. Depress. Anxiety 2007;24:15-21

[7] Chatillon O, Even C. Antepartum depression: Prevalence, diagnosis and treatment. L'Encéphale. 2010;36:443-451.

[8] Sawyer A, Ayers S, Smith H. Pre-and postnatal psychological wellbeing in Africa: A systematic review. J Affect Disord. 2010;123:17-29

[9] Gausia K, Fisher C, Ali M, Oosthuizen J. Magnitude and contributory factors of postnatal depression: A community-based cohort study from a rural subdistrict of Bangladesh. Psychol Med. 2009;39:999-1007

[10] Asad N, Karmaliani R, Sullaiman N, Bann CM, McClure EM, Pasha O, et al. Prevalence of suicidal thoughts and attempts among pregnant pakistani women. Acta Obstet Gynecol Scand. 2010;89:1545-1551

[11] Nasreen HE, Kabir ZN, Forsell Y, Edhborg M. Prevalence and associated factors of depressive and anxiety symptoms during pregnancy: A population based study in rural Bangladesh. BMC Womens Health. 2011;11:22

[12] Bindt C, Appiah-Poku J, Te Bonle M, Schoppen S, Feldt T, Barkmann C, et al. Antepartum depression and anxiety associated with disability in African women: Cross-sectional results from the cds study in Ghana and Côte d'ivoire. PloS one. 2012;7:e48396

[13] Dibaba Y, Fantahun M, Hindin MJ. The association of unwanted pregnancy and social support with depressive symptoms in pregnancy: Evidence from rural southwestern Ethiopia. BMC Pregnancy Childbirth. 2013;13:135

[14] Hartley M, Tomlinson M, Greco E, Comulada WS, Stewart J, Le Roux I, et al. Depressed mood in pregnancy: Prevalence and correlates in two Cape town peri-urban settlements. Reproductive Health. 2011;8:9

[15] Biratu A, Haile D. Prevalence of antenatal depression and associated factors among pregnant women in Addis Ababa, Ethiopia: A cross-sectional study. Reproductive health. 2015;12:99.

[16] Stewart RC, Umar E, Tomenson B, Creed F. A cross-sectional study of antenatal depression and associated factors in Malawi. Archives of Women's Mental Health. 2014;17:145-154

[17] Thompson O, Ajayi I. Prevalence of antenatal depression and associated risk factors among pregnant women attending antenatal clinics in Abeokuta north local government area, Nigeria. Depress Res Treat 2016;2016

[18] Esimai O, Fatoye F, Quiah A, Vidal O, Momoh R. Antepartum anxiety and depressive symptoms: A study of nigerian women during the three trimesters of pregnancy. J Obstet Gynaecol. 2008;28:202-203.

[19] Marcus SM. Depression during pregnancy: Rates, risks and consequences. Can J Clin Pharmacol. 2009;16:15-22

[20] Breedlove G, Fryzelka D. Depression screening during pregnancy. J Midwifery Womens Health. 2011;56:18-25

[21] Aktas S, Yesilcicek Calik K. Factors affecting depression during pregnancy and the correlation between social support and pregnancy depression. Iran Red Crescent Med J. 2015;17

[22] Shen Y, Yeatts DE. Social support and life satisfaction among older adults in china: Family-based support versus community-based support. Int J Aging Hum Dev. 2013;77:189-209

[23] Qiu C, Williams MA, Calderon-Margalit R, Cripe SM, Sorensen TK. Preeclampsia risk in relation to maternal mood and anxiety disorders diagnosed before or during early pregnancy. Am Journal Hypertens. 2009;22:397-402

[24] Lin HC, Tang TC, Yen JY, Ko CH, Huang CF, Liu SC, et al. Depression and its association with self-esteem, family, peer and school factors in a population of 9586 adolescents in Southern Taiwan. Psychiatry Clin Neurosci. 2008;62:412-420

[25] Al-Krenawi A. A study of psychological symptoms, family function, marital and life satisfactions of polygamous and monogamous women: The Palestinian case. Int J Soc Psychiatry 2012;58:79-86.

[26] Awopetu R, Annor T, Ingyer M, Anyakaa J. Demographic variables predicting psychological distress among pregnant women in Markudi metropolis, Benue state, Nigeria. J Psychol Behav Sci. 2016;4:56-64

[27] Fatoye FO, Adeyemi AB, Oladimeji BY. Emotional distress and its correlates among Nigerian women in late pregnancy. J Obstet Gynaecol. 2004;24:504-509

[28] Biaggi A, Conroy S, Pawlby S, Pariante CM. Identifying the women at risk of antenatal anxiety and depression: A systematic review. J Affect Disord. 2016;191:62-77

[29] Muzik M, Marcus SM, Flynn H, Rosenblum KL. Depression during pregnancy: Detection, comorbidity and treatment. Asia-Pac Psychiat. 2010;2:7-18

[30] Silva R, Jansen K, Souza L, Quevedo L, Barbosa L, Moraes I, et al. Sociodemographic risk factors of perinatal depression: A cohort study in the public health care system. Rev Bras Psiquiatr. 2012;34:143-148

[31] Lee AM, Lam SK, Lau SMSM, Chong CSY, Chui HW, Fong DYT. Prevalence, course, and risk factors for antenatal anxiety and depression. Obstet Gynecol. 2007;110:1102-1112

[32] Afolabi MO, Abioye-Kuteyi EA, Fatoye FO, Bello IS, Adewuya AO. Pattern of depression among patients in a Nigerian family practice population. S Afr Fam Pract 2008;50:1

[33] Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: A systematic review. Am J obstet gynecol. 2010;202:5-14

[34] Yanikkerem E, Ay S, Mutlu S, Goker A. Antenatal depression: Prevalence and risk factors in a hospital based Turkish sample. J Pak Med Assoc. 2013;63:472-477

[35] Agostini F, Neri E, Salvatori P, Dellabartola S, Bozicevic L, Monti F. Antenatal depressive symptoms associated with specific life events and sources of social support among Italian women. Matern Child Health J. 2015;19:1131-1141

[36] Karmaliani R, Asad N, Bann CM, Moss N, Mcclure EM, Pasha O, et al. Prevalence of anxiety, depression and associated factors among pregnant women of Hyderabad, Pakistan. Int J Soc Psychiatry. 2009;55:414-424

[37] Qiao YX, Wang J, Li J, Ablat A. The prevalence and related risk factors of anxiety and depression symptoms among Chinese pregnant women in Shanghai. Aust N Z J Obstet Gynaecol. 2009;49:185-190

[38] Luke S, Salihu HM, Alio AP, Mbah AK, Jeffers D, Berry EL, et al. Risk factors for major antenatal depression among low-income African American women. J Womens Health. 2009;18:1841-1846

[39] Park J-h, Karmaus W, Zhang H. Prevalence of and risk factors for depressive symptoms in Korean women throughout pregnancy and in postpartum period. Asia Nurs Res. 2015;9:219-225

[40] Kim E, Ryu S. The relationship between depression and sociopsychological factors in pregnant women. J Korean Soc Mat Child Health. 2008;12:228-241

[41] Field T. Prenatal depression effects on early development: A review. Infant Behav Dev. 2011;34:1-14

[42] Gaynes BN, Gavin N, Meltzer-Brody S, Lohr KN, Swinson T, Gartlehner G, et al. Perinatal depression: Prevalence, screening accuracy, and screening outcomes: Summary. 2005

[43] Martini J, Knappe S, Beesdo-Baum K, Lieb R, Wittchen H-U. Anxiety disorders before birth and self-perceived distress during pregnancy: Associations with maternal depression and obstetric, neonatal and early childhood outcomes. Early Human Development. 2010;86:305-310

[44] Ibrahim NO, Adelufosi AO, Adebowale TO, Adebayo KO, Oladele T, Mosanya TJ. A study of the pattern of distribution and correlates of major depressive disorder among pregnant women in a South Western hospital in Nigeria. J Behav Health. 2014;3:242-249

[45] Jenkins C, Shestak A, Laux J, Jancsin J. As a diagnostic category, trauma-and stress or-related disorders represent a new grouping in the diagnostic and statistical manual of mental disorders ; American psychiatric association [Apa]. DSM-5. Family Systems. 2017;2:159

[46] Bird P, Omar M, Doku V, Lund C, Nsereko JR, Mwanza J. Increasing the priority of mental health in Africa: Findings from qualitative research in Ghana, South africa, Uganda and Zambia. Health Policy Plan. 2010;26:357-365

[47] Wang PS, Aguilar-Gaxiola S, Alonso J, Lee S, Schoenbaum M, Üstün TB, et al. Assessing mental disorders and service use across countries. The Conceptual Evolution of DSM-5. 2010:231

[48] Tomlinson M, Grimsrud AT, Stein DJ, Williams DR, Myer L. The epidemiology of major depression in South africa: Results from the South african stress and health study. S Afr Med J. 2009;99

[49] Shiue I. Caregivers had neighbourhood support but perceived it unsatisfactory and worsened: England community life survey, 2012–2014. Environ Sci and Pollut Res. 2017;24:10900-10905

[50] Rochat TJ, Tomlinson M, Newell M-L, Stein A. Detection of antenatal depression in rural hiv-affected populations with short and ultrashort versions of the Edinburgh postnatal depression scale (epds). Arch Womens Mental Health. 2013;16:401-410

[51] Rich-Edwards JW, Kleinman K, Abrams A, Harlow BL, McLaughlin TJ, Joffe H, et al. Sociodemographic predictors of antenatal and postpartum depressive symptoms among women in a medical group practice. J Epidemiol Community Health. 2006;60:221-227

[52] Bilszta JL, Tang M, Meyer D, Milgrom J, Ericksen J, Buist AE. Single motherhood versus poor partner relationship: Outcomes for antenatal mental health. Aust N Z J Psychiatry. 2008;42:56-65

[53] Räisänen S, Lehto SM, Nielsen HS, Gissler M, Kramer MR, Heinonen S. Risk factors for and perinatal outcomes of major depression during pregnancy: A population-based analysis during 2002–2010 in Finland. BMJ open. 2014:4

[54] Ibrahim NO, Adelufosi AO, Adebowale TO, Adebayo KO, Oladele T, Mosanya TJ. A study of the pattern of distribution and correlates of major depressive disorder among pregnant women in a South Western hospital in Nigeria. J Behav Health. 2014;3:242-249