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Original Research Article

The prevalence and complications of preeclampsia in Benue South, Nigeria

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ABSTRACT

Background: Preeclampsia (PE) is the second leading cause of maternal morbidity and mortality in Sub-Saharan Africa. There is a lack of research describing the burden of preeclampsia and its associated morbidities in Benue South, Nigeria. This study aims to determine the prevalence, risk factors, and complications of preeclampsia among antenatal patients in Benue South, Nigeria.
Methods: This health facility-based descriptive cross-sectional study was conducted among 238 antenatal patients in three general hospitals and one mission hospital across four local government areas in Benue South. Ethical approval was obtained from the Ethical Committee of the Federal University of Health Sciences, Otukpo. Data were collected from patients' medical records and interviews using a pretested, structured online questionnaire via Kobo Collect. Data were uploaded into an excel spreadsheet, cleaned and analysis was performed using SPSS version 20.
Results: A total of 238 pregnant women participated in the study from the Benue South senatorial zone, of which 45 had preeclampsia, giving a prevalence rate of 18.9%. Headache (84.4%) was the most common complication associated with preeclampsia. No factors were found to be significantly associated with preeclampsia in the multiple regression analysis.
Conclusions: This study highlights the high prevalence of preeclampsia in Benue South. There is a need to train health workers on the prevention, identification, and management of preeclampsia to reduce the complications associated with the disease.

Keywords: Benue South, Complications, Preeclampsia, Prevalence

INTRODUCTION

Preeclampsia remains one of the leading causes of maternal deaths and disabilities in Nigeria, as it is in most parts of Sub-Saharan Africa.[1,2] Although variably defined, it is a pregnancy-specific condition typically characterized by the development of new-onset hypertension occurring after 20 weeks of gestation, along with proteinuria and/or end-organ damage.[3,4] While the prevalence and associated mortality rates are likely to vary between countries, institutions, and study populations, evidence in the literature suggests that preeclampsia complicates approximately 3-5% of pregnancies globally and about 1.4% of pregnancies in Nigeria.[3,4] Ultimately, preeclampsia accounts for about 18% of maternal deaths and is estimated to cause 62,000-77,000 maternal deaths annually, with a risk of maternal mortality from preeclampsia estimated to be 2.6%.[5]

Preeclampsia contributes significantly to maternal and perinatal morbidity and mortality worldwide, especially in developing countries.[6] Globally, about 12% of maternal deaths are attributed to preeclampsia. According to the WHO, preeclampsia is seven times more likely to occur in developing countries compared to developed countries. Prevalence rates between 1.8% and 16.7% have been reported in developing countries.[7] Newborns of women with preeclampsia face approximately twice the risk of neonatal death, and a stillbirth rate of 10.7% has been reported.[4,8]

Although numerous studies have examined preeclampsia across different regions of Nigeria, there is a lack of research specifically addressing the burden of preeclampsia and its associated morbidities in Benue South, Nigeria. This gap poses challenges in developing and implementing targeted interventions to optimize outcomes during pregnancy and the postpartum period. The proposed project aims to generate baseline epidemiologic estimates and characterize the burden of preeclampsia, along with its associated morbidity and mortality, in Benue South. This study will also lay the groundwork for future research in this region. The aim of this study was to determine the prevalence, complications, and risk factors of preeclampsia among antenatal patients in Benue South, Nigeria.

METHODS

Study design, study sites and study population

This study employed a cross-sectional design and was conducted across several primary and secondary health facilities in four purposively sampled Local Government Areas (LGAs) of the Benue South Senatorial District: Otukpo, Okpoga, Ohimini, and Agatu. The study included all pregnant women attending antenatal clinics in the selected hospitals. Women were excluded if they were critically ill, had chronic hypertension, had gestational hypertension without proteinuria, or declined consent to participate in the study.

An informed consent was obtained from each of the study participants and the ethical clearance was obtained from the Ethical Committee of the Federal University of Health Sciences Otukpo (FUHSO-HREC).

Sampling technique

The study sites were selected using the purposive sampling technique and the study population were selected consecutively using the convenient sampling technique until the desired sample size was achieved.

Sample size determination

The sample size was calculated using the formula for cross-sectional study when parameters are in normal proportion.[9]

$n=Zn^2 \times PQ/E^2$

Where, n= minimum sample size; Zn^2 = normal deviation for two-tailed alternative hypothesis at 5% level of significance which is 1.96; P= Prevalence of 3.6% for preeclampsia from previous study in Gwagwalada, North Central Nigeria (Akaba et al., 2021); E= Precision or the margin of error, which is taken as 0.05(5%).

With 10 non response rate N=54. A total of 238 study participants were recruited for this study.

Measurement of blood pressure

The blood pressure of study participants was measured while they were seated upright in a chair. The non-dominant arm was supported at heart level on a table, ensuring that no tight clothing constricted the arm. The cuff of the mercury sphygmomanometer (Accoson brand) was placed on the arm, with the center of the bladder positioned over the brachial artery. The lower edge of the cuff was placed 2-3 cm above the point of brachial artery pulsation, and the bladder encircled at least 80% of the arm.

To estimate the systolic blood pressure, the radial artery was palpated, and the cuff was inflated until the pulsation disappeared. The cuff was then deflated to determine the estimated systolic pressure. Next, the sphygmomanometer was inflated 30 mmHg above the estimated systolic pressure needed to occlude the pulse. A stethoscope diaphragm was placed over the brachial artery, and the cuff was deflated at a rate of 2-3 mmHg per second until regular tapping sounds were heard. The systolic blood pressure was recorded at the point where the first sound was heard, and the diastolic blood pressure was recorded at the point where the sound became muffled (Korotkoff phase IV), with both measurements taken to the nearest 2 mmHg.

Preeclampsia was defined as hypertension and proteinuria occurring after 20 weeks of gestation in a pregnant woman who was previously normotensive and non-proteinuric. Hypertension was defined as a blood pressure reading of ≥140/90 mmHg, measured twice, six hours apart, by a trained assistant. Significant proteinuria was defined as 1g (2+) of protein on dipstick urinalysis or persistent 30 mg/dl (1+) proteinuria in a random urine sample.

Statistical analysis

Data were collected from patients' medical records, interviews, and measurements using a pretested, structured online questionnaire administered via Kobo Collect by trained researchers. All analyses were performed using Statistical Package for Social Sciences (SPSS) software version 20.0. Univariable and multivariable logistic regression models were used to estimate the crude and adjusted odds ratios (ORs) for the association between potential socio-ecological factors and preeclampsia.

RESULTS

A total of 238 pregnant women participated in the study from the Benue South Senatorial Zone. The median age of participants was 27 years (IQR: 7). Nearly one in three participants (29.8%) were from Otukpo, 26.5% from Okpokwu, 24.8% from Agatu, and 18.8% from Ohimini. About 85% of the women were Idoma, and approximately 95% were affiliated with Christianity.

Table 1: Socio-demographic and clinical characteristics of women attending antenatal care (n=238).

Variables	Frequency (N)	Percent
Age of respondents (years)		
<25	70	29.5
25-34	138	58.2
35+	29	12.2
Location of facility		
Okpokwu	63	26.5
Otukpo	71	29.8
Ohimini	45	18.8
Agatu	59	24.5
Religion		
Christian	225	94.5
Muslim	13	5.5
Education		
None	13	5.5
Primary	55	23.1
Secondary	112	47.1
Tertiary	58	24.4
Occupation		
Current body weight (kg)		
< 65	117	49.2
65-74	57	23.9
75+	64	26.9
Gestational diabetes		
Yes	22	9.2
No	216	908
Pre-gestational diabetes		
Yes	21	8.8
No	217	91.2
Pregnancy period		
First trimester	26	10.9
Second trimester	116	48.7
Third trimester	96	40.3
Parity		
Nullipara	35	14.7
Primipara	32	13.4
Multipara	171	71.9
Pregnancy type		
Singleton	217	91.2
Multiple gestation	21	8.8
Gravidity		
Primigravida	56	23.5
Multigravida	182	76.5

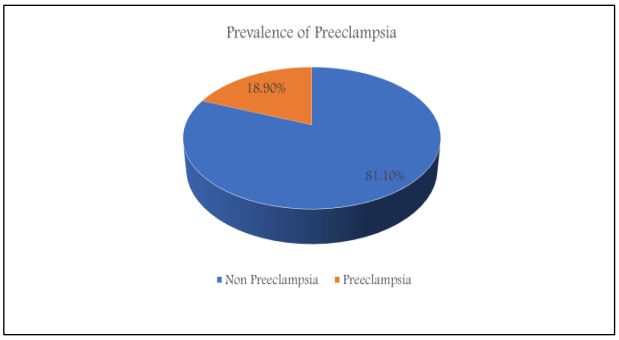

Figure 1: The prevalence of preeclampsia in Benue South.

Figure 1 shows the prevalence of preeclampsia in Benue south. Out of the 238 study participants 45(18.9%) had preeclampsia and 193(81.1%) did not develop preeclampsia.

In terms of education, 23.1% had a primary level of education, 47.1% had secondary education, and 24.4% had tertiary education. Around 72% of the women were multiparous, 14.7% were nulliparous, and 13.5% were primiparous. At least 90% of pregnancies were single gestations, while 4.4% were twin gestations, and 4.6% were triplet gestations. Additionally, 4.6% of the participants experienced convulsions (eclampsia).

Table 2: Complications among women with preeclampsia (n=45).

Variables	Frequency (N)	Percent
Headache		
No	7	15.6
Yes	38	84.4
Visual disturbances		
No	27	60
Yes	18	40
Convulsions/eclampsia		
No	40	88.9
Yes	5	11.1
Chest pain		
No	32	71.1
Yes	13	28.9
Nausea		
No	37	82.2
Yes	8	17.8
Vomiting		
No	41	91.1
Yes	4	8.9
Oliguria/renal failure		
No	39	86.7
Yes	6	13.3

Overall, the mean systolic blood pressure (SBP) and diastolic blood pressure (DBP) for preeclamptic pregnancies were 147.2±22.2 mmHg and 92±15.2 mmHg,

respectively. The mean HDL-C level was 1.1±0.6 mmol/L for preeclamptic subjects, while the mean LDL-C level was 3.5±2.4 mmol/L. The mean levels of alkaline phosphatase (ALP) and aspartate transaminase (AST) were 6.3±5.9 IU/L and 32.1±69.1 IU/L, respectively.

Table 1 presents the social and clinical characteristics of women attending antenatal care. Most of the study participants were within the age range of 25-34 years (138, 58.2%). The majority of participants were from Otukpo (71, 29.8%). Nearly all participants (225, 94.5%) were affiliated with Christianity. A large proportion of participants had secondary education (112, 47.1%). Additionally, 22 (9.2%) and 21 (8.8%) of the participants had gestational and pre-gestational diabetes, respectively. Most participants were in their second trimester of pregnancy (116, 48.7%). A significant number of participants were multigravidae (182, 76.5%) and multiparous (171, 71.9%).

Table 3: Bivariable and multivariable logistic regression analysis of factors associated with preeclampsia among pregnant women (n=238).

Variables	Preeclampsia		Odds ratios	
	Yes (n=45)	No (n=193)	COR (95% CI)	AOR (95% CI)
Age (in years)				
< 25	7	63	1.00	1.00
25-34	28	110	2.29 (0.95-5.55)	0.22 (0.06-0.81)
35+	10	19	4.74 (1.59-14.14)	0.09 (0.02-0.53)
Obese				
No	5	112	1.00	1.00
Yes	17	40	0.41 (0.09-1.83)	3.77 (0.94-15.16)
Religion				
Christian	42	183	1.00	1.00
Muslim	3	10	0.77 (0.20-2.90)	0.42 (0.05-3.59)
Education				
None	1	12	1.00	1.00
Primary	3	52	0.69 (0.07-7.25)	1.39 (0.15-12.99)
Secondary	26	86	3.63 (0.45-29.23)	0.18 (0.02-1.31)
Tertiary	15	23	4.19 (0.50-34.98)	0.22 (0.02-2.08)
Occupation				
Unemployed	10	24	3.06 (0.99-9.44)	0.27 (0.05-1.32)
Farming	6	44	1.00	1.00
Junior civil servant	9	25	2.64 (0.84-8.29)	1.29 (0.28-5.95)
Senior civil servant	2	7	3.26 (0.76-13.95)	0.47 (0.06-3.29)
Small scale business	14	84	1.22 (0.44-3.40)	1.51 (0.39-5.87)
Large scale business	2	7	2.09 (0.35-12.53)	3.37 (0.26-43.16)
Gestational diabetes				
Yes	3	19	0.65 (0.19-2.31)	1.09 (0.11-10.42)
No	42	174	1.00	1.00
Pre-gestational diabetes				
Yes	3	18	0.69 (0.19-2.447)	0.74 (0.07-7.61)
No	42	175	1.00	1.00
Pregnancy period				
First trimester	38	179	1.00	1.00
Second trimester	1	9	0.52 (0.06-4.26)	1.24 (0.25-6.17)
Third trimester	6	5	5.65 (1.64-19.48)	0.36 (0.08-1.71)
Pregnancy type				
Singleton gestation	38	179	1.00	1.00
Multiple gestation	7	14	2.36 (0.89-6.23)	0.33 (0.16-0.68)
Gravidity				
Primigravida	13	150	1.00	1.00
Multigravida	32	43	0.71 (0.34-1.46)	2.46 (0.80-7.61)

DISCUSSION

The prevalence of preeclampsia in this study was 18.9%. This high prevalence was similar to the studies by Guerrier et al in Taraba Nigeria who reported a prevalence of 16%. This, however, differs from several studies who reported a much lower prevalence range of 1.75% to 6%.[4,7,12,10,15] This difference may be due to variation in the study population and methodological approach. The high prevalence in the index study informed the need for obstetric vigilance with policy makers at various tiers of government as well as local and international nongovernmental organization to collaborate to prevent preeclampsia and its complications.

Several complications were identified in this current study. These include headache, visual disturbances, convulsions/eclampsia, chest pain, nausea, vomiting and oliguria/renal failure. This corroborates the findings by Mou et al who similarly reported visual problems, anaemia, headache, nausea, dizziness, chest pain, sleeping disturbances as complications found among their respondents.[7] Other researchers also reported more elaborated complications for both the mother and the fetus. These include increase caesarean section birth, eclampsia, HELLP syndrome, placenta abruptio, pulmonary edema, acute renal failure, post-partum haemorrhage, maternal mortality, preterm delivery, low birth weight, birth asphyxia and perinatal mortality.[10,12,14,16] These evidence show that preeclampsia is a devastating disease with its attendant maternal and perinatal morbidity and mortality. Therefore, there is need for more antepartum, intrapartum and postpartum surveillance for both mother and child by all stakeholders to mitigate these adverse pregnancy outcomes associated with this disease.

Although this index unlike other studies did not identify any sociodemographic risk factors to be significantly associated with preeclampsia. This is probably due to the study of population variations and methodological approach. However, risk factors associated with preeclampsia identified by other researchers include age, multiple pregnancy, history of diabetes, requirement for antihypertensives, unbooked patients, history of preeclampsia and chronic hypertension, nulliparity, family history of hypertension and diabetes, history of diabetes, and renal disease.[7,12,14,17] Therefore, identification of various risk factors associated with the disease is important in preventing preeclampsia and its adverse fetal and maternal complications.

The limitation of this study was its cross-sectional study design which does not allow follow up to determine complications and other parameters associated with the disease.

CONCLUSION

This study has shown high prevalence of preeclampsia in Benue South. This will form the basis policies as well as other research areas for policy makers and stakeholders to develop policies to prevent preeclampsia in Benue South and globally. We recommend more longitudinal studies to explore the effect of preeclampsia on pregnancy outcomes to serve as basis for more strategies to prevent this devasting disease.

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Conflict of interest: None declared
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