Original

Prevalence and Outcomes of Gestational Hypotension and Hypertension among Pregnant Women Attending a Tertiary Health Institution in South-West Nigeria

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Abstract

Background: Gestational hypertension and hypotension are common complications during pregnancy, affecting maternal and foetal health in lower and middle-income countries, including Nigeria. Therefore, assessing the prevalence of gestational hypertension and hypotension and maternal pregnancy outcomes would add to the documentation of evidence-based data that could be used to improve maternal and foetal health in Nigeria. The study investigated the prevalence of gestational hypotension and hypertension and maternal pregnancy outcomes among pregnant women attending Federal Medical Centre, Owo.

Methods: The study employed a retrospective, descriptive, cross-sectional design. Purposive sampling was used to review 207 files of pregnant women who gave birth in FMC Owo from January 2021 to December 2023. The data was analysed with Statistical Package for Social Sciences (SPSS) version 25.0.

Results: The mean age of the mothers was 29.50±6.32 years while majority 189(91.3%) were married. The prevalence of hypotension, normotension, prehypertension, and stage 1 hypertension were 6(2.9%), 52(25.1%), 113(54.6%), and 26(12.6%), respectively. Symptoms presented by the hypertensive, normotensive and hypotensive mothers were severe labour pains 46(30.9%), drainage of liquor 9(17.3%) and prolonged labour 1(16.7%). Few hypertensives 3(8.7%), normotensive 6(11.5%) and hypotensive mothers 1(16.7%) presented with complications during delivery. Only a few of the hypertensive mothers 4(2.7%) had stillbirth while all the hypotensive mothers 6(100%) had live births and 3(5.8%) of the normotensive mothers had preterm birth.

Conclusion: The findings highlighted the relatively low occurrence of serious complications related to blood pressure abnormalities during deliveries, though hypertensive mothers may face a slightly higher risk of adverse outcomes.

Keywords: Hypertension, Hypotension, Prevalence, Pregnancy Outcome, Blood Pressure, Pregnant women

How to cite this article

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Introduction

Gestational hypertension and gestational hypotension are common complications during pregnancy, affecting maternal and foetal health. Hypertension during pregnancy is a significant clinical concern, often classified as either gestational hypertension or preeclampsia, while hypotension, though less discussed, can also lead to adverse outcomes.[1] Gestational hypertension, characterised by elevated blood pressure after the 20th week of pregnancy without proteinuria, can lead to preeclampsia. This condition increases the risk of maternal and foetal morbidity and mortality.[2] In contrast, gestational hypotension is defined by low blood pressure during pregnancy and can lead to symptoms such as dizziness, fainting, and in severe cases, complications affecting organ perfusion and foetal development.[3]

The American College of Obstetricians and Gynecologists,[4] defined hypertension as blood pressure readings of 140/90 mm Hg or higher while gestational hypotension is defined as a systolic blood pressure of less than 90 mmHg and a diastolic blood pressure of less than 60 mmHg.[5] The onset of severe gestational hypertension and/or severe preeclampsia before 35 weeks gestation is connected to significant maternal and perinatal complications.[6] Globally, 2.73% of women suffer from hypertension disorders in pregnancy while the frequency of chronic hypertension, preeclampsia, and eclampsia are 0.29%, 2.16%, and 0.28%, respectively. [6,7] Hypertension disorders in pregnancy increase the danger of preterm births, stillbirths, small for gestational ages, neonatal deaths, and expose mothers to emergency caesarean sections, which raise the possibility of low-birth-weight infants and neonatal deaths.[7] On the other hand, gestational hypotension was recognised as a significant contributor to maternal mortality and morbidity and can significantly impact maternal pregnancy outcomes.[8] A study in 2013 found that gestational hypotension affects 2.3-7% of pregnant women, with a higher likelihood in the second trimester compared to the first trimester. This study also revealed that women with comorbidities such as gestational diabetes, preeclampsia, and placental abruption were more susceptible than those without these conditions.[9] Maternal outcomes associated with gestational hypotension encompass an increased likelihood of adverse outcomes and health challenges related to conditions like pre-eclampsia, preterm birth, and foetal growth restriction. Moreover, gestational hypotension may contribute to general pregnancy complications such as placental abruption, placental insufficiency, and reduced uterine blood flow.[10] On the infant side, associations with gestational hypotension heighten the risk of neonatal mortality and morbidity, particularly among preterm infants.[11] Offsprings born to mothers experiencing gestational hypotension may encounter a spectrum of complications, including respiratory distress syndrome, acute kidney failure, and low birth weight.[11]

Both conditions are impacted by the following factors among others: pre-existing health conditions, socioeconomic status, maternal age, obesity, and environmental influences.[1] Due to the paucity of data in low-resource settings, especially in regions like Nigeria, it is important to explore the prevalence and the outcomes of these conditions in the healthcare system in the area. The Federal Medical Center in Owo, Ondo State, with its substantial patient pool of pregnant women of varied ethnicities, represents an opportunity to examine these factors authentically. Knowing the incidences of gestational hypotension and hypertension, in addition to their related pregnancy outcomes, health professionals can spot and treat high-risk pregnancies in the first place, prevent, and develop prevention strategies for the imbalance of maternal and foetal health. A study in this context is the mainstay of improving maternal care quality, reducing the load of complications such as preterm births, low birth weight, stillbirths, maternal morbidities, and adding to the knowledge on maternal health in Nigeria.[1]

This study, conducted in Owo, Nigeria, examined the prevalence and outcomes of gestational hypertension and hypotension among pregnant women attending the Federal Medical Centre (FMC) Owo, Ondo State. Understanding these associations is crucial to enhancing maternal care policies and practices, advancing health outcomes for mothers and babies, and addressing gaps in healthcare services in the region.

Materials and Methods

Study Design

The study employed a retrospective descriptive cross-sectional design which investigated the prevalences of gestational hypotension and hypertension and maternal pregnancy outcomes among pregnant women attending Federal Medical Centre Owo, Ondo state. The duration

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of the reviewed record was from January 2021 to December 2023.

Study Area

The study was conducted at the Federal Medical Centre Owo, Ondo state. The hospital was founded in 1989 when the Federal Government of Nigeria took over the former general hospital at Owo owned by the Ondo State Government. The hospital is on a land mass of 58.5 hectares it was thereafter upgraded to a Federal tertiary Health institution of 300 beds capacity and re-designated to Federal Medical Centre, Owo. Administrative and Clinical activities commenced in the Centre 1993 and 1994 respectively. The Centre like other Federal Medical Centres is expected to perform the function of Federal University Teaching hospitals. It also renders health services as providing trainings and research as may be necessary in the health sector.

Study Population

The study population that was used in this study were pregnant women who gave birth at the Federal Medical Centre, Owo, Ondo State between January 2021 and December 2023. There were about 150 pregnant women attending the antenatal clinic in Federal Medical Centre Owo (Record department, Federal Medical Center Owo) during that period.

Inclusion Criteria

Due to the outcome variable of interest in this study, data were extracted from those pregnant mothers whose BP readings were taken and recorded.

Exclusion Criteria

Pregnant mothers who gave birth in FMC Owo, but did not have their BP readings recorded were excluded from the study.

Sample Size

The sample size for this research study was determined using Yamane Yaro's Formula[12] calculated as follows: n=N/(1+N×(e)^2). Where: n= the sample size, 1= constant, N= the population size (150), e= level of significance (0.05). Therefore, the sample size was 109.

Sampling Procedure

Due to the accessibility and feasibility of implementing the study, the records of all pregnant women who gave birth at Federal Medical Centre Owo, Ondo State within the period of the study and met the inclusion criteria were purposively selected from the records department and used for the study.

Instrument for Data Collection

A structured data collection instrument was designed to capture the demographic characteristics of the women, the anthropometric measures, the prevalences of hypotension and hypertension, pregnancy complications, and outcomes.

Method of Data Collection

The data was collected by trained research assistants from the records Department of Federal Medical Centre Owo. The data was collected on designated days at the records Department of the Federal Medical Centre Owo, Ondo State where records were retrospectively sorted and required pieces of information was extracted. The duration of the records review was from January 2021 to December 2023. The data was collected between the months of April to June, 2024.

Records of Blood Pressure and Anthropometric Parameters

The height and weight obtained were used to calculate the Body Mass Index (BMI) of the respondents using the formula BMI =Weight (kg)/Height × Height (m2). Body-mass index categories were defined using the WHO cut-off points in units of kg/m2, normal weight =18.5 kg/m2 - < 25 kg/m2, overweight = 25 kg/m2 - < 30 kg/m2 and obese >30 kg/m2[13].

Blood pressure (BP) was measured according to the International Society of Hypertension: Hypotension (<90/60mmHg), normal (<130/85 mmHg), high-normal (130–139/85–89 mmHg), grade 1 hypertension (140–159/90–99 mmHg), and grade 2 hypertension (≥160/100 mmHg)[14].

Determination of packed cell volume (PCV), blood was taken by finger prick into a capillary tube. After centrifugation with the microhematocrit centrifuge for 5 min at 3000 rpm, the PCV was measured using a Hewkley microhematocrit reader. PCV less than 33% was considered to be below normal PCV level, PCV between 33-38% was considered to be normal and PCV above 38% was considered to be above normal[15].

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Method of Data Analysis

The data was analysed using IBM Statistical Package for Social Sciences (SPSS) version 25.0. Descriptive results were presented in charts, tables, Mean, and SD.

Ethical Consideration

Ethical approval for the study was obtained from the Ethical Review Board of the Federal Medical Centre Owo, Ondo State. Also, permission was sought from the head of the records unit at the Federal Medical Centre Owo, Ondo State before commencing the data collection and the reference number is FMC/OW/380/VOL.CLX11/95.

Results

In Table 1, more than half of the women 124(59.9%) were within ages 25-34 years with a mean age of 29.50±6.32 while majority 189(91.3%) were currently in a union and about half 107(51.7%) attained tertiary education. Furthermore, most of the women 189(91.3%) were Christians and 133(64.3%) resided in urban areas. In addition, 84(40.6%) of the women were artisan and majority 177(85.5%) had gestational age between 7-10 months.

Table 1: Sociodemographic characteristics of the mothers

Variable	Frequency (N=207)	Percentage
Age (Years) Mean age: 29.50±6.32		
15-24	41	19.8
25-34	124	59.9
35-44	38	18.4
45-54	4	1.9
Marital Status		
Not Currently in Union	18	8.7
Currently in Union	189	91.3
Level of Education		
None	42	20.3
Primary	3	1.4
Secondary	55	26.6
Tertiary	107	51.7
Ethnicity		
Christian	189	91.3
Muslim	18	8.7
Type of Residence		
Urban	133	64.3
Rural	74	35.7
Occupation		
Civil servant	17	8.2
Student	20	9.7
Artisan	84	40.6
Trader	69	33.3
Housewife	6	2.9
Lab scientist	2	1.0
Corper	9	4.3
Gestational age at delivery in months		
3 – 6 months	30	14.5
7 – 10 months	177	85.5

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In Figure 1, about 6(2.9%) of the women who delivered at the hospital were hypotensive, 113(54.6%) were prehypertensive while 52(25.1%) were normotensive and 26(12.6%) were in stage 1 hypertension.

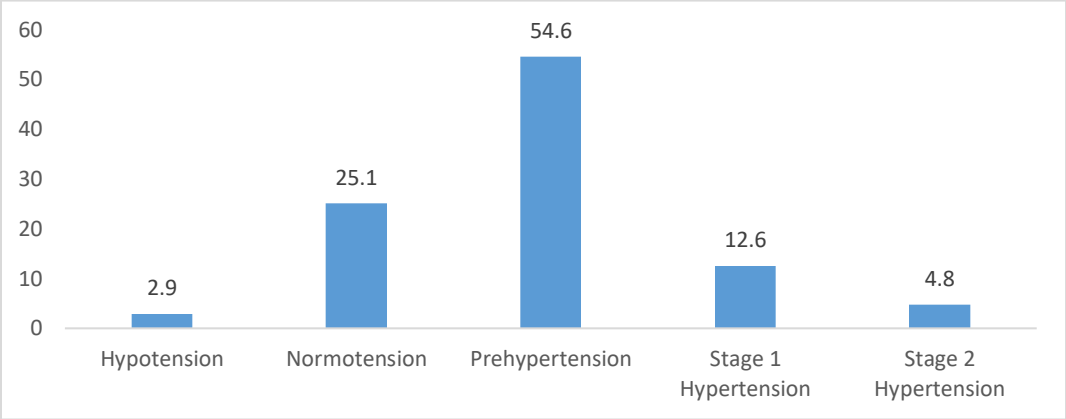

Figure 1: Prevalence of Hypotension and Hypertension among the Women

In table 2, symptoms presented by the hypertensive mothers include severe labour pains 46(30.9%), fever 18(12.1%) while symptoms presented by the hypotensive mothers include drainage of fluid per min for about 3 hours and labour pain 1(16.7%) and labour pain with 3 to 4 contractions lasting for 45-50 sec. in 10 minutes 1(16.7%) respectively. In addition, almost half of the hypertensive mothers 72(48.3%) and half of the hypotensive mothers 3(50.0%) had between 7-13 antenatal visits before delivery. Majority 130(87.2%) of the hypertensive mothers and all the hypotensive mothers had cephalic (vertex) foetal presentation during delivery. Only few of the hypertensive mothers 13(8.7%) and hypotensive mothers 1(16.7%) had complications during delivery.

Table 2: Symptoms presented during labour, number of antenatal visits and complications among the mothers during delivery

Variable	F(N=149)	&	Variable	F(N=6)	%	Variable	F(N=52)	%
Hypertension Symptoms			**Hypotension Symptoms**			**Normotension Symptoms**		
Fever	18	12.1	Drainage of fluid per min for about 3 hours and labour pain	1	16.7	Bleeding	1	1.9
Severe preeclampsia	8	5.4	Drainage of Liquor	1	16.7	Severe labour pain	1	1.9
None	55	36.9	None	2	33.2	Lower abdomen pain	5	9.6
Severe labour pain	46	30.9 10.1 0.7	Labour pain with 3 to 4 contractions lasting for 45-50 sec. in 10 minutes	1	16.7	Fever	3	5.8
Drainage of liquor	15	10.1	Prolonged labour	1	16.7	Drainage of liquor	9	17.3
Intrauterine growth restriction (IUGR)	1	0.7				None	23	44.2

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Variable	F(N=149)	&	Variable	F(N=6)	%	Variable	F(N=52)	%
Chest pain	3	2.0				Labour pain with 3 to 4 contractions	1	1.9
Body itching	1	0.7				Backpain	2	3.8
Right breast lump and low abdominal distension	1	0.7				Oedema	1	1.9
Enlarged abdomen with gravid uterus, ovoid in shape						Loss of consciousness	1	1.9
						General body pain	2	3.8
						Dyspnoea, cough, chest tightness	1	1.9
						PROM	2	3.8
Antenatal Visits			**Antenatal Visits**			**Antenatal Visits**		
1-6	65	43.6	1-6	3	50.0	1-6	27	51.9
7-13	72	48.3	7-13	3	50.0	7-13	23	44.2
Booked	3	2.0				Unbooked	2	3.8
Unbooked	4	2.7						
None	5	3.4						
Foetal presentation			**Foetal presentation**			**Foetal presentation**		
Breech presentation	14	9.4	Cephalix (Vertex)	6	100	Breech presentation	1	1.9
Cephalix (Vertex)	130	87.2				Cephalix (Vertex)	49	94.2
Brow presentation	3	2.0				Caesarean section	2	3.8
Caesarean section	2	1.3						
Presence of complication			**Presence of complication**			**Presence of complication**		
Yes	13	8.7	Yes	1	16.7	Yes	6	11.5
No	106	71.1	No	4	66.7	No	30	57.7
Unknown	30	20.1	Unknown	1	16.7	Unknown	16	30.8

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Variable	F(N=149)	&	Variable	F(N=6)	%	Variable	F(N=52)	%
Complications			**Complications**			**Complications**		
Post partum haemorrhage after delivery	1	0.7	Anaemic	1	16.7	Bleeding in pregnancy	1	1.9
Major placenta previa	2	1.3	None	5	83.3	Anaemia	2	3.8
Bleeding in pregnancy	1	0.7				PROM	2	3.8
Intrauterine growth restriction	1	0.7				None	46	88.5
Anaemic	1	0.7				Induction of labour	1	1.9
Obstructed labour	1	0.7						
Pregnancy Induced Hypertension	1	0.7						
Difficult labour	1	0.7						
None	136	91.3						
Loss of blood	1	0.7						
Post datism	1	0.7						
Unable to deliver placenta	1	0.7						
Fetomaternal condition	1	0.7						

In Table 3, almost all the hypertensive mothers 138(92.6%) and all the hypotensive mothers 6(100%) had live birth after delivery.

Table 3: Pregnancy Outcome among the mothers after delivery

Variable	F(N=149)	Percent	Variable	F(N=6)	Percent	Variable	F(N=52)	Percent
Hypertension			**Hypotension**			**Normotension**		
Pregnancy outcome			**Pregnancy outcome**			**Pregnancy outcome**		
Still birth	4	2.7	Live birth	6	100	Preterm Birth	4	7.7
Underweight	2	1.3				Live Birth	46	88.5
Preterm birth	1	0.7				Induced Abortion	1	1.9
Live birth	138	92.6				Twin: One died, the other lived	1	1.9
Spontaneous abortion	2	1.3						
Twin: one died, the other lived	1	0.7						
Twin: first one was still birth;	1	0.7						

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Variable	F(N=149)	Percent	Variable	F(N=6)	Percent	Variable	F(N=52)	Percent
Hypertension			**Hypotension**			**Normotension**		
second one was live birth								
Child's birth weight in Kg			**Child's birth weight in Kg**			**Child's birth weight in Kg**		
0 – 0.99	7	4.7	3.5	1	16.7	0 – 0.99	3	5.8
1 – 1.99	7	4.7	3.1	1	16.7	1 – 1.99	3	5.8
2 – 2.99	36	24.2	No Record	1	16.7	2 – 2.99	12	23.1
3 – 3.99	82	55.0	2.5	1	16.7	3 – 3.99	25	48.1
No record	12	8.1	3.3	1	16.7	No record	8	15.4
4 – 4.99	5	3.4	0.6	1	16.7	4 – 4.99	1	1.9
Child birth length in cm			**Child birth length in cm**			**Child birth length in cm**		
10 - 19	1	0.7	49	1	16.7	10 - 19	2	3.8
30 - 39	22	14.8	48	1	16.7	30 - 39	6	11.5
40 – 49	64	43.0	58	1	16.7	40 – 49	15	28.8
50 – 59	20	13.4	No Record	3	50.0	50 – 59	10	19.2
No record	42	28.2				No record	19	36.5

In Table 4, few of the hypertensive 23(15.4%) and hypotensive mothers 2(33.3%) had malaria during pregnancy. Only 2(1.3%) of the hypertensive mothers were treated for intestinal parasites during pregnancy. Other diseases reported by hypertensive mothers include Chronic hypertension in pregnancy 5(2.4%) and Anaemia in pregnancy 4(1.9%).

Table 4: Clinical Presentation of the mothers during Pregnancy

Variable	F(N=149)	Percent	Variable	F(N=6)	Percent	Variable	F(N=52)	Percent
Hypertension			**Hypotension**			**Normotension**		
Malaria status of the mothers during pregnancy			**Malaria status of the mothers during pregnancy**			**Malaria status of the mothers during pregnancy**		
Yes	23	15.4	Yes	2	33.3	Yes	12	23.1
No	93	62.4	No	3	50.0	No	28	53.8
Unknown	33	22.2	Unknown	1	16.7	Unknown	12	23.1
Treatment of the woman for malaria during pregnancy			**Treatment of the woman for malaria during pregnancy**			**Treatment of the woman for malaria during pregnancy**		
Yes	23	15.4	Yes	2	33.3	Yes	12	23.1
No	93	62.4	No	3	50.0	No	29	55.8
Unknown	33	22.2	Unknown	1	16.7	Unknown	11	21.2

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Variable	F(N=149)	Percent	Variable	F(N=6)	Percent	Variable	F(N=52)	Percent
Hypertension			**Hypotension**			**Normotension**		
Treatment of intestinal parasites during pregnancy			**Treatment of intestinal parasites during pregnancy**			**Treatment of intestinal parasites during pregnancy**		
Yes	2	1.3	No	4	66.7	No	40	76.9
No	108	72.5	Unknown	2	33.3	Unknown	12	23.1
Unknown	39	26.2						
Other diseases reported by the mothers during pregnancy			**Other diseases reported by the mothers during pregnancy**			**Other diseases reported by the mothers during pregnancy**		
None	174	84.1	None	6	100	None	44	84.6
Chronic hypertension in pregnancy	5	2.4				Malaria in pregnancy	3	5.8
Mouth deviation, Intrauterine growth restriction with severe preclampsia at term	1	0.5				Anaemia	2	3.8
Malaria in pregnancy	16	7.7				Malaria in pregnancy & UTI	2	3.8
Anaemia	4	1.9				Graves' disease	1	1.9
Malaria in pregnancy and Urinary tract infection	4	1.9						
Symptomatic uterine fibroid	1	0.5						
Grave's disease	1	0.5						
Hepatitis B	1	0.5						

Also, about 23(15.4%) of the hypertensive and 1(16.7%) of the hypotensive mothers had known blood pressure conditions before pregnancy. In addition, 46(30.9%) of the hypertensive mothers and 1(16.7%) of the hypotensive mothers had normal weight during pregnancy.

About 127(61.4%) of the mothers had below normal PCV level, 60(29%) had normal PCV level, 8(3.9%) had above normal PCV level and 12(5.8%) had no record of their PCV level.

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Discussion

The findings of the study shows that more than half of the mothers were prehypertensive and few were hypotensive. However, only few of the hypertensive and hypotensive mothers presented with complications during delivery. Furthermore, some of the hypotensive and hypertensive mothers presented with malaria in pregnancy. In addition, almost two-third of the mothers had below normal PCV level during delivery.

Findings from the research demonstrated that a large portion of women giving birth at the facility may be at risk for getting complex medical conditions in connection to hypertension, in particular when it comes to the high prevalence of prehypertension and stage 1 hypertension. This has increased beyond the current prevalence in Nigeria [22-44%], but the situation is not the same when comparing different regions. Consequently, healthcare providers hasten up to solve this issue.[16] Likewise, the condition can affect both the health of the mother and foetus, as pregnancy-induced hypertension has been proven to be a contributing factor to complications like preeclampsia, gestational hypertension, and other cardiovascular issues.[17] The women of this group may require more frequent monitoring, lifestyle changes, and perhaps medical treatment to regulate their blood pressure and lower the likelihood of negative consequences that may occur. These outcomes are consistent with other studies conducted in Nigeria.[18,19] Only a minority of the mothers were suffering from hypotension, although this is a minority, the fact must be taken into account that hypotension has its risk during or after birth, such as dizziness or fainting, which could, in turn, have an impact on the health of both, the mother and the foetus. Part of the results were comparable to those seen in prior research on hypotension in expectant mothers.[9] This points to the need for greater attention to tracking blood pressure during pregnancy, early interventions to manage hypotension, and prehypertension, and educating women about the importance of maintaining healthy blood pressure levels throughout as well as following pregnancy.

The study findings indicate that hypertensive mothers had a slightly higher incidence of severe symptoms and complications during labour than the hypotensive ones. However, the antenatal care the hypertensive, normotensive and hypotensive mothers received could have been of good quality, with a majority of foetal presentations being favourable (cephalic). Hypotensive mothers were the more common group to report symptoms of fluid draining during labour, labour pain of 3 to 4 ten minutes of contractions, and prolonged labour, while hypertensive mothers had symptoms like severe labour pain, high fever, and intrauterine growth restriction, and mothers with normotension indicated oedema, and back pain. In like manner a slightly larger percentage of the hypertensive mothers had complications in comparison to hypotensive and normotensive mothers, but the prevalence of complications was generally low. The kinds of complications hypertensive mothers faced were more varied, including issues like anaemia and obstructed labour, while hypotensive mothers got originally fewer and more specific combinations. The low frequency of hypertension and hypotension-related complications points to a possible enhancement in the healthcare management methods among the staff of the Federal Medical Centre. The results corresponded to an earlier study's outcomes, which recorded a lower number of maternal complications associated with hypertension and attributed it to good prenatal care and management practices.[20] Similarly, another research reported a lower percentage of difficulties during pregnancy in hypotensive mothers, attributing better outcomes to rigorous monitoring and early intervention protocols during antenatal care.[21] This is a clear indication of the need for careful monitoring and control of blood pressure values of pregnant women and the incidence of complications.

Furthermore, while pregnancy-related hypertension generally raises the likelihood of negative outcomes, it seems to have little impact on the live birth rate among participants in this research, with an impressive 92.6% of mothers with hypertension giving birth to live babies. In contrast, hypotension, which is less frequently examined as a potential cause of danger in pregnancy, achieved a 100% live birth rate in this small group. This is significant, although the limited sample size means that further research using a bigger cohort is necessary to draw definitive conclusions regarding the consequences of hypotension on pregnancy outcomes. Similarly, normotensive patients had an 88.5% live birth rate, indicating a positive trend for mother and foetal health. These findings differ from a previous study in Nigeria, where most mothers delivered preterm babies.[22] The discrepancies may be because of the disparities in the facilities, as the earlier study was carried out in a

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privately owned establishment. Additionally, the birth weights of babies born to mothers with hypertension showed some instances of underweight infants and a higher quantity of infants weighing between 2-3 kg, which could suggest a slightly elevated possibility of low birth weight in hypertensive pregnancies, although most were within normal weight ranges. These results align with research by Ijeoma et al.,[23] which reported more favourable outcomes and a lower incidence of adverse pregnancy events, indicating that better pregnancy-related hypertension management could lead to improved results.

Clinical findings indicated that malaria prevalence and intestinal parasites were relatively low among the participants in the research. It was discovered that the prevalence of malaria was 15.4% among hypertensive mothers, while it was slightly higher at 23.1% for normotensive mothers and 33.3% for hypotensive mothers. However, the small sample size of hypotensive mothers means this difference is possibly not statistically significant. The prevalence of malaria documented in this investigation was higher than what was documented in Lagos, South-Western Nigeria.[24] The discrepancy in malaria prevalence may result from variations in the research design between the studies, as the current study utilized a retrospective approach. Additionally, the documentation of unknown malaria status among the three groups of mothers may be due to an absence of testing or gaps in the reporting of malaria cases within the hospital. This underscores the necessity for enhanced malaria screening and documentation while receiving prenatal treatment. Furthermore, the treatment rates for malaria appeared low across all groups, with only 15.4% of mothers with hypertension, 23.1% of mothers with normotension, and 33.3% of hypotensive mothers receiving treatment. While these treatment rates correspond with the quantity of mothers who reported having malaria, they may also indicate potential underreporting or inadequate treatment. Moreover, very few mothers were treated for intestinal parasites, with only 1.3% of hypertensive mothers receiving treatment, suggesting that this is possibly not a significant concern during pregnancy. However, the unknown treatment statuses for parasites in the intestines among the three groups also imply poor documentation or testing, which is crucial to address since these parasites can result in maternal anaemia and adverse pregnancy outcomes.

Mothers with hypertension have a substantial history of hypertension before pregnancy, while those with hypotension were somewhat aware of their condition, which may have played a part in the high number of live births and fewer complications observed. Additionally, a large majority of normotensive patients (88.5%) lack any known blood pressure issues before getting pregnant. This is encouraging, as having pre-existing hypertension can elevate the likelihood of complications during pregnancy, including preeclampsia, premature birth, and restricted foetal growth. The high percentage indicates that most women in this group entered pregnancy without a chronicle of hypertension, which likely contributed to the better mother and foetal outcomes seen among normotensive mothers.

A significant number of hypertensive mothers maintain a normal weight, but a concerning percentage is classified as overweight or obese. This aligns with findings from a previous study that noted mothers were generally normal to slightly overweight.[25] On the other hand, hypotensive mothers look to possess a tendency towards being overweight or obese. This trend may suggest potential weight-related issues within this group, although the small sample size calls for careful interpretation. Furthermore, data concerning normotensive patients shows that a considerable number of mothers were either overweight (25.0%) or obese (19.2%), which might raise the chance of problems during pregnancy. Nevertheless, the low rate of complications observed indicates that the health facility staff could have effectively managed high-risk pregnancies, thereby reducing the incidence of complications. The lack of documented BMI among the mothers highlights the necessity of improved data gathering and record-keeping. By addressing these challenges through focused interventions, education, and public health initiatives, we can enhance outcomes for both mothers and their infants.

Most of the mothers had PCV levels that were below normal. This suggests that a considerable number of mothers in this group may be dealing with anaemia or other health issues that could have impacted their PCV levels. Less than one-third of the mothers had normal PCV levels, which is lower in contrast to those with below-normal levels, but it still accounts for a significant portion of the population. Additionally, only a small proportion of mothers had above-normal PCV levels,

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which is a much smaller fraction and could suggest conditions like dehydration or polycythemia, although these are less common. Furthermore, a few mothers did not possess any record of their PCV levels, indicating a potential void in the data collection or insufficient testing for those individuals. Nevertheless, the high percentage of below-normal PCV levels is concerning, as it may signal nutritional deficiencies, underlying medical issues, or other factors that require attention. It would be crucial to further investigate the reasons behind these low PCV levels to enhance maternal health outcomes. The PCV levels reported were greater in this investigation than those in a prior study conducted in Ibadan, which found a 30% rate of anaemia.[26] This difference in PCV levels may be due to differences in the two studies' geographical regions and study designs.

Strengths and Limitations of the Study

The strength of the study is that it focuses on a specific group (pregnant women at FMC Owo) which is a major referral centre in Owo and other nearby local government areas which gives insight on the prevalence of hypotension and hypertension as well as complications; thereby providing baseline data for future intervention programmes among pregnant women in FMC Owo. However, the limitations of the study include retrospective bias which involves reliance on existing records may introduce missing/incomplete data, affect accuracy and conduct the study only at FMC Owo, thereby limiting generalisability to other regions or healthcare settings.

Implications of the findings of the study

The high prevalence of prehypertension and stage 1 hypertension suggests the need for routine BP checks during antenatal visits, with closer monitoring for at-risk mothers. Also, early intervention protocols (e.g., lifestyle counseling, antihypertensive therapy) should be prioritised to prevent progression to severe hypertension (e.g., preeclampsia). In addition, anaemia management strategies such as Iron and folate supplementation programmes and Malaria Prevention strategies such as insecticide-treated nets (ITNs) and other prophylactic treatment should be implemented. Furthermore, other interventions such as community awareness programmes on the risks of prehypertension, anaemia, and malaria during pregnancy, promotion of balanced nutrition, weight management, and BP self-monitoring, improving record-keeping and training for healthcare workers on hypertensive disorders in pregnancy (HDP) management

Conclusion

The study aims to determine the prevalence and outcomes of gestational hypertension and hypotension among pregnant women attending the Federal Medical Centre (FMC) Owo, Ondo State. A notable number of women who gave birth at the Federal Medical Centre showed signs of pre-hypertension and stage 1 hypertension, which can result in risks for both the mother and the baby, including preeclampsia and intrauterine growth restriction. While the incidence of complications is relatively low, mothers with hypertension often face more severe symptoms and complications during labour compared to individuals with normal or low blood pressure. Additionally, the study reveals a concerning number of women with below-normal packed cell volume (PCV), indicating potential anaemia or nutritional deficiencies that could impact both maternal and foetal health outcomes. The study recommends that pregnant women, especially those with prehypertension or hypertension, should be closely monitored throughout their pregnancies. Implementing more interventions, such as lifestyle modifications, medication adherence, and regular check-ups, could help lower the dangers of complications like preeclampsia and intrauterine growth restriction.

Declarations

Ethical approval: *o*btained from the Ethical Review Board of the Federal Medical Centre Owo, Ondo State. Also, permission was sought from the head of the records unit at the Federal Medical Centre Owo, Ondo State before commencing the data collection and the reference number is FMC/OW/380/VOL.CLX11/95.

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