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Research Article

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Prevalence, Risk Factors and Management of Hypertensive Disorders of Pregnancy Among Pregnant Women in University of Benin Teaching Hospital, Benin City, Nigeria

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Abstract

Background: *This facility-based retrospective cross sectional design study examined the prevalence, risk factors and management of hypertensive disorders of pregnancy among pregnant women attending antenatal clinic in the University of Benin Teaching Hospital, Benin City*

Materials and Methods: *A stratified proportionate sampling technique were adopted to review a total of 358 secondary data of patients who were managed for hypertensive disorders of pregnancy from June 2015 – June 2020 in the study institution.*

Data were analyzed using descriptive statistics, multinomial regression analysis at 0.05 the level of significance for all measured variables.

Results: *The mean ± SD = 31.15 ± 5.954 years. More than half 60.3% of them were multigravida. 60.1% were in second trimester. Mean BP at booking was 146/95 mmHg. 56.1% were overweight while 17.6% were obese. The mean ± SD ANC visits was 10.71 ± 5.411 times. The five-year prevalence rate of hypertensive disorders of pregnancy among pregnant women in the study setting is 10.9%.*

Conclusion: *There is high prevalence of HDP in the study institution with preeclampsia most prevalent. Therefore, we strongly recommend the utilization of screening tools for the prediction, early diagnoses as well as timely intervention HDP*

Keywords: Prevalence, Risk Factors, Management, Hypertensive Disorders of Pregnancy

Introduction

Hypertensive disorders of pregnancy are an important cause of maternal and perinatal morbidity and mortality throughout the world, particularly in developing countries like Nigeria [1]. While motherhood is a positive and enjoyable experience, many women are experiencing suffering, illness, and death and according to World Health Organization 2018 around 15% of pregnant women are expected to develop life-threatening complications during pregnancy, at delivery or post-partum. and hypertensive disorders of pregnancy (HDP) are significant contributors to these complications and sufferings. A pregnant woman is considered hypertensive if her blood pressure is greater than or equal to 140/90 mmHg on two consecutive measurements [2]. It includes pregnancy-induced hypertension (PIH) (without proteinuria), preeclampsia (with proteinuria) and eclampsia (preeclampsia with convulsions), gestational hypertension and chronic hypertension [3].

Worldwide, 4.4%-15% of all pregnancies are complicated by hypertension (HTN) and in Nigeria, prevalence rates of hypertensive disorders of pregnancy range from 17% to 34.1% [4]. According to World Health Organization (WHO) report in 2019, 295 000 maternal deaths was recorded globally due to pregnancy and child

birth related causes in 2017. The risk of maternal death is 40 times higher in the least developed countries compared with European counties. Sub-Saharan African and Southern Asian countries accounted about 66% and 20% of the global maternal death, respectively (WHO, UNFPA, World Bank Group and the United Nations Population Division, 2019). Women with HDP are five times more likely to have perinatal death compared with women who have no hypertensive disorders of pregnancy [5]. Overcoming the prevailing challenges in the control of (HDP) in developing countries hinges on the ability of health care systems to identify and manage women at high risk [6]. Accurate data regarding the prevalence of the condition is also paramount to be able to form a result-oriented approach towards addressing the problem of HDP among pregnant women. However, knowledge of pregnancy induced hypertension and health seeking behaviour among expectant mothers in Nigeria has been reported to be poor [7]. There is dearth of information in literature regarding the prevalence, risk factors and management of hypertensive disorders of pregnancy among pregnant women in University of Benin Teaching Hospital, Benin City. Bridging this literature gap form the basis for this study.

Materials and Methods

Study Design

This is a retrospective study from the month of June 2015 to June 2020 which utilized a cross sectional design as a strategy to examine the prevalence, risk factors and management of hypertensive disorders of pregnancy among pregnant women in university of Benin teaching hospital, Benin city, Nigeria.

Study Setting

This study was conducted in the University of Benin Teaching Hospital (UBTH), Benin City, Edo State, Nigeria which is located in Ugbowo quarter of Egor LGA of Edo State, South-South, Nigeria. This setting was chosen because this hospital has one of the largest obstetrics and gynaecology department in the South-South, Nigeria. The institution was established in 1973 and it is a referral center. Service departments are grouped into academic institutions, clinical and non-clinical departments.

Sample Size

The studied sample was calculated from the study population using the Taro Yamane's equation.

The Yamane formula is: $n = N / (1 + Ne^2)$.

Where N = population size (1642), and
e = alpha level, i.e. e = 0.05 at confidence interval of 95%.

Therefore, n = 1642/[1+ 1642(0.05)2] = 1642/5.105 = 322

Adjusting for attrition (non-response) rate, $Ar = \frac{n}{1 - 10\%}$ were n = 322

Therefore, $Ar = \frac{322}{0.9} = 358$

Hence, the sample size for the study = 358

Sampling Technique

Since the data belong to different years (June 2015 to June 2020), stratified proportionate sampling technique approach was used to select the documents for review.

Table 3.2: Proportionate sample size through stratified random sampling technique

Strata	2015	2016	2017	2018	2019	2020	Total
Population	287	333	319	385	257	61	1642
Proportion	0.18	0.20	0.19	0.23	0.16	0.04	1
Sample size	65	72	68	82	57	14	358

Inclusion Criteria

1. A pregnant woman diagnosed of hypertensive disorders of pregnancy during antenatal visit to the University of Benin Teaching Hospital (UBTH)
2. The diagnosis recorded between June 2015 to June 2020
3. The case was managed at the University of Benin Teaching Hospital (UBTH), Benin

Instrument for Data Collection

Data for this study were collected using a structured research check-list. The check-list consisted of socio-demographic variables. personal risk factors, type of hypertensive disorders and clinical manifestations, investigations and management approaches. The validity of the instrument was determined by two lecturers in university of Benin and a consultant obstetrician at the university of Benin teaching hospital both in Benin City.

On the reliability of the instrument, this was pretested using split-half method and the data obtained was computed in SPSS version 24 using Cronbach's alpha reliability. A coefficient of 0.889 was obtained, which was significant for the instrument to be used for the study.

The consistency of the research Instrument was examined through a trial (pilot) study conducted in Specialist Hospital, a tertiary health institution in Benin City, Edo State. The pilot study was done by reviewing 40 secondary data (which represented 10% of the sample size of the study) of women admitted and managed for HDP.

Method of Data Collection

Data for the study was collected by the researcher with the assistance of three midwives and a medical record officer from case note, treatment charts, and nursing documentations using the prepared check-list. Attention was paid to every detail information on each patient and information needed were collected three working days for four weeks.

Method of Data Analysis

The raw data retrieved were coded and imputed into a computer and analyzed using the Statistical Package for the Social Sciences (SPSS) version 24.0 statistical software. Inferential statistical analysis was adopted and descriptive data were expressed in percent, frequency counts, and mean ± standard deviation. Multinomial regression analysis was done to evaluate the relations between dependent variables (types of HDP) and independent variable (socio-demographic characteristic/risk factors) $P < 0.05$ was considered the level of significance for all measured variables.

Ethical Consideration

Ethical approval was obtained from the ethics committee of the University of Benin Teaching Hospital and an approval with reference number: ADM/E22/A/VOL.VII/14831026 was obtained on March 23, 2021. Oral permission was sorted from the various ward's managers and the record department for access to the patients' data.

Results

Table 1: Showing social-demographic characteristics of the patients (n = 358)

Variable		Frequency	Percent
Age	18-27	100	27.9
	28-37	142	39.7
	>37	116	32.4
	Mean ± SD = 31.15 ± 5.954		
Family setting	Monogamous	268	74.9
	Polygamous	90	25.1
Highest level of education	Primary	81	22.6
	Secondary	122	34.1
	Tertiary	85	23.7
	None	70	19.6
Employment Status	Unemployed	75	20.9
	Self-employed	144	40.2
	Employed in private setting	84	23.5
	Employed in public setting	55	15.4

Demographic characteristics of the patients as shown on table 1 revealed that majority 142(39.7%) were within the age bracket of 28-37 years, 100(27.924%) were within 18-27 years while 116(32.4%) were above 37 years. The mean ± SD = 31.15 ± 5.954 years. Majority 268(74.9%) were in monogamous family setting. Those with secondary level of education were more 122(34.1%) while 70(19.6%) had no formal education. With respect to employment status, self-employed were more 144 (40.2%) while those without any formal job were 75 (20.9%).

Table 2: Obstetric characteristics of patients

Variable		Frequency	Percent
Pregnancy status	Primagravida	142	39.7
	multigravida	216	60.3
Gestational age	First trimester	84	23.5
	Second trimester	215	60.1
	Third trimester	59	16.5
No of Pregnancies	1-3	223	62.3
	>3	135	37.7
No of Children	None	150	41.9
	1-3	134	37.4

	>3	74	20.7
Blood Pressure Measurement at Booking	Normative	140	39.1
	Hypertensive (>140/90mmHg) Mean BP = 146/95mmHg	218	60.9
Weight on booking	≥70kg	219	61.2
	<70kg	139	38.8
	Mean ± SD = 76.07 ± 8.397kg		
Weight at 28 Weeks	≥70Kg	298	83.2
	<70Kg	60	16.8
	Mean ± SD = 78.97 ± 9.144kg		
Height at booking	≥1.6M	214	59.8
	<1.6M	144	40.2
	Mean ± SD = 1.62 ± 6.232M		

As presented on table 2, more than half 216(60.3%) of them were multigravida while 142(39.7%) were primigravida. Majority were 215(60.1%) were in second trimester, 84(23.5%) were in first trimester while 59(16.5%) were in third trimester. With respect to number of pregnancies, those with first to third (1-3) pregnancy were more 223 (62.3%) while 135(37.7%) of them had more than three previous pregnancies. Those with 1-3 children were 134(37.4%) while 150(41.9%) are yet to have any child. 218(60.9%) had blood pressure (BP) more than 140/90mmHg as at time of antenatal clinic (ANC) booking. The mean BP was 146/95mmHg. More than half 219(61.2%) weighed 70kg and above at time of ANC booking with mean ± SD of 76.07 ± 8.397kg while 298(83.2%) weighed 70kg and above at 28 weeks gestation with mean ± SD of 78.97 ± 9.144kg. More than half 214(59.8%) measured ≥1.6M at time of booking with mean ± SD height of 1.62 ± 6.232M. More than half 201(56.1%) were overweight (25-29.9 kg/m2) while 63(17.6%) were obese (≥30 kg/m^2). Many 151(42.2%) of them had more 10 times ANC visits. The mean ± SD ANC visits was 10.71 ± 5.411 times

Table 3: Showing prevalence rate of hypertensive disorders of pregnancy among pregnant women in the study setting based on calculated sample size (n = 358)

Years	Incidence rate				Total Booking	Prevalence rate per years
	PRE	ECL	PIH	Total		
2015	27	13	25	65	329	19.8
2016	30	14	28	72	495	14.5
2017	29	13	26	68	792	8.6
2018	35	16	32	82	825	9.9
2019	24	11	22	57	693	8.2
2020	6	3	5	14	164	8.5
Total	151	69	138	358	3298	10.9
Prevalence rate per cases	4.6	2.1	4.2			

NB: PRE= Preeclampsia, ECL = Eclampsia, PIH = Pregnancy Induced Hypertension

On prevalence rate, table 3 shows that the highest prevalence rate of hypertensive disorders of pregnancy among pregnant women in the study setting was recorded in year 2015 was 19.8%, followed by 14.5% recorded in year 2016. (9.9%) in 2017 8.6% while in 2018 was 9.9 %. In 2019 the prevalence rate was 8.2% and 8.5% was recorded in 2020. The total five-year prevalence rate of hypertensive disorders of pregnancy among pregnant women in the study setting was 10.9% of which preeclampsia was 4.6%, eclampsia was 2.1% and PIH was 4.2%

Table 4: Showing risk factors of hypertensive disorders of pregnancy among pregnant women in the study setting (n = 358)

Variable	Reported finding	
	Yes (%)	No (%)
Pre-existing health condition prior to pregnancy		
• Diabetes	26(7.3)	332(92.7)
• Hypertension	220(61.5)	138(38.5)
• Hypertension and diabetes	25(7.0)	333(93.0)
• Renal condition	7(2.0)	351(98.0)
• None	76(21.2)	282(78.8)
• Others*	79(22.1)	279(77.9)
Family history of hypertension	229(64.0)	129(36.0)
Body Mass Index:		
• known Overweight	201(56.1)	157(43.9)
• Known Obese	63(17.6)	295(82.4)
• Normal weight	94(26.3)	264(73.7)
History of hypertensive disorders in previous pregnancy:	90(25.1)	268(74.9)
Multiple Gestation	90(25.1)	268(74.9)

***Others include PUD, Eye conditions**

Table 4 shows that 282 (78.8%) had pre-existing health condition prior to pregnancy out which 26(7.3%) were known diabetic, 214(59.8%) were known hypertensive but only 25(7.0%) were both hypertensive and diabetic. 7(2.0) presented with renal conditions while 79(22.1%) had other conditions such as peptic ulcer disease (PUD) or eye conditions. 229(64.0%) had family history of hypertension. 201(56.1%) were overweight while 63(17.6%) were obese. 90(25.1%) had history of hypertensive disorders in previous pregnancy while 86(24.0%) had multiple gestation.

Table 5: Commonest type of hypertensive disorders of pregnancy among women in the study setting (n = 358)

S/N	Hypertensive disorders	Frequency	Percent
1	Preeclampsia	151	42.2
2	Eclampsia	69	19.3
3	PIH	138	38.5
	Total	**358**	**100.0**

Table 5 indicated that the commonest type of hypertensive disorder of pregnancy among pregnant women in study institution is Preeclampsia 151(42.2%), followed by Pregnancy Induced Hypertension (PIH) 138(38.5%) and Eclampsia 69(19.3%)

Table 6: Management approach of hypertensive disorders of pregnancy among pregnant women in the study setting (n = 358)

Variable		Reported finding	
		Yes (%)	No (%)
Presented symptoms	Pedal Oedema	243(67.9)	115(32.1)
	Face and ankle oedema	174(48.6)	184(51.4)
	Frontal headache	244(68.2)	114(31.8)
	High Blood pressure	358(100.0)	-
	Epigastric pain	77(21.5)	281(78.5)
	Fits	68(19.0)	290(81.0)
	Coma	72(20.1)	286(79.9)
Investigations	Urinalysis	358(100.0)	-
	Ultrasound	358(100.0)	-
	Lipid profile	215(60.1)	143(39.9)
	ECG	170(47.5)	188(52.5)
	Others	153(42.7)	205(57.3)
Management approach	Lying in ward	86(24.0)	272(76.0)
	I C U	56(15.6)	302(84.4)
	Bed rest	117(32.7)	241(67.3)
	Treated on outpatient basis	101(28.2)	257(71.8)
Treatment regimen	Medications		
	• Labetalol	98(27.4)	260(72.6)
	• Hydralazine	246(68.7)	112(31.3)
	• Methyldopa	358(100.0)	-
	• Nifedipine	258(72.1)	100(27.9)
	• Magnesium Sulphate	208(58.1)	150(41.9)
	Dietary approach	358(100.0)	-
	Both	358(100.0)	-

Table 6 shows that 243 (67.9%) of the women presented with pedal oedema, 174 (48.6%) presented with face and ankle oedema, while 174 (48.6%) presented with frontal headache. At the time of diagnosis, all of the women 358 (100.0%) presented with high blood pressure, 77 (21.5%) presented with epigastria pain. 68 (19.0%) had fits while 72 (20.1%) presented with coma. Urinalysis and abdominal-pelvic ultrasound (USS) investigations were carried out for all the patients 358 (100.0%) respectively. Lipid profile was done for 215(60.1%) while 170(47.5%). had ECG. With respect to management approach, 86(24.0%) were on admission in the hospital ward, 56(15.6%) were admitted in intensive care unit (I C U), 117(32.7%) were offered bed rest while 101(28.2%) were treated on outpatient basis. On method of delivery, 151(42.2%) had spontaneous vaginal delivery (SVD) while 207(57.8) had caesarean section (C/S). All the patients were managed with dietary approach and multiple medications with methyldopa been the commonest drug used for all the cases. 345(96.4%) of them were discharged while record of mortality cases, 5(1.4%) were mothers while 8(2.2%) were babies.

Table 7: Showing predictors of hypertensive disorders of pregnancy among pregnant women in the study setting

Variable		HTN Disorders			Total	AOR	P	95%CI
		PR-EC	EC	PIH				
Age	18-27 years	45(45.0)	20(20.0)	35(35.0)	100(100)	1.358	.316	.747-2.469
	28-37 years	62(43.7)	25(17.6)	55(38.7)	142(100)			
	>37 years	44(37.9)	24(20.7)	48(41.4)	116(100)			
Family setting	Monogamous	112(41.8)	56(20.9)	100(37.3)	268(100)	1.052	.914	.418-2.646
	Polygamous	39(43.3)	13(14.5)	38(42.2)	90(100)			
Highest level of education	Primary	35(43.2)	8(9.9)	38(46.9)	81(100)	6.419	.011	.143-.780
	Secondary	52(42.6)	25(20.5)	45(36.9)	122(100)			
	Tertiary	31(36.4)	18(21.2)	36(42.4)	85(100)			
	None	33(47.2)	18(25.7)	19(27.1)	70(100)			
Employment Status	Unemployed	30(40.0)	20(26.7)	25(33.3)	75(100)	5.884	.015	.017-.647
	Self-employed	65(45.1)	25(17.4)	54(37.5)	144(100)			
	private setting	32(38.1)	18(21.4)	34(40.5)	84(100)			
	public setting	24(43.6)	6(10.9)	25(45.5)	55(100)			
Pregnancy status	Primagravida	56(39.4)	27(19.0)	59(41.6)	142(100)	.702	.188	.415-1.188
	Multigravida	95(44.0)	42(19.4)	79(36.6)	216(100)			
Gestational age	1st trimester	45(53.5)	14(16.7)	25(29.8)	84(100)	2.938	.078	.886-9.742
	2nd trimester	92(42.8)	37(17.2)	86(40.0)	215(100)			
	3rd trimester	14(23.7)	18(30.5)	27(45.8)	59(100)			
No of Pregnancies	1-3	92(41.3)	46(23.6)	85(38.1)	223(100)	.799	.502	.415-1.538
	>3	59(43.7)	23(17.0)	53(39.3)	135(100)			
No of Children	None	57(38.0)	37(24.7)	56(37.3)	150(100)	.568	.123	.276-1.166
	1-3	54(40.3)	22(16.4)	58(43.3)	134(100)			
	>3	40(54.1)	10(13.5)	24(32.4)	74(100)			
BP at Booking	Normative	55(39.3)	29(20.7)	56(40.0)	140(100)	.898	.688	.532-1.516
	Hypertensive	96(44.0)	40(18.4)	82(37.6)	218(100)			
Weight on booking	≥70Kg	92(42.0)	47(21.5)	80(36.5)	219(100)	1.105	.795	.521-2.344
	<70Kg	59(42.4)	22(15.9)	58(41.7)	139(100)			
Weight at 28 Weeks	≥70Kg	126(42.3)	60(20.1)	112(37.6)	298(100)	1.081	.861	.452-2.588
	<70Kg	25(41.7)	9(15.0)	26(43.3)	60(100)			
Height At Booking	≥1.6M	91(42.5)	44(20.6)	79(36.9)	214(100)	.549	.579	.066-4.565
	<1.6M	60(41.6)	25(17.4)	59(41.0)	144(100)			
BMI on booking	Normal weight	37(39.4)	17(18.1)	40(42.5)	94(100)	7.792	.014	1.505-40.347
	Overweight	88(43.8)	46(22.9)	67(33.3)	201(100)			
	Obesity	26(41.3)	6(9.5)	31(49.2)	63(100)			
Number of antenatal attendances	<5 times	35(58.3)	7(11.7)	18(30.0)	60(100)	1.347	.390	.683-2.653
	5-10 times	66(44.9)	26(17.7)	55(37.4)	147(100)			
	>10 times	50(33.1)	36(23.9)	65(43.0)	151(100)			
Diabetic (DM)	Yes	11(42.3)	9(34.6)	6(23.1)	26(100)	1.435	.524	.472-4.365
	No	140(42.2)	60(18.1)	132(39.7)	332(100)			

Hypertensive (HTN)	Yes	94(42.7)	45(20.5)	81(36.8)	220(100)	1.574	.656	.214-11.549
	No	57(41.3)	24(17.4)	57(41.3)	138(100)			
HTN/DM	Yes	10(40.0)	6(24.0)	9(36.0)	25(100)	.843	.768	.271-2.621
	No	141(42.4)	63(18.9)	129(38.7)	333(100)			
Renal condition	Yes	2(28.6)	2(28.6)	3(42.8)	7(100)	.675	.699	.092-4.945
	No	149(42.5)	67(19.0)	135(38.5)	351(100)			
Family history of HTN	Yes	9842.8)	48(21.0)	83(36.2)	229(100)	417	.438	.046-3.790
	No	53(41.1)	21(16.3)	55(42.6)	129(100)			
HD in previous pregnancy	Yes	39(43.3)	13(14.5)	38(42.2)	90(100)	3.922	.048	.141-.990
	No	112(41.8)	56(20.9)	100(37.3)	268(100)			
Multiple Gestation	Yes	38(44.2)	14(16.3)	34(39.5)	86(100)	1.250	.628	.594-2.367
	No	113(41.6)	55(20.2)	104(38.2)	272(100)			
Pregnancy outcome	Discharged	147(42.6)	63(18.3)	135(39.1)	345(100)	.087	.014	.012-.608
	Maternal death	2(40.0)	2(40.0)	1(20.0)	5(100)			
	Fetal death	2(25.0)	4(50.0)	2(25.0)	8(100)			

NB: PIH = Pregnancy Induced Hypertension, EC = Eclampsia, PR-EC = Preeclampsia

As presented on table 7, there is indication of pregnancy induced hypertension (PIH) and eclampsia occurring among women over 37 years (41.4%) and (20.7%) respectively while preeclampsia occurring among women within 18-27 years (45.0%) (AOR = 1.358, P = 0.316, 95% CI: 0.747-2.469). PIH and preeclampsia more likely to occur among women in polygamous family setting (42.2%) and (43.3%) than those in monogamous family setting (37.3%) and (41.8%) respectively while eclampsia is more likely to occur among women in monogamous family setting (20.9%) (AOR = 1.052, P = 0.914, 95% CI: 0.418-2.646). With respect to education status, there is 6 times likelihood of PIH in women with primary education (46.9%) while preeclampsia and eclampsia occurring among women without formal education experience (47.2%) and (25.7%) respectively (AOR = 6.419, P =0 .011, 95% CI: 0.143 - 0.780).

PIH is 5 times more likely to occur among women employed in public setting (45.5%), eclampsia occurring among unemployed women (26.7%) and preeclampsia occurring among self-employed women (45.1%) (AOR = 5.884, P = 0.015, 95% CI: 0.017- 0.647). Multigravida is more likely to be associated with preeclampsia (44.0%) and eclampsia (19.4%) respectively while Primigravida is more likely to be associated with PIH (41.6%) (AOR = 0.702, P = 0.188, 95% CI: 0.415 - 1.188). PIH and eclampsia are twice likely to occur in third trimester while preeclampsia is twice more likely to occur in first trimester (AOR = 2.938, P = 0.078, 95% CI: 0.886 - 9.742). PIH and preeclampsia are more likely to occur in women with higher number of previous pregnancies (>3) while eclampsia is more likely to occur among women with lesser number of pregnancies (AOR = .799, P = 0.502, 95% CI: 0.415 - 1.538). However, PIH is more likely to occur in women with 1-3 children, eclampsia is more associated with women with no children while preeclampsia is more likely to occur among women with higher number of children (>3) (AOR = 0.568, P = 0.123, 95% CI: 0.276-1.166). PIH and eclampsia are more likely to occur among women that presented with normal blood pressure at the time of ANC booking while preeclampsia is more likely to occur among women that presented with high blood pressure at the time of ANC booking (AOR = 0.898, P = 0.688, 95% CI: 0.532-1.516). Higher weight (≥70Kg) on booking is likely to be associated with eclampsia (AOR = 1.105, P = 0.795, 95% CI: 0.521-2.344) while weight ≥70kg and at 28 week of gestation is likely to be associated with preeclampsia and eclampsia (AOR = 1.081, P = 0.861, 95% CI: 0.452-2.588). Preeclampsia and eclampsia are more likely to occur in women with higher height (≥1.6M) while PIH is more likely to occur in women with lower height (<1.6M) (AOR = 0.549, P = 0.579, 95% CI: 0.066-4.565).

Preeclampsia and eclampsia are more likely to occur among overweight while PIH is more likely to occur among obese women (AOR = 7.792, P = 0.014, 95% CI: 1.505-40.347). With respect to number of antenatal attendances, women with preeclampsia and PIH are twice more likely to have a greater number of ANC attendances (AOR = 1.347, P = 0.390, 95% CI: 0.683-2.653). Preeclampsia and eclampsia are more like to occur in pregnant women with diabetes while PIH is more likely to occur in non-diabetes pregnant women (AOR = 1.435, P = .524, 95% CI: 0.472-4.365). Similarly, women with history of hypertension are more likely to develop preeclampsia and eclampsia (AOR = 1.574, P = 0.656, 95% CI: 0.214-11.549). Also, women with history of hypertension and diabetes are more likely to develop eclampsia (AOR = 0.843, P = 0.768, CI: 0.271-2.621) and those with history of renal condition are more likely to develop PIH and eclampsia and (AOR = 0.675, P = 0.699, 95% CI: 0.092-4.945).

Women with family history of hypertension are more likely to develop preeclampsia and eclampsia (AOR = 0.417, P = 0.438, 95% CI: 0.046-3.790). Women who had suffered hypertensive disorder of pregnancy in previous pregnancy are 3 times more likely to develop PIH and preeclampsia (AOR = 3.922, P = .048, 95% CI:

0.141-.990) whereas women with multiple gestation are more likely to develop PIH and preeclampsia (AOR = 1.250, P = 0.628, 95% CI: 0.594-2.367). With respect to pregnancy outcome, preeclampsia and eclampsia poses equal risk of maternal death while eclampsia poses greater risk for fetal death (AOR = .087, P = 0.014, 95% CI: 0.012-0.608).

Discussion

The mean age of the women is higher (25.66 ± 6.17years) compared to study recorded by Olivier et al. among women in in Ngaoundere (Adamawa Region, Cameroon) and (26.9 ± 5.4) reported from Dezam division, North-West Region of Cameroon [8, 9]. The difference may be due to differences in sample size of the studies and study settings. However, similar to the Njukang et al. study, more of the women in the present study possessed secondary educational qualification [8]. More than half of the women were multigravida. This finding is contrary to the finding of Ayogu et al. form Abuja, Nigeria in which primigravida was more [5].

The five-year prevalence rate of hypertensive disorders of pregnancy among pregnant women in the study setting is (10.9%) which is similar to previous findings (11.6%) reported from Benin City by Ebeigbe et al. (2007). This value is higher compared to the study conducted in India which was 7.8% Khosravi (2014), (6.82%) reported from Ethiopia by Tesfa et al. but lower than (14.5%) reported by Njukang et al. from Cameroon and (19.4%) reported by Ayogu et al. from Abuja, Nigeria. However, it is comparable to (10.3%) reported by from Ogun state, Nigeria [1, 9-11]. The variations in this prevalence may be due to the difference in health facility types, settings, geographical locations, study designs, years and periods during which the study was carried out. The prevalence of preeclampsia (4.6%) recorded in this study falls within the prevalence range (0.2-9.2%) reported in epidemiological studies review by Umesawa and Kobashi [12].

The high prevalence of HDP recorded in this study might be attributed to the settings. Being a viable tertiary health institution with adequate manpower and facility to manage obstetric cases, it is most probable that majority of the complicated cases of pregnancies including HDP are referred to the study center for specialized multidisciplinary care. Again, being a hospital-based study could partly account for the higher prevalence of HDP compared to a population-based study.

Findings on the risk factors of hypertensive disorders of pregnancy among the sample study indicates that the proportion of the women with family history of hypertension (64.0%) and overweight (56.1%) is at variance with the findings (11.0%) and (75.0%) respectively reported from Usmanu Danfodiyo University Teaching Hospital (UDUTH), Sokoto, Nigeria by Singh, et al. 2014. Both studies were similar in the sense that singleton gestation was more in both study participants.

The commonest type of hypertensive disorders of pregnancy (HDP) in the present review is preeclampsia with a prevalence rate of (4.6%), followed by PIH with a prevalence rate of (4.2%) and eclampsia with prevalence rate of (2.1%). In the Cameroon study by Njukang et al, preeclampsia was also the commonest type of HDP reported with a prevalence of (48.3%) [9]. A similar finding (39.96%) was also reported by from China by [13]. These findings are consistent with the World Health Organization Multicounty Survey on Maternal and Newborn Health 2014 [14]. However, the present finding is at variance with the pooled prevalence of HDP in Africa with the overall prevalence of HDP of 100.4% of which gestational hypertension prevalence was (49.8‰) while preeclampsia was (44.0%) and finding reported from Ethiopia by Berhe et al. in which pooled prevalence of pregnancy-induced hypertension (PIH) and preeclampsia/eclampsia alone were 6.29 and 5.47 respectively [15].

The pooled prevalence of eclampsia was 2.1% according to this review, which is similar to a review performed in Africa (1.47%) and global estimates (0.2%–9.2%) but higher than a survey performed in China (0.9%) and WHO multicounty survey prevalence of 0.3% [12, 14, 16]. The differences might be due to geographical variation, variability in maternal risk factors, socio-demographic factors, and the difference in prenatal care service utilization.

On management approach, urinalysis and abdominal-pelvic ultrasound (USS) was the major investigation carried out. All the patients were managed with dietary approach and multiple medications with methyldopa been the commonest used for all the cases. These findings were consistent with American College of Obstetricians and Gynecologists' recommendations on management of HDP (ACOG), 2015 [17].

Magnesium level is known to decline during pregnancy and its effect has been linked to incidence of pre-eclampsia, leg cramps and pre-term birth. Hence, the World Health Organization recommended magnesium sulphate as the most effective, safe and low-cost drug for the treatment of eclamptic seizures and for prophylaxis in severe pre-eclamptic (Enaruna et al., 2013). However, the proportion (58.1%) of cases managed with magnesium sulphate in the present review is lower compared to (71%) [18].

The rate of caesarean section (C/S) (57.8%) is higher compared to (31.21%) reported from Brazil by Filho and Antunes (2020) and (46.4%) reported from Ebonyi State, Nigeria [19]. Neonatal mortality rate (2.2%) recorded in the present review is higher compared (0.91%) reported in the Brazil study by Filho and Antunes (2020) but lower compared to (16.2%) reported in the Ebonyi study by Onoh et al. and (6.4%) reported from Lagos State, Nigeria [2, 19]. However, the maternal mortality rate (1.4%) recorded in the present review is lower compared to (5.0%) reported from Ethiopia by Berhan and Endeshaw (2015) but higher compared to (0.4%) reported in the Lagos study by Babah et al. and (0.7%) reported in the Ebonyi study by Onoh et al. [2, 19].

With respect to pregnancy outcome, the present review found equal risk of maternal death (40.0%) among preeclampsia and eclampsia cases. This finding is at variance with the finding from Haiti by Bridwell et al. which reported greatest odds of adverse events among eclampsia with more than twelve times risk of maternal death. However, both studies shared similar findings in that eclampsia was found to pose a higher risk of fetal death [20].

In this study, significant predictive risk of PIH include primary education qualification, employment in public setting, obesity, and

history of hypertensive disorder of pregnancy in previous pregnancy. Working in public setting may predispose to some level of stress arising from waking up early in order not be cutup in traffic jam, being assigned to a large volume of work or responsibilities etc. Stress, obesity and history of hypertensive disorder of pregnancy are well known risk factor for HDP (WHO, 2013). Hence, it is not surprising that these variables were found to significantly predict higher risk of PIH in this study.

Significant predictive risks of preeclampsia include lack of formal education, self-employed, overweight, and history of hypertensive disorder of pregnancy in previous pregnancy. Similar finding of association between overweight and preeclampsia was also reported in the Cameroon study by Njukang et al. and from Lanzhou, China by Shao et al. [9, 21].

Significant predictive risks of eclampsia include lack of formal education, self-employed, unemployment, overweight, and women with no history of hypertensive disorder of pregnancy in previous pregnancy [22-25].

Conclusion

This study was able to identify prevalence of hypertensive disorders of pregnancy, their socio-demographic characteristics and other risk factors that can predict this condition among pregnant women. The prevalence rate is high

This study provides most recent baseline information about prevalence, risk factors and management of hypertensive disorders of pregnancy among pregnant women in University of Benin Teaching Hospital, Benin City, Edo State, Nigeria. From the findings this is study was able to identify prevalence of hypertensive disorders of pregnancy, their socio-demographic characteristics and other risk factors that can predict this condition among pregnant women and conclude that there is high prevalence of HDP in the study institution but low maternal mortality.

It is recommended that more public enlightment on prevalence and danger of hypertension in pregnancy should be re-enforced among the general populace. Health care providers should consider the reported independent predictive risk factors for HDP among the study group as a screening tool for the prediction, early diagnoses as well as timely interventions of hypertensive disorders of pregnancy. Improving on antenatal care services and multidisciplinary management approach may improve maternal and fetal outcome in patients with HDP.

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