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Hypertensive disorder of pregnancy prevalence and associated factors among pregnant women attending ante natal care at Gondar town health Institutions, North West Ethiopia 2017

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ABSTRACT

Introduction: Hypertensive disorders of Pregnancy are the major complications that cause about 60%–80% of all maternal deaths. Preeclampsia is a major hypertensive disorder of pregnancy that had caused maternal mortalities and morbidities all round the world.
Objective: To assess the prevalence of pregnancy induced hypertension disorder and associated factors among pregnant women attending antenatal care service at Gondar town public health institutions.
Methods: Institutional based cross-sectional study were conducted from April-June 2017 in Gondar town public health institutions, Northwest Ethiopia. The data were entered and analyzed by using SPSS version 20.0.
Result: The prevalence of hypertensive disorder of pregnancy were 16.8%. Maternal age, family history of hypertension, and alcohol intake during pregnancy were significantly associated with hypertensive disorder of pregnancy.
Conclusion: The finding of this study showed that there were a considerable proportion of women had hypertensive disorder of pregnancy. Therefore, it is important to give health education to develop health seeking behavior of pregnant women.

1. Introduction

Hypertensive Disorders of Pregnancy (HDP) are one of the five major complications that cause about 60% to 80% of all maternal deaths [1]. Studies indicate that HDP is the main cause for maternal mortality and morbidity all round the world [2,3].The classification of HDP is difficult because of limited knowledge about its etiology and the lack of conformity of definitions [2,3]. The classification of blood pressure among pregnant women categorizes HDP into five classes: Preeclampsia, Eclampsia, gestational hypertension, Chronic hypertension and Preeclampsia superimposed on chronic hypertension. Preeclampsia is a pregnancy induced hypertension that causes considerable rise in proteinuria [4].

Approximately 289,000 women died globally from pregnancy related causes in 2013, from which 99% of deaths occur in developing nations. Sub-Saharan African countries contribute for about 56% of all maternal deaths in the world. A women life time risk of dying from pregnancy related complications in developing countries is14 times higher than in developed countries [5].

Investigations revealed that preeclampsia is a predisposing factor for several potentially lethal complications. Placental abruption, disseminated intravascular coagulation, intracranial hemorrhage, hepatic failure, acute renal failure and cardiovascular collapse, intra uterine fetal growth restriction, intrauterine fetal demise and prematurity appear to be the major lethal obstetric problems that result from preeclampsia [6–9]. Preeclampsia is one of the leading causes of maternal mortality and morbidity among pregnant women in the world. The incidence of the disease shows discrepancy among affected populations

Abbreviations: ANC, Antenatal Care; BMI, Body mass index; EMONC, Ethiopian emergency obstetric and neonatal care; HDP, Hypertensive disorder of pregnancy; HTN, Hypertension; LNMP, Last normal Menstrual period; MMR, Maternal Mortality Rate; PPH, Postpartum hemorrhage; SDG, Sustainable development goals; WHO, World Health Organization

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of the world [10].

The American High Blood Pressure Education Program Working Group report indicates that about 30% of HDP in that country were due to chronic hypertension while 70% of the cases were preeclampsia [6]. It is also expected that undeveloping countries are more prone to the problem than developed countries and face worse complications of the problem than the developed ones [10,11]. Poor pregnancy outcomes that are associated with lack of antenatal care (ANC) follow up and delayed recognition and intervention in the affected mothers aggravate the situation more [12–16].

According to Ethiopian Demographic Health Survey (EDHS, 2011) report 60–80% deaths are due to five major complications-namely PPH, puerperal sepsis, HDP, unsafe abortion and obstructed labor [5]. The Ethiopian National Emergency Obstetric and Newborn Care also reported as the complications of about 5% of all pregnancies and 1% of all deliveries resulted from preeclampsia [16].

All these health problems are rampant in developing countries like Ethiopia. Hence, unfortunately the maternal mortality rate in our country is 676/100,000 live births when compared to 12/100,000 live births in most developed countries [17].

2. Justification of the study

Hypertensive disorder of pregnancy among pregnant women is the outstanding public health problem and important contributing factor for maternal and prenatal morbidity and mortality in the world especially in developing countries.

Reducing MMR is one of the SDG which were a top priority of Ethiopian government health policy. Hence, early identification and management HDP and its associated factors among pregnant women at ANC clinic are the basic component of obstetrical care in Ethiopia. However, the number of studies to assess prevalence of hypertensive disorder of pregnancy and its associated factors in the study area is limited.

Therefore this study will help to address the prevalence of HDP and its associated factors among pregnant women in the study area and will be an input for the already existing program to curb its negative impact on maternal and prenatal health.

3. Objectives

3.1. General objective

To assess the prevalence of pregnancy induced hypertension and factors among pregnant women attending antenatal care service at Gondar Town health institution.

3.2. Specific objectives

To determine the magnitude of pregnancy induced hypertensionin the study area.

To identify associated factors related to pregnancy induced hypertension.

4. Methods

4.1. Study area and period

The study were conducted at Gondar town health institutions from April-June 2017. Gondar town is located about 750 km far from Addis Ababa, the capital city of Ethiopia. According to the 2007 population and housing census report, the total population size of Gondar town were estimated to be 206,987. It is 2133 m above the sea level with a tropical climate having an average annual temperature of 19.1 °c at 12°36′N 37°28′E and 12.600 N 37°.487°E latitude and longitude respectively [17].There are ten health centers, one referral hospital, one private general hospital and several privately owned higher, medium and primary clinics in the town.

4.2. Study design

Institution based cross-sectional design were conducted.

4.3. Source population

All pregnant women attending antenatal care service in Gondar town public health institutions.

4.4. Study population

The study population were all pregnant women attending antenatal care service for the first time in Gondar town health institutions during the study period. Inclusion criteria were pregnant women attending ANC for the first time at Gondar university referral hospital and women with a history of chronic hypertension were excluded.

5. Sample size and sampling procedure

5.1. Sample size

The required sample size of the study was determined by single population proportion formula [18];

$$\frac{n=(P)(1-p)(Z\alpha/2)^2}{d^2}$$

n = (1.96)2(0.5) (0.5)/(0.05)2 = 384.

10% = ——38.4(non response rate).

Total sample size = 422.

5.2. Assumption

n = the number of pregnant women to participation in the study.

z = 95% confidence interval, which is 1.96.

p = the proportion of pregnant women having HDP = 0.5 (since there were no previous similar study, 50% proportion of HDP were taken).

d = the margin of error, taken as 5%.

5.3. Sampling technique

Systematic random sampling was used to select study participants.

6. Operational definition

Gestational hypertension: is a rise in gestational blood pressure beyond the normal (systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DBP) ≥ 90 mmHg) after 20 weeks of gestation without the development of significant protein uria (< 0.3 g/l) during pregnancy, labor and/or within 48 h of delivery.

Gestational proteinuria: Development of significant proteinuria (> 0.3 g/l) after 20 weeks of gestation or during labor and/or within 48 h of delivery.

Pre-eclampsia: Development of gestational hypertension and significant proteinuria after 20 weeks of gestation or during labor and/or within 48 h of delivery.

7. Data collection tools, procedure, data quality control and analysis

Data were collected by using interviewer administered semi structured questioner. The tool were developed from different literatures to gather the desired information from the sample population. The

questionnaire were first prepared in English and then translated into the local language (Amharic), and back to English to ensure consistency. Field supervisors reviewed the questionnaires daily. The tool validity and reliability were tested and Cronbach's alpha value were 0.89. Data were checked for completeness, coded and entered in to Epi-info version 7 statistical software and exported to SPSS Windows version 22 for analysis. Model fitness were checked by using Hosmer and Lemeshow and it were > 0.05. Variables with P-value < 0.05 were identified on the basis of Odds Ratio with 95% confidence interval. Frequencies, percentage frequencies, and cross tabulations were used to summarize descriptive statistics and the result are presented with tables.

8. Results

8.1. Socio-demographic characteristics

A total of 422 pregnant women were incorporated into the study. This makes the response rate 100%. About 34(8.1%) of them were aged below 24 years and there were 34(8.1%) pregnant women whose age were ≥35 years. Orthodox and Muslim were the major religions practiced among the participants each accounting 320(75.8%) and 95(22.5%), respectively. Among the total respondents, 413(97.9%) were married and the rest 9(2.1%) were single. Concerning their level of education, about 106(25.1%) of them attended primary level of education. Majority of them 399(94.5%) were Amhara in ethnicity (Table 1).

8.2. Characteristics related to reproductive, obstetric, behavioural and family history of pregnant women

From all the study participants about 300 (71.1%) had menarche at their age of 13–15 years and 41(9.7%) of them started before their thirteenth birth day. About 397 (94.1%) of them became pregnant at the age < 35 years and 25 (5.9%) were pregnant at the age greater than or equal to thirty five years. About 174(41.2%) of them were primgravida (become pregnant for the first time) and 247(58.5%) of them were multiparous. From the total participants 21(5%) of the women had conceived twins. History of chronic hypertension in the previous pregnancy were seen in 17(4%) of the informants while 71(16.8%) of them developed hypertensive disorder of pregnancy with the current pregnancy There were family history of hypertension in 71(16.8%) of them. Diabetes mellitus (DM) were seen in the families of 40(9.5%) informants. From this study the prevalence of hypertensive disorder of pregnancy were16.8% (Table 2).

Table 1
Socio demographic Characteristics of pregnant women attending ANC in public health institutions in Gondar town, North Gondar Zone, Ethiopia 2017.

No	Variable		Frequency (N)	Percent (%)
1	Age (in years)	< 24	34	8.1
		25–29	28	6.6
		30–34	326	77.3
		35 and above	34	8.1
2	Marital status	Married	413	97.9
		Un married	9	2.1
3	Residence	Urban	351	83.2
		Rural	71	16.8
4	Religion	Orthodox	320	75.8
		Muslim	95	22.5
		Protestants	2	0.5
		Others	5	1.2
5	Ethnicity	Amhara	399	94.5
		Oromia	10	2.4
		Tigray	4	0.9
		Others	9	2.1
6	Educational status	Unable to read and Write	126	29.9
		Able to read and Write	92	21.8
		Primary educations	106	25.1
		Secondary educations	98	23.2
7	Average monthly income (in birr)	100–999	156	37.0
		1000–1499	112	26.5
		1500–2499	95	22.5
		2500 1nd 1bove	59	14.0

Table 2
Reproductive and obstetriccharacteristics of women attending ANC in public health institutions in Gondar town, North West Ethiopia, 2017.

Variable		Frequency	%
Age at menarche in years	< 12	41	9.7
	13–15	300	71.1
	≥16	81	19.2
Age at first pregnancy	< 25	360	58.3
	26–34	37	8.8
	> 35	25	5.9
Parity	Nulliparous	175	41.5
	One delivery	99	23.5
	Two and above deliveries	148	35.1
Gravidity	One	174	41.2
	Two and above	248	58.8
Multiplicity of current pregnancy	Single	401	95
	Twin	21	5
Previous history of HDP	Yes	71	16.8
	No	351	83.2
Family history of hypertension	Yes	71	16.8
	No	351	83.2
Family history of DM	Yes	40	9.5
	No	382	90.5
Blood pressure > 140/90 mmhg	0	351	83.2
	1	71	16.8
Urine protein ≥ 0.3 gm/l(+2 and above)	< 2	347	82.2
	≥2	75	17.8

8.3. Behavioural and nutritional characteristics

From the total pregnant women of the study, 38(9%) were tobacco smokers and the rest had no habit of smoking. About 64(15.2%) of the informants had history of drinking alcohol while the remaining 358(84.8%) didn't have history of alcohol intake during current pregnancy (Fig. 1)

8.4. Factors associated with pregnancy induced hypertension

The odds of age of respondents < 24 had 69% less likely to develop hypertensive disorder of pregnancy when compared to age ≥35 (AOR = 0.31; 95% CI: 0.05, 0.027). pregnant women who have family history of hypertension were 7.8 times more likely to develop hypertensive disorder of pregnancy when compared to those pregnant women who do not have family history of hypertension (3.037, 19.62 (AOR = 0.7.77; 95%CI: 3.037, 19.62). Furthermore, alcohol users during current pregnancy are two times more likely to develop hypertensive disorder of pregnancy compared to non-users (AOR = 0.1.984; 95% CI: 0.77, 5.108) (Table 3).

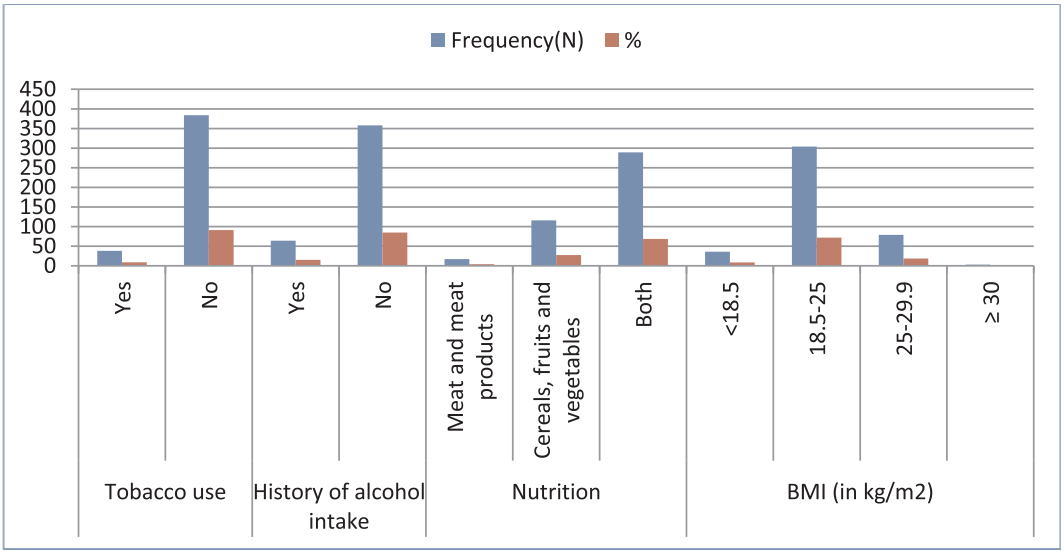

Fig. 1. Behavioural and nutritional characteristics of pregnant women attending ANC in public health institutions in Gondar town, North West Ethiopia, 2017.

9. Discussion

Hypertensive disorder of pregnancy is characterized by high blood pressure and a significant amount of protein in the urine. It is one of the major causes of maternal mortality worldwide [2]. This study attempted to examine the prevalence and factors associated to pregnancy induced hypertensionamong pregnant women who had ANC follow up in Gondar town public health institutions.

The finding of this study showed that 71(16.8%) of pregnant women had hypertensive disorder of pregnancy during their current pregnancy. This prevalence is comparable with the prevalence reported from a study done in Nigerian teaching Hospital 17.0% [23] but significantly

Table 3
Multivariable logistic regression analysis of factors associated with pregnancy induced hypertension disorder among pregnant women attending ANC in public health institutions in Gondar town, North West Ethiopia, 2017.

Variables		HDP		COR (95% CI)	AOR with 95% CI* P value < 0.05
		Yes	No		
Age in year	< 24	5	29	18.944(4.755,75.159)	0.31(0.05,3.027)
	25–29	11	17	8.433(2.551,27.884)	0.78(0.14,3.422)
	30–34	37	289	12.744(5.886,27.685)	0.42(0.012,6.015)
	35 and above	18	16	1	1
Educational status	Unable to read and write	18	108	0.625(0.294,1.329)	3.304(0.915,11.93)
	Able to read and write	36	56	0.663(0.295,1.489)	2.23(0.539,9.217)
	Primary education	10	96	0.600(0.276,1.303)	4.318(1.314,14.18)
	secondary education	7	91	1	1
Average monthly income	100–999	21	135	2.69(1.077,6.721)	0.20(0.052,1.764)
	1000–1499	12	100	1.701(0.687,4.209)	0.559(0.168,1.859)
	1500–2499	24	71	0.306(0.138,0.677)	2.096(0.695,6.328)
	> =2500	14	45	1	1
Age at first pregnancy	< 25	56	304	1.179(o.440,3.156)	0.08(0.000, 2.159)
	26–34	5	32	0.276(0.118,0.646)	0.628(0.240,1.647)
	> 35	10	15	1	1
Age at menarche in year	< 12	14	27		
	13–15	43	257	14.00(1.810, 108.272)	0.08(0.000,1.159)
	> =16	14	67	1.793(1.000, 3.214)	0.628(0.240,1.647)
	> =2	51	197	1	1
Multiplicity	Single	35	304	2.134(1.203,3.789)	0.154(0.021,1.128)
	Twin	36	47	1	1
Self-history of chronic HTN	Yes	7	64	0.268(0.098,0.730)	1.817(0.380,8.691)
	No	10	341	1	1
Family history of HTN	Yes	26	45	*0.255(0.143,0.452)	*7.77(3.037,19.62)
	No	45	306	1	1
Tobacco smoking	Yes	10	61	0.529(0.244,1.145)	0.081(1.47,25.02)
	No	28	323	1	1
Alcohol intake	Yes	20	44	0.365(0.199,0.670)	*0.984(0.77,5.108)
				1	1

Key: *Significant variables.

higher from the findings of the study done in Yekatit 12 Hospital, Addis Ababa, Ethiopia5% [15]. The difference might be due to place of residence and health institutions in Gondar town serve patients out of the catchment area. However a study conducted inYekatit 12 Hospital took their study participants from urban areas. But in our case, some of the participants were rural dwellers.

According to the finding of the current study, the risk of developing hypertensive disorder of pregnancy are higher in older women than in young pregnant women. A similar finding were reported from a study done in Dessie Referral Hospital, Ethiopia [5]. This might be because of increasing of age increases the risk of developing cardiovascular disease [5–9].

This study identified that multiplicity of pregnancy is not a factor for pregnancy induced hypertension. However, a study done in Dessie referral hospital [19], suggests that multiple pregnancies had significant effect on the incidence of hypertensive disorder of pregnancy that might be due to exposure to excessively abundant trophoblastic tissue and possibly from the psychological and physiological stress that develops in the women because of the multiple pregnancies [20]. Hence, this difference might be due to the presence of few numbers of pregnant women in this category (5%).

In this study those pregnant women who have family history of hypertension have greater odds (eight times) of developing hypertensive disorder of pregnancy compared to those who haven't. This finding is consistent with a study done in Dessie Referral Hospital in which pregnant women who had family history of hypertension were nine times more likely to develop hypertensive disorder of pregnancy. This might be due to genetic factors that contribute to physiologic predisposition of hypertensive disorder of pregnancy [19].

Some studies reported that alcohol consumption is a predisposing factor for preeclampsia [19,21,22]. The same finding were also seen among our study participants. The reason might be because of alcohol use may have effect on renal function and systemic blood vessels that may expose the person to secondary hypertension and the secondary hypertension ultimately leads to preeclampsia [21].

However unlike other literatures [23], this study showed that tobacco smoking were not a significant factor for the development of hypertensive disorder of pregnancy. This might also be related to the presence of fewer numbers of pregnant women who have history of smoking during pregnancy in the study area.

10. Conclusion

Hypertensive disorder of pregnancy was less prevalence in this study than other similar studies. Some of the factors associated with hypertension disorder of pregnancy particularly were maternal age, family history of hypertension, and history of alcohol intake during pregnancy.

11. Declarations

11.1. Ethical approval and consent to participate

11.1.1. Ethical consideration

The proposal were reviewed and approved by the ethical review committee of Gondar University School of Nursing before the starting of the study. All respondents participated in this study were volunteers. Measures were taken to assure the respect, dignity and freedom of each individual participating in the study. Information on the procedure of the study were given verbally to all study subjects. Verbal consent were obtained before administrating the questionnaire and participants were assured of confidentiality of information and the data were collected anonymously.

12. Availability of data and materials

All relevant data were within the manuscript.

Competing interests

The authors declare that they have no competing interests.

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The University of Gondar covered the data collector payment. However, the funders had no role in study design, data collection and analysis, decision to publish, or preparation of the manuscript.

Authors contributions

Tarkie Abebe carried out the study starting from conception, analysis and interpretation of data and drafting of the manuscript. Abere Woretaw participated in data analysis and interpretation of the finding and in critical review of the manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.preghy.2019.03.007.

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