

Factors Associated with Hypertensive Disorder of Pregnancy in Kombolcha

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Abstract

Background: Hypertensive disorder of pregnancy is a leading cause of maternal and prenatal mortality. It is also a major cause of pregnancy complication, causing premature delivery, foetal growth retardation. In addition, it has long-term health effects, like, chronic hypertension, kidney failure and nervous system disorders. Since no study was conducted so far in Kombolcha town, exploring determinants of hypertensive disorder of pregnancy is important to take important preventions in the study area. The objective of this study is to assess determinants of hypertensive disorders of pregnancy among pregnant women attending antenatal and delivery in Kombolcha town.

Methods: A facility based unmatched case control study design was conducted among pregnant women attending antenatal and delivery care services in health facilities of Kombolcha town. 117 cases and 353 controls were participated in the study. For data collection, a structured and pretested standard questionnaire was used. Descriptive statistics were done to characterize the study population using different variables. Bivariate and multiple logistic regression models were fitted to control confounding factors. Odds ratios with 95% confidence intervals were computed to identify determinants of hypertensive disorders of pregnancy.

Result: In this study participants who could not read and write were 2.66 (AOR, 2.643, 95% CI, 1.106-6.319) and 4.4 (AOR, 4.417, 95% CI, 1.583-12.327) times more risk of developing hypertensive disorder of pregnancy than those who can read and write, attending their primary education respectively. Women who have previous history of preeclampsia were 4.4 (AOR, 4.224, 95% CI, 2.064-8.645) times more risk of hypertensive disorder of pregnancy than their counterparts.

Conclusion and recommendation: In this study, lower educational status, previous history of preeclampsia and family history of hypertension were determinants of hypertensive disorders of pregnancy. Health care providers should give high attention for illiterate, previous history of preeclampsia to initiate ANC to prevent, early diagnosis and treatment of hypertensive disorders of pregnancy in pregnant women to reduce maternal and child complications.

Keywords: Factors; Hypertensive; Pregnancy; Kombolcha

Abbreviations: ANC: Anti Natal Care; AOR: Adjusted Odds Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; DBP: Diastolic Blood Pressure; HDP: Hypertensive Disorder of Pregnancy; SBP: Systolic Blood Pressure

Introduction

Hypertensive disorder of pregnancy (HDP), defined as high blood pressure during pregnancy; is one of the direct cause of maternal and child mortality [1-3]. It is measured by blood pressure level greater than 140/90 mm Hg after 20 weeks gestation. Severe forms of HDP are reflected through blood pressure levels of 160/100 mm Hg and more [4,5].

In developing countries pregnant women suffered by pregnancy related complications and physiological effect of pregnancies. HDP which includes preeclampsia and eclampsia is a major public health problem in sub Saharan countries. It is common medical complication of pregnancy responsible for maternal and child mortality [6-11]. Its

effect is high when a woman has chronic disease like renal and diabetes mellitus [12]. It complicates the health of the new born through preterm delivery, low birth, hypothermia and would end up as a still birth or abortion [13,14].

The Ethiopian government plane to reduce maternal mortality due to pregnancy related complication like hypertension, pre partum and postpartum bleeding, but the incidence of hypertension and its complication on mothers and new born is prevalent as indicted by different study conducted in different parts of the country [14-16].

Blood pressure level is more effectively controlled through enhancing the pregnant mothers' self- care knowledge. However, it appears most pregnant women with pregnancy related hypertension lack adequate knowledge to look after themselves during pregnancy in order to control the blood pressure level. Even though there are few studies exploring hypertension during pregnancy in Ethiopia, there has no any study conducted yet in the current study area of my interest. Therefore, this study will be conducted to identify factors associated with hypertension during pregnancy. So this study aimed to assess the associated factors of pregnancy related hypertension and finally the findings will provide information on health status of pregnant mothers

in the study setting and the recommendation will point out appropriate actions for decision makers.

Method

Study setting

A facility based unmatched cases-controls study was conducted in health facilities of Kombolcha town, south Wollo zone, Amhara regional state of Ethiopia. Kombolcha is located 372 km away from the capital city of Ethiopia, Addis Ababa. It has five health centres and one family guidance association providing maternal health services (antenatal, delivery and post natal care).

Source population

Both source and study populations were pregnant women who had visited antenatal and delivery service wards of health facilities in Kombolcha town from September 20, 2016–January 26, 2017. Pregnant women who were admitted for delivery service and unable to respond during interview were excluded from the study.

The sample size was calculated using Epi Info version 7.1.5.2 software for unmatched case control study. It was determined by taking an important independent predictor (age of pregnant women) (20) which gave maximum sample size (the proportion of exposure in controls group on age greater than 30 was 21.1 with odds ratio of 2 with the following assumptions 80% power, 5% level of significance, 10% non-response rate, 1:3 Ratio (case to control ratio), then the total sample size was about 470 (case 117 and 353 and the total sample size is 470). Both institutions were included purposefully. By assuming clients were randomly distributed all cases were included consecutively and three controls preceding the case were included consecutively till adequate sample was taken from the two hospitals.

Study variables and measurement

Hypertensive disorder of pregnancy is the dependent variable of this study. Whereas Socio demographic characteristics (age, residence, religion, ethnicity, marital status, educational status, occupational status), Medical and reproductive history and Women behavioural factors (alcohol consumption, chat chewing, tobacco use) were independent variables.

Cases are pregnant women's who had visited health institution for antenatal care and delivery service and had confirmed diagnosis of hypertensive disorders of pregnancy. Controls are pregnant women's who had visited health institution for antenatal care and delivery service and had no evidence of hypertensive disorders of pregnancy.

Blood pressure of pregnant mothers was measured manually with a validated sphygmomanometer in sitting position at the right upper arm after the mothers take rest at ANC and delivery ward clinic for five minutes and classify as pregnancy related hypertension which is systolic blood pressure ≥ 140 mm Hg or diastolic pressure ≥ 90 mm Hg which occurs 20 weeks of gestational age on wards on previously normal hypertensive woman after taking two times similar measurements and considered as cases. The presence of edema at face, hands will be investigated by physical examination. And systolic blood pressure ≥ 160 mm Hg or diastolic pressure ≥ 110 mm Hg as sever hypertensive disorder of pregnancy. Preeclampsia is gestational hypertension [systolic blood pressure (SBP) ≥ 140 mm Hg and/or

diastolic blood pressure (DBP) ≥ 90 mm Hg after 20 weeks of gestation plus the presence of proteinuria.

Data quality control

In order to assure the quality of data the following measures were taken: questionnaire was prepared in English and translated to local language Amharic and re translated back to English. Training was given for both data collectors and supervisors for two days. Pretest of tool was done in non- selected health centre (Dessie) on 5% of the sample which is not part of the study area before conducting the main study and the lessons obtained from the pre-test were included in the final tool. Supervision of data collectors was made for each hospital by supervisor and investigators.

Data analysis

The completed questionnaire was checked for completeness and consistency by the principal investigator and the coordinators each day and code was given to the completed questionnaire. The data were entered using Epi Info version 3.5.1 and transferred to SPSS 21.0 statistical package for analysis. Data cleaning was performed to check for accuracy, consistencies, and values. Then errors were identified and corrected. Univariate analysis using frequency technique was used to describe the data according to some important characteristics of the study subjects. Then the data were expressed in percentage, means, medians and standard deviations. Then bivariate logistic regression techniques was used to see the crude association between the independent variables and the dependent variable and the strength of association was expressed in odds ratio (OR). Variables with ($p < 0.25$) were analyzed by using multivariate logistic regression to control confounding effects.

Ethical consideration

In this study, the principal investigator was followed the basic ethical principles of respect for persons, beneficence and justice.

Ethical clearance obtained from the institutional review board of Wollo University, department of public health, college of medicine and health science. Written permission obtained from District health department and respective health centres. During data collection process, which held by asking each women, their willingness to participate and informing the significance of the study, their rights to participate, withdraw, and refuse the interview at any time. In addition, written informed consent also gained for their readiness to participant. After ensuring the participation, the data was collected. The information gained interview strictly kept confidential, safe and privacy kept. Generally, the data obtained from the participants used for this study only. Besides data collection, a woman who had hypertensive disorder of hypertension advised to follow antenatal care strictly and get appropriate treatment for the current and future pregnancy.

Results

Socio demographic characteristics

In this study 117 cases of hypertensive disorder of pregnancy and 353 control women who visit antenatal care and delivery services were interviewed. Among cases 66 and 51 were detected during antenatal

and delivery care respectively. From cases 12 were developing preeclampsia and 17 were severe HDP (Table 1).

Variable	Cases (n=117)	Controls (n=353)	Total (470)
	N (%)	N (%)	N (%)
Age			
15-24	42 (36.0)	118 (33.5)	160 (24.8)
25-34	59 (50.3)	165 (46.7)	224 (47.7)
35-44	12 (10.3)	57 (16.1)	69 (14.8)
>44	4 (3.4)	13 (3.7)	17 (3.7)
Residence			
Urban	71(60.7)	175 (59.8)	246 (52.4)
Rural	46 (39.3)	142 (40.2)	224 (47.6)
Religion			
Orthodox	69 (59.0)	238 (67.4)	307 (65.3)
Muslim	37 (31.6)	95 (26.9)	132 (28.1)
Protestant	11 (9.4)	20 (5.7)	31 (6.6)
Ethnicity			
Amhara	111 (94.9)	336 (95.2)	447 (95.1)
Tigray	6 (5.1)	17 (4.8)	23 (4.9)
Marital Status			
Single	11(9.4)	24 (6.8)	35 (7.4)
Married	98 (83.8)	317 (89.8)	415 (88.3)
Divorced	8 (6.8)	12 (3.4)	20 (4.3)
Educational Status			
Not Read And Write	17 (14.5)	103 (29.2)	120 (25.5)
Read And Write	58 (49.6)	135 (38.3)	193 (41.1)
Primary School	23 (19.7)	52 (14.7)	75 (16.0)
Secondary And Above	19 (16.2)	63 (17.8)	82 (17.4)
Occupation			
Unemployed	62 (53.0)	181 (51.3)	243 (51.7)
Employed	55 (47.0)	172 (48.7)	227 (48.3)

Table 1: Socio demographic characteristics of women who attend ANC and delivery care in health facilities of Kombolcha town, September 20, 2016 -January, 26, 2017.

From the total of 65 cases and 195 controls, 71 (60.7%) of cases and 175 (59.8%) of the controls were urban residents. Majority, 69 (59.0%) cases and 238 (67.4%) of the controls were orthodox religion followers. Almost all 111 (94.9%) of case and 336 (95.2%) controls were Amhara ethnic groups.

Majority of the women were married, 98 (83.8%) cases and 317 (89.8%) controls respectively. 19 (16.2%) of cases and 63 (17.8) controls had attend secondary and above level of education.

Reproductive and medical history of clients

The study revealed that nearly one fourth of, 16 (24.6%) cases and 50 (25.6%) of controls were prim-gravid. In addition, 48 (73.8%) cases and 138 (70.8%) of controls were nulliparous. only 14 (21.5%) of cases and one fourth of 49 (25.1%) of controls had ANC visit four times during their current pregnancy. 19 (29.2%) of cases and one third of 72 (36.9%) of controls had get their first pregnancy before 19 years old.

Nearly half 29 (44.6%) of cases and 103 (52.8%) controls have greater than 35 month inter-pregnancy space. About half of 34 (52.3%) cases and 89 (45.6%) of controls were give female child birth. Majority of both cases and controls had a single pregnancy 61 (93.8%) and 190 (97.4%) respectively.

Nearly half of 29 (44.6%) cases and 25 (12.8%) controls had previous history of preeclampsia. Only 9 (13.8%) of cases and 10 (5.1%) controls had family history of diabetes mellitus (DM). 33 (50.8%) of cases and 33 (16.9%) of controls had family history of hypertension (HTN).

About one-fourth of (26.2%) cases and (29.2%) controls had history of abortion. Only 1 (1.5%) of cases and 5 (2.6%) of controls were chat chewers. 100% of both cases and controls did not smoke cigarette (Table 2).

Variable	Cases (n=117)	Controls (n=353)	Total (470)
	N (%)	N (%)	
Gravid			
Primgravid	29 (24.8)	100 (28.4)	129 (27.4)
Multigravida	88 (75.2)	253 (71.6)	341 (72.6)
Parity			
Prim parous	27 (23.1)	107 (29.3)	134 (28.5)
Multiparous	90 (76.9)	246 (69.7)	336 (71.5)
Age of first pregnancy (15-49)			
15-19	37 (31.6)	132 (37.4)	169 (36.0)
20-24	71 (60.7)	202 (57.2)	273 (58.0)
25-29	9 (7.7)	19 (5.4)	28 (6.0)
Time interval between pregnancy			
No interval	30 (25.6)	88 (24.9)	118 (25.1)
1-24 months	31 (26.5)	74 (21.0)	105 (22.3)
25-34 months	5 (4.3)	18 (5.1)	23 (4.9)
≥ 35 months	51 (43.6)	173 (49.0)	132 (47.7)
Previous history of preeclampsia			
No	65 (55.6)	303 (85.8)	368 (78.3)
Yes	52 (44.4)	50 (14.2)	102 (21.7)

Family history of DM			
No	106 (90.6)	337 (95.5)	443 (94.3)
Yes	11 (9.4)	16 (4.5)	27 (5.7)
Family history of HTN			
No	55 (47.0)	290 (82.2)	345 (73.4)
Yes	62 (53.0)	63 (17.8)	125 (26.6)
History of abortion			
No	86 (73.5)	256 (72.5)	342 (72.8)
Yes	31 (26.5)	97 (27.5)	128 (27.2)
History of DM			
No	114 (97.4)	353 (100)	467 (99.4)
Yes	3 (2.6)	0 (0)	3 (0.6)
History of kidney disease			
No	83 (70.9)	326 (92.4)	409 (87.1)
Yes	34 (29.1)	27 (7.6)	61 (12.9)
Chat chewing			
No	2 (1.7)	8 (2.3)	10 (2.1)
Yes	115 (98.3)	345 (97.7)	460 (97.9)
Alcohol consumption			
No	31 (26.5)	72 (20.4)	103 (21.9)
Yes	86 (73.5)	281 (79.6)	367 (78.1)

Table 2: Reproductive and medical history of women who attend ANC and delivery care in health facilities of Kombolcha town, September 20, 2016 -January, 26, 2017.

Determinants of preeclampsia

Different factors were analyzed for their independent effect on HDP. Delivering women who could not read and write were two point six (AOR, 2.643, 95% CI, 1.106-6.319) and about four (AOR, 4.417, 95% CI, 1.583-12.327) times more risk of developing HDP than those who can read and write and attending their primary education respectively.

Delivering women who had previous history of preeclampsia were 4.2 (AOR, 4.2, 95% CI, 2.1-8.6) times more risk of HDP development as compared to these who had no previous experience of preeclampsia.

Delivering women who had Family History of hypertension were about 4 (AOR, 3.9, 95% CI, 2.0-7.8) times more risk of developing HDP as compared to these who had no family history of hypertension (Table 3).

Discussion

Recognizing factors that affect hypertensive disorder of pregnancy in pregnant women had a paramount important to reduce maternal as well as child mortality and morbidity.

In the present study women who had family history of hypertension were about five times at more risk of developing HDP than their counterparts. The study is in line with studies done at Dessie referral hospital, Bangladesh, Derashie [13,14,17].

Variables	Cases (n=117)	Controls (n=353)	COR (95% CI)	AOR (95% CI)	p-value
Religion					
Orthodox	69 (59.0)	238 (67.4)	1		
Muslim	37 (31.6)	95 (26.9)	1.343 (0.675-2.348)		
Protestant	11 (9.4)	20 (5.7)	1.897 (1.203-14.342)		
Educational Status					
Not Read and Write	17 (14.5)	103 (29.2)	1	1	
Read and Write	58 (49.6)	135 (38.3)	2.603 (1.171-5.848)	2.643 (1.106-6.319)	0.029
Primary School	23 (19.7)	52 (14.7)	2.679 (1.499-9.529)	4.417 (1.583-12.327)	0.005*
Secondary and Above	19 (16.2)	63 (17.8)	1.872 (0.783-4.855)		
History of Kidney disease					
No	83 (70.9)	326 (92.4)	1		
Yes	34 (29.1)	27 (7.6)	4.946 (1.980-9.123)		
Previous history of preeclampsia					
No	65 (55.6)	303 (85.8)	1	1	
Yes	52 (44.4)	50 (14.2)	4.848 (2.875-10.436)	4.224 (2.064-8.645)	0.000***
Family history of HTN					
No	55 (47.0)	290 (82.2)	1	1	
Yes	62 (53.0)	63 (17.8)	5.189 (2.741-9.351)	3.941 (1.984-7.826)	0.000***
Family history of DM					
No	106 (90.6)	337 (95.5)	1		
Yes	11 (9.4)	16 (4.5)	2.185 (1.151-7.679)		

Table 3: Factors associated with HDP women who attend ANC and delivery care in health facilities of Kombolcha town, September 20, 2016 -January, 26, 2017.

Educational attainment of women is another determinant of developing HDP [6,8,17]. Illiterate mothers were more likely to have HDP than their counter parts. This is could be educated mothers are likely to be aware of pregnancy related complications (due to use of contraception, antenatal care) and its consequences, likely to marry educated husband that facilitate couples discussion on maternal health care utilization, likely to be autonomous in decision making and hence meting her reproductive need when she want. Education may also increases health seeking behaviours of women.

Previous history of preeclampsia increases risk of developing HDP in feature pregnancies. The result is supported by other studies history of previous preeclampsia is a known risk factor for a new event in a future pregnancy [12,15,17].

Limitations of the study are it mainly focuses on individual level factors and factors related to the health system and the service providers did not included, the socio cultural factors and related misconception on early initiation of antenatal care and women who were give delivery at home were not assessed. Since it is cross-sectional study cause effect relation is not established. Further research is needed on the outcome of HDP on women by using follow up study.

Conclusion and Recommendations

Lower educational status, previous history of preeclampsia and family history of hypertension are predictors of HDP.

Based on the findings the following recommendations were given. As maternal health services (ANC) is potential time for counselling of mothers about pregnancy related complications, counselling about HDP should get more focus. There is great need to prioritize education of girls to empower them to use different interventions which reduces the occurrence of different pregnancy related complications, particularly HDP, to encourage women to be supported by their spouses and to promote utilization of different maternal health services. In addition there is need to focus on pregnant women with family and previous history of preeclampsia and hypertension by strengthening client-provider interaction especially through maternal and child health services.

Declarations

Ethics approval and consent of participants

The study proposal got ethical approval from Wollo University, health science college ethical review committee. Administrative bodies of respective town and hospital administrations were asked for their permission of the research to be conducted in the area. Informed oral and written consent was obtained from participants.

Availability of data and materials

“The data that support the findings of this study has a sort of identifier of individual participants and researcher reserved to send it”.

Competing interests

The author declares that he has no competing interest.

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