

**HYPERTENSIVE DISORDERS OF PREGNANCY AND ASSOCIATED FACTORS
AMONG ADMITTED PREGNANT CASES IN DESSIE TOWN REFERRAL HOSPITAL,
NORTH EAST ETHIOPIA, 2015**

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Abstract

Introduction: Hypertensive disorder of pregnancy (HDP) is the most common medical problem encountered during pregnancy, which increased risk of maternal and neonatal mortality and morbidity. Despite of its significant effect, the magnitude and risk factors yet not assessed at local context.

Objective: To assess the occurrence of hypertensive disorders of pregnancy and associated factors among admitted pregnant women in obstetrics and gynecology ward in Dessie referral hospital, North East Ethiopia.

Methods: Institutional based retrospective cross sectional study in 320 admitted pregnant cases at obstetrics and gynecologic ward through one year document review and documents selected with systematic random sampling. Bivariate and multivariate logistic regression were used to identify significant risk factors for the development of hypertension disorder of pregnancy and presented by AOR and P-value.

Result: Out of 320 sample pregnant mothers, 28(8.8%) had confirmed hypertensive disorders of pregnancy (HDP). Of which 13(46.4%) were mild preeclampsia, 8(28.6%) were severe preeclampsia, 3(10.7%) were eclampsia, 4(14.2%) were gestational hypertension. Being urban residence (OR=4.409, 95%CI ;(1.459-13.324)), nully parity (OR=11.363, 95%CI ;(3.991-32.349)) and multiple pregnancy (OR=3.369, 95CI ;(1.178-59.442)) were statically significant risk factors for occurrence hypertension disorder of pregnancy. Regarding past medical conditions, having pre - existing hypertension, renal disease and cardiac disease were positively associated risk factors for the development of HDP.

Conclusion: Significant numbers of pregnant mothers develop hypertensive disorder of pregnancy. To decrease this burden, health personnel's should work extensively at static and community level in reducing risk factors which lead to hypertension disorder of pregnancy.

Key words: Eclampsia, Gestational Hypertension, IUGR

Introduction

Hypertension disorder of pregnancy is the major cause of poor pregnancy outcome that encountered during pregnancy (1). HDP defined as abnormal raising of blood pressure during pregnancy, which diagnosis as chronic hypertension, gestational hypertension, mild preeclampsia, severe preeclampsia or/and eclampsia (2, 3)

Globally, 5-10% of all pregnancy women were affected with HDP which cause substantial maternal and infant morbidity and mortality (2, 3). It is believed that 10-15% of maternal mortality in developing countries is due to HDP (5). Ethiopia is one of the six countries in which 50% of all maternal deaths occurred in 2008(6). According to EDHS 2011 report, maternal mortality ratio in Ethiopia was 673 per 100,000 live births (7).

About 70% of maternal deaths are attributed to five major complications; hemorrhage, infection, unsafe abortion, hypertensive disorders of pregnancy, and obstructed labor (1).

HDP increases the risks of serious outcomes for maternal and newborn baby such as premature delivery, IUGR, perinatal mortality & morbidity, acute renal failure (ARF), acute hepatic failure, bleeding at the time of delivery and postpartum bleeding, maternal mortality & morbidity following harms such as disseminated intravascular coagulation (DIC) and seizures (8-11).

The exact cause for HDP yet not well studied in local context especially in developing countries in which mothers come to health institution after complications arise. The possible risk factors may relate to socio demographic, obstetric gynecology and past medical history factors.

Therefore, this study answered, what is the magnitude of HDP among admitted pregnant cases of obstetrics and gynecology ward? What specific factors associated with occurrence of HDP?

Methods and Materials

Study Design and period

Institutional based retrospective cross sectional study was conducted from July 8th 2014 to July 7th 2015. To ensure representativeness, sample documents were selected by using a systematic random sampling method.

Study Area

The study was carried out at Dessie town referral hospital. Dessie is one of the oldest towns which are found in South East of Amhara Region of Ethiopia, 523 km from Bahir Dar (Regional Capital) and 401Km from Addis Ababa (National Capital). The town is divided in to10 urban and 5 rural village units. Dessie referral hospital is one of the oldest hospitals in Amhara region, North East Ethiopia serve for a million of people. The hospital has different departments, of which obstetric and gynecology department is one of the main, which serve for ANC, pregnancy related problem diagnosis and management, delivery and post delivery service. It has 34 admission beds with obstetric and gynecology specialist doctors.

Source Population:

All women who were utilizing Dessie referral hospital service during pregnancy.

Study Population:

All pregnant women who were admitted to obstetrics and gynecology ward at Dessie referral hospital during the study period.

Inclusion criteria

All pregnant women admitted to obstetrics and gynecology ward that completed their treatment, delivered or died after initiation of treatment in the hospital during the study period.

Exclusion criteria

Pregnant women discharged against medical advice or had incomplete data.

Sample size determination

The required sample size was determined using single population proportion formula

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by taking proportion of hypertensive disorders of pregnancy among admitted pregnant cases 8.5% (22), 95% level of confidence and 3% marginal error.

$$n = [Z_{(\alpha/2)}^2 * p(1-P)] / d^2$$

Since the study population is less than 10,000, the final sample size corrected as follows:

$Nf = 331/1 + 331/2373 = 291$. By adding 10% non response rates, the final sample size equal to 320.

Sampling procedure

Firstly, from health management information system registration book of all admitted pregnant mothers during the study period at obstetrics and gynecologic ward was checked for completeness. Then for those mothers who had complete data in the book, separate sampling frame was made by giving number from 1 to N. Then using a systematic random sampling method samples taken in every 7th from sampling frame which determine by $K = N/n = 2373/320$. The first document was selected by lottery method which is three.

Study Variables:

1) Dependent Variable:

Hypertensive disorders of pregnancy (present or absent)

2) Independent Variables:

Socio demographic variables: Age, residence, religion, ethnicity, marital status, BMI, smoking status.

Obstetric gynecology variables: Parity, gravidity, ANC follow up, multiple pregnancies, gestational age.

Medical history: Preexisting hypertension, familial history of hypertension, cardiovascular factors, renal factors, Diabetes mellitus.

Operational Definitions:

Hypertensive Disorders of Pregnancy: A pregnant mother admitted because of having chronic hypertension, gestational hypertension, mild preeclampsia, severe preeclampsia or/and eclampsia(2,3)

Data collection procedure and data quality control

Data was collected through document review in obstetrics and gynecologic ward. The required data were extracted from patient chart, registration book and anesthesia room registrations & operation log books by four Bsc nurses who work in gynecology & obstetric department and had at least three year work experience for one week period.

To ensure the quality of the data and checking the existence of required variable, pre test was made at obstetrics and gynecologic ward. One day training was given to data collectors for identifying complete and incomplete data. And daily supervision was done to check completeness and consistency.

Data processing and analysis

The collected data was cleaned and entered to EpiData 3.1 software which secured further data quality by reducing errors made while data entry. Then entered data were transported to SPSS version 21.0 for data analysis.

To explain the study population in relation to relevant variables, descriptive statistics were computed like a frequency distribution table; graph and summery measures were computed.

To identify significant associated variables for hypertensive disorders of pregnancy, first each independent variable with the outcome variable checked using bivariate logistic regressions. And those variable p value ≤ 0.3 were selected and imported for further analysis using multiple logistic regressions.

In multiple logistic regressions, those variables' p value ≤ 0.05 were considered as statistically significant and presented using adjusted odds ratio, 95% confidence interval and P- value

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Ethical Consideration

Ethical clearance was obtained from Wollo University College of medicine & health science ethical review committee. Permission was secured from Dessie referral hospital clinical service head. To keep the confidentiality of mothers' history, their names were not documented; rather a code was given for each card.

Results

Socio-demographic characteristics of the study participants

Out of 320 reviewed documents, 96(61.3%) were rural residents and 242(75.6%) were Amhara ethnic group. About 258(80.6%) were orthodox Christians followed by 47(14.7%) Muslims

160(50%) of participants were belongs to age group between 20-24 years old. About 304(95%) pregnant mothers were married and the rest were not married

Table 1: Socio demographic characteristics of the pregnant women who admitted in obstetric and gynecologic ward, Dessie town referral hospital, from July 8th 2014 - July 7th 2015(n=320).

Variables	Classification	Total sample cases		Cases of HDP	
		Frequency	Percent	Frequency	Percent
Age(in years)	<20	16	5.0	3	10.7
	20-24	160	50.0	15	53.6
	25-29	73	22.8	5	17.8
	30-34	36	11.3	1	3.6
	≥35	35	10.9	4	14.3
	Total	320	100	28	100
Residence	Rural	196	61.3	8	28.6
	Urban	124	38.8	20	71.4
	Total	320	100	28	100
Ethnicity	Amhara	242	75.6	21	75
	Oromo	43	13.4	5	17.9
	Afar	18	5.67	2	7.1
	Total	320	100	28	100
Religion	Orthodox	258	80.6	23	82.1
	Muslim	47	14.7	5	17.9
	Protestant	7	2.2	0	0
	Catholic	8	2.5	0	0
Total	320	100	28	100	
Marital status	Married	304	95.0	27	96.4
	Not married	16	5.0	1	3.6
	Total	320	100	28	100

Occurrence of hypertensive disorders of pregnant (HDP)

Out of 320 admitted pregnant mothers at obstetric and gynecology ward, 28(8.8%)

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were confirmed hypertensive disorders of pregnancy (HDP). Of which, 13(46.4%) were mild preeclampsia, 8(28.6%) were sever preeclampsia, 3(10.7%) were eclampsia, 4(14.2%) were gestational hypertension.

Obstetric and gynecological profile of the patient

Out of 320 women whose obstetric and gynecological profile had reviewed, about 262(81.6%) were multigravida, of which 11

were developed HDP. Similarly about 61(19%) pregnant mothers were nully parity, of which 18(64.2%) were developed HDP.

Regarding the type of pregnancy, about 21(14.3%) pergnant women had multiple type of pregnancy, of which four were developed HDP. On the other hand, about 241(75.3%) of pregnant mothers had at least one ANC visit.

Table 2: Obstetric and gynaecologic characteristic of pregnant women who had admitted at obstetric and gynecologic ward, Dessie referral hospital, Dessie from July 8th 2014-July, 7th 2015(n=320).

Obstetric and gynecological profile	Classification	Total sample cases		Cases of HDP	
		Frequency	Percent	Frequency	Percent
Gravida	Primigravida	58	18.1	17	60.7
	Multigravida	262	81.9	11	39.3
Parity	Nully parity	61	19	18	64.3
	≥1	259	81	10	35.7
Gestational age (in week)	<28	23	7.2	2	7.1
	28-32	0	0	0	0
	32+-34	13	4.1	1	3.6
	34+-36+	28	8.8	7	25
	37-42	229	71.6	13	46.4
	≥42	6	1.9	0	0
	Unknown LMP	21	6.6	5	17.9
Type of pregnancy	Single	299	93.4	24	85.7
	Twin/multiple	21	6.6	4	14.3
ANC follow up history	Yes	241	75.3	26	10.8
	No	79	24.7	2	2.5

Past history of medical conditons/illness

Out of 320 reviewed documents, six mothers had pre existing hypertension and of which five of them had developpe HDP in current pregnancy. Regarding family history of hypertension, 20(6.3%) had family history of HPN, of which four(14.3%) had developed HDP during current pregnancy. Similarly, about 12(3.85) participants had

diabetes mellitus history, of which four (14.3%) were developed HDP.

Regrding history of renal disease, 26(8.1%) pregnant mother had history renal disease, of which six(21.4%) were developed HDP. And similary, five mothers had a history of cardiovascular disease, of which two had developed HDP at current pregnancy.

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Table 3: Past history medical conditons/illness of pregnant women who had admitted at obstetric and gynecologic ward, Dessie referral hospital, Dessie from July 8th 2014-July 7th 2015(n=320).

Past history illness Related to HDP	Classification	Total sample cases		Cases of HDP	
		Frequency	Percent	Frequency	Percent
Preexisting hypertension	Yes	6	1.8	5	17.8
	No	314	98.2	23	82.2
Family history of hypertension	Yes	20	6.3	4	14.3
	No	300	93.8	24	85.7
History of diabetes mellitus	Yes	12	3.8	4	14.3
	No	308	96.3	24	85.7
History of renal disease	Yes	26	8.1	6	21.4
	No	294	91.9	22	78.6
History of cardiac disease	Yes	5	1.6	2	7.6
	No	315	98.4	26	92.4

Factors Associated with Hypertensive disorders of pregnancy:

Among the variables imported to multiple logistic regressions - residence, parity, multiple pregnancies, history of renal and cardiac disease were statistically significant risk factors for the occurrence of hypertensive disorders of pregnancy.

Urban resident pregnant women were 4.409 times more likely to develop hypertensive disorders of pregnancy as compared with rural residence pregnant women. [AOR: 4.409, 95%CI: (1.459, 13.324)].

Women who had zero parity/had not given birth so far were 11.363 times more likely to develop HDP as compared with mothers

who gave birth. [AOR: 11.363, 95%CI: (3.991, 28.35)].

Mothers who had multiple pregnancies were 3.37 times more likely to develop HDP as compared with single type of pregnancy. [AOR: 3.37, 95%CI: (1.18, 10.44)].

Women had a history of renal disease were 3.5 times more likely to develop hypertensive disorder of pregnancy as compared with those mothers who had not history of renal disease. [AOR: 3.5, 95%CI: (1.96, 20.63)].

Women who had a history of cardiac disease were 6.56 times more likely to develop HDP as compared with those who had not history of cardiac disease. [AOR: 6.56, 95%CI: (4.065, 32.219)].

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Table 4: Bivariate and multiple logistic regression analysis on factors associated with HDP among pregnant women who had admitted at obstetric and gynecologic ward, Dessie referral hospital, Dessie from July 8th, 2014-July 7th, 2015. (n=320).

Variables	HDP status		COR (95%CI)	AOR (95% CI)
	Present	Absent		
Residence				
Rural	8	188	1.0	1.0
Urban	20	104	4.52(1.92, 10.62)	4.41(1.46, 13.32)
Parity				
nulliparity	18	43	10.42 (4.51, 24.10)	11.36(3.99, 28.35)
≥1	10	249	1.0	1.0
Types of pregnancy				
Multiple	4	17	2.70(0.84, 8.66)	3.37(1.18, 10.44)
Single	24	275	1.0	1.0
History of renal disease				
Yes	6	20	3.71(1.35, 10.19)	3.50(1.96, 20.63)
No	22	272	1.0	1.0
History of cardiac disease				
Yes	2	3	7.41(1.18, 46.37)	6.56(4.07, 32.22)
No	26	289	1.0	1.0

Discussion

Out of 320 admitted pregnancy cases, 8.8% pregnant mothers developed hypertensive disorders of pregnancy. This finding was comparable to global range HDP from 5-10% (1). But lower than studies done in south Wales and Tehran, Iran hospital obstetric and gynecology ward (9.8%)(12,13). This variation may be due to socio economical and cultural difference between study areas.

In contrast with above, the result of this study higher than studies done in Bahrain, India, Pakistan, Ethiopia Jimma and Addis Ababa (14-23). This might be due to every pregnant mother recommended by the government to undergo ANC and deliver at health institutions which increase the rate of

diagnosis. Besides the above, it might be due time difference studies done.

Regarding the distribution of mild preeclampsia, severe preeclampsia, eclampsia, gestational hypertension among hypertension disorder of pregnancy (HDP) cases, the highest cases due to mild and sever preeclampsia, followed by gestational hypertension and eclampsia. This finding was in line with other studies findings done in south Wales, southern Iran, Bahrain, India and Jimma Ethiopia (13-19).

Being urban residence is one of the significant important risk factor for the development of hypertension disorder of pregnancy. This finding was similar with a study done in Jimma hospital Ethiopia (17). The association might be due to the life style of urban which are exposed for

sedentary/less exercise and over nourished as compared with rural residences.

Multiple pregnancy and multiparity also significantly associated with the development of hypertensive disorder of pregnancy (HDP). This finding is similar with other studies (20-22). This finding can be explained by being multiple pregnancies and having the first pregnancy can induce physical and psychological stress that make a woman at risk of the development of HDP. Renal disease and cardiovascular disease also statistically significant risk factor for hypertension disorder of pregnancy. This finding was in line with studies done in America and south India (21-22). The probable reason for this justification may be due to; most of the women may not have regular medical checkup after once treated.

Age, smoking, gestational age and family history were not statically significant in this study, but they are mentioned as an important risk factor for hypertension disorder of pregnancy by other researches (17, 20-23).

Limitation of the study

Documents review was in Dessie referral hospital only, it doesn't considered private clinics, health centers and home delivery mothers since they have not well documented and have not computerized health information management system. All assumed risk factors were not considered since the study was based on document review.

Conclusion

Significant number of pregnant mothers affected with hypertensive disorder of pregnancy. Being multiple pregnancies,

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nulliparity and urban residence are significant socio demographic and obstetric and gynecology variables that are risk for the development of HDP. Having renal disease and cardiac disease also important risk factors for the occurrence of HDP.

Recommendations:

Community health workers should educate pregnant mothers on how to cope up with psychological and physical stress, including slight physical exercise to minimize stress as well as normalize cardiac output and blood pressure. Health workers should build a mechanism to follow up those mothers who had cardiac disease, pre existing hypertension or renal disease. Besides regular pregnancy check up while ANC follow-up, special test should undergo to detect pre existing health problems since most pregnant women know their status after serious consequence happened. Health workers should give adequate counseling service for all pregnant women while ANC follow up regarding factors which predispose to HDP.

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