

Research Article

Prevalence of Preeclampsia and Associated Factors among Antenatal Care Attending Mothers at Tirunesh Beijing General Hospital, Addis Ababa, Ethiopia

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Background. Hypertensive condition during the pregnancy of the mother that usually occurs after 20 weeks of gestation age is clinically considered preeclampsia. This health problem of pregnant mothers can lead to various complications for both the mother and the baby. But the risk factors for preeclampsia have not been well documented. Therefore, availing up-to-date information on the prevalence and associated factors of preeclampsia is essential for its early identification and management. This study aimed to assess the prevalence of preeclampsia and associated factors among pregnant women attending antenatal care (ANC). **Methods.** Cross-sectional study design was used from March 1, 2022, to March 30, 2022, among 235 pregnant women attending antenatal care at Tirunesh Beijing General Hospital (TBGH) from March 1, 2022 to March 30, 2022, in Addis Ababa, Ethiopia. Systematic random sampling was employed to get study participants from antenatal care attendants. Data were collected by an interviewer-administered questionnaire. The presence of statistical association was determined using an adjusted odds ratio (AOR) with a 95% confidence interval (CI). Variables with *P* values less than 0.05 were considered statically significant. **Result.** A total of 235 participants were enrolled in the study with a 99.1% response rate. The prevalence of preeclampsia among the current pregnant women who attended ANC in Tirunesh Beijing General Hospital was 5.5% with 95% CI (AOR = 1.3–10.0). Significant variables such as respondents age >35 years, 2.1 (AOR = 1.3–3.4), history of preeclampsia 8.5 (AOR = 1.2–10.3), history of hypertension 2.9 (AOR = 3.0–7.3), ANC visit <3 times 8.5 (AOR = 3.1–13.4), and family history of hypertension 2.2 (AOR = 1.24.3) were significantly associated with preeclampsia. **Conclusion.** A considerable proportion of pregnant women were experiencing preeclampsia. History of preeclampsia and hypertension, family history of hypertension, and maternal age were associated factors of preeclampsia. Therefore, health professionals working in health institutions give more attention to controlling hypertension during antenatal service.

1. Introduction

Preeclampsia is a hypertensive condition common to pregnancy that usually occurs after 20 weeks of gestation and affects both the mother and the fetus. It is a multisystem pregnancy-specific disorder happening in 3–5% of all pregnancies, and it is one of the leading causes of maternal and fetal morbidity and mortality [1].

Severe preeclampsia commonly occurs since the second trimester of gestation and it is a serious clinical type of preeclampsia manifested by at least one of the following: persistent increase in blood pressure ($\geq 160/110$ mmHg), proteinuria greater than 5 g per 24 hours, platelet count $<100,000/\text{mm}^3$, haemolytic elevated liver enzymes and low platelet count (HELLP) syndrome, cerebral or visual disturbances, persistent severe epigastric pain or more

specifically right upper quadrant pain, and pulmonary edema [2–4].

The risk of maternal death is 40 times higher in the least developed countries compared with European countries. Sub-Saharan African and Southern Asian countries accounted for about 66% and 20% of the global maternal deaths, respectively [5]. Preeclampsia accounts for up to 12% of all yearly worldwide maternal deaths and it is responsible for 25% of fetal and neonatal deaths [6]. The prevalence of preeclampsia ranges from 2% to 10%, which varies from one country to another [7]. The impact of preeclampsia is more severe in developing countries and the prevalence rate is between 1.8% and 16.7% [8]. Based on the estimation of World Health Organization, the incidence of preeclampsia is seven times higher in developing countries than that in developed countries [9]. In Africa, preeclampsia occurs in 10% of pregnancies, which is significantly higher than the global average of 2 percent [10]. In Ethiopia, preeclampsia contributes 11% of maternal deaths [11]. The Ethiopian National Emergency Obstetric and new-born care showed that preeclampsia contributed to the complication of approximately 1% of all deliveries and 5% of all pregnancies; moreover, it had contributed to 16% of direct maternal mortality and 10% of all maternal mortality and morbidity [12]. In Addis Ababa, preeclampsia increased from 2.2% in 2009 to 5.58% in 2013 [13]. Antenatal care (ANC) is one of the freely provided maternal care services in Ethiopia. Blood pressure measurement and urine analysis are some of the routinely performed activities of ANC [14].

The Ethiopia Ministry of Health provides training for health care providers to detect and manage preeclampsia including magnesium sulphate protocol, provision of logistics, and supportive supervision. Nevertheless, maternal mortality in the country is still high, 412 per 100,000 live births [15]. However, the majority of deaths due to preeclampsia are avoidable through the provision of timely and effective management of such complications [16]. So far, there has been limited evidence from other studies that clearly indicate the prevalence and associated factors of preeclampsia in Ethiopia. In addition, the evidence of previous studies is outdated. Therefore, availing up-to-date information on the prevalence and associated factors of preeclampsia is essential for its early identification and management. The result of this study is important for improving the survival status of mothers and new-born babies.

2. Methods

2.1. Study Design and Setting. Cross-sectional study design was conducted from March 1, 2022, to March 30, 2022, on 235 pregnant women who are attending antenatal care at Tirunesh Beijing General Hospital, Addis Ababa, Ethiopia. The hospital is fully organized and launched in 2011 with a total number of 376 employees. At present, it is estimated to give service for about 605,266 people per year according to the hospital report 2021. According to the hospital 2022 first quarter report, the hospital provided ANC follow-up service for 325 pregnant women.

2.2. Sample Size and Sampling Procedure. The sample size of the study was calculated using a single population proportion formula considering the following assumptions: proportion of preeclampsia (P) 9.9% [16], 95% CI, 4% margin of error, and a nonresponse rate of 10%. The final sample size was 235. The systematic random sampling technique was used to select the study participants.

2.3. Data Collection Tools and Process. Data were collected by face-to-face interview using a structured and pretested questionnaire. The questionnaire was pretested at Gandhi memorial hospital, Ethiopia. Three midwives, one nurse, and one public health supervisor were involved in the data collection process. Medical records were also reviewed for some clinical and laboratory results including proteinuria.

2.4. Data Process and Analysis. Descriptive statistics was used to explore the data in relation to the relevant variables. Binary logistic regression was used to assess the association between the dependent variable and independent variables. Then, variables with *P* value less than or equal to 0.2 were fitted to multiple logistic regression. The predictive ability of the model was tested with Hosmer–Lemeshow goodness-of-fit test. Finally, variables with *P* value less than 0.05 will be considered as factors associated with preeclampsia.

3. Result

3.1. Sociodemographic Characteristics of the Study Participants. A total of 235 pregnant mothers with ANC visits were expected to participate in the study and 233 responded to the study, only 2 pregnant women did not volunteer to participate in this study which makes our response rate of 99.1%. The mean age of the study participants was 27.96 (\pm SD 4.3). Majority of the respondents were married 218 (93.56%). Most of the respondents had completed secondary school [9–12] 67 (28.75%).

3.2. Obstetric Characteristics of Study Participants. One hundred sixty-two (69.5%) of the mother's current pregnancies were planned. One hundred eighty-eight (80.6%) of the participants have attended ANC more than three times, 163 (69.6%) of the mothers were primigravida. Among the study participants, 67 (28.7%) have experienced obstetric problems, abortion 52 (22.31%), neonatal death 13 (5.58%), and 2 (0.85%) still birth (Table 1).

3.3. History of Maternal Chronic Disease. Thirty (12.8%) and 18 (7.7%) pregnant women had a history of hypertension and family history of hypertension, respectively. In another hand, 12 (5.1%) had the history of preeclampsia during the previous pregnancy. Around 30 (12.87%) pregnant women were reported that they were diagnosed with anaemia and 4 (1.7%) were diagnosed with diabetes mellitus.

TABLE 1: Obstetric characteristics of respondents among ANC attendants at Tirunesh Beijing hospital 2022.

Obstetric characteristics	Frequency	Percent	
Parity	Primipara	206	88.41
	Multipara	26	11.16
	Grandmultipara	1	0.43
Gravidity	Primigravida	163	69.96
	Multigravida	70	30.04
Obstetric problem	Abortion	52	22.32
	Still birth	2	0.85
	Neonatal death	13	5.58
	No	166	71.2
Planned pregnancy	Yes	162	69.53
	No	71	30.47
ANC visit	<3	45	19.31
	>3	188	80.69
Partners support	Yes	150	64.38
	No	83	35.62
Gestational age in weeks	20–37 weeks	213	91.4
	>37 weeks	20	8.6

TABLE 2: Bivariate and multivariable logistic regression analysis on the prevalence of preeclampsia among ANC attendants at Tirunesh Beijing hospital 2022.

Variables	Categories	COR (95%) CI	AOR (95%) CI	P value	
ANC visit	<3 times	2 231	6.78 (0.478, 98.896)	8.5 (3.4–13.4)	0.017*
	>3 times	11 222	1		
History of preeclampsia	Yes	3 9	0.081 (0.01, 3, 0.664)	8.0 (1.2–10.3)	0.032*
	No	10 211	1		
Family history of hypertension	Yes	3 12	0.048 (0.002, 0.973) 0.048*	2.2(1.2–4.3)	0.026*
	No	10 207	1		
History of hypertension	Yes	8 23	0.035 (0.005–0.242)	2.9 (3.0–7.3)	0.0001*
	No	5 200	1		
Partner support	Yes	8 142	1.785 (0.184, 7.369)	0.970 (0.340–2.772)	0.955
	No	5 78	1		
History obstetric problem	Yes	3 64	1.851 (0.306–1.851)	0.578 (0.248–1.347)	0.204
	No	10 156	1		
Women age	<35	0 233	1	2.1 (1.1–3.4)	0.008*
	>35	13 220	138.43 (3.52, 4.62)		

3.4. *Maternal Behaviours.* Among respondents, 19 (8.6%) were reported that they are drinking alcohol and only 2 (0.86%) of them smoke cigarettes. And 3 (1.28%) of the study participants were using traditional herbal medicines.

3.5. *Prevalence of Preeclampsia and Protein Urea Measurements.* The overall prevalence of preeclampsia was 13 (5.57%). Two hundred eight (89.3%) women did not have protein urea in their urine during the study period and 25 (10.7%) of study participants' protein urea in their urine during the study period was +1 and above.

3.6. *Associated Factors with the Prevalence of Preeclampsia.* Bivariable logistic regression was performed and those variables which had a *P* value <0.25 were entered into the multivariable logistic regression analysis. Only seven variables were selected for multivariable analysis, these were having history of preeclampsia in previous pregnancy,

number of ANC visits, family history of hypertension, history of hypertension, history of obstetric problems (neonatal death), partner support, and women age >35.

The findings of this study confirmed that the women age greater than 35 years old (AOR = 2.1; 95% CI: 1.3, 3.4), pregnant women who had a history of preeclampsia in a previous pregnancy (AOR = 8; 95% CI: 1.2, 10.3), women who had ANC visits <3 times (AOR = 8.5; 95% CI: 3.4, 13.4), women who had history of hypertension (AOR = 2.9; 95% CI: 3.0, 7.3), and pregnant women who had a family history of hypertension (AOR = 2.2; 95% CI: 1.2, 4.3) were significantly associated with preeclampsia (Table 2).

4. Discussion

Preeclampsia is pregnancy-induced hypertension with significant proteinuria. It is one of the major causes of maternal mortality worldwide. The current study revealed that the prevalence of preeclampsia was 5.57% (95% CI: 1.5–10.0).

The finding was comparable with a study conducted at Jimma University Hospital, Ethiopia (7.6%) [17] and it was high as compared with the studies conducted in different parts of Ethiopia, 4.4% in Dessie referral hospital, Ethiopia [12] and 2.23% in Dilla hospitals, Ethiopia [18]. In contrast to the other study, this study finding was found to be lower compared with the studies conducted in Abakaliki, South-East Nigeria (16%) [19]. This variation might be due to the fact that there is a difference in study setting, socio-economical differences, method difference, and a difference in time duration.

This study confirmed that there is a presence of higher odds of developing preeclampsia in older women. This is congruent with the study conducted in Germany, Pakistan, Tehran, Iran, and Desse, Ethiopia [12, 20–22]. This could be explained as the woman gets older, she is more likely to have cardiovascular problems. This would particularly happen due to the gradual loss of compliance of the cardiovascular vessels that is mainly associated with ageing of uterine blood vessels and arterial stiffness. In addition, when the woman gets older, the hemodynamic adaptations during pregnancy becomes more difficult [19].

According to this study, those women with a family history of hypertension had about 2 times greater odds of developing preeclampsia compared with those who have not. This finding is in line with studies conducted in Brazil [20], Sudan [21], Pakistan [22], and Uganda [23]. This might have occurred due to genetic factors that contribute to the physiologic predisposition of preeclampsia.

5. Conclusion

The findings of this study showed that a considerable proportion of pregnant women experienced preeclampsia. History of preeclampsia, previous history of hypertension, and family history of hypertension, women age >35 years old, and ANC visits were associated factors of preeclampsia.

Acronyms

ANC: Antenatal care
 AOR: Adjusted odds ratio
 APO: Adverse pregnancy outcome
 CI: Confidence interval
 DBP: Diastolic blood pressure
 DM: Diabetic mellitus
 HTN: Hypertension
 OR: Odds ratio
 PIH: Pregnancy-induced hypertension
 WHO: World Health Organization.

Data Availability

The analysed data used to support the findings of this study are included within the article.

Ethical Approval

Ethical clearance was obtained from Debre Berhan University College of Health Science Ethical Review Committee.

Permission to gather data was obtained from Tirunesh Beijing General Hospital administrative office. An information sheet was provided to the study participants with the introductory part of the questionnaire and an interview topic guide that further explains the study purpose and confidentiality of the research information. Participation was on a voluntary basis.

Consent

Oral consent was sought from the study participants prior to data collection.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Authors' Contributions

Dr. Esubalew Tesfahun and Mrs. Selam Tadesse designed the study, conducted the statistical analysis, and drafted the manuscript. Dr. Awraris Hailu, Dr. Abebe Menda, Dr. Meseret Ekubay, Mr. Behailu Tarikuand, and Mr. Abinet Dagnaw designed the study, supervised the data collection, and edited the manuscript.

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