PRE-ECLAMPSIA RISK FACTORS AMONG PREGNANT WOMEN ATTENDING IN FOUR PUBLIC HEALTH FACILITIES OF ADDIS ABABA CITY

Administration, Central Ethiopia: Case Control Study

Eyob Mohammed[1], MPH, Gebi Agero[2] , MPH and Elias Ali[3], MD, MPH

[1and 2] College of Health sciences, Arsi University, Asella, Ethiopia

[3] Jimma Institute of Health Sciences, Jimma, Ethiopia

ABSTRACT

BACKGROUND: Preeclampsia represents a major cause of morbidity and mortality in mother, fetus and infant in many parts of the world particularly developing countries including Ethiopia. It has been increasing and linked to multiple factors, and making prevention of the disease a continuous challenge.

OBJECTIVE: To assess risk factors of preeclampsia among pregnant women visiting ante natal or delivery care in four public health facilities of Addis Ababa City administrative, Ethiopia.

METHOD: This is a case control study of 261 (87 Cases and 174 Control) pregnant women attending antepartum or intrapartum. Bivariate analysis was run to assess crude association between predictor and outcome variable. Multiple logistic regression analysis was used to see the effect of independent variables on the outcome variable for those p values < 0.2 in bivariate analysis.

RESULTS: The significantly associated risk factors with preeclampsia were BMI >30 [AOR 5.2 95% CI 2.1~12.6], age 18—23 years, [AOR .3, 95% CI .128 –.71)], low level of occupation/daily worker/, [AOR 0.3, 95% CI .128 –.71)], not know or heard preeclampsia [AOR 6.49 95% CI 3.02~13.9], and primigravidity [AOR 3.29, 95% CI 1.143 –7.54)]. Whereas women who were gravid more than four [AOR 3.85, 95% CI 1.46 –10.1], previous history of preeclampsia [AOR 9.74 95% CI 2.38~39.8] and family history of hypertension [AOR 2.92, 95% CI 1.194 –7.1] after the effects of other significant risk factors were controlled in multivariate logistic analysis.

CONCLUSIONS: This study found evidence that socioeconomic, medical and obstetric variables have a significant influence on the odds of in pregnant woman. Effective interventions targeting risk factors of preeclampsia and routinely educate and create awareness by the pregnant woman towards risk factors of preeclampsia during antenatal care visit.

KEY WORDS: Preeclampsia, Risk Factor, knowledge, Addis Ababa, Ethiopia.

(Ethiopian Journal of Reproductive Health 2017;9:45-59)

INTRODUCTION

Maternal mortality is unacceptably high; with about 830 women die from pregnancy or childbirth-related complications around the world every day[1]. The complications that account for 80% of all maternal deaths are: severe bleeding (mostly bleeding after childbirth), infections (usually after childbirth), high blood pressure during pregnancy (preeclampsia and eclampsia), and unsafe abortion[2]. Ethiopia is one of the countries in sub-Saharan Africa with markedly high maternal mortality ratio[3]. The limited information indicates that the proportion of maternal deaths after unsafe abortion is decreasing while deaths after /eclampsia are increasing[4, 5].

The case fatality rates of /eclampsia and ruptured uterus/obstructed labor are increasing. There were 15 deaths due to eclampsia/accounting for 35.7% of the maternal deaths at Tekur Anbas Hospital and Gandi Memorial Hospital[6]. In the same two hospitals, in 1981 -1983, there were 9 deaths due to eclampsia which account for 6.5% of the total maternal death[7].

The most significant risk factors for are previous history of preeclampsia, multiple gestation, history of chronic high blood pressure, diabetes, kidney disease or organ transplant, first pregnancy, obesity particularly with body mass index (BMI > 30), over 40 or under 18 years of age family history of preeclampsia[8]. In low- and middle-income settings, /eclampsia is significantly associated with maternal death, perinatal death, preterm birth and low birth weight[9,10]. Most studies indicate common risk factors are nulliparity[8,11,12,13,14], advanced maternal age[15], multiple pregnancies[16,17], gestational diabetes[18,19] and pre-gestational diabetes. Women with a history of diabetes have an up to four-fold increased risk of development of compared to the general population[20,21]. Chronic hypertension also one of the main determinants of [22,23]. Relationship between the history of preeclampsia and recurrence risk of has been reported by many researches[24,25,26].

Preeclampsia has remained a significant public health threat in both developed and developing countries contributing to maternal and perinatal morbidity and mortality globally. The impact of the disease is felt more severely in developing countries like Ethiopia. The problem is confounded by the continued mystery of the etiology and the unpredictable nature of the disease.

METHODS AND MATERIALS

Facility based case control study was used to assess the risk factors associated with preeclampsia at four public hospitals in Addis Ababa, Ethiopia, from March to April, 2016. Four public hospitals were chosen at random from eight public hospitals in Addis Ababa. The included hospital was Gandie Memorial Hospital, Turenensh Baging Hospital, Yakatiet 12 Hospital, Zawditu Memorial hospital.

The selected cases and controls recruited for the study had gestational age of 20 weeks or greater. Pregnant women with serious medical and obstetric conditions excluded from the study.

The cases were pregnant women diagnosed to have preeclampsia during their antenatal care (ANC), delivery or /and postnatal care within 48 hours. Consecutive cases were included in the study as the diagnosis of

preeclampsia was made until the required sample size was obtained. For each case, two controls were selected by using proportional allocate the sample to health facilities as per their client size (Fig 1).

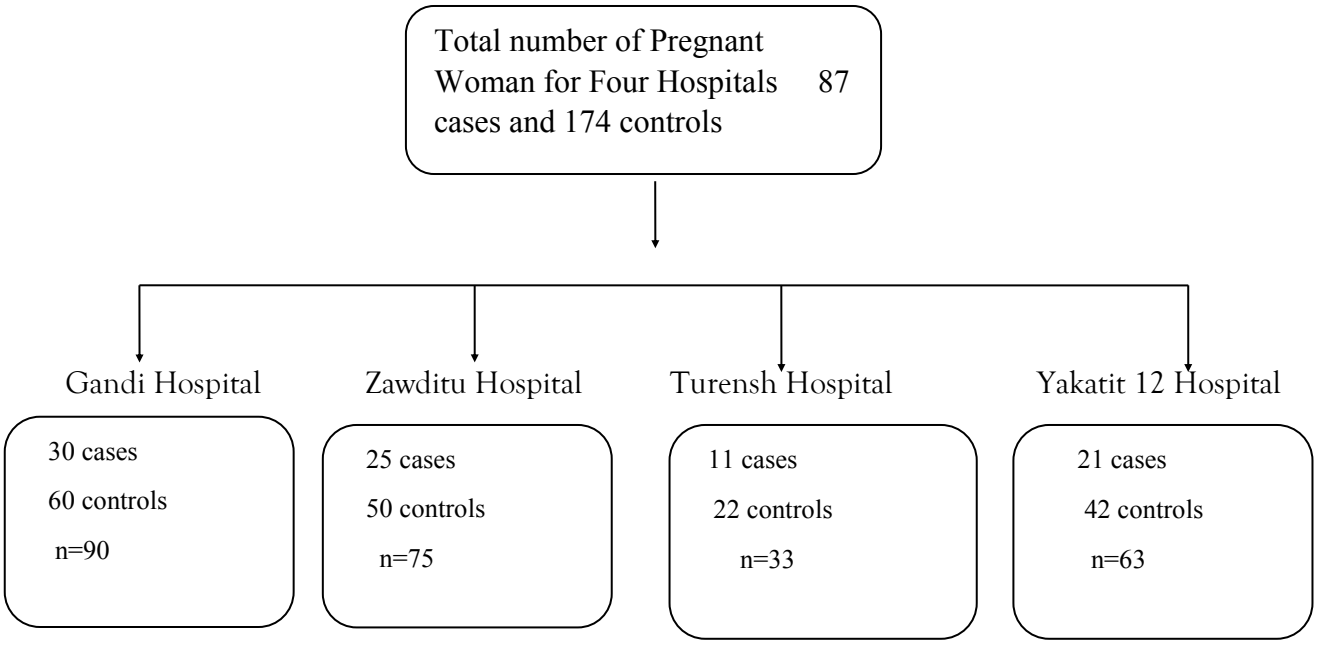

Figure1: The diagrammatic presentation shows how sample population was found selected each hospital

To determine the sample size, the following assumptions was made calculator for two populations by taking 80% power of the test, 95% confidence level and a control to case ratio of 2:1 and odds ratio of 2.2 taken from the findings of literatures using the family history of hypertension as a risk for preeclampsia[43]. Based on the above assumption, the total sample size was required for case and control including 10% for no response was calculated to be 87 and 174 respectively. Preeclampsia women were identified by blood pressure of 140/90 mmHg or higher at least twice, taken four hours apart after 20 weeks of pregnancy, as well as their urine lab result with protein +2 and above. The controls were pregnant woman without preeclampsia who had antenatal care or who gave birth in the labour ward within two days of identifying the case. Knowledge was assed based on five questions; those who have answered 60% of the score were considered to have 'adequate knowledge".

Preeclampsia was the dependent variable. The socio-economic and demographic characteristics were age, religion, occupation, family size, literacy and income status. The number of pregnancy, history of preeclampsia, number of ANC visit, types of pregnancy, family history of preeclampsia, family history of hypertension, family history of diabetes, history of hypertension and history of diabetes, knowledge of risk factors of preeclampsia, and obesity as independent variables.

A well-structured questionnaire was prepared in English version based on previously done similar studies and literature then translated to Amharic version by expert. The Amharic version was back translated to English to maintain conceptual consistency and pretested on other sample population (on 14 pregnant wom-

en). Eight Midwife Nurses were recruited to collect data. Two supervisors were supervising the data collection. Data was collected by face to face interview technique using structured questionnaire and medical records were reviewed for some clinical and laboratory results including proteinuria and blood glucose level.

The data was compiled, cleaned, coded, entered in to Epi info 3.5.1 and analyzed using SPSS 21 computer software version. After exploration, univariate, bivariate and multiple logistic regression analysis were performed in a step wise fashion. Using cross tabulation and unadjusted binary logistic regression technique was done to see the crude association between the dependent and independent variable and the strength of association using odds ratio and Chi Square test. P value < 0.05 used as a cutoff point to test statistically significance. Variables with P value < 0.2 were entered in to multivariate analysis using multiple logistic regression technique to see the effect of independent variables on the outcome variable by controlling effect of others/ confounders.

Ethical clearance and approval for the study was obtained from Research Ethical Review Committee/ RERC/ of College of Health Science of Arsi University. An official letter of cooperation was given to Addis Ababa city administrative health bureau. Selected public institutions were asked with an official letter to get permission. Data collectors were trained how to handle confidentiality and privacy using consent form attached to each questionnaire. The purpose of the study was explained for study participants and informed consent was obtained from respondents. Pregnant women who were not willing to involve the study and those who want to stop interview at any time were allowed to do so. Personal identifiers were not being registered on the questionnaire to keep confidentiality.

RESULT

Two hundred sixty-one women (87, 33.3% cases and 174, 66.7% controls) consented to participate. Their mean (±1 SD) age of cases and control was similar, 27.0 (±1 SD 4.84 years). Most of respondents were married (n=238, 91.2%), Orthodox Christianity (n=185, 70.9%), and house wives (n=109, 41.7 %). The most common educational level of participant's (n=232, 88.8%) and their partner's (n=193, 73.9 %) was primary level (Table 1).

Table 1: Socio-demographic Characteristics of Pregnant women attending Antenatal follow up or delivery care in selected Public Health facility Addis Ababa city administrative, Ethiopia, 2016

Variables	Status of Participant				Total	
	Cases	%	Controls		N=261	%
	N=87		N=174	%		
Age						
18---23	14	16.1	50	28.7	64	24.5
24---29	46	52.9	73	41.9	119	45.6
30---35	18	20.7	44	25.3	62	23.8
>35	9	10.3	7	4.1	16	6.1
Marital Status						
Single	5	5.7	10	5.7	15	5.7
Married	81	93.1	161	92.5	242	92.7
Divorced	1	1.1	3	1.7	4	1.5
Religion						
Orthodox	67	77	118	67.8	185	70.9
Muslim	12	13.7	34	19.5	46	17.6
Protestant	7	8.0	22	12.6	29	11.1
Catholic	1	1.1	0	0	1	0.38
Educational status of pregnant woman						
Primary and non	79	90.8	153	87.9	232	88.9
Secondary & above	8	9.2	21	12.1	30	11.1
Educational level of partners						
Primary and non	70	80.4	123	70.7	193	73.9
Secondary	13	14.9	42	24.1	55	21.1
Above Secondary	4	4.6	9	5.2	13	4.9
Occupation of pregnant woman						
Civil servant & NGO	10	11.4	43	24.7	53	20.3
Daily Worker	14	16.1	11	6.3	25	9.6
Merchant	7	8	23	13.2	30	11.5
Private worker	9	10.3	21	12.1	30	11.5
House wife	44	50.6	65	37.3	109	41.7
Other	3	3.4	11	6.3	14	5.3
Income Pregnant woman						
No Income	45	51.7	80	45.9	125	47.9
Low/1000--2000/	34	39.1	81	46.6	115	44.1
Middle/2001-3000/	5	5.7	9	5.2	14	5.3
High/>3001/	3	3.4	4	2.3	7	2.7
Income of partners						
No Income	19	21.8	31	17.8	50	19.2
Low/1000~2000/	36	41.3	57	32.8	93	35.6
Middle2001~3000/	20	23	46	26.4	66	25.3
High/>3001/	12	13.8	40	23	52	20
Family Size						
1--2 Family Member	37	42.5	62	35.6	99	37.9
3--4Family Member	35	40.2	93	53.4	128	49.0
Family Member 4+	15	17.2	19	10.9	34	13

Percipients' knowledge level of and risk factor was assessed by given question. About 149 (57.7%) respondents were adequate knowledge of and risk factor. Control groups 116 (66.6%) were better known or heard of preeclampsia the cause, sign and symptom than case groups 33 (37.9%). Health worker the main source of information among the respondents which accounted for 80 (53.6%) followed by Television which constituted 16(10.7%) of the adequate knowledge respondents (Table 2).

Table 2. Knowledge and source of information of Preeclampsia Pregnant women attending Antenatal follow up or delivery care in Four Public Health facility Addis Ababa city administrative, Ethiopia,2016

Variables	Status of Participant				Total	%
	Cases	%	Controls	%		
Knowledge of Preeclampsia						
Adequate Knowledge	33	37.9	116	66.7	149	57.1
Inadequate Knowledge	54	62	58	33.3	112	42.9
Source of Information						
Health Worker						
Yes	19	58	61	52.6	80	53.7
No	14	42	55	47.4	69	46.3
Radio						
Yes	5	15.2	6	5.2	11	7.4
No	28	84.8	110	94.8	138	92.6
Television						
Yes	3	9.1	13	11.2	16	10.7
No	30	90.9	103	88.8	133	89.3
Magazine						
Yes	1	3.1	2	1.7	3	2
No	32	96.9	114	98.3	146	98
Another source						
Yes	3	9.1	12	10.3	15	10.1
No	30	90.9	103	88.7	134	89.9

The risk factors in women with pre-eclampsia were evaluated. The association between socio-demographic, medical and obstetrical, family history of the women, and preeclampsia were assessed. In bivariate analyses the significant determinants identified for were BMI (OR = 4.8), age (OR = 0.4), occupation (OR =5.5), and knowledge of preeclampsia (OR = 3). Unlike other previous studies, factors such as education, marital status, and monthly income, family size of women did not show any significant correlation with the incidence of preeclampsia in this study (Table 3).

Table 3. Socio-demographic Factors in woman with and woman with Normal Pregnancy women attending Antenatal follow up or delivery care in four Public Health facility Addis Ababa city administrative, Ethiopia,2016=

						95 % CI	
Characteristic	Case	%	Control	%	Odds ratio	Lower Upper	P-Value
Obesity							.000*
18–24.9	13	14.9	74	42.5	1		
25–30	32	36.7	51	29.3	3.572	1.710–7.462	
>30	42	48.3	49	28.1	4.879	2.377–10.016	
Marital Status							.939
Single	5	5.7	10	5.7	1.5	.123–18.363	
Married	81	93.1	161	92.5	1		
Divorced	1	1.1	3	1.7			
Age							.027*
18–23	14	16.1	50	28.7	.444	.221–.893	
24–29	46	52.9	73	41.9	1		
30–35	18	20.7	44	25.3	.649	.335–1.257	
>35	9	10.3	7	4.1	2.040	.711–5.856	
Woman occupational							.011*
Civil servant & NGO	10	11.4	43	24.7	1		
Daily Worker	14	16.1	11	6.3	5.5	1.920–15.6	
Merchant	7	8.0	23	13.2	1.31	.440–3.218	
Privet worker	9	10.3	21	12.1	1.84	.651–5.218	
House wife	44	50.6	65	37.4	2.9	1.325–6.396	
Woman Educational							.491
Primary and non	79	90.8	153	87.9	2.121	.233–19.299	
Secondary & above	8	9.2	21	12.1	1		
Income of woman							.694
No Income	45	51.7	80	45.9	.750	.161–3.501	
Low/1000-2000/	34	39.1	81	46.6	.560	.119–2.636	
Middle/2001-3000/	5	5.7	9	5.2	.741	.116–4.728	
High/>3001/	3	3.4	4	2.3	1		
Family Size							.104
1–2 family Member	37	42.5	62	35.6	1.586	.903–2.784	
3–4Family Member	35	40.2	93	53.4	1		
Family Member 4+	15	17.3	19	10.9	2.098	.961–4.579	
Knowledge of Preeclampsia							.000*
Yes	33	37.9	116	66.7	1		
No	54	62.1	58	33.3	3.27	1.916–5.5	

The medical and obstetric factors in women with preeclampsia and women with normal pregnancy are shown in Table 4. Woman who had history of, who had a family history of hypertension, were prime-gravid and who were gravid four or more were more likely to develop. Unlike other previous studies, factors such as family history of preeclampsia, family history of diabetes militias, types of pregnancy, number of ANC visit, history of chronic hypertension, history diabetes militias of women did not show any significant correlation with the incidence of preeclampsia in this study (Table 4).

Table 4 Medical and Obstetric Factors in women with and woman with Normal of Pregnant women attending Antenatal follow up or delivery care in four Public Health facility Addis Ababa city administrative, Ethiopia,2016

						95 % CI		
Characteristic	**Case**	**%**	**Control**	**%**	**C.O. R**	**Lower**	**Upper**	**P-Value**
Number of Pregnancy /Parity/								.027*
Prim gravid	39	44.8	64	36.8	1.808	1.018–3.210		
Gravida2–4	30	34.4	89	51.1	1			
Gravid 4 +	18	20.6	21	12.1	2.543	1.197–5.401		
Types of Pregnancy								.841
Singleton	83	95.4	165	94.8	1.132	.339–3.784		
Twins/above	4	4.6	9	5.1	1			
Number of ANC visit								.436
1–3ANC visit	5	5.7	8	4.6	.804	.181–3.570		
4–6ANC visit	43	49.4	104	59.8	.532	.186–1.519		
6–8ANC visit	32	36.7	53	30.4	.776	.263–2.288		
ANC visit 8+	7	8.0	9	5.1	1			
History of Preeclampsia								.021*
Yes	14	16.1	10	5.7	2.72	1.097–6.745		
No	38	43.7	96	55.2	1			
Family History of								.128
Preeclampsia								
Yes	11	12.6	12	6.9	1.954	.825–4.628		
No	76	87.4	162	93.1	1			
Family History of								.047*
Hypertension								
Yes	20	22.9	23	13.2	1.96	1.008–3.810		
No	67	77.1	151	86.8	1			
Family History of Diabetes militias								.380
Yes								
No	4	4.6	13	7.5	.597	.189–1.888		
	83	95.4	161	92.5	1			
History of Chronic Hypertension								0.93
Yes								
No	5	5.7	3	1.7	3.476	.811–14.897		
	82	94.3	171	98.3	1			
History of Diabetes militias								.533
Yes	5	5.7	7	4.1	1.455	.448–4.723		
No	82	94.3	167	95.9	1			

Variables studied in bivariate analysis of risk of preeclampsia in this study (see Tables 3 and 4). Some showed significant difference with *P*-values of <0.05, while in order to avoid missing variables that were significant in other similar studies, a *P*-value ≤0.2 was used as a cutoff point for multivariable analysis. Ten variables that were significant at *P*≤0.2 were entered for backward-stepwise binary logistic regression. Hosmer–Lemeshow goodness-of-fit statistics methods were checked for fullness of the model. The final model showed 0.886 goodness, very far from 0.05 and clearly indicating the outcome variable was fully explained by the independent variables entered in the full model. The same findings were also obtained with forward-stepwise regression. Based on these seven variables were significantly associated with in multivariate logistic regression analysis after adjustment for confounding variables. Women who had obesity were five times as likely to develop as women with normal BMI. Women who had low level of occupation/daily worker/ were nine times more likely to develop preeclampsia compared to women who had employed government/NGO at .004 level of significant.

Majority of the cases and controls belonged to the 24-29-year age group (41.9% and 55.1%, respectively). the younger age group of pregnant women were 0.3 times more likely to develop than women who were woman age 24–29, whereas women who were >35 age no significant compare to women who were age 24–29 in this study. The patients who had not known or heard had six times of developing /eclampsia compared to those who know or heard preeclampsia.

Women who had history of were 9.7 times more likely to develop compared to women who did not have history preeclampsia. Similarly, women who had a family history of hypertension were three times more likely to develop. As women who did not primigravidae were three times more likely to develop than women who were gravid 2–4. Whereas women who were gravid more than four were four times more likely to develop than women who were gravida 2–4 (Table 5).

Table 5. Final Model of Multivariable Analysis for Risk Factors of in women with and woman with Normal of Pregnant women attending Antenatal follow up or delivery care in four Public Health facility Addis Ababa city administrative, Ethiopia,2016

Characteristic	Case	%	Control	%	C.O. R	A.O. R	P-Value
Obesity							.001
18~24.9	13	14.9	74	42.5	1	1	
25~30	32	36.8	51	29.3	(.710-7.46)	4.1(1.6-10.2)	
>30	42	48.2	49	28.2	(10.0-2.54)	5.2(2.1-12.6)	
Age							.010
18~23	14	16.1	50	28.7	.44(.221-.893)	.3(.128-.71)	
24~29	46	52.9	73	41.9	1	1	
30~35	18	20.7	44	25.3	.649(.335-1.3)	.4(.17-.87)	
>35	9	10.3	7	4.1	2.04(.711-5.9)	1.5(.368-6.0)	
Woman occupational							.004
Civil servant & NGO	10	5.7	43	24.7	1	1	
Daily Worker	14	16.1	11	6.3	5.5(1.9-15.6)	9.2(2.6-31.7)	
Merchant	7	8	23	13.2	1.3(.44-3.2)	1.86(.518-6.69)	
Privet worker	9	10.3	21	12.1	1.84(.651-5.2)	1.91(.55-6.609)	
House wife	44	50.6	65	37.4	2.9(1.32-6.4)	4.3(1.67-11.05)	
Other	3	3.4	11	6.3	.12(.275-5.0)	1.15(.233-5.68)	
Knowledge of Preeclampsia							.000
Yes	33	37.9	116	66.7	1	1	
No	54	62.1	58	33.3	3.271(1.92-5.5)	6.49(3.02-13.9)	
Number of Pregnancy/ Parity/							.005
Prim gravid	39	44.8	64	36.9	1.81(1.01-3.2)	3.29(1.42-7.54)	
Gravida2~4	30	34.5	89	51.1	1	1	
Gravid 4 +	18	9.2	21	12.1	2.54(1.19-5.4)	3.85(1.46-10.1)	
History of Preeclampsia							
Yes	14	16.1	10	11.5	2.72(1.1-6.74)	9.74(2.38-39.8)	
No	38	43.7	96	55.2	1		
Family History of Hypertension							
Yes	20	22.9	23	13.2	1.96(1.01-3.8)	2.92(1.194-7.2)	
No	67	77.0	151	86.9	1		

DISCUSSION

Our work demonstrates that risk factors for developing in Ethiopia woman attending public hospitals for prenatal care delivery are similar with studied in other populations. In multivariate analysis maternal age, BMI, occupation level, knowledge of, gravidity, history of, family history of hypertension was significant associated risk of developing of in the current pregnancy. This is consistent with similar findings in other studies. The association of family history of hypertension, family history of diabetes mellitus and family history of were remained significantly and independently associated with[15,27]. Many women with, particularly, at the community level are missed due to the lack of antenatal care. These women are more likely to develop serious complications[28].

Maternal obesity also well known risk factor for the development of preeclampsia [29, 30]. Thus, the risk of severe and mild preeclampsia[31] and preeclampsia occurring in early and late gestation[32] are greater in obese and overweight women. The relationship that obesity increases the risk of preeclampsia has been reported for several populations around the world [30,32,33,34,35,36,37.]

Obesity is a major epidemic in developed countries that is now extending to developing countries[10,30, 31,32,33,34]. It was found to be BMI > 30 kg/m^2a risk factor for preeclampsia in this study [AOR5.2 95% CI 2.1~12.6]. The finding that obese women are at a higher risk of had been shown in both high and low resource setting. [10, 32]. It is not known why obesity is a risk factor for preeclampsia[29], but these conditions might be related through common features related to oxidative stress, inflammation and altered vascular function. Recently, extensive vascular infiltration of neutrophils and vascular inflammation has been reported in both preeclamptic women and obese women. Therefore, if the vasculature of obese women is inflamed, they could be at increased risk of developing when they become pregnant and are exposed to the additional burdens of pregnancy[29,30]. Based on the finding women with the lowest BMI are relatively protected against preeclampsia[10], which is also confirmed in this study.

Current strategies for risk assessment are based on the obstetric and medical history and clinical examination. Pregnant women are assessed at their first antenatal clinic (prior to 12 weeks if possible) for risk factors for including age, nulliparity, prior history of, high BMI, history of diabetes mellitus and hypertension[38,39].

The association of maternal age and development of was noted in studies conducted at low and high-level setting[13,15,14,39]. The current study showed that woman aged between 18 - 23 years [AOR .3, 95% CI .128 – .71)] and 30 - 35 years [AOR .4, 95% CI (.17~.87)] were found to have 70% and 60% lesser chance of developing as compared to those women aged between 24 - 29 aged respectively. However, maternal age is a factor for the development of increased with pregnancies in older ages (age 35 and above)[14,15]. But, this study did not show this aged thirty-five and above years to demonstrate any significant effect of development.

This study used working status as proxy our finding shows an increased risk of developing in those women in low status compared to civil servant and NGO. Daily

worker women had about nine times [AOR 9.2 95% CI 2.6~31.7] and house wife woman four times [AOR 4.3 95% CI 1.67~11.05] developing preeclampsia. The association of low level working status and is unclear but could be due to low socioeconomic status lead to poor nutrition and stressful life conditions which may lead to over reactivation of the sympathetic nervous system[40].

Nulliparity has been shown to almost triple the risk of [11]. Many studies have reported nulliparity as a risk factor for severe[11,12,13,39]. Nulliparity compared to prior parity was associated with three-fold increased risk of [AOR 3.29, 95% CI 1.143 –7.54)] similar to previous report[11,12,13,39].

Our finding of a four-fold [AOR 3.85, 95% CI 1.146 – 10.2)] increased risk in woman who was gravida four or greater compared to those who were gravida 2- 3. This is similar to other report .[45]

Ethiopian woman with a prior history and recurrence had 10 times risk of developing severe pre - eclampsia in this study [AOR 9.74 95% CI 2.38~39.8]. Confirms similar reports to other studies have made similar observation.[24 25 26].

Women who had family history of hypertension had about three times [AOR 2.92, 95% CI 1.194 –7.1)] greater odds of developing preeclampsia compared those who have not after controlling for confounders. This was similar to what was found by other researchers in low and high-resources settings [35,41,46]. It is possible that a family history of hypertension is associated with high risk of through genetic, environmental or behavioral mechanisms.[15,27].

Woman without prior knowledge of had a 6.5 times higher risk of developing a disease [AOR 6.49 95% CI 3.02~13.9]. The reason for this could be because of lack of awareness of antenatal care or poor health seeking behavior leading to delay to come to hospital. No similar studies were found to support or contradict the finding of the study.

Our study did not find an association of number of factors by others to compare an increased risk of including: history of chronic hypertension, family history of preeclampsia, family history of diabetes militias, multiple pregnancy, number of ANC visit, history diabetes mellitus. It could be that we were underpowered to be able to observe an association in our population or that these truly do not present an elevated risk [35,41,40,42, 43,46].

CONCLUSION

Pregnant women in low and middle-income countries (LMIC) are amongst the most vulnerable populations in the world. /eclampsia is significantly associated with maternal death, perinatal death, preterm birth and low birth weight. At the individual level, a number of socio demographic and medical and obstetric variables are significant risk factors for eclampsia, with obesity, occupational status, knowledge of, history of, number of pregnancy/parity/, and family history of hypertension, posing the highest risks of the outcome, and with antenatal care visits. Acting as a protective factor due to increasing surveillance in highest risk patient, use of ASA, calcium as prophylaxis in highest risk patient and knowledge of the risk factors may allow for earlier recognition of treatment.

Limitation: This study was conducted in four general

public hospitals. It was not including teaching and referral hospitals and also private hospital and higher clinics found in the city. The women seen at those hospitals may not be representative of the ones seen in the hospitals or higher clinics. Women with eclampsia and HELLP syndrome /seriously ill/ were excluded and this could have affected the representativeness of the cases.

ACKNOWLEDGEMENT

We greatly indebted to thank Collage of Health Science, University of Arsi for its support for giving an official letter to contact different concerned organizations and officials to conduct the study. As well, special thanks go to pregnant and labor mothers who gave genuine information of, themselves and families to make the study fruitful.

We greatly indebted to thank Collage of Health Science, University of Arsi for its support for giving an official letter to contact different concerned organizations and officials to conduct the study. As well, special thanks go to pregnant and labor mothers who gave genuine information of, themselves and families to make the study fruitful.

Corresponding Author:

Eyob Mohammed

[1]College of Health sciences, Aarsi University, Asella, Ethiopia

Email: eyobeyob0125@gmail.com

REFERENCES

1. World Health Organization, Maternal Mortality. 2015.
2. Cousens S, B.H., etl., National, regional, and worldwide estimates of stillbirth rates in 2009 with trends since 1995. . Lancet, 2011, .
3. UNFPA, Trends inMaternal Healthin Ethiopia, 2012: Addis Ababa.
4. CSA, Ethiopia Demographic and Health Survey 2011,2012, Central Statistical Agency: Addis Ababa, Ethiopia and Calverton, Maryland, USA:.
5. Abdella, A., Maternal Mortality Trend in Ethiopia. Ethiop Journal Health Develpement . 2015.
6. A., A. Maternal mortality in two teaching hospitals in Addis Ababa, Ethiopia, 2007-2008. 2008.
7. BE, K., Unsafe motherhood: A monumental challenge-A study of maternal mortality in Addis Ababa. Netherland: Lithoprint Ltd (TU),1988.
8. Paola Aghajanian, S.W.A., etl., Current Diagnosis & Treatment Obstetrics & Gynecology, Tenth Edition, 2007: USA.
9. Kayode O. Osungbade1, a.O.K.I., Public Health Perspectives of Preeclampsia in Developing Countries: Implication for Health System Strengthening. J Pregnancy, 2011.
10. Sutapa Agrawal, G.K.W., Prevalence and risk factors for in Indian women. 2006.
11. Salafia C, S.K., Cigarette smoking and pregnancy - II: Vascular effects. Placenta , . 1999: p. 20:273-279.
12. Walker, J. J. Severe pre - eclampsia and eclampsia Baillieres Best Pract Res. Clin Obstet Gynaecol2000; 14:57-71.
13. Ekine Atombosoba Adokiye, J.I., Factors influencing the prevalence of Preeclampsia-eclampsia in booked and unbooked patients: . World Journal of Medicine and Medical Science, 2015. 3(2330 - 1341 (Online)).
14. Reeta LamminpääEmail author, K.V.-J.e., Preeclampsia complicated by advanced maternal age: a registry-based study on primiparous women in Finland 1997–2008. BioMed Central Ltd, 2012.
15. Gizachew Assefa Tessema1*, A.T.e., Preeclampsia and associated factors among pregnant women attending antenatal care in Dessie referral hospital, Northeast Ethiopia: a hospital-based study. Pregnancy and Childbirth, 2015.
16. Gilles Guerrier, B.O.e., Factors associated with severe preeclampsia and eclampsia in Jahun, Nigeria. International Journal of Women's Health, 2013.

17. Preeclampsia During the Twin Pregnancy.

18. Chris Iliades Preeclampsia and Gestational Diabetes. 2009.

19. Ajazi R, S.E., Rexhepi P, Alikaj A, Evaluation of diabetes as a risk factor for Preeclampsia.

20. Middleton P, C.C., Simmonds L, Muller P, Different intensities of glycaemic control for pregnant women with pre-existing diabetes., 2010.

21. S Ganesh Kumar, B.U., K Nagaraj2, S Jayaram3, Determinants of : A case-control study in a district hospital in South India. 2010.

22. Maryam Kashanian, H.R.B.e.l., Risk Factors for : A Study in Tehran, Iran. PMD, 2011.

23. Paul Kiondo, G.W.-M.e.l., Risk factors for in Mulago Hospital, Kampala,Uganda. 2009.

24. Barton JR, S.B., Prediction and prevention of recurrent preeclampsia. 2012, Royal college.

25. Sonia Hernández-Díaz, S.T., Risk of in first and subsequent pregnancies. BMJ, 2009.

26. Ramesh K, S.G.a.V.R., socio-Demographic and Other Risk Factors of Pre Eclampsia at a Tertiary Care Hospital, Karnataka: Case Control Study. 2013.

27. Mekbeb T, K.K., /eclampsia at Yekatit 12 Hospital, Addis Ababa, Ethiopia (1987-1989). PubMed

28. Johnson SR, Kolberg BH, Varner MW, Railsback LD. Maternal obesity and pregnancy. Surg Gynecol Obstet. 1987; 164: 431-437.

29. Walsh SW1. Obesity: a risk factor for preeclampsia.

30. Bodnar LM, Ness RB, Markovic N, Roberts JM. The risk of preeclampsia rises with increasing prepregnancy body mass index. Annals of Epidemiology. 2005;15:475–82

31. Mahomed K, Williams MA, Woelk GB, et al. Risk Factors For Among Zimbabwean Women - Maternal Arm Circumference and Other Anthropometric Measures Of Obesity. Paediatric and Perinatal Epidemiology. 1998; 12:253–262.

32. Hossain P, Kawar B, El Nahas M. Obesity and diabetes in the developing world--a growing challenge, New England Journal of Medicine. 2007; 356:213–5.

33. Hauger MS, Gibbons L, Vik T, Belizan JM. Prepregnancy weight status and the risk of adverse pregnancy outcome. Acta Obstetricia Et Gynecologica Scandinavica. 2008; 87:953–959.

34. Briana DD, Malamitsi-Puchner A. Adipocytokines in Normal and Complicated Pregnancies.Reproductive Sciences. 2009; 16:921–937.