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# The Maternal Outcomes and its Determinants among Pregnant Women Complicated by Severe Preeclampsia at Hidar 11 Hospital

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### ABSTRACT

**Background:** Pre-eclampsia is one of the causes of maternal morbidity and mortality throughout the world. It is common problem in developing countries. This study was aimed to assess the maternal outcomes of severe pre-eclampsia among pregnant women admitted and managed at Hidar 11 Hospital in 2018.

**Methods:** A cross-sectional study was conducted among preeclamptic women who were admitted to maternity ward of Hidar 11 Hospital in a four year period from JAN 1/ 2014 – Decem 31/ 2018. All laboring mothers that are admitted and managed at Hidar 11 hospitals was a source population retrieved by review of clinical records and then, the data was collected from April 1-30 2018. Daily completeness of the questionnaire was cross checked by principal investigator for data quality control using prepared checklist after a pretest given. Data regarding patient characteristics and treatment outcome (eg. maternal death, maternal complication, hospital stay) were collected. Data was collected using data collection format from patient medical charts. data was cleaned coded entered and analyzed using SPSS version 20. Descriptive statistics and logistic regression were used. All the statistical tests were significant at P-value < 0.05, Besides odd ratio 95%CI was used.

**Results:** A total of 318 mothers' medical charts were reviewed. One hundred sixty five (82.5%) pregnant women were diagnosed with severe preeclampsia. About 98(30.8%) of the women developed complications. The most common maternal complication was HELLP syndrome Mothers with gestational age less than 34weeks were 6.8 times more likely to develop complication [AOR=6.8, 95% CI = 1.974-24.026]. similarly primigravida 4 times more likely to develop complication [AOR=4.934 CI =2.281-10.675 ]. Mothers with antipartum preeclampsia were 6.6 times more likely to have prolonged hospital stay [AOR=6.611 ,95% CI=2.749-15.898].

**Conclusion:** The commonly seen poor treatment outcomes in preeclamptic mothers were magnesium sulphate toxicity, prolonged hospital stay and development of complications. Preeclampsia at gestational age of less than 34 weeks significantly increases the risk of developing maternal complication.

**Keywords:** Maternal outcome, pre-eclampsia

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## 1. INTRODUCTION

Severe pre-eclampsia is a blood pressure of  $\geq 160$  mmHg (systolic) or 110 mmHg (diastolic) and associated proteinuria of 5 grams or more per day. Pre-eclampsia may also be regarded as severe in the presence of involvement of multiple organs including thrombocytopenia (platelet count  $< 100,000/uL$ ), pulmonary edema, or oliguria. [2]

Preeclampsia continues to be an important cause of maternal morbidity and mortality. 16% of direct maternal mortality and 10% of all maternal mortality (direct and indirect) was due to preeclampsia/eclampsia. [4] Preeclampsia occurs in 7-10% of pregnancies with a case fatality rate of 6-10% worldwide.

Preeclampsia is pregnancy specific syndrome is associated with higher rate of maternal mortality and morbidity and obviously it is one of the five causes of maternal mortality across the world, apart from the effect on the mother this disease also have a negative health impact on developing fetus including risk of preterm delivery, intra uterine growth restriction even Perinatal death. In addition, induction of women for delivery to prevent the progression of preeclampsia is responsible for 15% of all preterm births [12, 13].

According to the 2016 reports of EDHS, Ethiopia showed decreasing pattern of maternal death from 676/100000 in 2005 to 412/100000. Despite this reduction maternal death in Ethiopia is high compared to developed countries (16). Sixty to eighty percent of all maternal deaths are due to five major complications from this preeclampsia is one of the most commonly encountered hypertensive disorders of pregnancy that accounts for 20% - 80% of maternal mortality in developing countries, including Ethiopia [17].

Despite this problem has adverse maternal and child health effect there is a paucity of information available about its burden, associated factors, and its adverse effect on maternal complications. Therefore the findings

of this study will be expected to contribute to the existing knowledge, to understand about the risk factors and its effect on maternal outcome of preeclampsia and helps to increase the provision of emergency obstetric and gynecological care and functioning health facility based on evidence. It will fill these gaps hopefully. Additionally, the finding will be used as baseline data for improving obstetric care in this area by providing policy makers, program implementers, NGOs and health care providers.

## 2. OBJECTIVE

### 2.1 General objectives

- To determine the maternal outcomes and associated factors among pregnant women complicated by severe preeclampsia at Hidar 11 Hospital in 2018

### 2.2 Specific objectives

- To measure the maternal outcomes of severe preeclampsia
- To identify factors associated with maternal outcome

## 3. METHODS

### Study area, design, period and population

Institutional based cross sectional study design used. The study was conducted at Hidar 11 District hospital, from April to May, 2018 G C, which is found in Akesta town in the Lagambo Woreda, South Wollo zone, Amhara Region; about 501 KM from the capital city of Ethiopia; Addis Ababa in the North East direction and at 100Km from the capital city of South Wollo (Desse) in West direction. The hospital is serving for total population of 192,500. The total numbers of staffs in hospital are 119. Of these; Surgeon 2, Gynecologist 1, Emergency Surgeon 1, general practitioner 9, midwife Bsc 9 and diploma 6 and others 91. The total number of bed in obstetrics and gynecology is 28. The hospital has two major operation tables and two minor operation tables. All pregnant women who were admitted to labor and maternity ward during the study period. All pregnant mothers with severe preeclampsia

who were admitted to labor and maternity ward during the study period All pregnant mothers with severe preeclampsia were included **and** Referred cases were excluded

### Sample size determination and Sampling procedure

The sample size was calculated using single population proportion formula. The estimated sample size being n, degree of precision of 4 % ( d) and confidence interval of 95% (Z= 1.96) were assumed. A one year longitudinal study done at Tikur Anbessa specialized teaching hospital showed a 14% (study from Gandhi hospital Addis Ababa Ethiopia, on maternal outcome, maternal complication ,HEEP syndrome 14%).(45)

The result from the above calculation was 289. Considering a 10% incomplete chart, the total sample size required was 318. There were about 703 patient charts with diagnosis of severe preclampsia at Hidar 11 hospital over a period of 5 years , Making a numbered list of all the units in the population each unit on the list should be numbered in sequence from 1 to 703, sampling units selected, using a "lottery" method .

### 3.9. Operational Definitions

**Maternal outcome:** - is defined as condition of mother after developing severe preeclampsia

**Favorable outcome;** patient with severe preeclampsia that were improved

**unFavorable outcome;** patient with severe preeclampsia that are complicated (abruptio placenta, eclamisia, renal failure, HEELP syndrome, maternal death)

**Expectant management;** Glucocorticoid administration followed by delivery for specific maternal and fetal indication.

**Favorable outcome;** patient with severe preeclampsia whose managed expectantly and improved

**unFavorable outcome;** patient with severe preeclampsia whose managed expectantly and complicated (abruptio placenta, eclamisia,

renal failure, HEELP syndrome, maternal death)

**Aggressive management-** Glucocorticoid administration followed by delivery within 48 hours

**Favorable outcome;** patient with severe preeclampsia whose managed aggressively and improved

**unFavorable outcome;** patient with severe preeclampsia whose managed aggressively and complicated (abruptio placenta, eclamisia, renal failure, HEELP syndrome, maternal death)

**Comorbidities;** medical diseases of along with pregnancy (Diabetes, renal disease, heart disease)

### Data Collection and Quality Control Measures

Structured pretested checklist adopted from different literatures and prepared in the context of the local situation and the aim of the study. To increase the quality of data, the data collection was done with pretested checks list. Based on the prepared format the collected data was cross checked.

#### 3.11 Data Processing and Analysis

The collected data was coded, cleaned and entered into SPSS version 20 for analysis. Then, the data was presented using tables, percentages, and charts. The association between each dependent and independent variables was determined by bivariate logistic regression first, then for those have association (p-value <0.05) was entered in to multivariate registration.

#### 3.12 Ethical Consideration

Ethical clearance was secured from ethical committee of Wollo University, college of health sciences. Institutional consent will be obtained by communicating to Hidar 11 District hospital administration. An official letter of cooperation from the university was given to the hospital. Privacy and confidentiality was maintained during data collection period.

## RESULT

### 4.1 Socio-demographic factors

A total of 318 mothers medical charts were reviewed during the study period. Majority of them, 207 (65.1%) were in the age group of 25-34 years. 232 (73%) of the pregnant women were primigravida. More than half of the patients 211 (66.4) were nulli-parous.

### 4.2 Background characteristics

As shown in Table 1, majority of the study subjects 303 (95.3%) had antenatal care follow up. two hundred seventy eight 278 (87.4%) of the pregnant women had gestational age at presentation <34 weeks. three hundred seven

(96.5%) and 11 (3.5%) pregnant women were singleton and twin respectively. About 31.4 % of patient had previous history of hypertension,diabetis melitus and renal disease and 89.6% had no history of medical illeness including chronic hypertention. The time of occurrence of preeclampsia in most participants 250 (78.6%) were during antepartum period. The main reasons for caesarean section were failed induction,twin plus severe ppreclamisia and fetal distress(NRFHRP);9(2.8%),7(2.2%) and 9(2.8%) respectively. The majority of the study subjects 95.3% had antenatal care follow up and about 4.7% does not.

**Table 1: Background characteristics of pregnant women admitted with the diagnosis of severe pre-eclampsia (n=318), hidar 11 hospital, akasta, Ethiopia.**

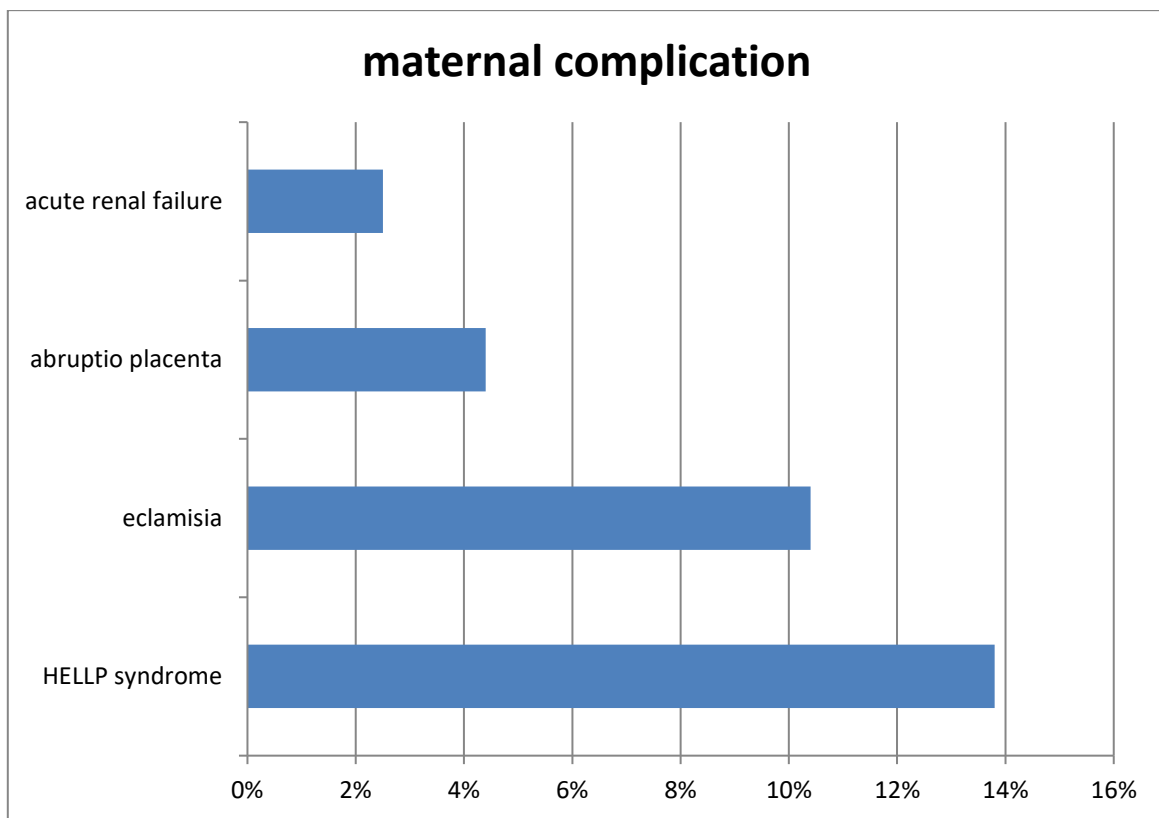
Variable	Category	Frequency(%)
ANC follow up	Booked	303(95.3)
	Unbooked	15(4.7)
Order of pregnancy	Singleton	307(96.5)
	Multiple	11(3.5)
Gestational age	<34weeks	278 (87.4)
	>=34weeks	40 (12.6)
Occurance of preclamisia	Antepartum	250 (78.6)
	Intrapartum	29 (9.1)
	Postpartum	39 (12.3)
Options of manegment	Expectant	37(11.6)
	Aggressive	281(88.4)
Mode of delivery	Vaginal route delivery	293(92.1)
	C/S delivery	25(7.9)
Reseason for cs	Failed induction	9(2.8)
	Twin plus severe preclamisia	7(2.2)
	Fetal distress	9(2.8)
Medical disease	Yes	100 (31.4)
	No	218 (68.6)
Type of diseas	Chronic hypertention	43 (13.5)
	Diabetius mellitus	18 (5.7)
	Renal disease	39 (12.3)
Complications	Eclamisia	33(10.4%)
	Abruptio placenta	14(4.4%)
	HELLP syndrome	44(13.8%)
	Acute renal failure	8(2.5%)

### 4.3 Maternal outcomes

There were two deaths because of primarily of pulmonary edema and DIC over a period of five years. As indicated in the study about 98 cases(30.8%) of the women developed complications. There was no maternal admission to ICU and 167 (52.5%) of the women had a prolonged hospital stay (>7 days). Low urine output and depressed deep tendon reflex were the most common

symptoms of magnesium sulphate toxicity that was observed in 21(6.6) and 9(2.8) of the pregnant mothers respectively.

As shown in Figure 1, the most common maternal complication was HELLP syndrome developed in 44(13.8%) of the women,33(10.4%) of the women developed eclamisia,14(4.4%)of the women develop Abruptio placenta and 8(2.5) of the women also develop renal failure.



**Figure 1: Maternal complications of pregnant women admitted with the diagnosis of severe pre-eclampsia.**

### 4.4 Factors associated with maternal outcome

Out of the 318 mothers 98 (30.8%) had developed at least one complication. As depicted in Table 2 univariate logistic regression analysis showed maternal age, ANC followup, occurrence of preclamsia, gravidity, GA, mode of delivery and histoy of medical illeness have statistically significant association with maternal complications. On multivariable logistic regression, it was found that GA, gravidity and

having medical illeness were found to be independent predictors of complication. Accordingly, mothers with gestational age less than 34 weeks were 6.8 times more likely to develop complication [AOR=6.8, 95% CI = 1.974-24.026].similarly primigravida 4 times more likely to develop complication[AOR=4.934 CI =2.281-10.675 ]and also having medical illeness was 2.4 times more associated with maternal complication. [AOR=2.494, CI , 1.308-4.757] .

**Table 2: Factors associated with maternal complications of pregnant women admitted with the diagnosis of severe pre-eclampsia (n=318), hidar 11 hospital, akasta, Ethiopia.**

Variables	categories	Maternal outcome		COR 95%(CI)	AOR 95%(CI)
		favorable	unfavorable		
Maternal age	15-24	80	22	0.079(0.015-.405)	0.015(0.012-0.621)**
	25-34	136	71	0.149(.030-.737)	0.282 (0.043-1.846)
	>=35	2	7	1	1
Gravidity	primigravida	150	82	2.065 (1.150-3.707)	4.9(2.281-10.675)***
	multigravida	68	18	1	1
Gestational age	<34weeks	156	125	6.610 (1.987-21.992)	6.8(1.974-24.026)***
	>=34weeks	33	4	1	1
Mode of delivery	vaginal	179	114	.070( .023-.211)	0.053(0.015-.183)***
	cs	15	10	1	1
Medical illness	Yes	59	41	1.873 (1.138-3.082)	2.4(1.308-4.757)***
	no	159	59	1	1

\*=P<0.05, \*\*p<0.01, \*\*\*=p<0.001 and 1= reference category

From all the mothers 167 (52.5) had a prolonged hospital stay. most of the mothers who had a prolonged hospital stay developed preeclampsia in the antepartum period. Accordingly, mothers with antepartum preclampsia were 6.6 times more likely to have prolonged hospital stay [AOR=6.611 ,95% CI=2.749-15.898].

## 5. DISCUSSION

Majority of preclampsic mothers in this study were primigravida (73.0%) and nulliparous (66.4%). Similarly a study conducted in India showed that primigravidas accounted for majority of preeclampsia groups as compared to multigravidas [7] and a study in Jimma showed that 66.5% of the mothers were nulliparous. [19]

Almost all patients (95.3%) had antenatal care (ANC) followup. Similar studies conducted in Jimma University Specialized Hospital showed about three fourth of mothers had antenatal care follow-up. [18] Another study in Nigeria showed 76.6% of the pregnant mothers received antenatal care at the study center. [20] In the contrary a study in India shows 82% of the mothers had no antenatal care follow up.

[21] The higher rate of antenatal care follow up in the current study could be because of the awareness created by the current governmental interventions and improvement in antenatal care coverage.

In the current study the type of occurrence for preeclampsia in most of the cases were antepartum (78.6%). Similarly a study in India showed that 80.4% of the mothers have antepartum preeclampsia. [22]. Vaginal route delivery was a common mode of delivery for mothers with severe pre-eclampsia in about 293 cases (92.1%) and C/S in about 25(7.9%), fetal distress and failed induction equally in about 9 cases (2.8%) each were the common indication for Caesarean section.

In this study there was two death report (0.6%) but no maternal admissions to ICU. This is low as compared to the result of the study done by Savita et al which reported 8% maternal mortality. [22] similar study in Jimma, Ethiopia reported two (2.5%) maternal deaths among preclampsic women. [23] Closer to the current study result in gandi memorial hospital reported one maternall death [35] A study in India, Hyderabad, showed there were 3 (4%)

maternal deaths due to severe pre-eclampsia. [19] A decrease in maternal death in this study could be due to an improvement in early antenatal and post natal care follow up. In addition the introduction of magnesium sulphate as a prophylaxis of seizure in case of severe preeclampsia could have a role in decreasing maternal mortality. [25]

In this study the most common maternal complication was HELLP syndrome developed in 44 (13.8%) of the women. HELLP syndrome occurs in 1 of 1000 over all pregnancies but it reaches 4-12% in patients who develop severe preeclampsia. [25] study conducted in Gandhi hospital shows that HELLP syndrome is the commonest in about 14% of the case. [35]. A study in Jimma reported that HELLP syndrome was one of the most severe forms of the disorder affecting 8.9% of the mothers. [27] A study in Bangkok showed one of the common maternal complications was HELLP syndrome occurred in 10.1% of subjects. [26] Study in India showed 2% of the mothers developed HELLP syndrome. [15] A relatively higher HELLP syndrome cases in this study may be due to delays in early detection and timely management of preeclamptic women at health centers as most of the mother were from remote area where HELLP syndrome may develop but platelet transfusion may be impossible.

In the current study, out of the 318 mothers 167 (52.5%) had prolonged hospital stay. A study in Nigeria showed 11.7% of the mother had a prolonged hospital stay. [26] Similar study in Jimma reported 11.2% of the mothers had prolonged hospital stay. [27] A relatively higher number of mothers with prolonged hospital stay in this study could be due to higher rate of complication. Therefore, in order to manage such complications additional days of hospitalization would be needed.

Regarding toxicity of magnesium sulphate in this study, it has been found that low urine output was the most commonly reported toxicity (6.6%) followed by DTR (2.8%). according to

study conducted in Gandhi Memorial Hospital LUOP and depressed DTR were 22.5% and 15% respectively. A retrospective study conducted in Nigeria reported that the observed magnesium sulphate toxicities were acute renal and respiratory depression in 9% of patients. [26] Similarly the Magpie Trial indicated intramuscular injection site problems account for 12% of magnesium sulphate received pregnant women. [28] A relatively less drug toxicity recorded in this study could be due to proper administration and follow up of magnesium sulphate.

The current study showed gestational age at delivery and having associated medical illnesses are the most important independent predictor for maternal outcomes like maternal complication. According to a retrospective study in India preterm (< 37 week of gestation) delivery was found to be associated with poor maternal outcome. [35,36]

## CONCLUSION

The commonly seen poor treatment outcomes in severe pre-eclamptic mothers were symptoms of magnesium sulphate toxicity, prolonged hospital stay and development of complications like HELLP syndrome, abruption placenta and renal failure. Development of Preeclampsia at gestational age of less than 34 weeks significantly increases the risk of developing maternal complication. Mothers with antipartum PE were more likely to have prolonged hospital stay.

## RECOMMENDATION

- District health office should give emphasis on health education and improving quality of antenatal care follow up care.
- Improving the care of pregnant ladies with ,and improving and creating a functional referral system at health center will enable early detection and treatment thereby preventing both maternal and perinatal complications.

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