ADDIS ABABA UNIVERSITY
COLLEGE OF HEALTH SCIENCE, SCHOOL OF MEDICINE
DEPARTMENT OF EMERGENCY MEDICINE

CLINICAL FEATURES AND OUTCOMES OF PATIENTS WITH PREECLAMPSIA AND ECLAMPSIA ADMITTED AT GONDAR UNIVERSITY HOSPITAL, NORTH ETHIOPIA 2021.

BY: - TAMALEW ALEMIE

A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCE, AND DEPARTMENT OF EMERGENCY MEDICINE FOR PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR MASTER OF SCIENCE IN EMERGENCY MEDICINE AND CRITICAL CARE NURSING.

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Title of the Research	Clinical features and treatment outcomes of preeclampsia and eclampsia at Gondar university specialized teaching hospital Amhara Ethiopia, 2020/2021.
Duration of Project	2 months
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APPROVAL

I the undersigned MSC student, declare that I have submitted my original work on a title; clinical features and treatment outcome of patients with Preeclampsia and Eclampsia admitted in Gondar specialized hospital, North Ethiopia 2021.

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This research work has been submitted for examination with my/our approval as an advisor.

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I/We, the undersigned, members of the Board of Examiners of the final open defense by, **Tamalew Alemie** have read, attend and evaluated his research paper entitled; **Clinical Features, and Treatment Outcomes of patients with Preeclampsia and Eclampsia admitted in Gondar University Specialized hospital, Northern Ethiopia, 2021.** This is therefore to certify that this research project has been accepted in partial fulfillment of the requirements for the degree of Master of Science in Emergency Medicine and Critical Care Nursing.

Approved by

Examiners

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ACRONYMS AND ABBREVATIONS

APGAR: - Appearance, Pulse, Grimace, Activity, Respiration

AST: - Aspartate Transaminase

ALT: - Alanine Transaminase

Cr: - Creatinine

C/S: - Cesarean Section

DIC: - Disseminated Intravascular Coagulation

EmONC: - Emergency Obstetrics and New born Care

GUCSH: - Gondar University Comprehensive Specialized Hospital

LBW: - Low Birth Weight

HDP: - Hypertensive Disorder of Pregnancy

HELLP: - Hemolysis, Elevated Liver Enzymes, And Low Platelet Count

Mgso4:- Magnesium Sulfate

MRN: - Medical Registration Number

MOH: - Ministry Of Health

PE/E: - Preeclampsia and Eclampsia

PI: - Principal Investigator

PIH: - Pregnancy Induced Hypertension

SDG: - Sustainable Development Goals

SPSS: - Statistical Package for Social Science

SSA: - Sub-Saharan Africa

SVD: - Spontaneous Vaginal Delivery

VLBW: - very low birth weight

WHO: - world health organization

ABSTRACT

Background: - Preeclampsia is a disorder of pregnancy characterized by high blood pressure and proteinuria after 20 weeks of gestation, and a common direct obstetric cause for perinatal and maternal morbidity and mortality in developing countries.

Objective: To assess the clinical features, and treatment outcome of women with preeclampsia and Eclampsia admitted in Gondar University specialized hospital, Northern Ethiopia 2020/2021.

Methods: A retrospective cross-sectional chart review study was conducted at Gondar university specialized hospital from April 9-May/30/2021. Among women hospitalized for preeclampsia and eclampsia 311 mothers selected using systematic sampling. A pretested check list was used to collect data from medical records. The collected data was coded, entered into Epi-data version 4.6, and exported to SPSS 26 for descriptive and inferential analysis. Chi-square and fishers exact test were done to determine a statistically significant factors and a p-value of ≤ 0.05 was considered to set a statically significant association.

Results; Out of 311 study population, almost half of cases (49.8%) were preeclampsia with severity features. While, Eclampsia accounted for 18.6% of women. Above 50% of mothers required immediate interventions to terminate the pregnancy by cesarean section for various indications. Unfavorable maternal outcome was present in more than 25% of cases; the observed unfavorable maternal outcomes were aspiration pneumonia 10.6%, HELLP syndrome 8.7% and maternal death 2(0.6%).While 12.2% of cases had unfavorable perinatal outcome. The unfavorable perinatal outcomes were still birth 31(10%) and early neonatal death 7(2.3%). Disease severity, mode of delivery, aspartate transaminase, gravidity, gestational age and antenatal care were statistically significant factors with outcome of pregnancy.

Conclusion; Prevalence of unfavorable maternal and perinatal outcomes of preeclampsia and eclampsia are considerable in the study area. To deter these effects both on perinatal and the maternal outcomes of pregnancy, antenatal care services and emergency obstetrics and new born care should be expanded and strengthen.

Key words; preeclampsia, eclampsia, outcome, Gondar and Ethiopia

CHAPTER ONE

1. INTRODUCTION

1.1. Background

A pregnant woman is considered hypertensive if her blood pressure is greater than or equal to 140/90 mmHg on two consecutive measurements each four hours apart (1). Hypertensive disorders of pregnancy (HDP) account for nearly 18% of all maternal deaths globally, with an expected 62 000–77 000 deaths per year (2). HDP is a general term it includes: chronic (pre-existing of any cause) hypertension, gestational hypertension or pregnancy-induced hypertension (PIH), preeclampsia/eclampsia, and preeclampsia superimposed on chronic hypertension (3).
Preeclampsia is a multisystem disorder of unknown etiology characterized by hypertension to the extent of 140/90 or more and new-onset proteinuria (≥300 mg/24 hour) which develops after the 20th week of pregnancy in previously normotensive women. However, even when no proteinuria meets or exceeds the diagnostic threshold, any of the following conditions can be diagnostic: new-onset thrombocytopenia, impaired liver function, renal insufficiency, pulmonary edema, or visual and cerebral disturbances (4,5).

Preeclampsia may be mild or severe based on its presentation. Severe pre-eclampsia is a BP of ≥ 160 mmHg (systolic) or 110 mmHg (diastolic) and accompanied proteinuria of 5g/24hr or more. Preeclampsia may also be considered as severe in the manifestation of thrombocytopenia (platelet count < 100,000/uL), cerebral or visual disturbance, pulmonary edema, or renal insufficiency (serum creatinine >1.1 mg/dL). while mild Pre-eclampsia is described by an elevated blood pressure less than 160 mmHg (systolic) or 110 mmHg (diastolic) with proteinuria greater than 300 mg, but less than 5 g per day (1,6).

Eclampsia is one of the serious obstetric emergencies and it is defined as new onset of grand - mal seizure activity and/or coma unexplained by other mental causes or disorders during pregnancy or postpartum in a woman with signs or symptoms of preeclampsia and /or gestational hypertension (4,7). About 10% of women in Africa develop any form of HDP at some point during pregnancy or puerperium. Among the various clinical types of HDP, Preeclampsia accounts for 5.3% regardless of the degree of severity and was found to be the commonest form of HDP in Africa. This prevalence of HDP in Africa exceeds the global estimates (5.2%-8.2%)

described in a recent report. Additionally, this prevalence seems to be higher than that observed in the United States (6%-8%); in the UK (5.4%-6.7%), and in Australia (8.2%), and 7% of all pregnancies in Canada, and are associated with an increased risk of adverse fetal, neonatal, and maternal outcomes including premature delivery, fetal growth restriction, intrauterine fetal death, renal or hepatic failure, hemorrhage, and stroke (8).

Pre-eclampsia/eclampsia is one of the leading causes of severe morbidity, long-term disability, and death among both mothers and their babies worldwide. In Africa and Asia, nearly 10% of all maternal deaths are associated with hypertensive disorders of pregnancy, while one-quarter of maternal deaths in Latin America have been associated with preeclampsia/eclampsia complications (9). As a world health organization report on maternal mortality trends, about 295 000 women died during and following pregnancy and childbirth in 2017. Likewise, as 2019 WHO maternal mortality fact sheet reported around 810 women die every day from pregnancy-related complications. By far most of these deaths (94%) occurred in low-income countries and most could have been prevented (10).

However, the abnormally implanted placenta is considered to be a major predisposing factor. The exact cause of pre-eclampsia/eclampsia remains unclear. This abnormally implanted placenta is believed to result in reduced uterine and placental perfusion, which causes a state of hypoxia and increased oxidative stress, and the release of anti-angiogenic proteins into the maternal plasma along with inflammatory mediators into the maternal plasma (11). Plus delivery of the placenta usually initiates the resolution of the acute clinical symptoms of preeclampsia, suggesting that the placenta plays a central role in preeclampsia pathogenesis (12).

Generally, preeclampsia is considered a disease of primigravida women. Other risk factors include advanced maternal age, multiple gestation, diabetes, and obesity and currently, there is no proven method to prevent preeclampsia. Nevertheless, low-dose aspirin could have a function in certain women. Low dose aspirin administered after 12 weeks' of gestation reduced the risk of preeclampsia by an average of 24% and prophylactic use of magnesium sulfate during prepartum, intrapartum, and immediately postpartum in those considered to have eclampsia (4).

1.2. Statement of the Problem

HDP continues the most significant and unsolved problems in obstetrics. These syndromes complicate 5 -10 % of all pregnancies, and jointly they are one of the direct lethal triads along with hemorrhage and infection that contributes greatly to maternal and perinatal morbidity and mortality rates (11). Of HDP the preeclampsia syndrome, both the new-onset and superimposed on chronic hypertension is the most dangerous and contributes to 11% of all maternal deaths (indirect and direct) and 16% of direct maternal deaths were due to this obstetric complication (12). Globally, the incidence of preeclampsia and eclampsia varies from country to country even within the country, and it is estimated that it affects between (2%-10%) of pregnancies every year (13). According to the WHO assessments, the incidence of preeclampsia in developing countries (2.8% of live births) is seven times higher than developed countries (0.4% of live births) (13,14). Eclampsia also increases the risk of maternal death both in developed (0.5–1.8%) and in developing countries (15%) (15). It is the second common direct cause of maternal death worldwide. They accounted for about 76, 000 maternal and 500, 000 prenatal deaths globally per year (14).

Different studies conducted in developed and developing countries on adverse maternal and perinatal outcomes of PE/E showed that those were associated with higher rates of morbidity and mortality such as preterm delivery, LBW, birth asphyxia, stillbirth, and early neonatal death. In accordance with perinatal figures, the proportion of induction of labour, cesarean sections, placental abruption, kidney injury, hepatic injury, pulmonary edema, aspiration pneumonia, and maternal death was more frequent among a group of mothers with PE/E (13,16–21).

Maternal near-miss cases were 8 times more common in women with preeclampsia and increased up to 60 times more common in women with eclampsia when equated with women without these disorders (9). Plus multi-country survey of WHO has shown that there have been about 3- and 5-fold increased risk of perinatal death in women with preeclampsia/eclampsia, respectively, as compared to women without preeclampsia/eclampsia (22). Studies show that in sub-Saharan Africa (SSA) countries preeclampsia and eclampsia are among the top five leading causes of morbidity and mortality of women and babies (15). For instance, 30% of all maternal deaths in Ghana and 29% in Nigeria are attributed to preeclampsia/eclampsia (23,24). Preeclampsia and eclampsia were also reported to account for 19% of maternal and 25% of

perinatal mortality in Ethiopia (2). Due to this and other issues, SSA countries including Ethiopia experience the uppermost maternal and newborn mortality.

Identification of the common poor maternal and perinatal outcomes of preeclampsia and their determinants is the first step to improve the service given to preeclamptic mothers. Studies that specifically addressed this issue are rare and are not comprehensive in Ethiopia, and to the knowledge of the investigator no study at Gondar. While prevalence of HDP is 17% in the study area which is as prevalent as or more than other regions in Ethiopia (25). So, this study aims to determine the clinical features, maternal and perinatal outcome and determinants of outcome of patients with PE/E treated in Gondar hospital.

1.3. Significance of the Study

To meet the Sustainable development goals Ethiopia has developed a five-year plan from 2015/16 to 2019/20 to reduce the maternal mortality ratio from 420 per 100,000s live birth to 199 per 100,000 live births. Similarly, there are plans for the improvement of maternal health services in the same time duration. Therefore, the rationale for this study is to help policymakers and programmers even, health care providers working in clinical areas to have a clear picture of the effect of preeclampsia and eclampsia on maternal and perinatal outcomes to make an evidence-based decision for the prevention, prioritization of interventions and management of adverse outcomes and mobilize resources accordingly for the management of PE/E and its associated perinatal and maternal complications in the area and the country.

This study also concerns the most common clinical symptoms which occur during pregnancy complicated with preeclampsia/eclampsia. Clinical symptoms are important to diagnose the patient, predict the outcome, and decide on intervention. Everyone, health care worker, patient, or patient's family, is better to know the most common clinical symptoms and signs. This study will be helpful for Gondar specialized referral hospital to improve patient care through health education and training for women and health care worker respectively, and through other measures to decrease hospital stay, mortality, and morbid complications of preeclampsia and eclampsia.

Finally, the data will be used as a baseline for other researchers who want to assess other working areas and regions as well.

CHAPTER TWO

2. LITERATURE REVIEW

2.1. Clinical Features of Preeclampsia and Eclampsia

Retrospective study conducted in north region of Afghanistan at four hospitals showed that headache 86.3% and 46.6%, epigastric pain 32.1% and 9.1%, blurred vision 26.5% and 12.5%, edema 24.8% and 10.2%, vertigo 16.7% and 6.8%, systolic hypertension88.9% and 83%, diastolic hypertension 90.2% and 83%, proteinuria greater than 0.3g/ 24hr 70.9% and 86.4% were the most common symptoms of preeclampsia and eclampsia respectively (19).

A Three years retrospective chart review study at a tertiary hospital in Ethiopia showed that the most common presenting symptoms of preeclampsia were headache37%, epigastric pain 25.1%, blurring of vision 19.1%, and 17.7% of severe BP measurement. Furthermore, 19.6% were anemic, 28.7% had elevated AST, 11.3 % had elevated ALT and 12.7% had elevated creatinine, and 4.4% of low platelet count (26).

According to a retrospective cross-sectional study at Gandhi memorial obstetrics and gynecologic hospital mothers with eclampsia had 93.5% of dizziness, 85.9% of headache, 83.8% of epigastric pain, and 82.7% of convulsion were clinical features on admission and delivery other than pregnancy and labour, associated to this 60.5% mothers were had DBP greater than 110 mmHg and 54.6% had proteinuria greater than +3 (27).

In a study conducted in eastern Ethiopia, the commonest presentation of patients with eclampsia was convulsion in 90.3%, and 9.7% presented with coma without prior report of seizures. Precedent symptoms were reported in 79.0% of the patients. The most frequently reported symptoms were: severe headache in 71.3%, blurring of vision in 47.3%, and epigastric pain in 18.3 % (28).

A one-year cross-sectional study in 2020 at Yekatit-12 teaching hospital showed that headache resistant to ordinary analgesics were among chief complaints in 54% of mothers, and blurring of vision in 39.4% of mothers with severe preeclampsia and eclampsia. One-fifth of mothers had creatinine greater than or equal to 1.2mg/dl and platelet count less than 100,000/mm^3 in 13.5% of mothers with severe preeclampsia and eclampsia. Besides all eclamptic mothers had generalized tonic-clonic seizure coupled with a loss of consciousness as a chief complaint at presentation with preceding symptoms of headache and blurring of vision (29).

2.1.1. Management of Preeclampsia and Eclampsia

Once the diagnosis of HDP is established, the key standards of management were; management of hypertension, management and prevention of complications including eclamptic fits, and safe delivery with a good outcome for mother and baby. "The regularly used treatments for high blood pressure were nifedipine and methyldopa. But labetalol and hydralazine were second-line antihypertensive drugs. Parenteral hydralazine was a preferred drug of choice for severe acute hypertension followed by parenteral labetalol. While for women with severe pre-eclampsia or eclampsia, intermittent intramuscular magnesium sulphate (Pritchard regimen) was given for the prevention and treatment of eclamptic fits" respectively (30).

In 2014 Sayed shir Mohammed ahadi et al showed magnesium sulfate had administered to prevent and treat convulsion for the majority 59.4% of preeclampsia patients and all the eclampsia mothers. In addition, against hypertension, hydralazine and methyldopa were used frequently, 56.8% and 55% of preeclampsia patients had used methyldopa and hydralazine respectively whereas patients among the eclampsia group 69.3% of used hydralazine (19).

As a study in 2015 by Mooij et al anticonvulsive treatment was started with Mgso4 in all patients with eclampsia and 85% of severe preeclampsia patients. Also, intravenous antihypertensive treatment was started with hydralazine in 5% of patients, and oral treatment with either methyldopa, hydralazine, or nifedipine was given in 65% of patients (31).

According to a study in Ethiopia, around 92% of severe preeclampsia mothers were given hydralazine and methyldopa for further stabilization of blood pressure. Plus all mothers with severe preeclampsia and eclampsia as well as 38.7% of mothers with mild preeclampsia were given Mgso4 for seizure prevention prophylaxis (29).

2.2. Maternal and Perinatal Outcomes of Preeclamptic and Eclamptic Mothers

A study at the University Hospital of the West Indies to determine the outcome of neonates born from women with preeclampsia shows 47% of premature, 58% of LBW, 25% of VLBW, and 28% of neonatal death (32). Similarly, a study done by Mooij et al found that six women with eclampsia died (case fatality rate of 11%), 30% and 27% of prenatal death occurred in women with severe preeclampsia and eclampsia respectively (31). Ndwiga et al found that women with preeclampsia had antepartum hemorrhage (3.9%), HELLP (16%), postpartum hemorrhage (8.1%), renal failure (9.3%), pulmonary edema (0.3%), and death (2.4%). Moreover, neonates

from preeclampsia's mother had respiratory distress syndrome (66%), neonatal jaundice (28%), asphyxia (14.6%), and 4.5% of neonatal convulsion (20).

A case-control retrospective study in south East Nigeria found that severe preeclampsia and eclampsia contribute to more than half of a cesarean section, 45% of low birth weight, 12% of maternal mortality, and 23% of perinatal mortality. Causes of maternal mortality were aspiration pneumonia (5.8%), acute renal failure (2.4%), abruptio placenta, DIC (2.4%) (33). Plus study conducted in Northern Afghanistan showed that among 88 patients with eclampsia 13% of them died. The causes were pulmonary edema 50%, renal failure 25%, cerebrovascular16.6%, and hemorrhage 8% (19).

In Egypt retrospective study at a tertiary hospital revealed four mothers died due to eclampsia which gives a case fatality rate of 1.6%. Two cases were due to massive intracranial hemorrhage, one case due to HEELP syndrome, and one case due to postpartum hemorrhage. In addition most common complications of eclampsia were HEELP (15.6%), liver injury 10.6%, postpartum hemorrhage (9.6%), DIC (7.6%), and 7.2% of renal impairment. Plus neonatal complications were 44.4% of preterm, 66.7% of LBW, low APGAR score 12%, and 18.8% of NICU admission with a perinatal mortality rate of 12% (34).

A retrospective cross-sectional research done by Desalegn found that about 26.1% of women with preeclampsia and eclampsia develop serious complications of that 26.3 % edema, renal failure 24.3% and 19.2% coagulation problems and maternal mortality of 7.3 % (35). Similarly, three years of study at Ayder specialized hospital Ethiopia revealed poor maternal and perinatal outcomes were present in 40% and 25% of mothers with preeclampsia respectively. The unfavorable maternal outcomes were HEELP (4.4%), maternal death (2.8%), intracranial hemorrhage (0.8%), and the poor perinatal outcomes were 25 perinatal death, giving a perinatal mortality rate of 69/1000 deliveries, stillbirth 5.8%, and 18.8% of cases with low APGAR score (26).

Research conducted in selected governmental hospitals at Addis Ababa showed that among 1089 mothers with preeclampsia/eclampsia 36% experienced at least one complication. The main complications were HEELP (39.5%), aspiration pneumonia (17.5%), pulmonary edema (17.5%) and abruption placenta (15.3%), and at least one neonatal complication occurred in 66.4% of deliveries. The most common neonatal complications were stillbirth (30.2%), prematurity

(32.8%), respiratory distress syndrome (37.9%) and low birth weight were (30.2%), and also there were 8.28% of early neonatal deaths (22).

Retrospective hospital-based study to determine feto-maternal outcomes of HDP at Yekatit 12 hospital in Ethiopia with the lion share of preeclampsia and eclampsia (73.6%) found that preterm deliveries were 29.5%, out of which preeclampsia and eclampsia accounted for 89%, and need for neonatal resuscitation support and referral to NICU was 15% and 11.5% respectively. Of which all were born from mothers with preeclampsia and eclampsia. Plus, maternal mortality and ICU admission was not present (28). A similar study at Mettu Karl Referral Hospital in Ethiopia Showed a prenatal mortality rate of 120/1000 deliveries and a stillbirth rate of 10.2%. Plus 30.5% of low birth weight, 18.5% of low APGAR score, abortion 10.7% and 31.4% of preterm delivery were major complications, and there were mothers complicated with renal failure 6.6%, 7.4% of postpartum hemorrhage and two percent abruption placenta but there was no maternal death (29).

A Study at Debrebirhan referral hospital showed Preterm delivery, LBW, and IUGR happened in 35.4%, 39.4%, and 8.5% of the cases of HDP respectively; 78.6% of them were from women with severe preeclampsia. Other complications encountered in cases of HDP included: fetal death (30.8%) of which 54.3% and 38.9% occurred by severe preeclampsia and eclampsia respectively and maternal death (2.5 %) of which 71.4% occurred with eclampsia it gives cases fatality rate of 6.67 % (36).

Research in urban Ethiopia revealed 31.7% of the women had maternal complications of which (19.5%) progressed to preeclampsia with a severe feature. There were two (1.22%) maternal deaths. Associated with this 19.5% of women delivered before 37 weeks, 12.5% of neonates had a birth weight of less than 2.5 kg, 36.6% of neonates were admitted to NICU, and 2.27% of early neonatal deaths had occurred. The perinatal mortality rate was 4.26% (42.6/1000). Five (71%) perinatal deaths occurred in preterm births (37).

Research conducted at selected hospitals in the Amhara region found that 46.5% of babies from mothers with severe preeclampsia and eclampsia ended up with unfavorable outcomes. The main causes were stillbirth 22.6 %,13% of LBW, low APGAR score 10.8%, IUGR 4.4%, preterm birth (10.8%), and 10% of birth asphyxia (21).

2.3. Factors Associated With Adverse Maternal and Perinatal Outcomes

As Research in Brazil by Silva et al in 2015 showed that Preeclampsia/ eclampsia women with incomplete antenatal care or antenatal care not done had a progressive risk of death and severe clinical complications (near-miss), and their children had also a higher chance of stillbirth or neonatal death (38).

In the year from 2005-2013 in Brazil 32 out of 256 maternal deaths were related to preeclampsia /eclampsia, representing 12.5% of the total. Of which preeclampsia made-up 37.5% and eclampsia represent 62.5%. The majority of deaths related to PE/E were in the age group of 30-34 years, with a share of 53.13%, and the lowest was in the age group of 15-19 years with 6.25% of deaths. While by the period of death the highest number 40.6% of maternal deaths occurred during pregnancy, labor and abortion combined, and by marital status, 43.75%, 37.5%, and 3.13% of deaths occurred in married, single, and divorced women respectively. Moreover, deaths by educational status with the highest value 37.5% of deaths among mothers their level of education unknown. Whereas the lowest value was 9.5% among mothers, their education level was 1-3 year of education (39).

In 2019 a study at Haiti by Bridwell et al found that among women who had HDP, the adjusted odds of having a low birth weight baby was four times than for women without HDP, more than three times for stillbirths, and five times for maternal death. Among the 3 types of HDP, eclampsia was associated with the greatest odds of adverse events with five times the odds of having a low birth weight baby, six times for stillbirths, and more than twelve times for maternal death. Hypertension alone was not associated with adverse outcomes (40).

A retrospective study at Yekatit -12 teaching hospital, Ethiopia revealed that there was a statistically significant association between the severity of hypertensive disorders and prematurity ($p < 0.001$). The low Apgar score was higher among neonates delivered from mothers with mild preeclampsia (Apgar at the first minute (25%) and fifth minutes (14.3%)), severe pre-eclampsia (Apgar at the first minute (28.0%) and fifth minutes (23.2%)) and eclampsia (50% of low APGAR at the first and fifth minutes (29).

Research by Seyoum et al showed that mothers with maximum blood pressure record during admission has 26 times more likely to develop a poor maternal management outcome of HDP

with p-value <0.001. Mothers who had Proteinuria were also more likely to develop unfavorable outcomes as compared with mothers with negative Proteinuria. Preterm newborns are 80.4 times (p-value <0.001) more likely to develop unfavorable fetal outcomes as compared with term ones. APGAR score has also a significant statistical association with the fetal management outcome of HDP. Newborns with a low Apgar score are 23 times (p-value = 0.002) more likely to develop unfavorable fetal outcomes as compared with newborns with a good Apgar score (41).

The study conducted at a tertiary hospital in Ethiopia revealed abnormal AST value has a significant statistical association with unfavorable maternal outcomes of preeclampsia. The odd of unfavorable maternal outcome is 90 times higher if the AST is elevated. The presence of headache and blurring of vision as a presenting complaint were also associated with unfavorable maternal outcomes. Address, gestational age at diagnosis, and maternal age were statistically significant with the perinatal outcome at a univariate level. But after multivariate binary logistic regression, gestational age at diagnosis less than 34 weeks were only found to have a significant association with poor perinatal outcome (26).

Melese et al found that newborns from preeclamptic/eclamptic mothers who had an educational status of unable to read/write, able to read/ write and elementary school were more possible to develop adverse perinatal outcomes compared with those mothers who had an educational status of college and above with the odds of 6.6, 4.6, 4.3 times more likely to develop adverse outcomes respectively. Plus newborns delivered from nulliparous and Primiparous women were more likely to develop unfavorable perinatal outcomes when compared with multiparous women with the odds ratio of 8.3 and 5.2, respectively. Gestational age was also associated with the outcome variable. Pregnancies interrupted from 20 to 27 and 28 to 36 completed weeks were with high unfavorable perinatal outcomes when compared with pregnancies terminated from 37–40 weeks with the odds ratio of 9.6 and 5.4 respectively. Also when pregnancies terminated from 37 to 40 weeks compared with pregnancies terminated at 41 and above weeks, it shows 80% less likely to develop unfavorable perinatal outcomes. It shows the favorable gestational age of pregnancy termination in severe preeclamptic-eclamptic mothers is from 37 to 40 weeks (21).

A study done by Belay Tolu et al stated that women older than 35 years were 2.54 times more likely to develop adverse maternal outcomes compared to those in the middle age group (20–35) with a P-value of 0.030. Those patients with early onset of preeclampsia without severe features

were 5.22 and 25.9 times more likely to develop maternal and perinatal complications respectively, compared to late-onset preeclampsia after 34 weeks with a P-value of <0.0001 (37).

The study conducted at Wolaita, Ethiopia, in 2014 on neonatal and fetal outcomes revealed that GA range of 20-24 years, parity, type of HDP, and high blood pressure were strongly associated with unfavorable fetal and neonatal outcomes (P<0.05). Null-parity, BP greater than 160/110, and preterm babies 5 times, while eclampsia 6 times more likely to develop unfavorable outcomes (42).

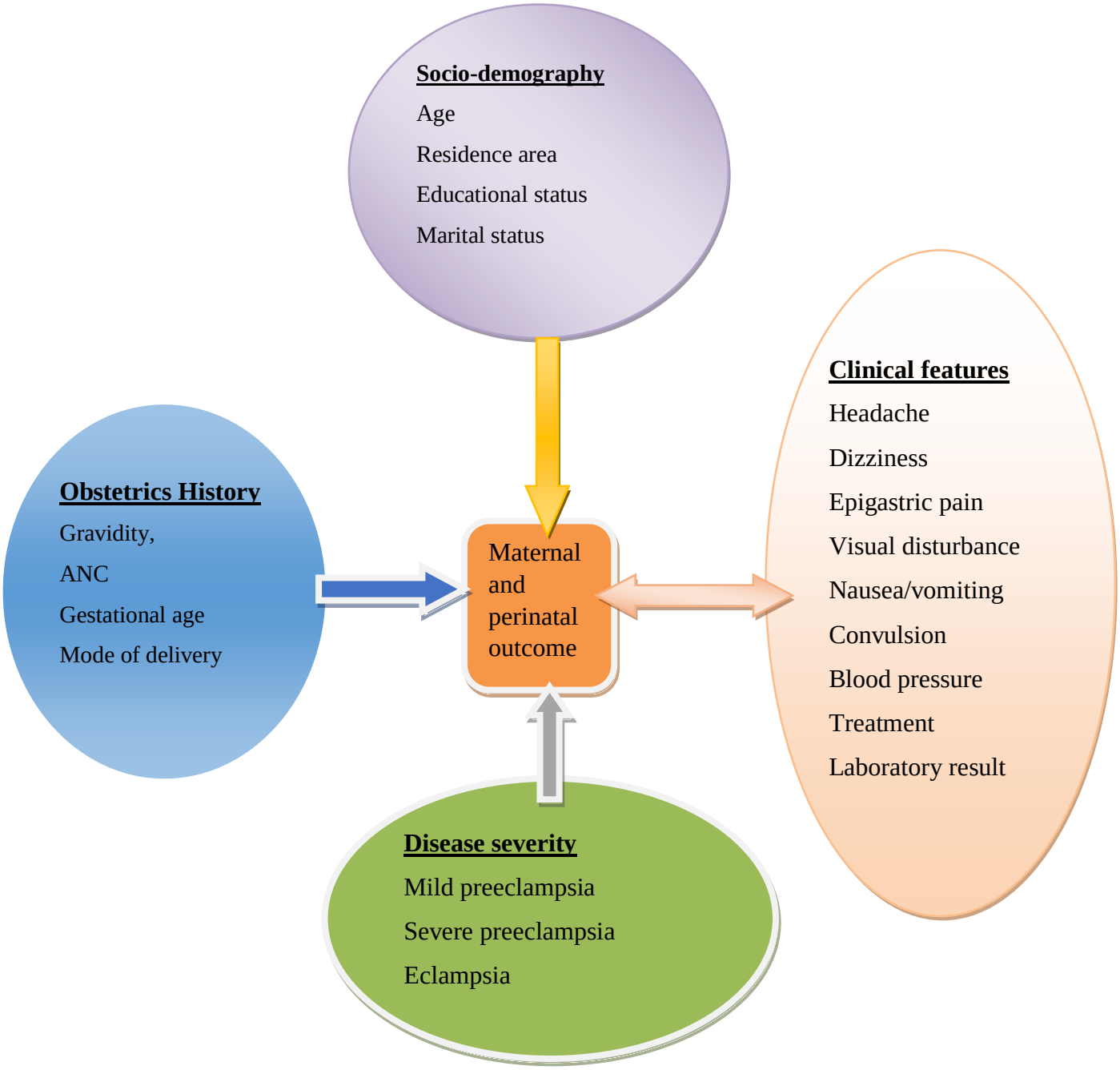

Figure 1- Conceptual framework for the assessment of clinical profile, and treatment outcomes of preeclampsia and eclampsia at GUCSH, North Ethiopia 2020/2021.

CHAPTER THREE

3. OBJECTIVE

3.1. General Objective

To assess the clinical profiles and treatment outcome of women with preeclampsia and Eclampsia admitted in Gondar University comprehensive specialized hospital Amhara, North Ethiopia 2020/2021.

3.2. Specific Objectives

1. To assess the clinical features of pregnant women with Preeclampsia and Eclampsia at Gondar University comprehensive Specialized Hospital Amhara, Ethiopia.
2. To determine the treatment outcome of Preeclampsia and Eclampsia at Gondar University comprehensive specialized Hospital Amhara, Ethiopia.
3. To identify the determinant factors those influence the treatment outcome of Preeclampsia and Eclampsia at Gondar University comprehensive Specialized Hospital Amhara, Ethiopia.

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CHAPTER FOUR

4. METHODS AND MATERIALS

4.1. Study Area and Period

Gondar city is found 750 km northwest of Addis Ababa (the capital city of Ethiopia). It has a latitude and longitude of 12°36'N 37°28'E with an elevation of 7,500 feet (2,300 meters) above sea level. Based on the 2019 central statistical agency of Ethiopia, Gondar had a total population of 500,788. Of those 300,000 were men and 200,788 were women. The Gondar University comprehensive specialized hospital (GUCSH) is a teaching and referral hospital that has more than a 500-bed capacity and is used as the referral center for more than 7 million catchment population. It provides both specialty and subspecialty services including Obstetrics and Gynecology units in its inpatient and outpatient clinics. According to the hospital's data registry, more than 10,000 mothers have delivery service annually. Data collection and analysis was held from April 2021 to June 2021.

4.2. Study Design

A descriptive retrospective cross-sectional study was conducted during the study period.

4.3. Population

4.3.1. Source Population

All women admitted for Preeclampsia and Eclampsia management at GUCSH from January 1 to December 30, 2020.

4.3.2. Study Population

All selected women with Preeclampsia and Eclampsia admitted at GUCSH from January 1, 2020, to December 30, 2020, and fulfills the inclusion criteria.

4.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion Criteria

All women admitted for Preeclampsia and Eclampsia in Gondar Specialized Hospital from January 1, 2020, to December 30, 2020, were included.

4.4.2. Exclusion Criteria

The study was exclude women with preeclampsia and eclampsia who do not have a complete record, lost cards and transferred to other hospitals.

4.5. Sample Size and Sampling Technique

4.5.1. Sample Size Determination

The sample size in this retrospective study was determined by using a single population proportion formula by considering the following statistical assumptions.

P=proportion of preeclamptic and eclamptic mothers who develop unfavorable outcomes (46.5%) obtained from a study conducted in Amhara region Ethiopia about the perinatal outcome of preeclampsia/eclampsia and its management in hospitalized mothers (26).

Z α/2 = the corresponding Z score of 95% CI

d= Margin of error (5%)

n= Sample size

$$n = \left[\frac{\left(z_{\frac{\alpha}{2}}\right)^2 p(1-p)}{(d)^2}\right] = (1.96)^2 \frac{0.465(1-0.465)}{(0.05)^2} \quad so, n = 382.3 \approx 382$$

Since the number of preeclamptic and eclamptic patients is less than 10,000, we used correction formulas. Because preeclamptic and eclamptic mothers who had delivery service at Gondar specialized hospital from January 1 to December 30/2020 were 1086 from registration book.

Final, $n_f = \frac{n \times N}{N+n} = \frac{382 \times 1086}{382+1086} = 282.59 \approx 283$

Where n = sample size

N = source population

n_f = Final corrected sample size

After the addition of 10% of the sample for missing and incomplete charts, the final corrected sample size is 311.

4.5.2. Sampling Technique

Samples were selected using systematic sampling by a constant K value; was calculated by dividing the number of PE/E mothers (source population) divided by the number of the sample size.

Therefore the value of **K** was $= \frac{1086}{311} = 3.49 \approx 4$

Then, the first chart was selected randomly.

4.6. Variables

4.6.1. Dependent Variable

Maternal and perinatal outcomes of Preeclampsia and Eclampsia

4.6.2. Independent Variable

Socio-Demographic Variables

- Age
- Residence area
- Educational status
- Occupation,
- Marital status

Disease Severity

- Mild preeclampsia
- Severe preeclampsia
- Eclampsia

Clinical Profile

- Headache
- Epigastric pain
- Blurred vision
- Seizure and coma
- Investigations
- Treatment

Obstetric History

- Gravidity
- ANC follow up
- Parity
- ✓ Number of fetus
- ✓ Gestational age
- ✓ Mode of delivery

4.7. Data Collection Tool

Data collection was done by using a pretested checklist format which is developed from reviewing different kinds of literatures(9,21,36,43,44). The checklist contains socio-demographic, obstetrics history, clinical presentation, management profiles and laboratory result and treatment outcome questions of preeclampsia and eclampsia.

4.8. Data Collection Procedure and technique

Records of eligible Preeclampsia and Eclampsia women were retrieved from the registration book. Then the medical registration number (MRN) of all preeclampsia and Eclampsia patients were sorted. Then one chart was selected randomly. After this, a systematic simple random sampling method was applied to select the study subjects. After that the selected MRN was given to chart unit workers to check-out the selected patient charts. Two BSC nurses were selected for data collection and a master nurse for supervision was selected to supervise and organize the whole process during data collection.

4.9. Data Quality Control measures

Before the actual data collection date, data collectors (two BSC nurses) and a supervisor (Msc, nurse) were trained for two days concerning the overall issue of data collection format like, objectives, method and duration for gather the needed information, how to fill the checklist. Eventually data collectors were familiar with each question. A Pretest was done from 5% of the total sample to ensure the agreement of the data abstraction format with the aim of the study at Maraki health center. Any error found in the data abstraction format (checklist) was corrected and modified. Like variable removal that were not available and every day, during data collection close supervision was carried out by the supervisor and principal investigator. Besides, they were checked the information for completeness and consistency regularly until data collection was completed and incomplete questionnaires were reversed and corrected. In this study, data were collected using checklists, after data collection papers were kept in a well closed brief case and the key was kept with the researcher himself. The data from the study was coded, transcribed and stored in a password protected personal computer.

4.10. Data Processing and Analysis

After manual checking of the data for completeness, and clarity data was entered into Epi-data version 4.6 Statistical Software and exported to statistical package for social sciences (IBM SPSS) version 26.0 for further analysis. A descriptive component such as central tendency measures, (mean, and median), standard deviation, and frequency distribution were used to present demographic, obstetric, and clinical characteristics of the patients. Inferential statistics like chi-square and fisher's exact test were used for the data analysis and testing relationship between predictor variables and outcome variables. Data were presented in the form of tables, graphs and paragraphs. Pearson chi-square was used when expected frequency for each cell in the association was greater than five. Whereas, fisher's exact test was used when each cell in the association of variables had expected count equal or less than five. Finally, independent variables with a P-value of less than or equal to 0.05 were considered as a statistically significant between the dependent variable.

4.11. Operational Definition

Incomplete charts is a chart lacks discharge summary, delivery summary (maternal vital sign at delivery, birth weight, Apgar score), and medication sheet.

Elevated **ALT and AST** is greater than 60.

Low platelet count is <100,000/micro-litter.

Neonatal Death: The death of a baby that occurs at less than 28 days of age with a birth weight of 500gms and more.

Maternal outcome: - refers to mothers who had at least one of the following complications (abruption of placenta, HEELP syndrome, DIC, acute renal failure, cardiac failure, post-partum hemorrhage, stroke, pulmonary edema, coagulopathy, abortion, prolonged hospital stay, and maternal death).

Abortion; Pregnancy that terminated before 28 completed weeks was considered as abortion, and prolonged maternal hospital stay was defined as more than 7 days.

Perinatal outcome:- refers to fetal/newborns who had at least one of the following complications (low birth weight, stillbirth, intrauterine growth restriction, intrauterine fetal death, preterm birth, low APGAR score, birth asphyxia and NICU admission).

4.12. Ethical Considerations

Initially ethical clearance letter was obtained from Addis Ababa university, college of medicine and health sciences, department of emergency medicine institutional board review **(Ref No: EM/SM/105/2021)**. Then the letter was taken to Gondar comprehensive specialized hospital (GUCSH) ethical research committee to get the permission. The hospital approved the proposal and the approval letter provided was submitted to the unit managers to start data collection from patient charts. Additionally, at the selected study department, the matron, medical officer-in-charge was contacted for consent and necessary information before the commencement of the study. All information collected from patients' charts was kept strictly confidential. Any personally identifiable information (e.g. name and address) was not recorded in the data collection format to maintain the confidentiality and anonymity of the study participants.

4.13. Dissemination Plan

The primary objective of this study is for partial fulfillment in the requirements for the master of Emergency Medicine and Critical Care Nursing. The result submitted to Addis Ababa University; Emergency medicine department, Gondar university comprehensive specialized hospital, library, policymakers, and other concerned stakeholders. Further effort will be made to present it at workshops, conferences and to publish it in reputable open access journals.

CHAPTER FIVE

5. RESULTS

5.1. Socio-demographic characteristics of respondents

A total of 311 randomly selected patients with response rate of 98.7% were included in this study. The maternal age of the study population ranged from 17-45 years, with the mean of 27.5 ± 6 years and 77.2% of cases were referred from health centers, primary hospitals and private clinics. Of the total study subjects, 174(56%) were residing in Gondar. Most, 226(94%) of the patients were married and majority of them 100(53%) had no formal education **(Table1below).**

Table 1:- Socio-demographic characteristics of mothers with preeclampsia/eclampsia and managed at GUCSH, Amhara, Ethiopia April/1 – June/1/2021.

Variables	Category		Frequency(n=311)	Percentage (%)
Referral	Yes	Health center	117	37.6
		Primary hospital	103	33.2
		Private clinic	20	6.4
	No		71	22.8
Age	≤20		41	13.2
	21-34		211	67.8
	≥35		59	19
Residence	Gondar city		174	56
	Out of Gondar city		137	44
Religion	Orthodox		228	73
	Muslim		56	18
	Protestant		27	9
Educational level	No formal education		100	53
	Primary school		10	5
	Secondary school		13	7
	College and above		66	35
Marital status	Married		226	94
	Unmarried		14	6

5.2. Obstetrics characteristics of the patients

One hundred sixty five (75%) of mothers' pregnancy were planned and supported. Concerning their gravidity about 52.7% were primigravidia. From a total 10(3.2%) and 140(45%) were 20-27 and 28-36 weeks of gestational age respectively with a mean gestational age of 36 ± 3.6. Among the total 54(17.4%) had no ANC follow up prior to their presentation and only13 (4.2%) of mothers conceived twin **(table 2 below).**

Table 2:- Obstetrics characteristics of mothers with preeclampsia and eclampsia and managed at GUCSH, Amhara, Ethiopia 2021.

Obstetrics characteristics(n=311)			Frequency	Percentage (%)
Planned/supported pregnancy	Yes		165	75
	No		55	25
Gravidity	Primigravidia		164	52.7
	Multigravida		147	47.3
Parity	Nulliparous		20	6.4
	Primiparous		160	51.4
	Multiparous		131	42.2
Gestational age (weeks)	Abortion		10	3.2
	Preterm		141	45.3
	Term		160	51.4
	Mean (SD)		**36 ± 3.6**	
ANC follow up	Yes	1-3	172	55.3
		≥4	85	27.3
		Mean (SD)	**3 ± 1.3**	
		No	54	17.4
Number of fetus	Single		298	95.8
	Twin		13	4.2

5.3. Clinical presentations of mothers with preeclampsia and eclampsia

In this study regarding their BP measurement, 180(57.9%) and 150(48.2%) of patients had SBP and DBP respectively in severity feature at admission, whereas, after 4 hour measurement SBP 116(37.3%) and DBP 120(38.6%) of patients were have normal blood pressure measurement. About the laboratory result of the participants 92% of them were have normal creatinine with a mean of 0.76mg/dl. Majority 54.4% had normal platelet and 17.3% of mothers had moderate thrombocytopenia. Furthermore, regarding their liver function test 55.1% and 76.2% of them had AST (SGOT) and ALT (SGPT) in normal range with a mean of 62.76 ± 55 and 45 ± 40.2 respectively **(table 3below).**

Table 3:- The clinical signs and symptoms, laboratory results and management profiles of mothers with PE/E at GUCSH Amhara, Ethiopia 2021.

Variables	Category	Frequency(n=311)	Percentage (%)
SBP at admission	< 140	1	0.3
	140-159	130	41.8
	≥ 160	180	57.9
	Mean + SD	**159 ± 13**	
DBP at admission	< 90	20	6.4
	90-109	141	45.3
	≥ 110	150	48.2
	Mean + SD	**105 ± 12**	
Platelet count	<100,000	55	17.9
	≥100,000	252	82.1
Cr	≤ 1.1	275	92
	> 1.1	24	8
AST(SGOT)	< 2x elevated	263	86.2
	≥ 2x elevated	42	13.8
ALT(SGPT)	< 2x elevated	285	94.1
	≥ 2x elevated	18	5.9

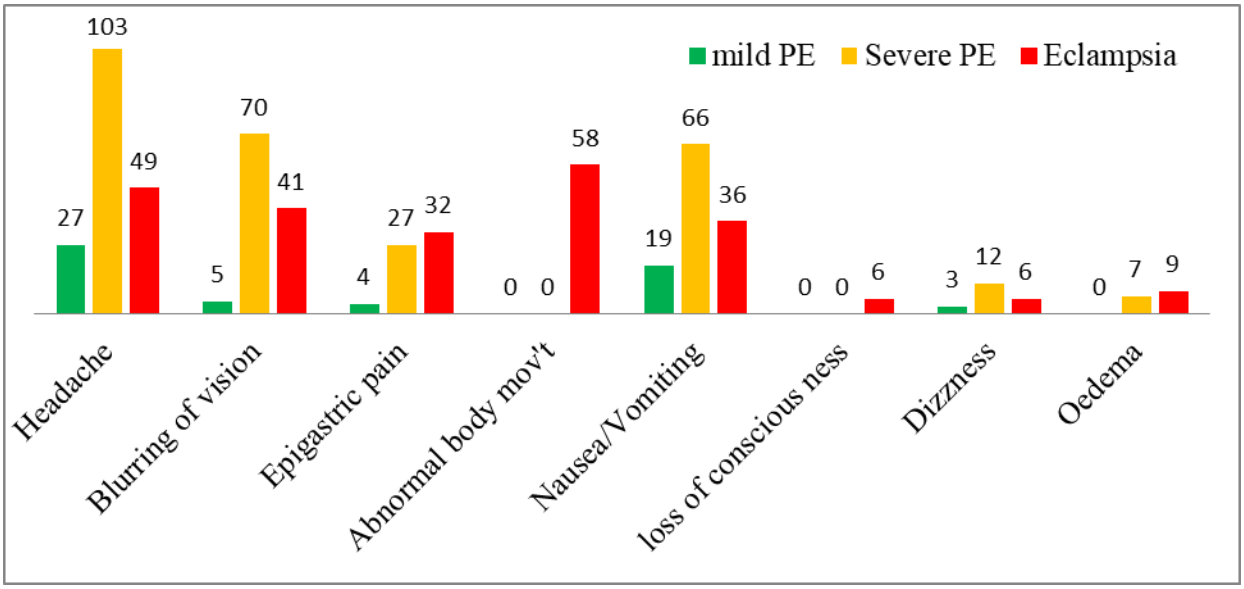

Figure 2:- Chief complaints of the study subjects at presentation.

In this study the most chief compliant was headache 179 (57.6%), followed by blurring of vision 116(37.3%) of mothers with preeclampsia and eclampsia. Among eclamptic mothers 6(1.9%) of them had loss of consciousness coupled with abnormal body movement **(Fig 2 above).**

5.4. Management of women with preeclampsia and eclampsia

Concerning the medications given hydralazine was mostly given antihypertensive, followed by nifedipine 146(66.7%) and Mgso4 92.9% of cases to prevent eclamptic fit (**table 4 below)**.

Table 4:- Management of women with Preeclampsia and Eclampsia admitted at GUCSH, North Ethiopia 2021.

Variables	Category	Frequency(n=311)	Percentage %
Antihypertensive	Yes No	219 92	70.4 29.6
Mgso4	Yes No	289 22	92.9 7.1
Corticosteroid	Yes No	100 211	32.2 67.8
Diazepam	Yes No	25 286	8 92
Antibiotic	Yes No	120 191	38.6 91.4

5.5. Maternal and Perinatal management outcome of mothers

In this study among 311 mothers the majority 49.8% of mothers were preeclampsia with severity feature. While, 98(31.5%) were preeclampsia without severity features and the remaining cases were eclamptic.

Related to mode of delivery, instrumental delivery accounted for 2.3% and C/S 59.5% for various obstetrics indications. Preeclampsia and eclampsia was implicated for 35%, fetal distress 7%, failed induction 4.5%, and others like NRFHRP and NRBPP contribute 8.7% were indication for c/s. One fourth 78(25.1%) of mothers develop complications of which HELLP syndrome accounted for 27(34.6%), aspiration pneumonia 33(42.3%), acute renal injury 4(5.2%) and others 13(16.9%).

A total of 62(19.9%) of cases had hospital stay ≥7 days of duration with a mean 6 ± 6.5 days. From those 46(63%) of them were eclamptic mothers. Among mothers with unfavorable outcome, eclampsia share 59%. Of the total births 171(55%) were males. In preeclampsia with severity features and eclampsia mothers, 31(9.96%) were had stillbirths. Regarding to their birth weight and Apgar score, most of the neonates were LBW with mean Apgar score of 7.48 at the 1^{st} minute, and 8.67 at the 5^{th} minute respectively. Among all live births 8.6% of them need NICU admission. Asphyxia, LBW, IUGR, and preterm were contributing factors for NICU admission **(table 5 below).**

Table 5:- Pattern of maternal and perinatal management outcomes according to disease severity at GUCSH, North Ethiopia 2021.

Variables	Category	Mild PE	Severe PE	Eclampsia
Onset of labour	Spontaneous	53(50%)	48(45.3%)	5(4.7%)
	Induction	9(25.7%)	20(57.1%)	6(17.1%)
	Immediate C/S	36(21.2%)	87(51.2%)	47(27.6%)
Mode of delivery	SVD	54(45.4%)	59(49.6%)	6(5%)
	Instrument	4(57.1%)	3(42.9%)	--------
	C/S	40(21.6%)	93(50.3%)	52(28.1%)
Maternal Complication	Yes	10(12.8%)	22(28.2%)	46(59%)
	No	93(39.1%)	133(55.9%)	12(5%)
Hospital length of stay	<7days	90(36.1%)	116(46.6%)	43(17.3%)
	≥7days	8(12.9%)	39(62.9%)	15(24.2%)
Maternal status of discharge	Alive at discharge	98(31.7%)	155(50.2%)	56(18.1%)
	Died	--------	--------	2(100%)
Outcome of delivery	Alive birth	98(35%)	132(47.1%)	50(17.9%)
	Still birth	---------	23(74.2%)	8(25.8%)
Sex of fetus	Male	56(32.7%)	87(51%)	28(16.3%)
	Female	45(32%)	68(48.2%)	28(20%)
APGAR at 1st minute	<7	27(26%)	54(52%)	23(22%)
	≥7	71(38.8%)	85(46.4%)	27(14.8%)
APGAR at 5th minute	<7	2(12.5%)	8(50%)	6(37.5%)
	≥7	95(35.2%)	132(49%)	43(15.9%)
NICU admission	Yes	2(8.3%)	17(70.8%)	5(20.8%)
	No	96(37.5%)	115(44.9%)	45(17.6%)
Neonatal death	Yes	---------	4(57.1%)	3(42.9%)
	No	98(34.8%)	134(47.5%)	50(17.7%)
Maternal outcome	Unfavorable	10(12.8%)	22(28.2%)	46(59%)
	Favorable	93(39.1%)	133(55.9%)	12(5%)
Perinatal outcome	Unfavorable	---------	27(71.1%)	11(28.9%)
	Favorable	98(35.9%)	128(46.9%)	47(17.2%)

5.6. Factors associated with maternal outcome of women with Preeclampsia and Eclampsia.

The Pearson chi-square and Fisher exact test were calculated to assess the relationship between predictor variables and maternal outcomes. Independent variables with p-value ≤0.05 were considered as significant factors. Over 77% of mothers with PE/E were referred from health center, primary hospital, and private clinics. Out of them 27% of were ended with unfavorable outcome. Referred from primary hospital had highest unfavorable maternal outcome (p=0.002).

Out of 311 studied subjects, more than 67% of mothers were between the age group of 21-34 years and accounted for about 65% of unfavorable maternal outcome, plus the association between maternal age and maternal outcome was statistically significant (P=0.02). Epigastric pain and blurring of vision were observed more frequently in unfavorable maternal outcome (p<0.001, p=0.005). The majority of patients with aspartate transaminase (AST) ≥ two times elevated and platelet count (plt) <100,000 values ended up in unfavorable maternal (P<0.001). Among cases who take antihypertensive 31.1% of them were experienced unfavorable outcome (p<0.001), and the higher occurrence of unfavorable maternal outcome were reported among 16(66.7%) of mothers whose creatinine value were above 1.1 mg/dl (p<0.001) **(table 6 below).**

Table 6:- Analysis of maternal outcome of mothers with Preeclampsia and Eclampsia at GUCSH, North Ethiopia 2021.

		Maternal outcomes		
Predictors	Category	Unfavorable n (%)	Favorable n (%)	P –value
Age of mothers	<=20	17(41.5)	24(58.5)	0.02
	21-34	51(24.2)	160(75.8)	
	>=35	10(16.9)	49(83.1)	
Residence	Gondar city	32(18.4)	142(81.6)	0.002
	Out of Gondar	46(33.6)	91(66.4)	
Gravidity	Primigravida	52(31.7)	112(68.3)	0.007
	Multigravida	26(17.7)	121(82.3)	
Epigastric	Yes	33(52.4)	30(47.6)	<0.001
	No	45(18.1)	203(81.9)	
Blurring of vision	Yes	40(34.5)	76(65.5)	0.005
	No	38(19.5)	157(80.5)	
Diagnosis	Mild PE	10(10.2)	88(89.8)	<0.001
	Severe PE	22(14.2)	133(85.8)	
	Eclampsia	46(79.3)	12(20.7)	
Mode of delivery	SVD	11(9.6)	104(90.4)	<0.001
	Instrumental	8(53.3)	7(46.7)	
	C/S	59(32.6)	122(67.4)	
Days of hospitalization	<7 days	44(17.7)	205(82.3)	<0.001
	>=7 days	34(54.8)	28(45.2)	
AST(SGOT)	<2x elevated	43(16.3)	220(83.7)	<0.001
	>2x elevated	33(78.6)	9(21.4)	
PLT	$<100x10^3$	32(58.2)	23(41.8)	<0.001
	$\geq 100x10^3$	45(17.9)	207(82.1)	

PLT; Platelet, AST; Aspartate transaminase, SVD; Spontaneous Vaginal Delivery

***p-value ≤0.05**

5.7. Factors associated with perinatal outcome of women with Preeclampsia and Eclampsia

There were abortion 10(3%), preterm 141(45%), and term deliveries 160(51.4%). According to this study the likelihood of unfavorable perinatal outcome was statistically significant with gestational age, DBP at admission, scale of the disease, birth weight, and Apgar score at 5^{th} minute (p<0.001). Also the higher occurrences of unfavorable perinatal outcome were observed among mothers who had AST level ≥2x elevated, ANC follow up less than 4 (p=0.03) (**table 7 below).**

Table 7:- Analysis of Perinatal outcome of mothers with Preeclampsia and Eclampsia at GUCSH, North Ethiopia 2021.

		Perinatal outcomes		
Predictors	**Category**	**Unfavorable n (%)**	**Favorable n (%)**	P –value
ANC number	1	5(31.2)	11(68.8)	0.028
	2-3	20(12.8)	136(87.2)	
	≥4	6(7.1)	79(92.9)	
Gestational age	Abortion	10(100)	0	<0.001
	Preterm	21(14.9)	120(85.1)	
	Term	7(4.4)	153(95.6)	
Corticosteroid	Yes	18(18)	82(82)	0.03
	No	20(9.5)	191(90.5)	
DBP at admission	Normal BP	0	20(100)	<0.001
	Mild PE	7(5)	134(95)	
	Severe PE	31(20.7)	119(79.3)	
AST(SGOT)	<2x elevated	28(10.6)	235(89.4)	0.03
	≥2x elevated	10(23.8)	32(76.2)	
Diagnosis	Mild PE	0	98(100)	<0.001
	Severe PE	27(17.4)	128(82.6)	
	Eclampsia	11(19)	47(81)	
Mode of delivery	SVD	23(20)	92(80)	0.001
	Instrumental	3(20)	12(80)	
	C/S	12(6.6)	169(93.4)	
Birth weight	VLBW	10(37)	17(63)	<0.001
	LBW	8(6.6)	114(93.4)	
	Normal BW	2(1.4)	142(98.6)	
NICU admission	Yes	3(12.5)	21(87.5)	0.015
	No	4(1.6)	252(98.4)	

***p-value ≤0.05**

CHAPTER SIX

6. DISCUSSION

This institutional based cross-sectional study has tried to assess the maternal and perinatal outcomes of preeclampsia with and without severity features; eclampsia and detrimental factors among women admitted and attend delivery service in GUCSH, North Ethiopia 2020.

The study results showed that out of 311 preeclampsia and eclampsia cases the proportion of preeclampsia with and without severity features was 49.8% and 31.5% respectively. The remaining 18.6% were eclampsia cases. This finding is comparable with some previous studies in Ethiopia; 52.5% of severe preeclampsia in Yekatit 12 hospital, 19% of eclampsia at Mettu karl hospital, 17.3% of eclampsia in Addis Ababa and Mizantepi hospital (22,29,41,45). However, it is higher than some review studies and global reports (2,9) as well as studies in Ethiopia; Debrebrhan referral hospital, and 2.6% of eclampsia at Yekatit 12 hospital (29,36). The exaggerated number of cases of Preeclampsia and Eclampsia in the current study is not surprising as the hospital is a specialty referral center for over 7 million populations and more than 12 health centers as catchment areas. Therefore this prevalence might be the effect of the sum rates several primary care facilities and a huge denominator population. On the other hand, it was lower than studies conducted at wolaita 26.1% of eclampsia; 82.5% of severe preeclampsia at Gandhi, 27.8% of eclampsia in Debrebrhan, and 78.1% of severe preeclampsia in Addis Ababa (6,22,36,46).

The majority of the women who attend the delivery service were referred 77.2%, and 27.5% of them were ended unfavorably. This is supported by a study done in wolaita-sodo teaching hospital which reported that 88.2% of referred patients, but the proportion is higher (46). But this was contrary to a study done in Kenya Nairobi only 20% of cases were referred (20), this could be due to the accessibility of high care services in their surroundings. In this study, the Source of referral was a significantly associated predictor of maternal outcome (p=0.002) and being referred from primary hospital had more unfavorable outcomes than other referral institutions. This may be due to late decision making for the referral. According to the finding majority of subjects were in the age group of 21-34 (67.8%) in line with the studies (26,29,42,47) also with a study in Kenya (48), Primiparous (51.4%) (p=0.03), and primigravidia (52.7%) (p=0.007) supported by a study in Iraqi (49). Also, the other statistically significant socio-demographic

factors were residence (p=0.002), and marital status (p=0.012). Regarding the presenting sign and symptoms, headache (57.6%) was the most presenting chief complaint and statistically significant factor (p=0.02). which was harmonious with 58.8% of headache from Yekatit-12, 48.9% from Debrebrhan and other studies in Ethiopia (26,27,29,36), and similar studies from abroad 70% in Bangladesh, 46.2% in Iran, 26.8% from Egypt, and 43% in Tanzania (31,34,50) was the most chief compliant and predictors of maternal outcome. The reason could be the aggressive and early reaction of the nervous system to elevated blood pressure.

Concerning their admission DBP measurement, more than 48% of mothers had ≥110 mmHg and 31.1% of them resulting in unfavorable maternal outcomes. Also this was a statistically significant predictor factor (p=0.001). This was agreed with a study done by Abera, Id and Demissie, in 2019 (46). According to this paper 70.4% of cases were taken antihypertensive to treat hypertension. Of which mild PE 11%, 64.8% of severe Preeclampsia, and 24.2% were eclamptic mothers. The three most commonly used medications to treat hypertension were 77.2% hydralazine, 26.9% methyldopa, and 66.7% were taken nifedipine. There was also a strong significant association between maternal outcome and antihypertensive medication (p<0.001).

All mothers with eclampsia and 99.4% of preeclampsia with severity features as well as 78.6% of mild PE mothers taken Mgso4 and this was in line with a study at Yekatit-12 and a study by Mooij et al in 2015 (29,31). This might be recommendation of Mgso4 for the prevention of eclamptic fits by World health organization. But the association between the maternal outcome and Mgso4 fail to show significance (p=0.3). Among mothers with unfavorable outcome 12.4%, 28.2%, 59% were mild PE, severe PE, and eclampsia cases respectively.

According to the WHO secondary survey preeclampsia is responsible for eight time more frequent maternal near-miss cases, while eclampsia contributes up to 60 times more frequently than women without these conditions (9). These conditions are also responsible for 18% of global and 19% of Ethiopia maternal deaths (2).

In this study, out of all cases two eclamptic women died which was higher than no death reported at mettu and Yekatit-12 (29,41), Moreover, the finding was inconsistent with a study in Egypt which report no death (34). This could be explained because of the referral of high risk mothers from the large denominator population and other institutional factors. whereas it was lower than a study at ayider 10(2.8%), and Debrebrhan7(2.5%) (26,36), even a study in rural

Tanzania 6(11%) death due to eclampsia (31). This discrepancy might be the effect of time related quality EmONC service improvement and due to variation in the study period, sample size, and setting. As to complication 46(79.34%) of eclampsia, 14.2% of severe PE, and 9.2% of mild PE patients developed complications. The observed complications were pulmonary edema 3(3.9%), aspiration pneumonia 33(42.9%), AKI 4(5.2%), HELLP 27(35.1%), PPH 3(3.9%), psychotic disorder 2(2.5%), and uterine rupture 2(2.5%), and C/S site infection 8(10.4%). Those complications were also reported in other studies in Ethiopia (2,26).

Preeclampsia and eclampsia were associated with poor perinatal outcomes like that of fetal and neonatal deaths. A review study in Ethiopia reported perinatal mortality rate among women with HDP is found to be 25%, and this was finding supported by a study in Pakistan which reported perinatal mortality of 17.3 % (2,51).

A result of this study showed 31(10%), 24(8.6%), 7(2.5%), of deliveries were complicated by stillbirth, NICU admission, and neonatal death respectively. This is congruent with the study done by Mooij et al reported 26(32%) of perinatal death, 20 stillbirth and 6 neonatal death (31). Whereas, this was higher than to a study in Ethiopia (27) and Egypt (34) this discrepancy may be attributed to time, sample size, the EmONC service and other study design factors. The rate of LBW was 39.2%; almost similar to the finding in Debrebrhan (36) and 8.7% of VLBW with the mean BW of 2.44 kg and there were 33.4% and 5.1% of low Apgar score at the first and 5^{th} minute sequentially.

Moreover, there were 10 abortions congruent with the studies at mekelle and mettu (26,41); and preterm delivery was observed in 45.3% of deliveries with the mean GA 36 ± 3.59 weeks. Mode of delivery was one of the factors which show a statistically significance with perinatal outcome (P=0.001) and SVD as well as instrumental deliveries ended with more unfavorable perinatal outcomes than C/S. this finding is comparable with retrospective studies done in Ethiopia(16,46).

According to the analysis output gestational age, DBP at admission, the severity of the disease, birth weight, and Apgar score at the 5^{th} minute were factors that have a strong significant association with perinatal outcome ($p<0.001$) this finding is consistent with a study at Mettu, wolaita and a study done in Nigeria (26,33,46).

7. CONCLUSION AND RECOMMENDATION

7.1. Conclusion

The findings of this study showed that a considerable proportion of women had unfavorable maternal (25.1%) and perinatal (12.2%) outcomes. In addition the study showed that several factors; like disease severity, mode of delivery, aspartate transaminase (AST) and NICU admission were statistically significance with the pregnancy outcome of preeclampsia and eclampsia patients. More than 77% of patients were referred from different health care institutions. However, 27.5%, and 14% of referred women experienced unfavorable maternal and perinatal outcome respectively. Majority of mothers had less than 4 ANC follow up which is below WHO recommendation.

7.2. Recommendations

For Ministry of health and policy makers

It is recommended to intervene at three areas to improve the maternal and perinatal outcomes of preeclampsia and eclampsia;

- ✓ Coordinate community based health education for mothers to improve their awareness regarding to maternal health service usage and early sign and symptoms of preeclampsia.
- ✓ Up to date and goal oriented training for lower and middle level health professionals at the health centers and in the Hospitals can further increase their capacity for early detection of high-risk pregnancies, and timely referral to advanced tertiary health facilities.
- ✓ The last but not least possible level of intervention could be, promoting the quality of emergency obstetrics and newborn care that a woman with Preeclampsia and eclampsia receives. In addition develop standard protocol for all facilities to aware health care providers.

For Gondar specialized hospital

- ✓ It is recommended to have easily available and accessible laboratory tests, antihypertensive and anticonvulsant drugs and increase quality of services
- ➢ It is also recommended to develop a uniform referral and communication system with the catchment areas; plus a systematic registration system of maternal and perinatal outcomes of PE/E.

- Adjust on job training for health care providers regarding to management of preeclampsia and its complications.
- In general, the hospital in line with the government and other bothering institutions; even NGOs should take a commitment to reduce adverse outcomes of preeclampsia, through multiple high impact interventions at both facility and community levels to remove bottlenecks such as harmful traditional practices, limited infrastructures, shortage of transportation facilities and inadequate care at health facilities that can hamper access to safe mother-hood services.

For health professionals

- Apply a through history taking and physical examination, to detect modifiable and non-modifiable risk factors, advice your patient to avoid at least the modifiable once and treat accordingly.
- Properly explain to your patient how she controls the blood pressure and for how long the medications continue. Improving mothers' awareness regarding to early sign and symptoms of preeclampsia.
- To do strict vital sign monitoring, timely and frequent laboratory updates and medication administration.

For Researchers

- To do prospective cohort study to overcome the limitations of the cross-sectional study design; hence it is difficult to determine the causal relationships between variables.

8. STRENGTHS AND LIMITATIONS

8.1. Strength

- The strengths of this study are that this study is unique in observing and presenting patient level data at the hospital. Also, the hospital serves a wide range of geographical area as a result the hospital, researchers, government bodies and concerned stake holders may take as a base for future work.
- Pretest was done and data collection performed by trained BSC midwife and nurse.

8.2. Limitations

- The limitations to our study include the retrospective and cross-sectional nature of the study design, did not allow inferences to be drawn regarding to the causal relationship among variables.
- Due exposure and outcome were measured simultaneously it was not possible to know whether the exposure or outcome presided.
- Data were collected from medical charts that were frequently fragmented, and a significant number of patients had missing laboratory values, missing documentation of obstetrics characteristics and prenatal care.
- The other limitation was lack of complete data from women with mild preeclampsia to compare complications and their association with degree of maternal and perinatal outcome. Besides, the diagnosis of preeclampsia was made by the treating physician and not confirmed by the authors. However, we conducted a thorough medical chart review, and all charts were reviewed by midwives.
- Given that this was an institution-based study, we are unable to form conclusions about women not presenting for hospital-level care.

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ANNEXES

I. Information Sheet

Date _____

Title of the Research Project: clinical features and treatment outcome of women with Preeclampsia and Eclampsia in Gondar University specialized hospital, North Ethiopia, 2021.

Name of Investigator: Tamalew Alemie (BSc in Nursing)

Name of the Organization: Addis Ababa University College of Health Science, School of medicine, Department of emergency medicine.

Name of the Sponsor: Addis Ababa University.

Introduction: This information sheet is prepared for Gondar specialized Hospital administration, obstetrics and gynecology coordinating office. The aim of the form is to make the above-concerned office clear about the purpose of research, data collection procedures and get permission to conduct the research.

Purpose of the Research Project: To assess clinical features and treatment outcome of preeclampsia/Eclampsia and its determinants among women admitted in Gondar specialized Hospital January 1-December/30/2020, North Ethiopia, 2021.

Procedure: In order to achieve the above objective, information which is necessary for the study will be taken from emergency, obstetric ward and ICU record form.

Risk and /or Discomfort: Since the study will be conducted by taking necessary information from medical chart, it will not cause any harm on the patients. The name or any other identifying information will not record on the questionnaire and all information is taken from the chart will kept strictly confidential and in a safe place. The information retrieved will be only used for the study purpose.

Benefits: The research have no direct benefit for one whose document/ record are included in this research. But the indirect benefit of the research for the participant and other clients in the program is clear. This is because if program planners are preparing predicted plan there is a benefit for clients in the program of getting appropriate care and treatment services for those

survived and other newly admitted ones. In all, the research work has a principal direct benefit for health care planners, providers and managers.

Confidentiality: To reassure confidentiality the data on the chart will be collected without the name of the clients and the information collected from this research project will be kept confidential and stored in a file cabinet. In addition, it will not be shown to anyone except the investigator and it has been kept in a key and locked system with computer password.

Person to contact: This research project will be reviewed and approved by the institutional review board of College of Health Science, department of emergency medicine, Addis Ababa University. If you have any question you can contact any of the following individuals (Investigator and Advisors) and you may ask at any the time you want.

Tamalew Alemie (BSc),

principal investigator

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Asmamaw Abebe (BSc, MSc in EMCCN); Advisor.

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My name is_____ I am collecting data on behalf of Mr. Tamalew Alemie. He is final year master's degree in emergency medicine and critical care nursing student at Addis Ababa University. He is currently conducting a research as partial fulfillment for the requirements of master's degree on the topic of clinical profiles and treatment outcomes of preeclampsia and eclampsia at Gondar Specialized teaching Hospital Amhara Ethiopia. The result of this study will be helpful for public and clinical interventions by identifying the clinical profiles and treatment outcomes of pregnancy complicated by preeclampsia and eclampsia. He uses patient charts to revise his essential information.

Data collector name _____

Supervisor name_____

S. No		II. Check List
1	Referral	1. Yes 2. No
1.1	If Yes, from where?	Health center Primary hospital Private clinic
A. Socio Demographic Data		
2	Age	
3	Address:	Urban Rural
4	Education level:	unable to read and write Elementary Secondary College and above
5	Marital status:	Married, Single (unmarried, divorced, widowed)
6	Occupation:	Employed Unemployed
B. **Obstetric History**		
7	Current pregnancy history	Gravidity
		Parity
8	Gestational age	
9	Antenatal care follow up	Yes No
9.1	If yes how many?	
10	Number of fetus	Single Twin (multiple)
11	Severity of disease	Mild preeclampsia
		Severe preeclampsia
		Eclampsia
12	Drugs given during current pregnancy	Yes No Methyldopa Nifedipine Hydralazine Labetalol Magnesium sulphate
		Diazepam

		Corticosteroid Antibiotic	
		Other (Specify)----------	
C. Past Medical History			
13	Past medical history of pregnant mother		Yes No
		Chronic hypertension Pregnancy induced hypertension Diabetes mellitus Chronic renal disease Heart disease class 1 (No limitation of activity) Heart disease, Class 2-4(any limitation in activity) Hematological disorder (Chronic anemia) Hepatitis Seizure disorder HIV/AIDS positive	
		Others, specify----------	
	D. Clinical Features On Admission		
14	Chief complaint (other than pregnancy/labour)		Yes No
		Headache Dizziness Epigastric pain Visual disturbance Nausea and /or Vomiting	
		Convulsions Loss of consciousness Oedema Others ----------	
		Blood pressure at admission	
		Blood pressure 4hr later	
E. Investigations			
17	Investigation done	Blood group and Rh	
			Lowest Highest

		Wbc Hct Hgb PLT AST	
		ALT ALP LDH Creatinine Urea Urine protein	
		Dipstick urine protein	1+ or trace 2+ ≥3+
G. Delivery			
18	Onset of labour	Spontaneous Induction Elective C/S	
			Yes No
19	If not spontaneous, Indications	Severe preeclampsia Intrauterine fetal death Abruptio placenta HELLP Syndrome Fetal distress Eclampsia	
		Others, specify----------	
20	Mode of delivery	Spontaneous Vaginal delivery Instrumental Caesarean section	
21	If caesarean section what was the indication	Fetal distress Abruptio placenta Severe preeclampsia Eclampsia Previous C/S scar Failed induction	
		Others, Specify----------	
22	Number of days of hospitalization		

H. Maternal Complications		
23	Is there any maternal complication?	Yes No
24	If yes what?	Abruptio placenta HELLP syndrome: DIC (Disseminated intravascular coagulation) Acute renal failure Cardiac failure Postpartum hemorrhage Stroke Pulmonary Edema Maternal death Others, Specify----------
I. Perinatal Outcome		
25	Sex	Boy Girl
26	Outcome of delivery;	Still birth Live birth
27	If live births Apgar score:	At 1 minute
		At 5 minutes
28	Need for resuscitation	Yes No
29	Need for NICU admission	Yes No
29.1	If NICU admission yes reasons	
30	Birth weight	
31	Neonatal death	Yes No
32	If Yes, How old?	