


# Prevalence of Eclampsia and Its Maternal-Fetal Outcomes at Gandhi Memorial Hospital, Addis Ababa Ethiopia, 2019: Retrospective Study

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**Background:** Eclamptic disorder during pregnancy is one of the common problems in sub-Saharan countries and forms one of the deadly triads along with hemorrhage and infection which complicates fetomaternal outcomes of pregnancy. So, the purpose of this study was to assess the prevalence of eclampsia and its maternal and fetal outcome in Gandhi Memorial Hospital, Addis Ababa Ethiopia, 2019.

**Methods:** A descriptive retrospective cross-sectional study was employed on a review of all cases of women who were delivered at Gandhi Memorial Hospital from 1st of September 2017 to last of August 2018. Data were analyzed using SPSS version 25 software. Descriptive statistics were used to calculate frequencies and percentages and data was presented using texts and tables.

**Results:** Out of the total deliveries, the prevalence of eclampsia was found to be 6.2%. In our experience of a very high rate of eclampsia, fortunately, we had only 3 maternal deaths out of the total cases. However, neonatal mortality and stillbirths had been extremely high: 41 (22.1%) of stillbirths and 30.3% neonatal deaths (a total burden of 52.4% of perinatal mortality). About 70.8% had reported a history of prior pregnancy-induced hypertension and 73.5% induced their current pregnancy following eclampsia. From mothers who required interventions to terminate the pregnancy by induction, 47.8% ended by cesarean section secondary to non-reassuring fetal status (29.2%). The majority (91.9%) had taken magnesium sulfate for the management of convulsion and 86.5% had taken hydralazine for hypertension management. Abruptio of the placenta (96.2%), postpartum-hemorrhage (89.2%), and HELLP syndrome (83.8%) were major maternal adverse outcomes reported, and 22.1% of pregnancy was ended as stillbirth. Over 53.6% of delivered babies, 18.4% of neonates required admission to nursery/NICU referral.

**Conclusion:** The prevalence of eclampsia was relatively high, with corresponding high maternal and perinatal morbidity and mortality. Increasing early detection before pregnancy, antenatal screening, and the use of magnesium sulfate to control convulsions will reduce the disorder and associated morbidity and mortality for both mother and fetus.

**Keywords:** eclampsia, prevalence, fetomaternal outcome, Ethiopia

## Introduction

Hypertensive disorders are the common complication occurring during pregnancy and it is one of the most leading causes of maternal and neonatal mortality in Ethiopia.<sup>1,2</sup> Preeclampsia and eclampsia are major contributors to maternal and neonatal deaths in sub-Saharan African countries, which nearly accounts for

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10–15% of direct maternal deaths and nearly a quarter of stillbirths and newborn deaths.<sup>3</sup>

Eclampsia which usually occurs after 20 weeks of gestation<sup>4,5</sup> remains a major cause of death in low-income countries and is highly associated with higher rates of adverse maternal and neonatal outcomes.<sup>6,7</sup> It causes cardiovascular, cerebrovascular diseases, liver and renal problems, abruption of placenta, DIC, and hemolysis, HELLP-syndrome on mothers and neonatal/fetal complications like oligo-hydramnios, non-reassuring fetal heartbeat/status, preterm birth, low birth weight, severe asphyxia, stillbirth, and intrapartum death.<sup>8–10</sup>

The study conducted on the outcomes of severe pre-eclampsia/eclampsia among mothers in northwest Ethiopia revealed that the overall prevalence of severe pre-eclamptic/eclamptic mothers was 46.5%.<sup>10</sup> In the study conducted in yekatit-12 teaching hospital, Addis Ababa, Ethiopia, eclampsia was accounted for 2.6%,<sup>11</sup> and studies also showed that complication was common in hypertensive disorders of pregnancy<sup>12,13</sup> for example the study conducted in Mpilo central hospital, Bulawayo, Zimbabwe<sup>14</sup> revealed HELLP syndrome (9.1%), maternal mortality (1.7%) and 49.6% of the babies were lost through stillbirths and early neonatal deaths.

Prior studies have tried to determine the prevalence of hypertensive disorders<sup>1,9,15,16</sup> and the government of Ethiopia in line with the ministry of health/who takes a commitment to reduce mortalities but specifically prevalence and its fetomaternal outcome in the study area is not studied yet. Therefore, the purpose of this study was to determine the prevalence of eclampsia and its maternal and fetal outcome in Gandhi Memorial Hospital, Addis Ababa Ethiopia, 2019 and the finding of this study will be significant for the improvement of health care setups for preventions as well as interventions of such problems/bottlenecks.

## Methods

### Study Area and Setting

Gandhi Memorial Hospital is a hospital in central Addis Ababa, Ethiopia, Located in Kerkos- sub-city. Mahatma Gandhi Memorial Hospital, a 350 bedded hospital was laid early in 1994 and the building of this spacious hospital was completed in 1995. The hospital opened its doors to the public on the 7th of March 1997. The hospital was named after the well-respected Mohandas Karamch and Gandhi. Today the Hospital is operated by the Ministry of

health and it has a total of 22 physicians, 140 nursing, and 45 Midwife staff. This hospital primarily cares for women and babies.

### Study Design and Period

A retrospective cross-sectional study design was used to assess maternal outcomes of eclampsia. A Two Years retrospective hospital-based quantitative patient chart review study design from September 1/2017 to August 30/2018 was conducted at Gandhi Memorial Hospital, Addis Ababa Ethiopia, in 2019.

### Source Population

All pregnant women who delivered (gave birth) and mothers were referred from other hospitals and, health centers for labor during the study period at Gandhi Memorial Hospital, Addis Ababa.

### Study Population

All women who gave birth at Gandhi Memorial Hospital during the study period and, diagnosed to have eclampsia.

### Inclusion Criteria

Mothers who were diagnosed with eclampsia and gave birth during the study period and also have a complete record were included.

### Exclusion Criteria

Mothers who were diagnosed with eclampsia, and gave birth but incomplete charts.

### Dependent Variables

Maternal and fetal outcome.

### Independent Variables

Maternal age, parity, gestational age, admission blood pressure (BP), presence or absence of proteinuria on urine dipstick, seizure activity, and the mode of delivery. Lab values of interest included the complete blood count (CBC), proteinuria, and BP readings during those antenatal visits.

### Sample Size Determination

The sample size was determined using the single population proportion formula by considering proportion (p) of eclampsia from the previously conducted study in Mettu Karl Referral Hospital showed that 19%,<sup>17</sup> the margin of error (5%) and level of confidence 95%, so

$$ni = \frac{(z\alpha/2)^2 p(1-p)}{d^2} = \frac{(1.96)^2 0.19(1-0.19)}{0.05^2} = 236$$

An adjustment formula was used and the total sample becomes 185.

## Sampling Procedure

Gandhi Memorial Hospital that offers maternal and delivery services were selected using a simple random technique and a review of all eclamptic cases was considered.

## Operational Definitions

Pregnancy-induced hypertension (PIH): is when systolic blood pressure higher than 140 mm Hg and two readings of diastolic blood pressure 90–110 mmHg, 4 hours apart, after 20 weeks of gestation, and with proteinuria of >300mg/l in 24 hours or up to 2+ or more and with/without edema.

Eclampsia: is systolic blood pressure higher than 140 mm Hg and diastolic blood pressure 90 mm Hg or more after 20 weeks gestation with Convulsions and Proteinuria 2+ or more high BP and plus seizure that cannot be attributed to some other cause or a woman with preeclampsia or Gestational HTN with seizure or coma.

HELLP syndrome: is a complication of pregnancy characterized by hemolysis, elevated liver enzymes, and a low platelet count.

Stillbirth: The birth of a dead fetus at 22 weeks or more and birth weight equal to or more than 500gms.

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

Maternal death: The death of a woman while pregnant or within 42 completed days of termination, irrespective of duration and site of pregnancy, from any causes related to or aggravated by the eclamptic disorder or by its management but not due to accidental or incidental causes.

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

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

Prevalence: quantifies the proportion of individuals in a population who have a disease at a specific time and provides an estimate of the probability.

## Data Collection Tool and Technique

A pre-test was done on 5% of the total sample size and data was collected using a structured checklist which was adapted from the other study.<sup>13,17</sup> The questionnaire was prepared in the English language and data was collected by the data collectors in the Gandhi memorial Hospital. All relevant information regarding demographic data, clinical findings, laboratory results, and each patient's outcome was collected. Data about antenatal care were extracted from the patient's history file and antenatal card.

## Data Analysis and Interpretation

After the data have been collected, data were first checked for completeness, edited, and coded. The extracted data were cleaned; checked for accuracy and consistency, then it was entered into epi-data manager 4.6 and analyzed using SPSS version 25. Descriptive and analytic statistical procedures were employed.

## Ethical Consideration

Ethical clearance letter was obtained from Addis Ababa University, School of Nursing and Midwifery, Department of midwifery b/c the principal investigator Mr. Addisu Yeshambel was a student specializing in Maternity and Reproductive Health in Addis Ababa University by the time or in the year 2018/2019 who was sponsored by Wolaita Sodo University and he was assigned at Gandhi Memorial Hospital for clinical work and requested to do research entitled Prevalence of Eclampsia and its Maternal-fetal outcomes at Gandhi Memorial Hospital. An official letter of cooperation was taken from Gandhi memorial Hospital to the respective departments/case team. Patient informed consent was not required since all data were fully anonymized before data was accessed and that this study was conducted in accordance with the declaration of Helsinki.

## Result

### Socio-Demographic Characteristics

From the total of 2973 delivered mothers, 185 charts were reviewed during the study period. The prevalence of eclampsia became 6.2%. The majority 57 (30.8%) were in the age of 30–34 years with a mean age of 30.1 (±6.1) and around 27.6% were Muslim. From the total participants, 70 (40%) were learned up to Secondary (9–12 grade) and more than half (117 (63.5)) were married.

Regarding their occupation, the majority (59.5%) were unemployed (Table 1).

## Past Obstetrical, Medical, and Family History of Eclamptic Mothers

Regarding past medical, obstetric, and family history, the majority (60.5%) of them had diabetes mellitus followed by chronic renal failure (23.2%). From the total participants, more than three-fourth (89.7%) had a history of pregnancy-induced hypertension and around 81% of them had reported a family history of hypertension (Table 2).

## Obstetrical History of Current Pregnancy of Eclamptic Mothers

Out of the total participants, the majority 131 (70.8%) reported as they were pregnant more than once followed by primigravida which was 29.2% and 47.0% were multiparas. Almost three-fourths 142 (76.8%) of them were reported as regular ANC follow-up and 40.0% of them had at least one history of abortion. Around 56.8% had a prior history of hypertension. Regarding drugs given in their current pregnancy, almost all 170 (91.9%) used

**Table 1** Socio-Demographic Characteristics of Eclamptic Women Delivered at Gandhi Memorial Hospital, Addis Ababa, Ethiopia 2019 (n=185)

Variables	Category/Group	Frequency	Percentage (%)
Age	<24	43	23.2
	24–29	53	28.6
	30–34	57	30.8
	>34	32	17.3
Religion	Orthodox	40	21.6
	Muslim	65	35.1
	Protestant	51	27.6
	Catholic	29	15.7
Educational level	Illiterate	36	19.5
	Elementary (1–8 grade)	38	20.5
	Secondary (9–12 grade)	74	40.0
	College and above	37	20.0
Marital status	Married	117	63.2
	Unmarried	37	20.0
	Divorced	18	9.7
	Widowed	13	7.0
Occupation	Employed	75	40.5
	Unemployed	110	59.5

**Table 2** Past Obstetrical, Medical, and Family History of Eclamptic Mothers Delivered at Gandhi Memorial Hospital, Addis Ababa, Ethiopia 2019 (n=185)

Variables	Frequency	Percentage (%)
Pregnancy-induced hypertension	131	70.8
Diabetes mellitus	112	60.5
Chronic renal disease	43	23.2
Heart disease class 1 (No limitation of activity)	38	20.5
Heart disease, Class 2–4 (any limitation in activity)	7	3.8
Hematological disorder (Chronic anemia)	14	7.8
Hepatitis	7	3.8
Seizure disorder	15	8.1
HIV/AIDS positive	14	7.6
Family history of hypertension	81	43.8
Family history of preeclampsia	84	45.4

magnesium-sulfate followed by hydralazine (86.5%), diazepam (53%), and methyldopa (50.3%) respectively (Table 3).

## Clinical Features (Chief Complaint (Other Than Pregnancy/Labor)) on Admission and Delivery History

On admission, more than three fourth (93.5%) had dizziness followed by headache (85.9%), epigastric pain (83.8%), and convulsion (82.7%) respectively. From the total, more than half (60.5%) had recorded diastolic blood pressure which was greater than 110mmHg on two occasions four hours apart and 54.6% had proteinuria +3. Nearly three-fourths (73.5%) started to induce labor to terminate their pregnancy secondary to fetal-distress (46.3%) and 47.8% of mothers delivered by caesarian section followed by IUFD (29.2%) and IUGR (27.2%). Non-reassuring fetal status (29.2%), IUFD (23.6%), IUGR (20.8%), and HELLP syndrome (18.1%) were the main reasons reported for caesarian section respectively (Table S1).

## Maternal and Fetal Outcomes of the Eclamptic Disorders of Pregnancy

Regarding fetomaternal complications related to eclampsia, the majority of them developed abruption of the placenta (96.2%), postpartum hemorrhage (89.2%), and HELLP syndrome (83.8%) respectively. Of the total participants, 22.1% of them gave stillbirth and from the total 77.9% live births around 41.1% were asphyxiated and 18.4% were admitted to nursery/NICU. From live birth babies, nearly half (40.1%) were low birth weight and the

**Table 3** Current Obstetrical History of Eclamptic Mothers Delivered at Gandhi Memorial Hospital, Addis Ababa, Ethiopia 2019 (n=185)

Variables	Group	Frequency	Percentage (%)
Gravidity	Primigravida	54	29.2
	Multigravida	94	50.8
	Grandgravidity	37	20
Parity	Primipara	72	38.9
	Multi-para	87	47.0
	Grand-para	26	14.1
Abortion	Zero	54	29.2
	One	74	40.0
	Two	43	23.2
	Greater than two	14	7.6
Gestational age	Preterm	105	56.8
	Term	68	36.8
	Post-term	12	6.5
Attended antenatal follow	Yes	142	76.8
	No	43	23.2
Number of children	No children	56	30.3
	One	73	39.5
	Two	28	15.1
	More than two	28	15.1
Prior history of PIH	Yes	131	70.8
	No	54	29.2
Drugs given during the current pregnancy	Methyldopa:	93	50.3
	Nifedipine	74	40.0
	Hydralazine	160	86.5
	Magnesium sulphate	170	91.9
	Diazepam:	98	53.0

majority (48.2%) died within one week of delivery (Table S2).

## Discussion

The study finds out, the prevalence of eclampsia and its maternal-fetal outcomes at Gandhi Memorial Hospital, Addis Ababa Ethiopia, 2019. In this study, the prevalence of eclampsia was found to be 6.2%. This finding was greater than the study conducted in Africa, Asia, Latin America, and the Middle East<sup>18</sup> which showed 0.28% cases, in Aminu Kano Teaching Hospital, Kano, Nigeria<sup>19</sup> which was 1.2% cases, in a rural hospital in Western Tanzania<sup>20</sup> which showed 1.6% cases, a study at King Abdulaziz University Hospital. The difference might be due to the time gap difference, sample size, and the educational and awareness level difference. The study is

also greater than the study conducted in Yekatit-12 Teaching Hospital, Addis Ababa, Ethiopia<sup>11</sup> which accounted for 2.6%. The difference might be due to the small sample size used in the study conducted in Yekatit-12 Teaching Hospital, the time gap difference, and due to more case flow and client preference to Gandhi Memorial Hospital since it gives only maternal and child health service.

This study finding is less than the study conducted at four hospitals in separate Departments across Haiti<sup>6</sup> which showed 23.3% cases, a tertiary care center in western Saudi Arabia<sup>16</sup> showed only 8% cases, in low-resource settings, Mpilo Central Hospital, Bulawayo, Zimbabwe (21.5%)<sup>14</sup> in Albert Schweitzer (HAS) in Deschappelles, Haiti (30.7%),<sup>21</sup> in Mettu Karl Referral Hospital, Ethiopia (19%),<sup>17</sup> cases in Addis Ababa (17.3%)<sup>12</sup> and in Amhara Region referral hospitals, North West Ethiopia (46.7%).<sup>10</sup> This might be due to the large sample size difference, study setting, time gap difference/data collection time used in the former studies.

In this study finding, three women (1.6%) died following eclamptic complications. This finding is in-line with the study conducted at Mpilo Central Hospital, Bulawayo, Zimbabwe,<sup>14</sup> severe preeclampsia or eclampsia for the period January 1, 2016, to December 31, 2016, which showed 1.7% death cases. The finding is less than in a study conducted in a rural hospital in Western Tanzania<sup>20</sup> six women with eclampsia died (case fatality rate 11%) and in the study conducted in Aminu Kano Teaching Hospital, Kano, Nigeria<sup>19</sup> of maternal death 11.7%. This difference might be due to the sample size difference, study setting, study time, or lack of awareness.

Regarding to maternal complication, postpartum-hemorrhage (89.2%), abruption of placenta (96.2%), HELLP-syndrome (83.8%), acute renal failure (41.1%) pulmonary edema (45.9%) and DIC (40.0%) were the major complications identified related to eclamptic disorder. This finding is in-line with the study conducted in Aminu Kano Teaching Hospital, Kano, Nigeria<sup>19</sup> (had pulmonary edema (1.7%), had an acute renal failure (5%) and 4.2% had HELLP syndrome), in Mettu Karl Referral Hospital, Ethiopia,<sup>17</sup> (12.4% of HELLP complicated with renal failure (6.6%), nine (7.4%) with postpartum hemorrhage) and Addis Ababa<sup>12</sup> (HELLP syndrome (39.5%), pulmonary edema (17.5%) and abruption placenta (15.3%)). This might be due to the fact that eclamptic



disorder is highly associated with these complications and the socio-economic similarities between the participants.

In this study, the proportion of mothers delivered with cesarean section is 47.8%. This is in-line with the study conducted in Aminu Kano Teaching Hospital, Kano, Nigeria<sup>19</sup> which showed 55.8% of patients were delivered by cesarean section, in a rural hospital in Western Tanzania<sup>20</sup> 19% of women delivered by Caesarean section, in Amhara Region referral hospitals, North West Ethiopia<sup>10</sup> showed 27.9% delivered by cesarean section. This might be due to the fact that eclamptic disorder causes seizure/convulsion which is highly associated with fetal distress related placental-insufficiency and causes fetomaternal complications.

According to this study finding, stillbirth (22.1%), birth asphyxia (41.1%), low birth-weight (40.1%), neonatal death (30.3%), were the fetal outcomes/complications identified related to the eclamptic disorder and 18.4% of newly delivered babies were admitted to nursery/NICU. This finding is in-line with the study conducted in Aminu Kano Teaching Hospital, Kano, Nigeria<sup>19</sup> (Stillbirth (22.5%), birth asphyxia (39.1%) and low birth weight in (25.8%), in Amhara Region referral hospitals, North West Ethiopia<sup>10</sup> (28.1%) were stillbirths, 10.9% of neonates required resuscitation and 11.5% NICU referral), and in Addis Ababa, Ethiopia<sup>12</sup> (stillbirths (30.2%), prematurity (32.8%), respiratory distress syndrome (37.9%) and low birth weight (30.2%))

## Conclusion

Even though various interventions were introduced in the country, the proportion of eclampsia cases in some governmental hospitals significantly increased. The rate of maternal complications during birth has slightly remained stable since the introduction of MgSO<sub>4</sub> for eclampsia management; however, fetomaternal complications related to eclampsia cases have experienced a significant increase in overtime in the years. Neonatal complications arising from deliveries by eclamptic mothers also are a problem in the country even if it slightly declined over time. In conclusion, based on our research findings and using eclampsia as an indicator of maternal health, the current state of maternal health in some governmental hospitals and hospitals with similar nature in Ethiopia was far from achieving developmental goals and in need of big assignment for sustainable development goals. Attention should be focused on up to date and goal-oriented training for health professionals

at the health centers and in the Hospitals to strengthening health facilities for early detection/prevention and management of fetomaternal complications related to eclampsia.

## Abbreviations

HELLP, hemolysis, elevated liver enzyme levels, and low platelet levels; DIC, disseminated intravascular coagulation; SNNPR, Southern Nations, Nationalities and People's Region; IUGR, intra-uterine growth retardation; ICU, intensive care unit; C/S, cesarean-section.

## Data Sharing Statement

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request and data request may be made and imposed on the corresponding author, email: addisyes3@gmail.com.

## Ethics Approval and Consent to Participate

Ethical clearance was obtained from Addis Ababa University. All data were fully anonymized before data was accessed. Personal client information was not recorded, and after finishing the data collection the patients' document return to the card room, the information was used for study purposes only.

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## Authors Contributions

AY-was involved in the conception, design, analysis, interpretation, report, manuscript writing, design, analysis, interpretation, and report writing. WA- was involved in the design, analysis, and interpretation of the data. All authors read and approved the final manuscript. All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors report no conflicts of interest in this work.

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