

Prevalence of Eclampsia and its Maternal-fetal outcomes at Ghandi Memorial Hospital, Addis Ababa Ethiopia, 2019. Retrospective study

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Abstract

Background: Eclamptic disorder of 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 maternal and fetal outcomes of pregnancy. To assess the prevalence of eclampsia and its maternal and fetal outcome in Ghandi Memorial Hospital, Addis Ababa Ethiopia, 2019.

Methods: A descriptive retrospective cross-sectional study was used on randomly selected 185 women who attended delivery at Ghandi 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 2,973 deliveries, the prevalence of eclampsia was found to be 16.1%. About 89.7% had reported a history of prior pregnancy-induced hypertension and 73.5% induced their current pregnancy following eclampsia. From mothers 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 33% of pregnancy was ended as stillbirth followed by low birth weight (28.6%). Over 53.6% of delivered babies had an APGAR score of less 4 and 30.4% of neonates required admission to nursery/NICU referral.

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

Background

Hypertensive disorders are the common complication occurring during pregnancy and it is one the most leading causes of maternal and neonatal mortality in Ethiopia (1, 2). among this, preeclampsia and eclampsia are major contributors to maternal and neonatal deaths in sub-Saharan African countries, which nearly accounts 10–15% of direct maternal deaths and nearly a quarter of stillbirths and newborn deaths(3).

Eclampsia which usually occurs after 20 weeks of gestation (4, 5) remains a major cause of death in low-income countries and it is highly associated with higher rates of adverse maternal and neonatal outcomes (6, 7). it causes cardiovascular, cerebrovascular diseases, liver and renal problems, abruptio 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(8–10).

the study conducted on the outcomes of severe preeclampsia/ eclampsia among mothers in northwest Ethiopia revealed that the overall prevalence of severe pre-eclamptic/eclamptic mothers was 46.5%(10). in the study conducted in yekatit-12 teaching hospital, Addis Ababa, Ethiopia, eclampsia was accounted 2.6%(11), and studies also showed that complication was common in hypertensive disorders of pregnancy(12, 13) for example the study conducted in Mpilo central hospital, Bulawayo, Zimbabwe(14) 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(1, 9, 15, 16) and the government of Ethiopia in line with the ministry of health/who takes a commitment to reduce mortalities but specifically prevalence and its feto-maternal 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 Ghandi 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

Gandi 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.

Study design and period

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

Source population

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

Study population

The study population was all women who gave birth at Ghandi Memorial Hospital during the study period and diagnosed to have eclampsia.

Inclusion criteria

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

Exclusion criteria

Mothers who were diagnosed as eclampsia, and gave birth but incomplete charts during the study period were excluded.

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 single population proportion formula by considering proportion (p) of eclampsia from the previously conducted study in Mettu Karl Referral Hospital showed that 19% (17), the margin of error (5%) and level of confidence 95%, so

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

$$d^2 = 0.05^2$$

Adjustment formula was used and the total sample becomes 185.

Sampling procedure

Ghandi Memorial Hospital that offers maternal and delivery service was selected using simple random technique and client card were selected by using systematic random sampling

Operational definitions

Pregnancy-induced hypertension (PIH): 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: Mother with signs and symptoms of severe preeclampsia and convulsion present.

Stillbirth: The birth of a dead fetus at 22 weeks or more and birth weight equal 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 adopted from the other study(13, 17). It was prepared by the English language and data was collected by the investigator in the Ghandi 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 was obtained from Addis Ababa University, School of Nursing and Midwifery, Department of midwifery. An official letter of cooperation was taken from Ghandi memorial Hospital to the respective departments/case team.

Result

Socio-demographic characteristics

A total of 185 mothers' medical charts were reviewed during the study period. Majority 57(30.8%) were in the age of 30-34 years 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, majority 86(46.5%) reported as they were pregnant for more than once followed by primi-gravid which was 38.9% and 47.0% were multiparas. Almost three-fourth 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 magnesium-sulfate followed by hydralazine (86.5%), diazepam (53%), and methyldopa (50.3%) respectively (Table 3).

Clinical features (Chief complain (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 in 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. From the total participants, 33% of them gave stillbirth and from the total 66% live births around 41.1% were asphyxiated and 30.4% were admitted to nursery/NICU. From live birth babies, more than three-fourth (82.2%) was low birth weight and the majority (79.4%) died within one week of delivery (Table S2).

Discussion

The study finds out, the prevalence of eclampsia and its maternal-fetal outcomes at Ghandi Memorial Hospital, Addis Ababa Ethiopia, 2019. In this study the prevalence of eclampsia was found to be 16.1%. This finding was greater than the study conducted in Africa, Asia, Latin America and the Middle East(18) which showed 0.28% cases, in Aminu Kano Teaching Hospital, Kano, Nigeria(19) which was 1.2% cases, in a rural hospital in Western Tanzania(20) which showed 1.6% cases, a study at King Abdulaziz University Hospital, a tertiary care center in western Saudi Arabia(16) showed only 8% cases. 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(11) 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, time gap difference, and due to more case flow and client preference to Ghandi Memorial Hospital since it gives only maternal and child health service.

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

In this study finding, three women(1.7%) died following eclamptic complications. This finding is in-line with the study conducted at Mpilo Central Hospital, Bulawayo, Zimbabwe(14), 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(20) six women with eclampsia died (case fatality rate 11%) and in the study conducted in Aminu Kano Teaching Hospital, Kano, Nigeria(19) 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%), HEELP 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(19)(had pulmonary edema (1.7%), had an acute renal failure(5%) and 4.2% had HELLP syndrome), in Mettu Karl Referral Hospital, Ethiopia(17),(12.4% of HELLP complicated with renal failure (6.6%), nine (7.4%) with postpartum hemorrhage) and Addis Ababa(12)(HEELP syndrome(39.5%), pulmonary edema (17.5%) and abruption placentae(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(19) which showed 55.8% patients were delivered by cesarean section, in a rural hospital in Western Tanzania(20) 19% women delivered by Caesarean section, in Amhara Regionreferral hospitals, North West Ethiopia(10) showed 27.9% delivered by cesarean section. This might be due to the fact that eclamptic disorder causes seizure/convulsion which highly associated with fetal distress related placental-insufficiency and causes feto-maternal complications.

According to this study finding, stillbirth(33%), birth asphyxia(41.1%), low birth-weight (28.6%), neonatal death(30.4%), were the fetal outcomes/complications identified related to the eclamptic disorder and 30.4% 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(19) (Stillbirth(22.5%), birth asphyxia (39.1%)

and low birth weight in (25.8%), in Amhara Region referral hospitals, North West Ethiopia(10)(28.1%) were stillbirths, 10.9% of neonates required resuscitation and 11.5% NICU referral), and in Addis Ababa, Ethiopia(12)(stillbirths (30.2%), prematurity (32.8%), respiratory distress syndrome(37.9%) and low birth weight(30.2%))

The study is limited by its retrospective nature and its dependence on patients' records so that missed information may bias the result of the study. Furthermore this hospital-based approach includes only women attending the hospital; as many women die in outside without visiting a health facility, the result of the study may not represent maternal outcomes of women with preeclampsia in non-hospital settings.

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 MgSO₄ for eclampsia management; however, fetomaternal complications related to eclampsia cases have experienced significant increase in over time 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 some governmental hospitals in 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, and C/S=Cesarean-section

Declarations

Ethics approval and consent to participant

Ethical clearance was obtained from Addis Ababa University. Personal patient information was not recorded, after finishing the data collection the patients' document return to the card room, the information was used for study purposes only.

Consent for publication

Not applicable.

Availability of data and material

The data sets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The Corresponding author declares that there were no competing interests

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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.

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Tables

Table 1: Socio-demographic characteristics of eclamptic women delivered at Ghandi 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 Ghandi Memorial Hospital, Addis Ababa, Ethiopia 2019 (n=185).

Variable	Frequency	Percentage (%)
Pregnancy-induced hypertension	166	89.7
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

Table 3: Current obstetrical history of eclamptic mothers delivered at Ghandi Memorial Hospital, Addis Ababa, Ethiopia 2019 (n=185).

Variables	Group	Frequency	Percentage (%)
Gravidity	Primigravida	72	38.9
	Multigravida	86	46.5
	Grandgravidity	27	14.6
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	105	56.8
	No	80	43.2
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

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