

Research Article

# Eclampsia at a tertiary care hospital of Nepal: A five year study

Shraddha Rana<sup>1</sup>, Pramod Kattel\*<sup>1</sup>

National Medical College and Teaching Hospital, Birgunj, Nepal

<sup>1</sup>Department of Obstetrics and Gynaecology, Kathmandu National Medical College, Kathmandu, Nepal

## **ABSTRACT**

**Background and Objectives:** Eclampsia poses a global threat in terms of fetomaternal morbidity and mortality and all medical practitioners fear the ailment. It is one of the major causes behind preventable maternal death. Etiopathogenesis of the disease condition is ambiguous and is considered to be multifactorial. This study was done to analyze cases of eclampsia in relation to maternal and fetal outcomes at a tertiary level care hospital.

**Materials and Methods:** A descriptive cross-sectional observational study was carried out in patients developing eclampsia over a period of five years starting from July 2011 to June 2016 at National Medical College and Teaching Hospital, Birgunj. Relevant data were collected from the statistics section of hospital reviewing the case sheets.

**Results:** There were 291 cases of eclampsia out of 16,445 deliveries and prevalence of eclampsia was calculated to be 1.77%. Forty-five percent of eclamptic women had age less than 20 years and two-third was primigravida. Approximately 84% of women were unbooked. Antepartum eclampsia was observed in 78.8% followed by postpartum eclampsia (14.8%) and intrapartum eclampsia (6.5%). At the time of admission systolic blood pressure more than 140 mmHg and diastolic blood pressure more than 90 mmHg were noted in 79% and 92.1% cases respectively. Caesarean section was the preferred mode of delivery and was performed in 62.9% cases. ICU admission was required in 35.7% and remaining cases were managed in general/eclampsia ward. Renal failure was the most common cause of maternal mortality seen in 29.4%. Still birth was noted in 13.4%.

**Conclusion:** Institutional obstetric patients are gradually facing eclampsia as prime cause of maternal death and unfortunately most of the cases are primigravid at younger age. All health care professionals should be proficient to manage eclamptic women instantaneously.

**Key words:** Eclampsia; Fetal Mortality; Maternal Mortality; Pre-Eclampsia

## **INTRODUCTION**

Maternal mortality is a global challenge with figures as high as 3,03,000 deaths in 2015.

Developing countries contribute to 99% of these fatalities [1]. Preeclampsia (PE) and eclampsia are the second leading cause of maternal mortality claiming 46,900 deaths

worldwide [2]. Wide difference in incidence of eclampsia has been observed between developing and developed countries [3,4].

The term eclampsia is derived from a Greek word meaning “*lighting*” or “*flash of light*” probably translating to its sudden and unpredictable inception. The first mention of eclampsia dates almost 4,000 years back [5]. The precise patho-physiology of PE and eclampsia is obscure and hence also called “*disease of theories*”. Abnormal placentation is pivotal to development of eclampsia and the basic aberrations noted are oxidative stress, endothelial dysfunction and vasospasm [6]. Eclampsia is an obstetric emergency and prognosis is uncertain for both mother and child [3,7].

Maternal death is perhaps one of the most conspicuous aspects of eclampsia. Case fatality reported by different studies reveals high values in low income countries [8-11]. Maternal complications such as pulmonary edema [10], cardiovascular accident (CVA) [8] and renal failure [5] are commonly implicated as cause of death in eclampsia. The disease is particularly of interest both to neurologists and nephrologists because of its close association to stroke and renal failure [6]. Prematurity and fetal loss is inevitable despite all efforts in management of the disease [3,12,13]. Risk of medical litigation due to possibility of maternal and fetal jeopardy cannot be overlooked. This study was done to analyze cases of eclampsia in relation to maternal and fetal outcomes at a tertiary level care hospital.

## **MATERIAL AND METHODS**

This was a descriptive cross-sectional observational study that looks at data collected over a period of 5 years between July 2011 to June 2016 at a tertiary level care

hospital. The dataset includes relevant information concerning patients’ with eclampsia admitted in the obstetric ward irrespective of booking status.

National Medical College and Teaching Hospital (NMC-TH) operates safe motherhood program and caters as a referral centre for all near and far areas of Terai and parts of Bihar (India), attracting a large number of patients. A total of 291 patients with eclampsia were included in this study. Pertinent information regarding the eclamptic cases was extracted from hospital inpatient records and discharge sheets. Facts collected were reconfirmed by going through operation records and delivery registers so that no cases would be missed. Information such as detailed patient profile, obstetric history, blood pressure (BP) at the time of admission, mode of delivery, duration of hospital stay including intensive care unit (ICU) admission, maternal complications and fetal outcome were noted. Ethical clearance was received from Institutional Review Committee of NMC-TH.

All data were entered in SPSS version 16 and were analyzed using simple descriptive statistics. Data were analyzed in terms of mean and percentage, and presented in tables.

## **RESULTS**

A total of 16,445 patients delivered within the study period, out of which 291 patients developed eclampsia. The prevalence of eclampsia came out to be 1.77% [Table 1].

Two-third of eclamptic women were primigravida and almost half of the study population were less than 20 years of age. The age of eclamptic women in our study varied from 17 years to 44 years. As high as

**Table 1: Year wise distribution of Eclampsia**

Fiscal year	No. of deliveries	No. of eclamptic women	Prevalence of eclampsia
2011/2012	3335	59	1.76
2012/2013	3283	47	1.43
2013/2014	3219	49	1.52
2014/2015	3285	62	1.88
2015/2016	3323	74	2.22
Total	16445	291	

**Table 2: Maternal Characteristics**

Maternal Characteristics	Number (n)	%
Age (years)		
<20	131	45.0
20-30	114	39.2
30-40	45	15.5
>40	1	0.3
Parity		
Primigravida	194	66.7
Multipara (1-3)	86	29.5
Grandmultipara	11	3.8
Booking status		
Unbooked	244	83.9
1-3 visits	46	15.8
4 or more visits	1	0.3

**Table 3: BP at the time of Admission**

BP at the time of admission	Number (n)	%
Systolic (mmHg)		
Less than 140	61	21.0
140-160	158	54.3
More than 160	72	24.7
Diastolic (mmHg)		
Less than 90	23	7.9
90-110	212	72.9
More than 110	56	19.2

83.9% of women managed for eclampsia were unbooked. Only one woman who suffered with eclampsia had completed four ante-natal check-up (ANC) visit as recommended by national protocol [Table 2]. BP noted at the time of admission was categorized in terms of systolic and diastolic. Systolic blood pressure (SBP) was more in

the range of 140-160 mmHg accounting 54.3% followed by >160 mmHg in 24.7% and <140 mmHg in 21%. Diastolic blood pressure (DBP) was noted to be <90 mm Hg in 7.9%, 90-110 mmHg in 72.9% and >110 mmHg in 19.2% [Table 3]. Antepartum eclampsia manifested as the most common type affecting 78.7% cases. Approximately 15%

women developed eclampsia in the postpartum period and a mere 6.5% exhibited intrapartum eclampsia [Table 4].

**Table 4: Types of Eclampsia**

Types of Eclampsia	Number (n)	%
Antepartum	229	78.7
Intrapartum	19	6.5
Postpartum	43	14.8

About 21% newborns were delivered prematurely (including stillbirth) under unavoidable circumstances. The fetal mortality was 13.4%. There were 9.6% fetal growth restricted (FGR) babies and 18.6% delivered preterm were alive. Despite born to an eclamptic mother 58.4% newborns were apparently normal [Table 6].

**Table 5: Maternal Outcome**

Maternal outcome	Number (n)	%
Mode of delivery	(n=291)	
Caesarean	183	62.9
Instrumental delivery	16	5.5
Vaginal delivery	92	31.6
Hospital stay	(n=291)	
ICU admission	104	35.7
Ward admission/Eclampsia room	187	64.3
Cause of death	(n=17)	
CVA	2	11.8
HELLP syndrome	2	11.8
Pulmonary edema	3	17.6
Renal failure	5	29.4
Unidentified cause	5	29.4

Out of 291 eclamptic patients, 183 women underwent caesarean section (CS) and 16 had instrumental delivery using either forceps or ventouse. Remaining 92 women delivered vaginally which also embraced 11 home deliveries. ICU admission was mandated in 35.7% women. Rest 64.3% women were managed in the eclampsia room and general wards depending on the patients' status. Maternal mortality was calculated to be 5.8% (n=17). Renal failure emerged as the major culprit behind maternal mortality comprising 29.4% of eclamptic death. Pulmonary edema was noted in 17.6% followed by HELLP syndrome and CVA each accounting 11.8%. Cause of death could not be identified in 29.4% of eclamptic women [Table 5].

**Table 6: Fetal Outcome**

Fetal outcome	Number (n)	%
Normal Weight	170	58.4
FGR	28	9.6
Prematurity	54(8 still births excluded)	18.6
Still birth	39	13.4

**DISCUSSION**

The overall prevalence of eclampsia in our study was 17.7 per 1000 deliveries. In a study conducted at a tertiary centre in Kathmandu which has almost 19,000 deliveries per year [14]; the prevalence was calculated to be 1.4 per 1000 deliveries [15]. Diversity in prevalence has been detected in various studies [8,16]. The frequency is significantly

lower in developed countries [3,11,17] and may be credited to effective antenatal services and advancements in diagnostic tools [4,8]. Prominent rates of eclampsia evident at our setting may be related to increased volume of case in safe motherhood program and high referrals received from peripheral health facilities. Year wise analysis of prevalence in our study revealed variation of 14.3 to 22.2 per 1000 deliveries. An increasing trend in prevalence was noted and results were similar to findings reported by Nobis et al [13] and Terefe et al [18].

Rise in incidence despite medical proficiency can be attributed to factors like increasing institutional delivery, inadequate ANC visits, advanced maternal age, associated undiagnosed co-morbid conditions, mismanagement of pre-eclamptic women by unskilled professionals and delayed referral.

Two-third of eclamptic women was primigravid. This finding was noted to be similar to studies conducted elsewhere in high and low resource countries [8,10,16,18,19]. Duckitt et al [20] in her study stated that nullipara is three times at risk of developing preeclampsia compared to multipara. Berhe et al [4] found no association between gravidity and hypertension of pregnancy.

In our study 45% of eclamptic women were aged less than 20 years and 39.2% women were in the age group of 20-30 years. This finding was comparable to study by Barbosa et al [9] who observed eclampsia at a mean age of 15.3 years. Other studies have also reported high incidence at younger age [8,10,11,16]. Survey conducted by United Nation's Population Fund (UNFPA) has concluded that pregnancy rate between 15-19 years was four time higher in low income countries compared to high income countries

[21]. Only one woman out of 291 study patients (0.3%) was above 40 years of age. The outcome is substantially dissimilar with result noted by Duckitt et al [20] and Berhe et al [4] who have identified advancing maternal age as a risk factor for eclampsia. Poor socioeconomic condition, rural orthodox community with low literacy level favoring early marriage and childbirth contributes to increased frequency of eclampsia at young maternal age [21,22]. Adolescent mothers are generally single, less educated and nulliparous all of which have strong association with eclampsia [22]. Study by Das et al [8] identified that eclampsia related deaths were more common in primigravida with younger age. Strategies to prevent pregnancy with safe sex practice teamed with comprehensive healthcare facilities are imperative to reduce pregnancy and associated complications in adolescent women [22].

Antenatal care is critical in identifying women at risk of developing obstetric complications. A study conducted in central Nepal detected that more than half of women were unaware regarding benefits of ANC visits [23]. This figure is exceeding gloomy as compared to results noted by Douglas et al [11] where only 3% women had no ANC checkups. Lack of antenatal visits signifies paucity of information that could jeopardize maternal health. In our study, it was observed that 83.9% women were unbooked. Our findings corresponded with reports from Ghimire [10] (97.32%), Das et al [8] (90.09%) and Shakya et al [15] (80%). Only 15.3% women had ANC visits once to utmost three times. Disparity in utilization of ANC services exists between urban and rural areas and is dependent on variables such as socio-economic condition and educational status [24]. None of the patients in the study attended World Health

Organization (WHO) revised eight ANC visits now termed as 'contacts'. Encouraging as well as facilitating women to utilize antenatal care can aid in prevention, early diagnosis and timely treatment of any unanticipated complications if aroused [23].

Late referral of pre-eclamptic women contributes to increased incidence of eclampsia. Unavailability of adequate healthcare facility and referrals on diagnosing eclampsia immediately or after loading dose of Magnesium sulphate are among the many factors that add to case volume [16]. Referrals at our centre were received in large number from State no. 2 as well as parts of India.

Antenatal eclampsia was observed in 78.7% cases. Comparable findings were found in other studies [19]. In contrast to our finding Douglas et al [11] reported higher incidence of postpartum eclampsia. All the cases of home delivery admitted in our hospital had postpartum eclampsia.

Level of BP is crucial in defining PE and eclampsia [6]. SBP of 140 mmHg or more and DBP of 90 mmHg or more is considered as cut-off level [4]. In our study SBP more than 160 mmHg was seen in 24.7%, 140-160 mmHg in 54.3% and less than 140 mmHg in 21%. Study conducted by Jha et al [19] who had SBP of more than 160 mmHg in 18%, 140-160 mmHg in 36% and less than 140 in 46%. DBP of more than 90 mmHg was noted in 92.1% cases similar to finding of Jha et al [19] who noted it to be 72%.

Mode of delivery was greatly influenced by control of fits and prematurity [19]. CS was performed in 62.9% women which emerged as the preferred means for delivery at our institution. Similar studies on eclampsia have also reported high rate of CS in eclamptic women [10]. Vaginal delivery was done in

31.6% women and instrumental delivery in 5.5% eclamptic women. Risk of medical litigation and taking no-risk policy adds to rising CS rate [10].

In our study, admission in ICU was needed in 35.7% cases which were concordant with study conducted by Terefe et al [18]. Management in the intensive unit is done when the patient is hemodynamically unstable or develops neurological deficits. Prolonged recovery from anesthesia also added to number of ICU admissions. A study by Faponle et al [25] reported eclampsia as the most common obstetric indication requiring ICU observation.

Eclampsia is a very perilous complication of pregnancy with increased rate of death and disability [8]. Almost 6% eclamptic women in our study did not survive. This finding correlates with study conducted by Das et al [8] (8.06%, n=1377), Barbosa et al [9] (8%, n=74), Ghimire [10] (5.3%, n=112), Shakya et al [15] (4.4%, n=45). A recent study conducted by Das et al [8] reported maximum deaths within 12 hours of hospital admission. It is a life threatening obstetric emergency and tertiary centers are gradually experiencing eclampsia as the primary cause of mortality [8].

The most common cause of death in our setting was identified to be renal failure which affected 29.4%. Pulmonary edema emerged as the second common cause involving 17.6% cases. CVA and HELLP syndrome were diagnosed in 11.8% each. In 29.4% etiology for death could not be ascertained. Study conducted at a tertiary centre identified pulmonary edema as the commonest cause of death [10]. Similarly, Das et al [8] also reported pulmonary edema followed by CVA as the commonest causes behind demise of eclamptic women. UK based

study discovered CVA as the primary cause for mortality [8]. Few fatalities in eclampsia are inevitable and isolating the exact cause is difficult as routine post-mortem is not practiced. Renal failure surfaced as the commonest reason behind death of eclamptic women in our study. This finding may be because our institution routinely performs renal function test along with other standard biochemical tests under safe motherhood program free of charge. All other investigations recommended for eclamptic patient is generally suspended mostly due to financial insufficiency. Coexistent multi-organ failure conditions in these women; though may be present is almost impossible to segregate.

Fetal complication in terms of serious morbidities and mortalities are significant in eclampsia [12]. Our finding showed that 39 babies (13.4%) were still born out of which eight babies were preterm. Fifty-four babies had prematurity and 28 suffered fetal growth restriction (FGR). Studies have shown high fetal mortality rate when eclampsia is allied with prematurity [15]. Up to 50.2% newborns of eclamptic women require admission in NICU. The perinatal mortality rate in eclampsia could diverge from 3% to 30.7% [3]. FGR may be consequential of placental insufficiency and severity is dependent on period of gestation at onset of disease symptoms [6].

Long term follow up of cases could not be done as the study was based on hospital records of previous years. Similar studies on PE and eclampsia should be conducted on expanded period of time to facilitate better understanding of change in disease pattern. Preventive strategies by utilization of ANC services should be encouraged. Elaborate counseling in patients own language where

possible followed by written informed consent are of paramount importance to save concerning health practitioner from medical law suit. Systematic and timely documentation assist to avert visit to the court [26].

## CONCLUSION

Eclampsia is a major cause of preventable maternal mortality globally more so in developing countries. Promoting medical education at community level and overcoming inconveniences faced during utilization of available health care facilities can significantly improve maternal and fetal outcomes. Health facilities are gradually facing eclampsia as prime cause of maternal death. Unfortunately most of the cases are primigravid at younger age. Eclampsia is an obstetric emergency that mostly arises without warning and all services providers should be competent to manage eclampsia patients instantaneously.

## ACKNOWLEDGEMENT

We would like to thank Dr Shruti Shah for helping us with data collection.

## AUTHOR'S CONTRIBUTION

**SR & PK**-Planning, research and preparation of manuscript

## SOURCE OF SUPPORT

None

## CONFLICT OF INTEREST

Author's declared that there is no conflict of interest regarding publication of this paper.

## REFERENCES

1. Bongaarts J. WHO, UNICEF, UNFPA, World Bank Group, and United Nations Population Division

- Trends in maternal mortality: 1990 to 2015 Geneva: World Health Organization, 2015. Population and Development Review 2016;42(4):726.
2. Wang H, Naghavi M, Allen C, Barber R, Bhutta Z, Carter A et al. Global, regional, and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016;388(10053):1459-544.
  3. Şahin G. Incidence, morbidity and mortality of pre-eclampsia and eclampsia [published lecture notes]. 12<sup>th</sup> Postgraduate course in reproductive medicine and biology, Geneva, Switzerland; lecture given 2003.
  4. Berhe AK, Kassa GM, Fekadu GA, Muche AA. Prevalence of hypertensive disorders of pregnancy in Ethiopia: a systemic review and meta-analysis. *BMC Pregnancy Childbirth* 2018;18:34.
  5. Lindheimer MD. The history of preeclampsia and eclampsia as seen by a nephrologist [published lecture notes]. ACOG's annual clinical meeting at San Diego; lecture given 2012 May.
  6. Bushnell C, Chireau M. Preeclampsia and stroke: Risks during and after pregnancy. *Stroke Research and Treatment* 2011;2011:1-9.
  7. Dutta DC. Hypertensive disorders in pregnancy. In: Konar Hiralal, editor. DC Dutta's textbook of obstetrics including perinatology and contraception. 7<sup>th</sup> ed. New Delhi: Jaypee; 2013. p. 219-40.
  8. Das R, Biswas S. Eclampsia: The major cause of maternal mortality in eastern India. *Ethiop J Health Sci Journal* 2015;25(2):111.
  9. Barbosa I, Silva W, Cerqueira G, Novo N, Almeida F, Novo J. Maternal and fetal outcome in women with hypertensive disorders of pregnancy: the impact of prenatal care. *Ther Adv Cardiovasc Dis* 2015;9(4):140-46.
  10. Ghimire S. Eclampsia: Feto-maternal outcomes in a tertiary care centre in eastern Nepal. *JNMA* 2016;54(201):24-28.
  11. Douglas KA, Redman CWG. Eclampsia in the United Kingdom. *BMJ* 1995;50(7):499-500.
  12. Cherian A, Paul E, Helan J, Aabidha P. Maternal and fetal outcome in pre-eclampsia in a secondary care hospital in South India. *J Family Med Prim Care* 2015;4(2):257.
  13. Nobis P, Hajong A. Eclampsia in India through the decades. *J Obstet Gynaecol India* 2016;66(S1):172-176.
  14. Shrestha P. Hospital records of fiscal year 2014/15. Souvenir. Paropakar Maternity and Women's Hospital; Thapathali 2015;56:54-56.
  15. Shakya B, Vaidya A. Overview of eclampsia at a tertiary care hospital. *NJOG* 2013;8(2):46-49.
  16. Chaturvedi S, Randive B, Mistry N. Availability of treatment for eclampsia in public health institutions in Maharashtra, India. *J Health Popul Nutr* 2013;31(1):86-95.
  17. Say L, Chou D, Gemmill A, Tunçalp Ö, Moller A, Daniels J, et al. Global causes of maternal death: a WHO systematic analysis. *Lancet Glob Health* 2014;2(6):323-33.
  18. Terefe W, Getachew Y, Hiruye A, Derbew M, Mariam DH, Mammo D, et al. Patterns of hypertensive disorder of pregnancy and associated factors at Debre Berhan referral hospital, North Shoa, Amhara Region. *Ethiop Med J* 2015;2:57-65.
  19. Jha R, Verma S, Jha SK. Eclampsia in Janakpur zonal hospital, Nepal: Favourable outcome with Magnesium sulphate. *N J Obstet Gynaecol* 2007;2(1):16-19.
  20. Duckitt K, Harrington D. Risk factors for pre-eclampsia at antenatal booking: systematic review of controlled studies. *BMJ* 2005;330(7491):565.
  21. Blum RW, Gates WH. Girlhood not motherhood: Preventing adolescent pregnancy. New York: UNFPA; 2015.
  22. Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J et al. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. *BJOG: An International Journal of Obstetrics & Gynaecology* 2014;121:40-48.
  23. Tunçalp Ö, Pena-Rosas J, Lawrie T, Bucagu M, Oladapo O, Portela A, et al. WHO recommendations on antenatal care for a positive pregnancy experience-going beyond survival. *BJOG* 2017;124(6):860-862.
  24. Ministry of Health. Maternal and newborn health care. Nepal Demographic and Health Survey 2016. 2017:156
  25. Faponle A, Adenekan A. Obstetric admissions into the intensive care unit in a sub-urban university teaching hospital. *NJOG* 2012;6(2).
  26. Mukherjee JB. Legal aspect of medical practice. *J Indian Med Assoc* 1999;97(11):461-74.

***Correspondence to:***

**Dr. Pramod Kattel**

Department of Obstetrics and Gynecology  
Kathmandu National Medical College,  
Kathmandu, Nepal

**Email:** pramodkattel85@gmail.com