



Demographic distribution of eclampsia in women attending the University of Calabar teaching hospital (UCTH), Calabar

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Abstract

Eclampsia is a complication of pregnancy characterized by life-threatening acute tonic-clonic seizures. It is the onset of seizures (convulsion) in a woman with pre-eclampsia. It affects 1 in 200 women with pre-eclampsia. The prevalence of eclampsia varies across geographical locations. The incidence of eclampsia lies in the range of 0.3 per 10 deliveries in Calabar (Cross River State). However, there is paucity of information on its prevalence in Calabar; thus this study is aimed at determining the prevalence of eclampsia in University of Calabar Teaching Hospital (UCTH) over a period of five years. Furthermore, data on eclamptic patients from 2015 to 2019 was obtained from Records Department of the hospital. A total of 9,575 deliveries and 153 cases of eclampsia were documented giving an overall prevalence of 1.5%. The prevalence in 2015, 2016, 2017, 2018 and 2019 was 1.2%, 1.0%, 1.5%, 3.4%, 1.2% respectively. One hundred and two (102) case notes were available for analysis (66.6%). The mean age of patients was 29.5±5.4 and majority (39.2%) were in the age group 27-32 years. The mean parity was 1.5 and 42 patients (41.1%) were primiparous. Mean blood pressure at presentation was systolic (158±19.5), diastolic (101.7±16.9) and proteinuria (2.4±0.7). 4 (3.9%) had history of eclampsia, 11 (10.7%) had personal history of pre-eclampsia, 12 (11.7%) had family history of hypertension and 7 (6.8%) had personal history of hypertension. The slight increase in prevalence over the years calls for close monitoring

Keyword: Eclampsia; Pre-eclampsia; Pregnant women; Hospitals; Demography

1 Introduction

Eclampsia is the onset of seizures (convulsions) in a woman with pre-eclampsia. Pre-eclampsia is a disorder in pregnancy in which there is high blood pressure and protein in the urine (proteinuria) (Lambert *et al.*, 2014). Eclampsia is a complication of pregnancy characterized by life threatening acute tonic – clonic seizures in a pregnant woman. Seizures are periods of disturbed brain activity that can cause episodes of staring, decreased alertness and violent shaking (convulsion). It is a fatal condition and is the second leading cause of maternal death in the United States. Eclampsia usually occurs in women with untreated pre-eclampsia (Rudra *et al.*, 2011).

Eclampsia can develop even if you don't have a history of seizure. Eclampsia often follows pre-eclampsia, it is also known as toxemia characterized by high blood pressure and high level of protein in the urine of women after the 20th week of gestation (Abubakar *et al.*, 2009). Pre-eclampsia, usually comes in the first pregnancy of women carrying twins. Preeclampsia and Eclampsia are forms of pregnancy induced hypertension (PIH). PIH is a condition characterized by development of high blood pressure, edema and proteinuria in pregnant women. It has been estimated that PIH affects about 7 to 10% of all pregnancy (Lo *et al.*, 2013).

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The symptoms of eclampsia are convulsion and seizures (Cooray *et al.*, 2011). Typically, the pregnant woman develops hypertension and proteinuria before a convulsion, the hallmark of eclampsia (Kane *et al.*, 2013). Eclampsia has causative factors similar to those of pre-eclampsia which includes; Mothers with preeclampsia, Obesity, Genes, Faulty diet and Irritability of the central nervous system. Pre-eclampsia and eclampsia most times affect women who conceive at a younger age or at an older age which is above 40years. The other risk factors are multiple pregnancy, Nulliparity, previous pre-eclampsia, Family history of pre-eclampsia, Body mass index (BMI), Time between pregnancies, change of partners, African – American race, Invitro fertilization, Pre – existing medical conditions (Craici *et al.*, 2008)

Approximately 10% of women will have high blood pressure at some point before delivery and preeclampsia complicate around 3 – 5% of pregnancy worldwide. The incidence is higher in the developing world and specific ethnical groups (Mattar *et al.*, 2000). Eclampsia, the severe end phase of preeclampsia is associated with mortality and accounts for more than 50,000 maternal deaths per year. It is rare in Europe with 2-3 cases per 10000 births but more common in developing countries with an estimated incidence of 16 – 69 cases per 10000 births. It affects 1 in 200 women with preeclampsia (Abalos *et al.*, 2013).

There are four goals for the treatment of eclampsia; to stop and prevent further convulsions, to control the elevated blood pressure, to deliver the baby as quick as possible, and to monitor closely for the onset of multi-organ failure. Convulsions are prevented and treated using magnesium sulphate. To date, the only effective “treatment” is delivery and removal of placenta. This needs to be carried even if the baby is immature, as the eclamptic condition is unsafe for both baby and mother (Rozenberg, 2006). Invasive haemodynamic monitoring maybe employed in an eclamptic woman at risk for or with cardiac disease, renal disease, refractory hypertension, pulmonary edema or poor urine output (Rath and Fischer, 2009).

The tendency to develop pre-eclampsia/eclampsia can be affected by genetic variations carried by either parent, and genetic variation carried by the unborn child can also play a role in the occurrence of pre-eclampsia/eclampsia (Valenzuela *et al.*, 2011). Mutations of Angiotensinogen (AGT), STOX1, STOX2, AVCR2A genes are associated with pre-eclampsia/eclampsia. It impacts two individuals, the mother and her child (Doridot *et al.*, 2014).

Eclampsia has remained a significant public health threat in both developed and developing countries, contributing to maternal and perinatal morbidity and mortality globally (McClure *et al.*, 2009; Shan *et al.*, 2009). However, the impact of eclampsia is felt more severely in developing countries including Nigeria. The incidence of eclampsia lies in the range of 0.3 per 10 deliveries in Calabar (Cross River State) to as high as 9 per 100 deliveries in Birnin Kudu (Jigawa State) (Itam and Ekabua, 2003; Tukur *et al.*, 2007). As there is paucity of information on the prevalence of eclampsia in Calabar, it is therefore imperative to research into this area. The aim of the study is to determine the prevalence of eclampsia in pregnant women in University of Calabar Teaching Hospital for a period of five years (2015-2019) and to examine the demographic predisposing factor for eclampsia in pregnant women.

2 Material and methods

2.1 Study location

This was a descriptive study carried out on the prevalence of eclampsia among pregnant women attending University of Calabar Teaching Hospital (UCTH), Calabar between the years 2015 to 2019.

2.2 Ethical approval

The study was granted approval by the Health Research Ethics Committee of the University of Calabar Teaching Hospital, Calabar (UCTH/HREC/33/559).

2.3 Research population

The study population consisted of all documented cases of Eclampsia in the hospital from 2015 to 2019.

2.4 Method of data collection

The case folders of eclamptic patients from 2015 to 2019 were identified and retrieved by record personnel using the hospital's code on the index cards for Eclampsia. Each of the folders was examined and information obtained includes ethnicity, age, parity, gestational age, personal history of eclampsia, family history of pre-eclampsia, personal or family history of hypertension, blood pressure, proteinuria at presentation, gestational age of delivery, mode of delivery, infant

birth weight. Eclampsia is a complication of pregnancy characterized by life threatening acute tonic – clonic seizures in a pregnant woman.

2.5 Data Analysis

Data collected was subjected to statistical analysis. Simple percentages were used to determine the prevalence rate and the data obtained was analyzed using descriptive statistics.

3 Results

A total of 9,575 deliveries and 153 cases of eclampsia were documented from 2015 to 2019.

In 2015, total delivery was 2,400 and 30 documented eclamptic cases, giving a prevalence of 1.2%; there were 2050 deliveries and 22 cases of eclampsia, resulting in 1.0% prevalence. In 2017, there were 1,638 deliveries and 26 cases of eclampsia with a prevalence of 1.5%. In 2018, there were 1,459 deliveries and 50 eclamptic cases with a prevalence of 3.4% while in 2019, there were 2,028 deliveries and 25 cases of eclampsia, the prevalence was 1.2%. The total prevalence of eclampsia from 2015 to 2019 is 1.5% (Table 1).

The prevalence of eclampsia over the study period indicates a slight drop from 1.2% to 1.0% between the year 2015 and 2016. In 2017, it was 1.5%. In 2018, showed an increase of 1.5% to 3.4% while in 2016, it dropped to 1.2%. Eclampsia had the highest prevalence of 3.4% in 2018 and lowest prevalence of 1.0% in 2019 (Figure 1).

Out of the 153 cases, 102 case notes were available for analysis. The case notes not retrieved was therefore 66.6%. The median age of the patients was 32.5 years, with the Youngest been 19 years and the eldest 45 years. The mean age of the patients was 29.5±5.4 years and 42 of the patients were between the ages 27 – 32 years (39.2%). The mean parity was 1.5 with 31 patients (30.3%) nulliparous, 42 patients (41.1%) primiparous, 24 patients (23.5%) multiparous and 5 patients (4.9%) grand multiparous.

Fifty seven patients had gestational age of presentation between 24 – 30 weeks (55.8%). 80 patients (78.4%) delivered at a gestational age below 37 weeks while 17 (16.6%) delivered above 37 weeks.

Based on the mode of delivery 69 patients (67.6%) had caesarean section, 30 patients (29.4%) had vaginal delivery while the remaining 3 cases (2.9%) were not documented. From all the 102 eclamptic pregnancies there were only two cases of twin delivery.

The mean birth weight was 2.25± 0.9. 62 patients (60.7%) had the highest birth weight between 1.5 -3.0kg. 88 patients (86.2%) had proteinuria while 14 (13.7%) were not documented. The mean blood pressure at presentation was systolic 158±19.5 and diastolic 101.7±16.9 (Table 2).

In the distribution of patients by age and parity there were various parity levels Of 0 – 5, 0 (nulliparous) had 31 patients, 1 (primiparous) had 42 patients, 2 - 3 (multiparous) had 24 patients and 4-5 (grand multiparous) had 5 patients. The age group 15 - 20 years had the least number of patients (5 patients) while 27 – 32 years had the largest number of patient (38 patients) (Table 3).

The ethnic population consists of Efik ethnic tribe 32 patients (31.3%), 27 patients (26.4%) Ibibio, 13 patients (12.7%) Igbo, 9 patients (8.8%) Yakurr, 7 patients (6.8%) Annang, 3 patients (2.9%) Hausas, 3 patients (2.9%) Obudu, 3 patients (2.9%) Yala, 1 patient (0.9%) Bekwarra, 1 patient (0.9%) Ejagham, 1 patient (0.9%) Oron, 1 patient (0.9%) Mbube, 1 patient (0.9%) Yoruba (Table 4).

Four cases (3.9%) had history of eclampsia, eleven cases (10.7%) had personal history of Pre-eclampsia, twelve cases (11.7%) had family history of hypertension and seven cases (6.8%) had personal history of hypertension.

Table 1 Prevalence of Eclampsia from 2015 to 2019

Year	Total no. of Delivery	No. of eclamptic cases	Prevalence of eclampsia (%)
2015	2400	30	1.2
2016	2050	22	1.0
2017	1638	26	1.5
2018	1459	50	3.4
2019	2028	25	1.2
Total	9575	153	1.5

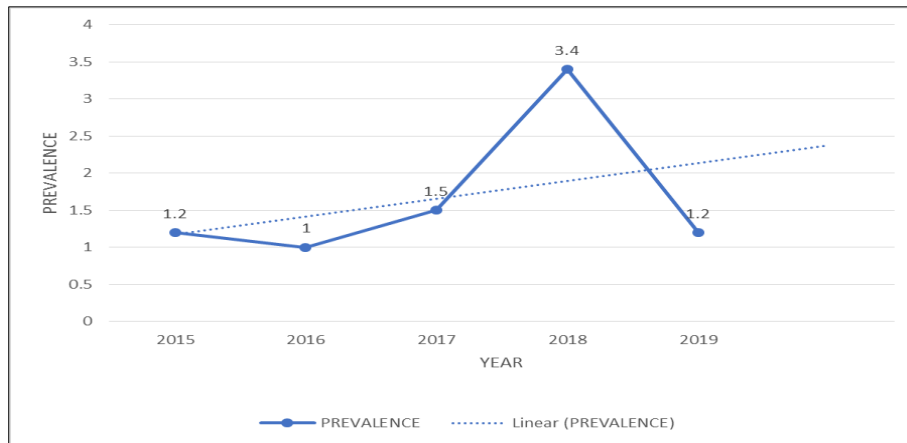


Figure 1 The prevalence of eclampsia over the study period

Table 2 Characteristics of study participants

Variable	Variable (sub groups)	Frequency	Percentage(%)
Age (Years)	15-20	5	4.9
	21-26	19	18.6
	27-32	40	39.2
	33-38	19	18.6
	39-44	15	14.7
	45-50	4	3.9
Parity group	0	31	30.3
	1	42	41.1
	2-3	24	23.5
	4-5	5	4.9
Gestational age at Presentation (weeks)	24-30	57	55.8
	31-36	21	20.5
	37-43	14	13.7
	Not Documented	10	9.8
Gestational age at Delivery (weeks)	<37	80	78.4

	≥ 37	17	16.6
	Not Documented	5	4.9
Mode of delivery	Caesarean section	69	67.6
	Vaginal delivery	30	29.4
	Not Documented	3	2.9
Birth weight (Kg)	<1.5	15	14.7
	1.5-3.0	62	60.7
	3.1-4.0	14	13.7
	Not Documented	11	10.7
Mean Systolic Blood Pressure (mmHg)	158±19.5	Range	110±175
Mean Diastolic Blood Pressure (mmHg)	101.7±16.9	Range	80±140
Mean Proteinuria With dipstick	2.4±0.7	Range	1-3
Mean Birth weight(Kg)	2.67±0.8	Range	0.85-4.0

Table 3 Distribution of patients by age and parity

Age group	Parity						Total
	0	1	2	3	4	5	
15-20	4	1	0	0	0	0	5
21-26	10	7	1	1	0	0	19
27-32	12	24	2	0	0	0	38
33-38	5	8	5	1	0	0	19
39-44	0	2	5	6	2	0	15
45-50	0	0	2	1	2	1	6
Total	31	42	15	9	4	1	102

Table 4 Distribution of patients by ethnicity

Ethnicity	Frequency	Percentage (%)
Annang	7	6.8
Bekwarra	1	0.9
Efik	32	31.3
Ejagham	1	0.9
Hausa	3	2.9
Ibibio	27	26.4
Igbo	13	12.7
Mbube	1	0.9
Obudu	3	2.9
Oron	1	0.9

Yakurr	9	8.8
Yala	3	2.9
Yoruba	1	0.9

4 Discussion

The study presents an overview of the prevalence pre-eclampsia among pregnant women in University of Calabar Teaching Hospital, Calabar from the year 2012 to 2016. This hospital based research revealed a total prevalence of 1.5% under the reviewed years.

Over the period of study, the prevalence rate was as follows; 1.2% in 2012, 1.0% in 2013, 1.5% in 2014, 3.4% in 2015, 1.2% in 2016. There was increase of prevalence in 2015 of 3.4%. The factor responsible for this slight increase is not clear from the study.

The total prevalence of eclampsia of the period under review of 1.5%, this rate is lower than the findings of 8.1% (lower income region) by Giodano J.C (2014) in Brazil, 1.5% by Nobis P.N (2016) in India. This prevalence is however higher than 0.3% reported on eclampsia by Itam and Ekabua (2003) in Calabar.

Pre-eclampsia could be managed once detected such that it is prevented from progression to eclampsia; this is responsible for the low incidence of eclampsia observed in Calabar. In Birin kudu, Jigawa State a high incidence of 9.4% was observed by Tukur (2007). Comparatively, high incidence of 7.8% at National Hospital, Abuja and a low incidence of 1.7 % in Olabisi Onabanjo University Teaching Hospital, Sagamu by Olatunji (2007).

The distribution of the patients by age and parity revealed that majority of the patients (41.1%) were primiparous which is lower than the report of 81.4% from Birnin Kudu but significantly occurred in nulliparous in Abuja and Sagamu. It is believed that immune maladaptation of primigravidae is responsible for majority of the patients in this group. This mal adaptation is lost in subsequent pregnancies, hence decreasing the case number in multigravidae.

It was observed that majority of the patients (39.2%) were in the age group of 27 – 32 years which is higher than the observation of 31.3% by Adekanle and Akinbile (2012) and 34.8% at University of Abuja Teaching Hospital by Agida (2010). This however differs from the report by Yousuf (2009) at Hyderabad, where he observed high incidence among patients less than 20 years of age. This difference may be due to the sample size of this study.

Up to 12 patients (11.7%) had family history of hypertension while 7 patients (6.8%) had personal history of hypertension this could be based that eclampsia and pre-eclampsia are described as pregnancy induced hypertension and shares same etiology with hypertension.

Four patients (3.9%) had history of eclampsia and eleven patients (10.7%) had history of Pre-eclampsia which supports the fact that eclamptic women are at risk of developing the disorder again in subsequent pregnancies.

A high proportion (78.4%) of the patients delivered their babies at a gestational age less than equal to 37 weeks which differs from the findings of 22.9% at Ladoke Akintola University of Technology Teaching Hospital (LAUTECH) by Adekanle and Akinbile (2012) were patients delivered at greater than equal to 37weeks. This may explain the observation that majority of 57 patients (55.8%) presented the disorder at an early gestational age.

The ethnic population were mainly of Efik ethnic tribe which were 32 patients (31.3%), 27 patients (26.4%) Ibibio tribe, 13 patients (12.7%) Igbo tribe. Up to 69(67.6%) of patients had caesarean section, 117 patients (51.7%) at Federal Medical Centre, Birnin Kudu, Jigawa state by Tukur (2007), 67 patients (55.8%) at Aminu Kano Teaching Hospital, Kano by Tukur (2012), 73 patients (53.7%) at Lagos State University Teaching Hospital, Ikeja by Akiolu (2008), 45 patients (54.2%) by Adekanle and Akinbile (2012), 18 patients (46.1%) at Hyderabad by Yousuf (2009) but lower than 39 patients (84.8%) at the University of Abuja Teaching Hospital by Agida (2010).

Thirty patients (29.4%) achieved spontaneous vaginal delivery, 18 patients (15%) had assisted vaginal delivery and the rest had normal vaginal delivery at Aminu Kano Teaching Hospital, Kano by Tukur (2012), 5 patients (10.8%) at University of Abuja Teaching Hospital by Agida (2010), 32 patients (23.5%) patients had spontaneous vaginal delivery but lower than 452 patients (65.8%) achieved vaginal delivery while 0.3% and 0.9% had forcep and vacuum deliveries

at Murtala Mohammad Specialist Hospital, Kano, 90 (43.4%) had vaginal delivery assisted with vacuum or forceps at Federal Medical Centre, Birnin Kudu by Tukur (2007). This indicates that most cases were severe or rapidly progressing necessitating immediate delivery. This is also supported by elevation in the blood pressure and proteinuria 2.4 with a range of 1 – 3.

The mean birth weight of the infants was 2.67kg and a similar report of 2.5 ± 0.7 at Ladoke Akintola University of Technology Teaching Hospital by Adekanle and Akinbile (2012). Low birth weight occurred in 25.8% of the babies at Aminu Kano Teaching Hospital this was attributed that preterm delivery has to be done quickly in the severity of eclampsia, irrespective of the foetal condition or maturity in order to save the mother's life.

The limitation of the study is the small sample size analyzed due to problems with the retrieval of case notes. Also, the study was conducted in a tertiary health care facility that manages high risk pregnancies so the prevalence may be lower than that of the general population. However, this limitation does not affect the validity of the result.

List of abbreviations

- AGT gene- Angiotensinogen gene
- BMI- Body mass index
- CI- Confidence interval
- CS- Caesarean section
- DNTP- Deoxyribonucleotide triphosphate
- Hd- Haplotype diversity
- HIV- Human Immunodeficiency virus
- MmHg- Millimeter Mercury
- PIH- Pregnancy induced hypertension
- PSG-1- Pregnancy specific beta-1 Glycoprotein
- SPSS- Statistics Package for social sciences
- UCTH- University of Calabar Teaching Hospital
- WHO- World Health Organization

5 Conclusion

The prevalence of eclampsia in 2012 was 1.2%, in 2013 a slight decrease to 1.0% was observed, in 2014 and 2015 an increase of 1.5% and 3.4% respectively while in 2016, it was 1.2%. However, the overall prevalence was 1.5%. The study revealed that 42 patients (41.1%) were primiparous while 40 (39.2%) were in the age group 27-32 years.

Furthermore, 4 (3.9%) had history of eclampsia, 11 (10.7%) had personal history of pre-eclampsia. It was observed that 12 patients (11.7%) had family history of hypertension while 7 patients (6.8%) had personal history of hypertension. This history supports the fact that eclamptic women are at risk of developing the disorder again in subsequent pregnancies and this is an underlying risk factor in a number of women.

Compliance with ethical standards

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Disclosure of conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Statement of ethical approval

The study was approved by the institution's Health Research Ethical Committee (HREC) at the University of Calabar Teaching Hospital (UCTH/HREC/33/559).

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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