

Seasonal Incidence of Eclampsia amongst Pregnant Women: Our experience at a tertiary care hospital

NAHEED AKHTER¹, MADIHA IQBAL², SANA IQBAL³, SHANDANA KHAN⁴, SABAH SAFDAR⁵, BASHARAT AHMAD⁶

¹Assistant Professor Gynae Deptt., Khyber Teaching Hospital Peshawar

²Assistant Professor Gynae Deptt., Hayatabad Medical Complex Peshawar

³Assistant Professor Radiology Deptt Northwest General Hospital Peshawar

⁴Assistant Professor Radiology Deptt Northwest General Hospital Peshawar

⁵Specialist Registrar GyneDeptt Hayatabad Medical Complex Peshawar

⁶Specialist Registrar Gyne Deptt., Hayatabad Medical Complex Peshawar

Correspondence to Dr. Madiha Iqbal, Email: drmediha881@gmail.com

ABSTRACT

Background: The causes of preeclampsia and eclampsia, two serious maternal disorders, are unknown. Understanding the precise correlation between various weather patterns may aid us in determining the possible causes of these phenomena. Eclampsia is associated with decreased temperature, increased humidity, and decreased barometric pressure.

Aim: To understand the correlation between weather changes and the prevalence of eclampsia in patients visiting Khyber Teaching Hospital Peshawar.

Methods: This cross sectional study was carried out at Department of Gynaecology and Obstetrics Khyber Teaching Hospital Peshawar from July 2020 to June 2021. We conducted a retrospective analysis of data collected over a 12-month period, noting the prevalence of eclampsia in our patients who presented for delivery.

Results: Total 5330 deliveries over a 12-months period wererecorded. Age ranged between 16-45 years with a mean age of 30.5 years. Total 2110(39.6%) belong to maternal age of 16-20 years, 2280(42.8%) in 21-30 years and 940(17.6%) belongs to maternal age of 31-45 years. The highest number of deliveries occurred in summer 1720(32.2%), followed by 1412(26.5%) in winter, 1190(22.3%) in Spring and 1008(18.9%) in Fall season.

Practical implication: The result of this study is important for improving the quality-of-life and survival status of mothers and newborn babies and for social-capital and sustainable economic growth of the country at large.

Conclusion: A slight reduction in the incidence of eclampsia was related with delivering in the fall as opposed to the winter. This is because the incidence of eclampsia has a direct linear association with rising temperature.

Keywords: Eclampsia, Weather, Climate, Temperature, Humidity, Atmospheric pressure.

INTRODUCTION

Eclampsia is defined as the occurrence of convulsions in a woman whose condition matches the criteria for preeclampsia but which are not brought on by a concurrent neurologic disorder (such as epilepsy)¹. Eclampsia is diagnosed whenever convulsions happen during pregnancy, delivery, or puerperium until otherwise established².

Despite the Western world's stated decreased incidence, eclampsia continues to be a leading cause of maternal death globally^{3,4}. The causes of preeclampsia and eclampsia, two serious maternal disorders, are unknown. Understanding the precise correlation between various weather patterns may aid us in determining the possible causes of these events⁵. Eclampsia is associated with lower temperatures, higher humidity levels, and lower barometric pressure. We shall learn more about the pathophysiology of this condition by exploring this association^{6,7}.

Dietary intake and infection risk exist in seasonal variations. Additionally, there can be significant seasonal fluctuations in both the air temperature and the amount of daylight⁸. Preeclampsia prevalence should follow predictable seasonal patterns if these factors played a significant role in its aetiology⁹. Seasonal changes are not mentioned in reviews of the aetiology and epidemiology of preeclampsia¹⁰.

One of the main factors contributing to high rates of maternal mortality, morbidity, and perinatal death is eclampsia. According to the World Health Organization, eclampsia accounts for 12% of all maternal fatalities worldwide. Eclampsia during pregnancy can be managed with early detection and close observation. Through early detection during antenatal care and by expanding access to hospital care, developed countries have decreased the incidence of eclampsia and associated mortality by approximately 90%.

In Pakistan, the incidence of eclampsia is poorly understood, and there is a lack of relevant data especially in the last couple of

years related with eclampsia among pregnant women in Peshawar, Pakistan and estimate the prevalence of the condition.

MATERIALS AND METHODS

This cross sectional study was carried out at Department of Gynaecology and Obstetrics Khyber Teaching Hospital Peshawar from July 2020 to June 2021. We conducted a retrospective analysis of data collected over a 12-month period, noting the prevalence of eclampsia in our patients who presented for delivery. This hospital is a government-owned, tertiary facility with 1400 beds located in Khyber Pukhtoonkhwa. It offers healthcare services to the residents of Peshawar and nearby regions. Every year, the Department of Obstetrics and Gynecology performs 5000 to 9000 deliveries.

A performa created especially for the study was used to collect variables relating to sociodemographic characteristics, maternal and foetal outcomes, from the medical records of all women treated for eclampsia between July 2020 and June 2021. In order to determine the prevalence of eclampsia, the total number of deliveries that took place throughout the time period was also acquired. The study included all pregnant patients with clinical hypertension who presented to the Obstetrics and Gynecology department of the Khyber Teaching Hospital during the study period and were treated for eclampsia. Women who gave birth before July 1, 2020 and after June 30, 2021, women whose chronic hypertension was diagnosed before the beginning of their pregnancies or before the 20th week of pregnancy, and women who did not develop eclampsia were excluded. SPSS 23.0 was used to analyse the data. All variables' frequencies and eclampsia rates underwent descriptive analysis. P values ≤ 0.05 were considered significant.

RESULTS

Total 5330 deliveries over a 12-months period were recorded. Age ranged between 16-45 years with a mean age of 30.5 years. There were 46 cases of eclampsia. This gives an incidence of eclampsia

Received on 11-09-2022

Accepted on 27-01-2023

of 0.86%. In total, 5(10.8%) of women with eclampsia died (sepsis=1, stroke=1, haemorrhage=1, hypertensive disorders of pregnancy = 2). Total, 329(6.1%) women were admitted to ICU, amongst which 63(19.1%) were due to hypertensive disorders of pregnancy, 113(34.3%) of these with eclampsia and 153(46.5%) with other complications of hypertensive disorders of pregnancy (Table 1).

Age group was analyzed as 2110(39.6%) belong to maternal age of 16-20 years, 2280(42.8%) in 21-30 years and 940(17.6%) belongs to maternal age of 31-45 years (Fig. 1).

The highest number of deliveries occurred in summer 1720(32.2%), followed by 1412(26.5%) in winter, 1190(22.3%) in Spring and 1008(18.9%) in Fall season (Fig. 2).

The prevalence of eclampsia varied slightly by the season of delivery and was found to be highest in the winter months 64(4.5%), followed by 45(3.8%) in Spring, 60(3.5%) in Summer and 28(2.8%) in Fall season (Fig. 3).

Women who delivered in the fall were 6% less likely to have eclampsia than those who delivered in the winter ($P = 0.02$) after adjusting for diabetes, maternal age, hypertension and obesity.

Table-1: Outcome of the study

Outcome	Frequency	Percentage
Eclampsia (n=46)		
Yes	46	0.8%
No	5284	99.2%
Factors associated with mortality (n=5)		
Sepsis	1	20%
Stroke	1	20%
Haemorrhage	1	20%
Hypertensive disorders of pregnancy	2	40%
ICU admission (n=329)		
Hypertensive disorder of pregnancy	63	19.1%
Due to eclampsia	113	34.3%
Other complications	153	46.5%

Figure 1: Maternal age distribution of the sample

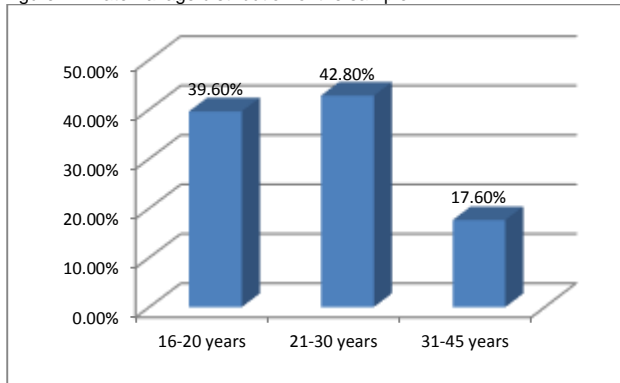


Figure 2: Frequency of deliveries

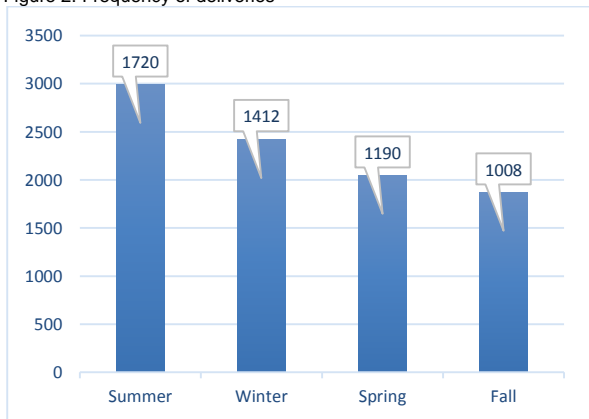
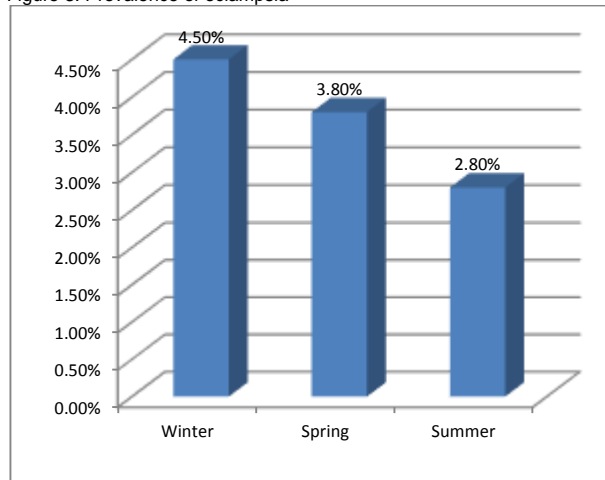


Figure 3: Prevalence of eclampsia



DISCUSSION

Despite advances in antenatal care and facilities, eclampsia still affects developing countries¹¹. It also contributes significantly to maternal mortality. Uncertainty surrounds the causes of preeclampsia and eclampsia.

We found that the incidence of eclampsia varied seasonally, peaking in the winter and minimum in the fall. Our findings and seasonal trends from other countries point to environmental factors that cause occurrence to vary seasonally. An analogy might be drawn between the impact of cold weather on ischemia, which is thought to be the root cause of the relatively strong correlation between outdoor temperature and the occurrence of myocardial infarction¹². Eclampsia is hypothesised to be caused by homocysteine, calcium, fish oil and antioxidants. Understanding the seasonal change in preeclampsia incidence may need consideration of seasonal fluctuation in dietary intake.

Abalos E¹³ et al concluded no correlation between weather conditions and the prevalence of eclampsia. However, the majority of evidence tend to indicate that eclampsia is linked to colder temperatures, winter, or greater humidity or rainfall. In contrast, Adamu AN¹⁴ et al suggest a higher incidence of eclampsia during hurricane weather, which is characterised by higher temperatures rather than lower ones, increased humidity, and decreased barometric pressures. In another study by Ajah LO¹⁵ et al have found that eclampsia is more common in the winter, which are similar to our results. On the other hand, Koofreh ME¹⁶ et al claim that eclampsia occurs more frequently in the summer, his results are in contrast to ours.

It is interesting to note that Agida ET¹⁷ et al, indicate a connection between seasons and the occurrence of eclampsia, however Griffen JB¹⁸ et al came to the conclusion that climatic factors had no impact on the incidence of eclampsia, even during times of high humidity. Eclampsia has been linked to the seasons, with a higher occurrence during colder seasons, according to an intriguing study by Naidoo H et al¹⁹. Our study is significant because, in contrast to studies from other countries with greater variety and poverty, access to health care services is not a problem in Pakistan, where prenatal care is almost free in government setup²⁰. The study placed a strong emphasis on the potential significance of seasonal environmental factors, including nutrition. In this particular climatic state, our goal is to evaluate the relationship between eclampsia and numerous weather parameters.

In the majority of eclampsia studies, great antenatal care and an elevated standard of living have received a lot of attention. The majority of pregnant women register for antenatal treatment at various hospitals and maternity centres, but because Khyber

Teaching Hospital has excellent ICU facilities, they are frequently referred there when labour difficulties arise.

CONCLUSION

A slight reduction in the incidence of eclampsia was related with delivering in the fall as opposed to the winter. This is because the incidence of eclampsia has a direct linear association with rising temperature.

Conflict of interest: Nil

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