ORIGINAL ARTICLE DOI:https://doi.org/10.52206/jsmc.2023.13.4.827 OPEN ACCESS

Factors Affecting the Birth Outcome Among Women with Eclampsia at Mardan Medical Complex, Mardan, Pakistan.

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ABSTRACT

Background: Eclampsia is a life-threatening complication of pregnancy. Identifying the factors affecting birth outcome in eclamptic patients allows for targeted interventions to enhance maternal and fetal well-being.
Objectives: To identify the risk factors that adversely affect birth outcomes among women with eclampsia.
Material and Methods: This Cross-Sectional Descriptive study was conducted at Gynae Unit in Mardan Medical Complex, Mardan, from 1st January to 31st Dec 2018. A total of 157 antenatal patients who presented with eclampsia and live fetuses were enrolled for the study through non probability sampling technique. The data on their demographic variables, gestational age at presentation, mode of delivery, and birth outcome were recorded.
The logistic regression model was used to investigate the dependence of birth outcome on maternal age, gestational age, mode of delivery, Parity and Booking Status.
Results: Our analyses indicate that maternal age, mode of delivery, and parity significantly affect the birth outcome in women suffering from eclampsia.-These three factors had a significantly negative impact on the birth outcome as their estimates are less than 1 at 5% level of significance indicating the probability of live birth decreases for the Normal Vaginal Delivery, Parity (multigravida), and advanced maternal age.
Conclusion: Increased maternal age, normal vaginal delivery and multiparity increased the probability of still births in patients with eclampsia. Compared to the Cesarean section mode, normal vaginal delivery had a lower probability of live birth. Multigravida had a lower probability of live birth in eclampsia patients.
Keywords: Cesarean Section, Eclampsia, Live birth, Normal vaginal delivery, Stillbirth.

This article may be cited as: Naila, Gul S, Rehman F, Irshad I, Amin N, Akhtar N, et al. Factors affecting the Birth outcome among women with eclampsia at Mardan Medical Complex, Mardan, Pakistan. J Saidu Med Coll Swat 2023;13(4):186-192. DOI:https://doi.org/10.52206/jsmc.2023.13.4.827

INTRODUCTION

The most prevalent medical conditions that complicate pregnancy are hypertensive disorders, which have an overall prevalence of 510%.[1] They are the primary contributory factors in maternal and perinatal morbidity and mortality.[2] A potentially fatal complication of hypertensive problems in pregnancy is eclampsia, which is the onset of tonic-clonic convulsions, linked to severe pre-eclampsia.[3] The incidence and morbidities of eclampsia vary significantly between developed and developing countries. In Europe, the overall incidence of eclampsia is 0.1%, while in Africa, it is 2.7%.[4,5] The crude incidence of Eclampsia in Pakistan has been calculated to be around 2.7%.[6] Despite a lack of national figures, the available statistics place eclampsia as Pakistan's second direct cause of maternal death.[7] In Pakistan's tertiary care facilities, eclampsia is responsible for about 34% of maternal mortality.[8] Several predisposing factors can influence birth outcome in cases of eclampsia. These factors can increase the risk of complications for both the mother and the baby.[9] Despite Pakistan's significant eclampsia burden, annual nationwide documentation and population-based risk factors for eclampsia are not yet available. It is impossible to identify particular at-risk populations and improve their health outcomes through early monitoring and case management in the absence of risk factor assessment. Moreover, the optimal mode of delivery is still controversial in eclamptic patients as the risk of respiratory distress versus risks associated with cesarean delivery in eclampsia.[10]

This study aims to assess the effect of the factors such as maternal age, gestational age, mode of delivery, parity and booking status on birth outcomes of eclamptic patients at a tertiary hospital in Mardan, Pakistan.

By pinpointing these risk factors, researchers and healthcare professionals can develop targeted interventions and evidence-based guidelines to improve maternal and fetal outcomes in cases of eclampsia. This research is crucial for guiding clinical decision-making and informing public health policies related to maternal and child health. By understanding these risk factors, healthcare professionals can optimize prenatal

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Received: October 12th, 2023 - 1st Revision: November 26th 2023
2nd Revision: December 13th 2023 - Accepted: December 13th, 2023

care, monitor the pregnancy closely, and intervene promptly if complications arise. This proactive approach significantly improves the chances of a safe birth outcome for both the mother and the baby, minimizing potential complications and ensuring the best possible care.

MATERIAL AND METHODS

This cross-sectional descriptive study was conducted at the Gynae Unit in Mardan Medical Complex, Mardan, from 1st January to 31st December 2018. A total of 157 antenatal patients who presented with eclampsia and live fetuses during that period were enrolled in the study through non-probability sampling technique. All these patients presented to emergency department of Obstetrics and Gynecology with antenatal eclampsia. These patients were admitted and followed till delivery of the baby to determine birth outcome (cesarean section and normal vaginal delivery). Sample size calculated at 95% confidence interval using WHO calculator was 41 but we included all patients admitted to the Obstetric unit in study duration to get a larger sample demographic variables size of 157 patients for generalizability of the results. The data of gestational age, maternal age, mode of delivery (cesarean section /Normal Vaginal Delivery (NVD), parity (primigravida (PG)/multigravida (MG)) and booking status (booked/ non-booked), and birth outcome were recorded on a predesigned proforma after taking approval from ethical review committee dated 20 December 2020(NO. 268/BKMC). Patients diagnosed with eclampsia and live fetuses were included in the study. Patients having intrauterine fetal death and medical co morbidities were excluded from the study. The study included singleton, cephalic and alive fetuses at or after 28 weeks of gestation. The study excluded patients before 28 weeks of gestation, previous cesarean section, malpresentation, multiple pregnancies, placental abruption, and placenta previa, intrauterine growth restriction and oligohydromios. Eclampsia was diagnosed using the following criteria: onset of hypertension at =20 weeks' gestation, systolic of = 140 mmHg or diastolic blood pressure = 90 mmHg measured on standard sphygmomanometer and proteinuria of = 1+ on dipstick and tonic clonic fits.[11] Fetal viability was confirmed by the presence of the fetal heart on ultrasound[12]. We used the Logistic Regression model [13] to examine the impact of five factors, i.e., maternal age, gestational age and mode of delivery (normal vaginal delivery (NVD)/C-Section), Parity (primigravida (PG) and multigravida (MG)) and booking Status (booked /non-booked). The birth outcome (i.e., live or dead) was taken as a dependent variable. In contrast, maternal age, gestational age, mode of delivery, parity, and booking status were used as independent variables. Logistic regression estimates the probability of an event, such as a live birth, based on a given dataset of independent variables. The logistic regression model was executed in the statistical software R version 3.4.3, and the frequency analyses were executed in Microsoft Excel.

RESULTS

A total of 157 patients were enrolled in the study. The mean age of these patients was 26.52 years. Most Patients were 22-25 and 30-31 years. Out of 157 Patients, 76 (48.40%) were primigravida, and 81 (51.59 %) were multigravida. 107 Patients (68.15%) were non-booked, and only 50 (31.85%) were booked. Most patients 36 (65.60%), presented at a gestation of 38 weeks and above as shown in Table 01.

The outputs of the logistic regression model are presented in Table 2. At a 5% significance level, three factors, maternal age, Mode of delivery (NVD), and Parity (MG), had significantly negative impacts on the birth outcome as their estimates are less than 1. The regression coefficient for maternal age was found to be 0.9150 with a p-value of 0.05, showing that maternal age significantly affects the probability of live birth in eclampsia patients. The negative relationship means that the probability of live birth decreases with an increase in maternal age. The coefficient estimates of the mode of delivery (NVD) were found to be 0.3001 with a p-value of 0.008 with C/section as a base. The results indicate the probability of live birth decreases with the NVD mode. In other words, the probability of live birth increases with the C/section Mode of delivery. Similarly, the estimate of the parity (MG) was found to be 0.31952 with a p-value of 0.037, showing a decrease in the probability of live birth for Parity (MG) compared to Parity (PG).

Table 01. Demographic data (n=157)

Distribution according to Age of Patient (n = 157)				
Age (years)	**Frequency**	**Percentage (%)**	**Dead Birth**	**Live Birth**
22-23	21	13.38	2	19
24-25	25	15.92	2	23
28-29	21	13.38	5	16
30-31	25	15.92	7	30
Distribution according to Parity of Patient (n=157)				
Parity	**Frequency**	**Percentage (%)**	**Dead Birth**	**Live Birth**
Primigravida	76	48.40	9	67
Multigravida	81	51.59	23	58
Distribution according to booking status (n=157)				
Booked/ Un-booked	**Frequency**	**Percentage (%)**	**Dead Birth**	**Live Birth**
Booked Patient	50	31.85	9	41
Un-booked Patient	107	68.15	23	84
Distribution according to Gestational age at presentation (n=157)				
Gestational Age (weeks)	**Frequency**	**Percentage (%)**	**Dead Birth**	**Live Birth**
34-35	19	12.10	3	16
36-37	49	31.21	6	43
38-39	53	33.76	14	39
Distribution according to Mode of Delivery (n=157)				
Mode of Delivery	**Frequency**	**Percentage (%)**	**Dead Birth**	**Live Birth**
NVD	50	31.85	17	33
CS	107	68.15	15	92

Table 02. Outcome model (n=157)

Coefficients	Estimates	Std. Error	Z value	P-value
Intercept	7.1773	2.269	0.869	0.385
Maternal age	0.915	0.046	-1.946	0.05
Gestational age	1.0874	0.053	1.595	0.111
Booked	2387195.9	1570.134	0.009	0.993
Non-booked	0.6781	0.485	-0.801	0.423
Mode of Delivery (NVD)	0.3001	0.445	-2.707	0.007
Parity (MG)	0.3195	0.548	-2.081	0.037
Parity (PG)	1.0686	0.578	0.115	0.909

The bar chart in Figure 01 shows the frequency of eclampsia among women in various maternal age groups. This result shows the age group 24-25 and 30-31 years as the most frequent age groups of eclampsia women in our unit. In the lower and upper maternal ages, the frequency of eclampsia patients shows a decreasing trend.

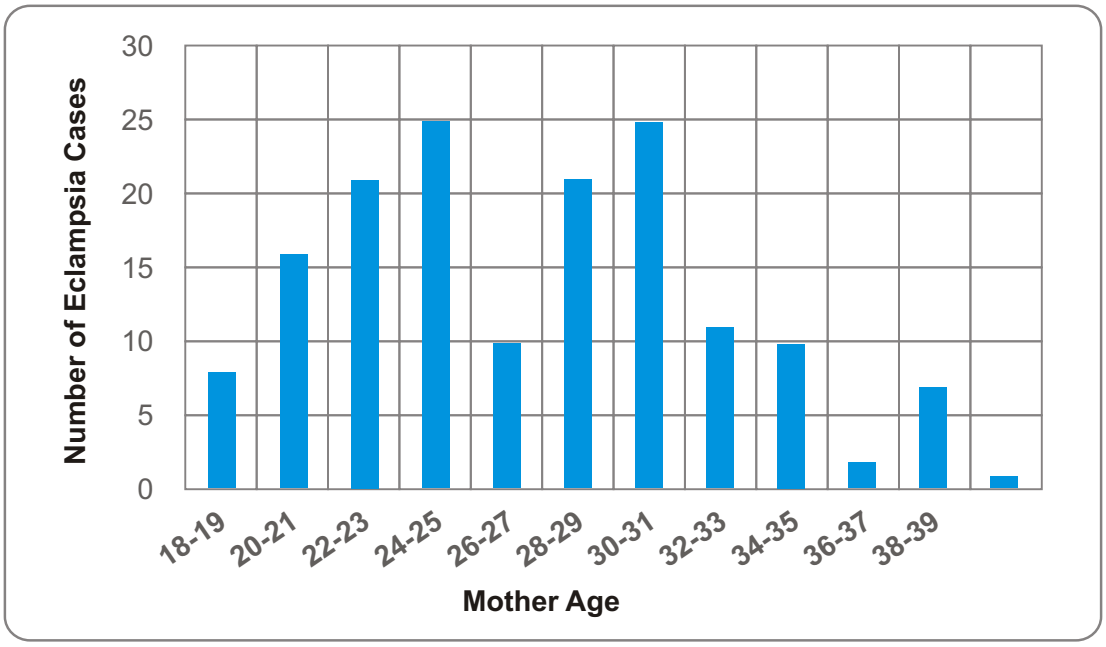


Figure 01. Frequency of eclampsia among women in various maternal age groups

The bar chart in Figure 02 shows the frequency of eclampsia among women in various gestational age groups. This result shows 38-39 weeks as our unit's most frequent gestational age for eclampsia women. The frequency of eclampsia in women shows a gradually increasing trend over the gestational age.

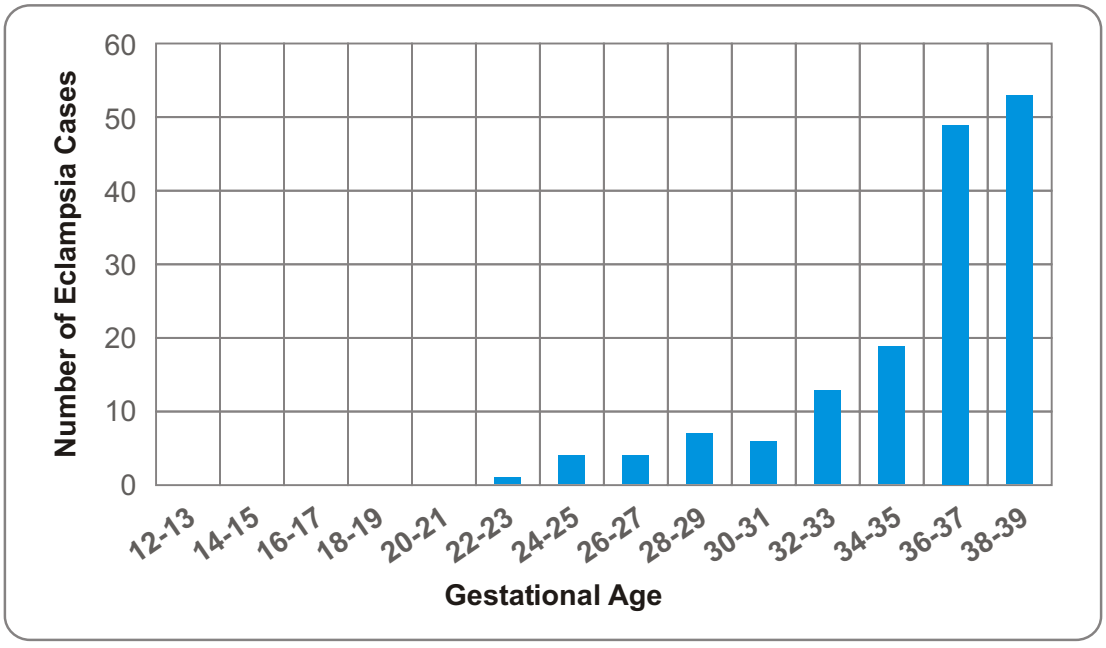


Figure 02. Frequency of eclampsia among women in various gestational age groups

DISCUSSION

This study analyses the risk factors that adversely affect the birth outcomes among women with eclampsia at Mardan Medical Complex, Mardan, Pakistan.

The age group of 22-25 and 28-31 years was the most frequent in eclampsia women in the present study. Similar results are found by Memon et al. where mean age of the patents with eclampsia was 25-28 years.[9] These results differ from a study carried out in Colombia by Olay-Garay et al. where eclampsia was reported in 38.3% as compared to 3% in adults.[14] Another study conducted in Egypt, where eclampsia was found more frequent in age groups less than 20 years.[15]

According to a study, women under the age of 20 had a 1.25 times greater chance of developing preeclampsia than women between the ages of 20 and 24, and a 2.3 times greater risk of developing eclampsia.[16] This discrepancy is due to the younger age of marriage in the later studies. Due to uterine immaturity in pregnancies among adolescents, defective deep placentation is the most likely cause.[17]

The results of present study show that advanced maternal age adversely affects live births in patients with eclampsia. These finding is comparable to another study where women with pre-eclampsia and advanced maternal age (= 35 years) had poorer perinatal outcome (81%) compared to those of reproductive age [(= 34 years) (59%)].[18] The number of live births decreases as the maternal age increases. Advanced maternal age leads to the ageing of uterine vessels, decreased compliance of cardiovascular vessels and endothelial dysfunction, affecting uteroplacental circulation and perinatal outcome.[19]

The findings of present study show a decrease in the probability of live birth for multigravida (MG) as compared to primigravida (PG). Similar findings were made in a study by Irene et al. who discovered a link between multiparity and poor neonatal outcomes. Previous history of pre-eclampsia and eclampsia in the first pregnancies and co-existing maternal medical disorders may be responsible for higher incidence of eclampsia in these women.[20]

A total of 107 Patients (68.15%) were non-booked, and only 50 (31.85%) were booked. In accordance with several studies, pregnant women who were not booked were more likely to have complications including pre-eclampsia. The impact of booking status on birth mode and postnatal maternal outcome was examined by Qureshi D et al. Un-booked mothers have been shown to have a 13-fold higher likelihood of dying in a hospital and a greater incidence of pre-eclampsia.[21]

The gestational age 38-39 weeks, is the most frequent in eclampsia patients at our hospital. In a study by Godana et al, comparable results have been identified.[22] However, in another study, most patients presented with eclampsia after 34 weeks of gestation.[10] So, in the third trimester, healthcare providers should be vigilant in monitoring pregnancies at risk of eclampsia.

Our findings suggests that the probability of live birth increases as the gestational age of women having eclampsia increases. However, this impact is not statistically significant. It suggests that within the scope of the study population, variations in gestational age do not significantly impact the birth outcome of mothers with eclampsia. It is important to note that while this specific study did not find a significant association, it does not mean gestational age is irrelevant in all cases of eclampsia. Other factors not considered in the study or specific conditions within the study population might have influenced these results. The findings of the study conducted by Mahran et al. where the live birth rate was higher at gestation greater than 34 weeks.[15] Research shows that pregnancy outcome is associated with the fetus gestational age.[23] Perinatal mortality is lowest in singleton pregnancies at 38-39 weeks of gestation.[24] Furthermore, pregnancy outcome in developed countries is 10-100-fold better than in developing countries at the same gestation.[25] Therefore, a multicenter study on larger sample size should be conducted.

Regarding the mode of delivery, the probability of live birth is higher for cesarean section than for normal vaginal delivery in present study. The optimal mode of delivery is controversial in patients with eclampsia.[20] Globally, caesarean section deliveries are higher in patients with eclampsia.[26] The findings of present study are like a study conducted by Dasari et al. where perinatal mortality was higher with normal vaginal delivery (16.7%) as compared to cesarean section (3.4%).[27] These findings are like a study conducted in China, where the perinatal mortality

was lower with cesarean section compared to vaginal delivery in patients with severe pre-eclampsia.[10] The possible cause of improved perinatal outcome with cesarean section in patients with eclampsia may be uterine contraction during labor, reduced placental blood flow, further increasing fetal hypoxia in the already compromised fetus. The caesarean section would prevent intermittent fetal hypoxia, which improves perinatal outcomes.

The finding of present study is contrary to another study, which revealed that perinatal outcome is not affected by the mode of delivery.[20] The most likely explanation for the discrepancy is that most protocols, including ours, recommend that delivery take place within 12 hours of the seizures. If the fetal condition remains stable, only pregnant mothers hospitalized in the active stage of labor or with good Bishop Scores are allowed to progress within 12 hours. A higher proportion of cesarean deliveries has also been largely attributed to the widespread use of cardiotogram (CTG) equipment to monitor labor and the lack of agreement over the interpretation of the tracing. Therefore, the mode of delivery should be decided after a thorough assessment of the feto-maternal condition.

Limitations

It was carried out on a smaller sample size in a single tertiary care facility. This might introduce bias and isn't necessarily representative of the entire population.

To evaluate the findings of the current study, additional multi-center, larger comparative studies with bigger sample sizes are required.

CONCLUSION

Maternal age, mode of delivery and parity level significantly impacted the birth outcome in eclampsia patients in Mardan Medical Complex Mardan, Pakistan. Reducing adverse birth outcomes in eclampsia is crucial for both the health of the mother and the newborn.

Recommendations

Based on results of present study, it is recommended to conduct community-based education programs to raise awareness about the signs and symptoms of eclampsia. Educate women and their families on the importance of regular antenatal care and seeking medical attention promptly when any concerning symptoms arise.

Ethical Consideration

This study was approved by the ethical board of Bacha Khan Medical College, Mardan, Pakistan.

Funding

There is no role of any funding agency in this study.

Conflicts of interest

Authors declare no conflicts of interest.

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DATA SHARING STATEMENT: The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

AUTHOR'S CONTRIBUTION

The following authors full fill authorship criteria as per ICMJE guidelines;

Naila, Gul S:	Substantial contribution to conception and design, drafting the manuscript, final approval, agreed to be accountable for all the work.
Rehman F, Irshad I:	Substantial contribution to conception and design, data acquisition, drafting the manuscript, final approval, agreed to be accountable for all the work.
Amin N, Akhtar N:	Analysis and interpretation of data, drafting the manuscript, final approval, agreed to be accountable for all the work.
Ullah S:	Analysis and interpretation of data, critical revision,final approval, agreed to be accountable for all the work.

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