Section: Miscellaneous

Original Research Article

ASSESSMENT OF MATERNAL AND FOETAL OUTCOMES IN PREGNANT WOMEN WITH EPILEPSY

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ABSTRACT

Background: Epilepsy during pregnancy increases the risk of low birth weight, premature delivery, and short gestational age. To have the best pregnancy outcomes, you need cautious planning, lower-teratogenic anti-seizure drugs (ASMs), and better seizure management before conception. Despite the increased risk of congenital abnormalities, cognitive impairment, and maternal outcomes, maternal anti-seizure medication is often prolonged pregnancy. This study examined how epilepsy affects maternal and foetal outcomes.

Materials and Methods: A cohort of 58 pregnant women, aged 18 years and above, diagnosed with epilepsy was recruited. Data on maternal age, medical history, seizure characteristics, anti-seizure medication usage, and pregnancy history were collected. Maternal and fetal complications, modes of delivery, and perinatal outcomes were assessed.

Results: The incidence of seizures was recorded in 12.06% of participants before pregnancy, rising to 22.41% during the gestational period. Additionally, 28% of participants experienced changes in their anti-seizure medication regimen throughout pregnancy. Normal vaginal delivery occurred in 67.24% of cases, while elective lower segment caesarean section (LSCS) accounted for 13.79%, and emergency LSCS comprised 8.62%. Fetal APGAR scores ranged between 5 and 7 in 94.81% of infants at 1 minute and between 7 and 8 in 94.43% at 5 minutes.

Conclusion: Epileptic pregnant women have higher obstetric and foetal difficulties, including congenital defects. Women must take folic acid and anti-seizure drugs before pregnancy to reduce these risks. Thus, adequate prevention, management, and counselling before or during pregnancy are necessary to limit epilepsy's negative impact on maternal and foetal health.

Keywords: Pregnancy women with epilepsy, Anti-seizure medication, APGAR score, Maternal outcome.

INTRODUCTION

Epilepsy is a chronic neurological condition that affects an estimated 50–70 million individuals worldwide, including pregnant women.[1,2] The management of anti-seizure medications (ASMs) and the occurrence of epileptic seizures during pregnancy pose significant challenges. Research indicates that pregnant women with epilepsy may experience an increased frequency of seizures due to fluctuations in drug plasma concentrations. [3,4] Furthermore, changing medications during pregnancy can expose both the patient and the foetus to the unpredictability of new antiepileptic drugs' effectiveness, potentially heightening the risk of seizures throughout the pregnancy. Various studies have shown that generalised tonic-clonic seizures during pregnancy may lead to serious complications such as foetal asphyxia, bradycardia, reduced uterine contractions, direct harm to both mother and foetus, and even fatal outcomes.[5] In comparison to healthy pregnant women, there is a notable prevalence of maternal complications among pregnant women with epilepsy, including

increased mortality risk, preeclampsia, preterm labour, and premature rupture of membranes.[6]

Effective management of epilepsy during pregnancy requires a careful balance between achieving seizure control with antiepileptic medications and minimising the potential adverse effects these drugs may have on both mothers and their developing foetuses.[7] However, information regarding the risks associated with pregnancy and childbirth complications in women with epilepsy (WWE) is inconsistent. Some studies suggest that maternal epilepsy does not significantly correlate with adverse pregnancy outcomes.[8] In contrast, other research indicates that women using antiepileptic medications may encounter a heightened risk of various maternal and delivery complications, such as preeclampsia, vaginal bleeding, labour induction, and the need for a caesarean section. [9,10] The implications of epilepsy and antiepileptic drugs on pregnancy outcomes warrant further research. This research is essential for informing healthcare providers and guiding treatment options for women with epilepsy who are planning to conceive. By understanding the potential risks and complications, we can develop improved prenatal care strategies to enhance both maternal and foetal health outcomes. Consequently, we designed this study to evaluate the impact of epilepsy on maternal and foetal outcomes.

MATERIALS AND METHODS

This prospective follow-up study was carried out within the Department of General Medicine in collaboration with the Department of Obstetrics and Gynaecology at MNR Medical College, spanning from August 2023 to March 2025. A cohort of 58 pregnant women diagnosed with epilepsy was recruited from the Outpatient department of General Medicine and Obstetrics and Gynaecology. Individuals of reproductive age who planned for pregnancy, became pregnant while on antiepileptic medications before and during gestation, and expressed a willingness to participate in the study were included. Cases involving systemic disorders, seizures induced by hypertension and diabetes mellitus, the initial seizure episode occurring post-pregnancy onset, the administration of antiepileptic medications after the first trimester, and individuals unwilling to participate were excluded from consideration. Informed consent in written form was secured from all participants, and the study protocol received approval from the institutional ethics committee.

The demographic profile of the patients has been acquired. A comprehensive account has been gathered concerning the onset age of epilepsy, its duration, the types of seizures experienced, the frequency of these seizures, the dosage of antiepileptic drugs administered, and the number of medications involved. A comprehensive neurological examination was conducted, including EEG and MRI of the brain for all patients. Women and their families receive comprehensive information regarding the potential risks prior to conception. Factors that may contribute to unfavorable pregnancy outcomes, such as nutritional status whether in the form of obesity or underweight as well as various concurrent illnesses including diabetes, hypertension, and urinary tract infections, are evaluated. To initiate risk mitigation before conception in all expectant mothers diagnosed with epilepsy.

The classification of seizures was conducted in accordance with the guidelines established by the International League Against Epilepsy (ILAE). The specifics regarding the frequency of seizures, the anti-seizure medications administered along with their dosages, and the classification of these medications as either monotherapy or polytherapy, including the requisite drug dosages, were meticulously documented. Details pertaining to obstetrics, such as gestational age, folic acid consumption during the preconceptual phase, occurrences of pre-eclampsia, hyperemesis gravidarum, premature labour, and abruptio placentae, were meticulously gathered.

The specialized scans were conducted during the first, second, and third trimesters to evaluate foetal anomalies, neural tube defects, and various congenital anomalies, as well as to assess the adequacy of amniotic fluid and birth weight. The specifics regarding the mode of delivery were documented. During the postnatal period, patients are observed for a heightened frequency of seizures, attributed to the elevated stress levels and sleep deprivation characteristic of this time, and are encouraged to adhere to their medication regimen consistently. The assessment includes the Apgar score at one minute and five minutes, birth weight, head circumference, as well as the identification of major and minor congenital anomalies and specific drug-related abnormalities.

The gathered data underwent analysis utilising SPSS version 32.0. Categorical variables are expressed in terms of percentages and frequencies. Continuous variables were expressed in terms of their mean and standard deviation. The chi-square and Fisher's exact tests were employed to facilitate comparisons of categorical variables across the groups, as deemed appropriate. An independent samples t-test was employed to compare variables across the groups, with $p<0.05$ deemed indicative of a statistically significant outcome.

RESULTS

Table 1: Sociodemographic details of study participants

Sociodemographic details	No of participants (n=58)	
	Frequency	Percentage
Age (In years)		
18-24	14	24.13%
25-30	27	46.55%
31-35	13	22.41%
Above 35	04	6.90%
Educational status		
Primary	14	24.13%
Secondary	16	27.58%
Intermediate	13	22.41%
Graduate & above	08	13.80%
Illiterate	07	12.06%
Status of work		
House wife	34	58.62%
Employee	16	27.58%
Agriculture	08	13.80%
Parity		
Primi	28	48.27%
Multi	30	51.72%
Family History		
Maternal	11	18.96%
Paternal	07	12.06%
No family history	41	70.68%
Intake of folic acid (Preconceptual)		
Yes	52	89.65%
No	06	10.34%
Associated complications		
Diabetes mellitus	02	3.44%
Anaemia	32	55.17%
Hypertension	03	5.17%
Others	01	1.72%
None	20	34.48%

Table 2: Details of seizure profile and AED therapy of study participants

Seizure profile	No of participants (n=58)	
	Frequency	Percentage
Type of seizures		
GTCS	46	79.31%
Complex partial	07	12.06%
Simple partial with secondary generalisation	02	3.44%
Complex partial with Secondary generalisation	03	5.17%
Frequency of seizure (Antepartum)		
Good	51	87.93%
Poor	07	12.06%
Frequency of seizure (during pregnancy)		
Good	45	77.58%
Poor	13	22.41%
Anti-seizure medication (Monotherapy)		
Sodium valproate	07	12.06%
Carbamazepine	15	25.86%
Phenytoin	19	32.75%
Anti-seizure medication (Polytherapy)		
Sodium valproate + Carbamazepine	04	6.89%
Sodium valproate + Phenytoin	03	5.17%
Carbamazepine + Phenytoin	02	3.44%
Carbamazepine + Phenytoin + Phenobarbital	02	3.44%
Carbamazepine + Phenytoin + Sodium valproate	03	5.17%
Carbamazepine + Sodium valproate + Levetiracetam	03	5.17%

Table 3: Details of maternal outcome

Maternal outcome	Pregnant Women with epilepsy (n=58)	
	Frequency	Percentage
Type of delivery		
Preterm	07	12.06%
Term	51	87.93%
Mode of delivery		
Normal vaginal	39	67.24%

Forceps		01	1.72%
LSCS	Elective	08	13.79%
	Emergency	05	8.62%
Abortions		03	5.17%
Still births		02	3.44%
Postpartum Haemorrhage			
Yes		02	3.44%
No		56	96.55%
Postpartum seizures			
Present		03	5.17%
Absent		55	94.82%

Table 4: Details of foetal outcome

APGAR Score	At 1 min		At 5 min	
	Frequency	Percentage	Frequency	Percentage
Score 2	1	1.72%	-	-
Score 3	1	1.72%	-	-
Score 5	19	32.75%	-	-
Score 6	21	36.20%	-	-
Score 7	15	25.86%	35	60.03%
Score 8	3	5.17%	20	34.4%
Score 9	-	-	03	5.17%

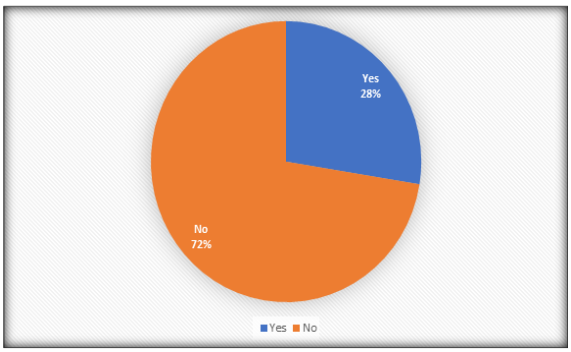

Figure 1: Details of changes in anti-seizure medication

DISCUSSION

The predominant age group among participants was 25-30 years, comprising 46.55%, followed by those aged 18-24 years. A significant proportion of participants had completed higher secondary education (27.58%), followed by those with primary education (24.13%) and intermediate education (22.41%). The predominant group of participants consists of housewives, accounting for 58.62%, followed by employees at 27.58% and agriculture workers at 13.08%. Multigravidas constitute a greater proportion at 51.72% compared to primigravida, who account for 48.27%. A total of 89.65% of participants were found to have utilised preconceptual folic acid. Anaemia was a prevalent associated complication in 55.17%, followed by hypertension at 5.17% and diabetes mellitus at 3.44%, while 34.48% of participants exhibited no associated complications (Table 1).

Generalised tonic-clonic seizures constitute a prevalent category, accounting for 79.31% of cases, while complex partial seizures represent 12.06%. Simple partial seizures with secondary generalisation make up 3.44%, and complex partial seizures with secondary generalisation account for 5.17%. The incidence of seizures was observed in 12.06% of participants prior to pregnancy, which escalated to 22.41% during the gestational period. We administered monotherapy with anti-seizure medications to a total of 70.68% of participants, specifically sodium valproate in 12.06%, carbamazepine in 25.86%, and phenytoin in 32.75%. Polytherapy was noted in 29.31% of the overall participants (Table 2). Twenty-eight percent of participants experienced alterations in their anti-seizure medication regimen during the course of pregnancy (Graph 1).

Full-term delivery occurred in 87.93% of cases, while preterm delivery was noted in 12.06%. The predominant mode of delivery observed was normal vaginal delivery, accounting for 67.24%. This was succeeded by elective lower segment caesarean section at 13.79%, emergency lower segment caesarean section at 8.62%, and forceps delivery at 1.72%. Instances of stillbirths were observed in 3.44% of cases. Postpartum haemorrhage was noted in 3.44% of participants, while postpartum seizures were recorded in 5.17% of participants (Table 3). The foetal Apgar score at 1 minute revealed that 32.75% of participants scored 5, 36.20% achieved a score of 6, 25.86% received a score of 7, and 5.17% scored 8. Additionally, scores of 1 and 2 were observed in 1.72% of participants each. At the 5-minute mark, a score of 7 was noted in 60.03% of newborns, a score of 8 in 34.4%, and a score of 3 in 5.17% (Table 4). A notable 32.75% of newborns born to mothers with epilepsy exhibited low birth weight.

A study conducted by Zeytin Demiral G and colleagues examined a cohort of 112 pregnant women diagnosed with epilepsy alongside 130 healthy pregnant counterparts. The findings revealed that 4 (3.5%) of the women with epilepsy refrained from utilising anti-seizure medications, while 79 (70.5%) were administered a singular type of medication, and 29 (25.8%) were prescribed multiple medications. The incidence of pregnancy termination, spontaneous abortion, and

complications affecting both maternal and foetal health was notably elevated among pregnant women diagnosed with epilepsy. The utilisation of folic acid, the rate of planned pregnancies, and the incidence of postpartum breastfeeding were all significantly diminished among pregnant women with epilepsy. The incidence of intensive care unit admissions, as well as the prevalence of infants with a birth weight below 2500 g, congenital malformations, and preterm births, was markedly elevated among babies born to mothers with epilepsy. Among the pregnant women with epilepsy who were administered multiple medications, gestational diabetes was observed in 4 individuals (13.8%), while congenital malformations were noted in 4 individuals (14.3%).[11]

A systematic review and meta-analysis conducted by Xinwei Xu et al. demonstrated a noteworthy correlation between pregnant women with epilepsy and various complications, including the incidence of caesarean section, preeclampsia/eclampsia, gestational hypertension, induction of labour, gestational diabetes, and postpartum haemorrhage, in contrast to their counterparts without epilepsy. In terms of newborn outcomes, individuals with epilepsy compared to those without exhibited heightened probabilities of preterm birth attributed to being small for gestational age, low birth weight (under 2500 g), congenital malformations, and foetal distress. The likelihood of operative vaginal delivery, newborn mortality, and Apgar scores (≤ 7) were comparable between PWWE and healthy women.[12] A study conducted by Thamilpavai et al. involving 100 pregnant women diagnosed with epilepsy revealed that 87% experienced a smooth progression during their pregnancy and successfully delivered at term. Nine percent experienced preterm delivery. Eight out of ten individuals experienced a standard vaginal delivery at full term. Four percent of the participants encountered a challenging labour and necessitated the use of forceps for delivery. Three individuals underwent the procedure of abortion. Four percent experienced postpartum haemorrhage, while other four percent encountered postpartum seizures. The results indicate that congenital malformations were observed in 6% of first-time mothers and in 1% of those who have previously given birth. A total of 72% of the 100 patients were receiving monotherapy, with 42% prescribed phenytoin (PHT), 23% on carbamazepine (CBZ), and 7% utilising sodium valproate (SVP). The occurrence of congenital malformations was observed to be 3 in individuals treated with phenytoin, compared to 1 in those receiving carbamazepine.[13]

A study conducted by Li Y et al. indicated that folic acid supplementation during pregnancy holds significant importance, with a dosage exceeding 400 mcg/d in the early stages (first 12 weeks) correlating with improved neurodevelopmental outcomes in offspring of women with epilepsy. Breastfeeding poses no harm and should be actively promoted among women with epilepsy, even those undergoing treatment with antiseizure medications. The research further indicated that sodium valproate presents a distinct risk for malformations as well as cognitive and behavioural impairments. Several antiseizure medications present minimal risks, such as lamotrigine and levetiracetam; however, the risks associated with numerous other antiseizure medications remain ambiguous.[14] A study by Razaz N et al. indicated that pregnant women with epilepsy face an increased risk of adverse pregnancy and delivery outcomes compared to their counterparts without epilepsy. These outcomes include preeclampsia, infections, placental abruption, and both emergency and elective lower segment caesarean sections, as well as the induction of labour. Infants born to mothers with epilepsy are also at heightened risk, facing issues such as stillbirth, both medically indicated and spontaneous deliveries, being small for gestational age at birth, and experiencing neonatal infections. Additionally, these infants may present with an APGAR score ranging from 4 to 6 at 5 minutes, or a score of 0 to 3 at the same interval. In women with epilepsy, the use of antiepileptic drugs during pregnancy did not appear to increase the risks associated with pregnancy and perinatal complications, aside from a noted rise in the rate of labour induction.[15] A study conducted by Kuo CY et al. further revealed that women with epilepsy are at significantly higher risk for a variety of complications, including puerperal cerebrovascular diseases, respiratory distress syndrome, mortality, sepsis, pregnancy-related hypertension, preeclampsia, caesarean delivery, and preterm labour. Infants born to mothers with epilepsy showed an increased risk of unexplained stillbirth, congenital anomalies, central nervous system malformations, low birth weight, and a reduced APGAR score at 5 minutes.[16] These findings highlight the need for careful monitoring and management of pregnancies in women with epilepsy to reduce potential risks for both mothers and infants. Further research is vital to develop effective strategies that can improve outcomes and ensure safer pregnancies for this vulnerable population. This includes examining the impact of various antiepileptic medications on pregnancy outcomes, as well as the importance of preconception counselling and continuous support throughout the gestational period. By prioritising the health and well-being of both mothers and children, healthcare providers can help facilitate more positive experiences and outcomes for families affected by epilepsy.

CONCLUSION

Unfavourable obstetric outcomes and foetal problems involving congenital abnormalities are more common in pregnant women who suffer from epilepsy. To reduce the risk of problems, it is

important to take folic acid and anti-seizure medicine before getting pregnant. Thus, in order to lessen the detrimental effects of epilepsy on the health of both the mother and the unborn child, it is essential to establish suitable methods of prevention and intervention, as well as counselling sessions, either before or during the pregnancy.

REFERENCES

1. Trinka E, Kwan P, Lee B, Dash A. Epilepsy in Asia: Disease burden, management barriers, and challenges. Epilepsia. 2019; 60:7-21.
2. England MJ, Liverman CT, Schultz AM, Strawbridge LM. Epilepsy across the spectrum: Promoting health and understanding. Epilepsy Behav. 2012; 25:266-76.
3. Tomson T, Battino D. Teratogenic effects of antiepileptic drugs. Lancet Neurol. 2012; 11:803–13.
4. Nucera B, Brigo F, Trinka E, Kalss G. Treatment and care of women with epilepsy before, during, and after pregnancy: a practical guide. Ther Adv Neurol Disord. 2022;15.
5. Spiegel R, Merius H. Principles of Epilepsy Management for Women in Their Reproductive Years. Front Neurol. 2020;11.
6. Fairgrieve SD. Population based, prospective study of the care of women with epilepsy in pregnancy. BMJ. 2000; 321:674-5.
7. Viale L, Allotey J, Cheong-See F, Arroyo-Manzano D, Mccorry D, Bagary M, et al. Epilepsy in pregnancy and reproductive outcomes: a systematic review and meta-analysis. Lancet. 2015; 386:1845-52.
8. Thomas SV, Sindhu K, Ajaykumar B, Devi PBS, Sujamol J. Maternal and obstetric outcome of women with epilepsy. Seizure 2009; 18:163-6.
9. Borthen I, Eide M, Daltveit A, Gilhus N. Obstetric outcome in women with epilepsy: a hospital-based, retrospective study. BJOG 2011; 118:956-65.
10. Veiby G, Daltveit AK, Engelsen BA, Gilhus NE. Pregnancy, delivery, and outcome for the child in maternal epilepsy. Epilepsia 2009; 50:2130-9.
11. Zeytin Demiral G, Betaş Akın S, Kayacık Günday Ö, Şahbaz FG, Türk Börü Ü. Maternal and fetal outcomes of antiepileptic treatments during pregnancy: A retrospective study. Epilepsy Behav. 2024; 158:109937.
12. Xinwei Xu, Leihao Sha, Sijia Basang, Anjiao Peng, Xiangyang Zhou, Yanxu Liu, Yixuan Li & Lei Chen. Mortality in patients with epilepsy: a systematic review. Journal of Neurology. 2025; 272:4.
13. Thamilpavai N, Viveka Saravanan R, Marian Jude Vijay A. The impact of epilepsy on the maternal and foetal outcome. Int J Acad Med Pharm 2023; 5(4); 1518-1524.
14. Li Y, Meador KJ. Epilepsy and Pregnancy. Continuum (Minneap Minn). 2022 Feb 1;28(1):34-54.
15. Razaz N, Tomson T, Wikström A, Cnattingius S. Association between pregnancy and perinatal outcomes among women with epilepsy. JAMA Neurol. 2017;74(8):983–991.
16. Kuo CY, Kuo CF, See LC, et al. The impact of epilepsy and antiseizure medications on pregnancy and neonatal outcomes: A nationwide cohort study. Brain Behav. 2023;13(12): e3287.