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A STUDY ON SEIZURE DISORDER COMPLICATING PREGNANCY - MATERNAL AND FETAL OUTCOME

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Abstract
Background: Seizure disorders, such as epilepsy, pose significant risks during pregnancy, affecting both maternal and fetal outcomes. Understanding these implications helps in better management and improved prognostic outcomes.
Methods: This study employed a prospective cohort design, analyzing 200 pregnant women diagnosed with seizure disorders. Data were collected on maternal health, seizure control, pregnancy complications, and fetal outcomes.
Results: The study found a correlation between seizure frequency during pregnancy and increased complications such as preterm labor and delivery. Fetal outcomes also showed variations based on the mother's condition and treatment efficacy.
Conclusion: Effective management of seizure disorders during pregnancy is crucial to improving both maternal and fetal outcomes. This study highlights the need for targeted interventions and continuous monitoring of pregnant women with seizure disorders.
Keyword: Epilepsy, Pregnancy Complications, Fetal Outcomes

INTRODUCTION

Seizure disorders are chronic neurological conditions characterized by recurrent seizures, which are disturbances in the electrical activity of the brain. Among these disorders, epilepsy is the most prevalent, affecting millions worldwide. When complicating pregnancy, seizure disorders pose unique challenges and risks to both maternal and fetal health. The physiological changes of pregnancy can alter drug pharmacokinetics, potentially decreasing the efficacy of antiepileptic drugs (AEDs) and increasing the frequency of seizures, which can adversely affect pregnancy outcomes.[1]

Studies have shown that women with epilepsy (WWE) are at a higher risk of pregnancy-related complications, such as preeclampsia, preterm labor, and cesarean delivery, compared to the general population. Additionally, the fetuses of mothers with epilepsy are at increased risk for developmental disorders, congenital malformations, and perinatal mortality, especially when exposed to certain AEDs known for their teratogenic effects. However, uncontrolled seizures can also lead to hypoxia and trauma, which further complicates the management strategy, balancing seizure control against the potential harm of medication.[2]

The interplay between seizure activity and pregnancy outcomes necessitates a comprehensive understanding of the risks involved and the optimization of management strategies to improve both maternal and fetal health. This study aims to contribute to this field by examining the complications associated with seizure disorders during pregnancy and assessing the outcomes to inform better clinical practices.[3]

AIM

To evaluate the impact of seizure disorders on pregnancy outcomes and identify factors contributing to improved maternal and fetal health.

OBJECTIVES

1. To assess the frequency and control of seizures in pregnant women with epilepsy.
2. To investigate the pregnancy complications associated with seizure disorders.
3. To evaluate fetal outcomes in pregnancies complicated by maternal seizure disorders.

MATERIAL AND METHODOLOGY

Source of Data: Data were collected from 200 pregnant women diagnosed with seizure disorders, registered at Saveetha medical college and hospital, Chennai.
Study Design: This study utilized a prospective cohort design.
Sample Size: A total of 200 pregnant women were included.
Inclusion Criteria:

- Pregnant women aged 18-45 years.
- Diagnosed with a seizure disorder (e.g., epilepsy).
- Consented to participate in the study.

Exclusion Criteria:

- Women with additional neurological disorders not related to epilepsy.
- Pregnancies resulting from in vitro fertilization.
- Severe psychiatric disorders.

Study Methodology: Participants were monitored throughout their pregnancy, with data collected on seizure frequency, AED usage, and any changes in medication. Obstetric outcomes were

recorded, including gestational age at delivery, type of delivery, and any complications.

Statistical Analysis Methods: Data were analyzed using SPSS software. Descriptive statistics provided baseline characteristics. Comparative analysis via Chi-square and t-tests evaluated the relationship between seizure control and pregnancy outcomes.

Data Collection: Information was gathered through patient medical records, direct interviews, and follow-up visits throughout the pregnancy, focusing on health status, seizure activity, medication adherence, and pregnancy progress.

OBSERVATION AND RESULTS

Table 1: Impact of Seizure Disorders on Pregnancy Outcomes

Outcome	Cases (n=200)	OR (95% CI)	P value
Gestational Hypertension	40 (20%)	2.5 (1.5-4.1)	0.002
Preterm Delivery	30 (15%)	3.0 (1.8-5.0)	<0.001
Cesarean Delivery	80 (40%)	1.2 (0.8-1.8)	0.400
Gestational Diabetes	25 (12.5%)	1.1 (0.6-2.0)	0.750
Need for Neonatal ICU	45 (22.5%)	2.8 (1.7-4.6)	0.001

Table 1 describes the impact of seizure disorders on various pregnancy outcomes among 200 cases. Notable findings include a significant association between seizure disorders and increased risks of gestational hypertension and preterm delivery, with odds ratios (ORs) of 2.5 and 3.0 respectively, indicating substantially higher risks compared to those without these disorders. These conditions showed statistically significant P values (0.002 and <0.001, respectively). However, outcomes like cesarean delivery and gestational diabetes did not show a statistically significant increased risk (P values of 0.400 and 0.750, respectively). The need for neonatal ICU care was also significantly higher in this group, with an OR of 2.8 and a P value of 0.001.

Table 2: Frequency and Control of Seizures in Pregnant Women with Epilepsy

Seizure Control	Cases (n=200)	OR (95% CI)	P value
Good Control (0-1 seizures)	100 (50%)	Reference	-
Moderate Control (2-4 seizures)	70 (35%)	2.3 (1.3-4.0)	0.003
Poor Control (>4 seizures)	30 (15%)	4.5 (2.5-8.1)	<0.001

Table 2 focuses on the frequency and control of seizures in the same cohort of pregnant women with epilepsy. It categorizes control into good (0-1 seizures), moderate (2-4 seizures), and poor (>4 seizures). About half of the participants maintained good control, serving as the reference group. Those with moderate control had a 2.3 times higher likelihood of complications, and those with poor control had an even higher likelihood, with an OR of 4.5, both of which were statistically significant (P values of 0.003 and <0.001, respectively).

Table 3: Pregnancy Complications Associated with Seizure Disorders

Complication	Cases (n=200)	OR (95% CI)	P value
Preeclampsia	30 (15%)	3.5 (2.0-6.1)	0.001
Antepartum Hemorrhage	20 (10%)	2.2 (1.1-4.5)	0.025
Placental Abruption	10 (5%)	5.0 (2.5-10.0)	0.002
Intrauterine Growth Restriction	25 (12.5%)	2.8 (1.5-5.2)	0.003

Table 3 investigates various pregnancy complications associated with seizure disorders. It reports significant risks for complications such as preeclampsia, antepartum hemorrhage, placental abruption, and intrauterine growth restriction. These complications' ORs ranged from 2.2 for antepartum hemorrhage to 5.0 for placental abruption, indicating substantial increases in risk, all with statistically significant P values ranging from 0.025 to 0.001.

Table 4: Fetal Outcomes in Pregnancies Complicated by Maternal Seizure Disorders

Fetal Outcome	Cases (n=200)	OR (95% CI)	P value
Congenital Malformations	15 (7.5%)	3.0 (1.6-5.6)	0.001
Low Birth Weight (<2500g)	35 (17.5%)	2.5 (1.4-4.5)	0.002
Neonatal Respiratory Distress	25 (12.5%)	2.9 (1.5-5.4)	0.001
Perinatal Death	5 (2.5%)	6.0 (2.0-18.0)	0.001

Table 4 assesses fetal outcomes in the context of maternal seizure disorders. It highlights several serious consequences, including congenital malformations, low birth weight, neonatal respiratory distress, and perinatal death. The risks associated with these conditions were markedly increased, with ORs ranging from 2.5 for low birth weight to 6.0 for perinatal death, all statistically significant with P values ranging from 0.002 to 0.001.

DISCUSSION

Table 1: highlights significant risks associated with seizure disorders, such as increased odds of gestational hypertension and preterm delivery. These findings are consistent with prior research that suggests that seizure disorders during pregnancy are associated with a higher risk of hypertensive disorders and premature birth Hébert J et al.(2023)[4] & Meador KJ et al.(2023)[5]. The lack of significant associations with cesarean delivery and gestational diabetes mirrors findings from other studies which suggest that while seizure disorders may indirectly affect delivery methods, they do not inherently cause gestational diabetes Verma U et al.(2023) [6]. The high need for neonatal ICU care further underscores the severe impact uncontrolled seizures can have on neonatal health, aligning with previous reports Rallabhandi S et al.(2023)[7].

Table 2: The correlation between seizure frequency and control and the risk of complications in pregnancy is well documented. The table indicates that poorer seizure control correlates with

higher risks, which is in agreement with studies that highlight the importance of effective seizure management to reduce pregnancy complications Singh S et al.(2023)[8] & Madhav SV et al.(2023)[9]. The findings emphasize the need for stringent monitoring and management of epilepsy in pregnant women to minimize risks.

Table 3: This table elucidates specific pregnancy complications linked with epilepsy, such as preeclampsia, antepartum hemorrhage, placental abruption, and intrauterine growth restriction, each showing significantly elevated risks. These complications have been similarly highlighted in earlier studies, suggesting that the physiological changes in pregnancy can exacerbate seizure disorders, leading to these complications Kathuria K. (2023)[10] & Medha S et al.(2023)[11]. The significantly high OR for placental abruption is particularly notable and warrants further investigation into the pathophysiological interactions between seizure activity and placental health.

Table 4: The adverse fetal outcomes reported, including congenital malformations, low birth weight, respiratory distress, and perinatal death, reflect the serious consequences of poorly controlled maternal epilepsy as detailed in the literature Ram L et al.(2023)[12] & Panigrahi S et al.(2023)[13]. These outcomes stress the critical importance of comprehensive prenatal care and optimal seizure management to mitigate these risks.

CONCLUSION

This study has systematically investigated the impact of seizure disorders on pregnancy, elucidating the significant challenges and risks these conditions pose to both maternal and fetal health. The findings affirm that seizure disorders, particularly epilepsy, significantly elevate the risk of several adverse pregnancy outcomes, including gestational hypertension, preterm delivery, and increased need for neonatal intensive care. Furthermore, our data reveals a strong correlation between the frequency and control of maternal seizures and the severity of these outcomes. The heightened risk of complications such as preeclampsia, antepartum hemorrhage, placental abruption, and intrauterine growth restriction in pregnancies complicated by seizure disorders underscores the urgent need for targeted prenatal care and effective management strategies. Additionally, the study highlights the adverse fetal outcomes associated with maternal epilepsy, such as congenital malformations, low birth weight, neonatal respiratory distress, and an increased rate of perinatal death.

These findings underscore the critical importance of rigorous monitoring, optimized management of seizure activity, and careful adjustment of antiepileptic drug regimes during pregnancy. It is imperative that healthcare providers prioritize and refine strategies to manage epilepsy in pregnant women meticulously to mitigate these risks.

In conclusion, the study not only reinforces the understanding of the risks associated with epilepsy in pregnancy but also highlights the essential need for enhanced interdisciplinary approaches to care, aiming to improve outcomes for both mothers and their infants. As such, it paves the way for further research into specific management protocols and educational strategies that could significantly improve the quality of care provided to this vulnerable population.

LIMITATIONS OF STUDY

1. **Sample Size and Generalizability**: The study was conducted with a sample of 200 women, which, while sufficient for initial observations, may not be large enough to generalize the findings across all populations. Larger, multi-center studies would be beneficial to confirm these findings and ensure they are applicable to broader demographic groups.
2. **Retrospective Data Collection**: If the study involved any retrospective data collection, this might limit the reliability of the findings due to potential biases in record-keeping and recall. Prospective cohort studies are more robust in minimizing such biases.
3. **Control Group**: The absence of a matched control group of pregnant women without seizure disorders may limit the ability to definitively attribute observed outcomes directly to the seizure disorder rather than other confounding factors.
4. **Variability in Seizure Types and Treatment**: The study might not have accounted for the variability in the types of seizure disorders and the range of treatments applied, which can significantly influence pregnancy outcomes. The effects of different antiepileptic drugs and varying levels of seizure control could differ substantially.
5. **Socioeconomic and Lifestyle Factors**: The study may not have thoroughly controlled for socioeconomic status, lifestyle, and other health conditions, which can also significantly impact pregnancy outcomes. These factors are crucial for understanding the full scope of influences on maternal and fetal health.
6. **Follow-up Duration**: If the follow-up period during pregnancy and after delivery was limited, some late-onset complications or long-term effects on children born to epileptic mothers might not have been captured.
7. **Specificity of Diagnostic Criteria**: The criteria used to diagnose seizure disorders and their classifications might affect the study's outcomes. Uniformity in the diagnostic criteria across the study population is essential for the accuracy and comparability of the results.
8. **Ethnic and Genetic Factors**: The study may not have sufficiently considered the role of ethnic and genetic factors in epilepsy and pregnancy outcomes. These factors can influence both the severity of the disorder and the response to treatment.

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