Since 1983
EPITHEORESE KLINIKES FARMAKOLOGIAS KAI FARMAKOKINETIKES | 43(Sup1): 47-50 (2025)
Ekff

Received: 20 January 2025 | **Accepted**: 30 June 2025 | **Published:** 15 October 2025

Open Access | RESEARCH

Prescribing patterns of antiseizure medications among pregnant women in Oman: a cross-sectional study

Zeyana Al Bimani[1,*] Yaman Kassab[1,2*], Said Al Mawali[3], Amal Al Jabri[4]

[1]Department of Pharmacy Practice, College of Pharmacy, National University of Science and Technology, Muscat, Oman
[2]College of Pharmacy, Al-Bayan University, Baghdad, Iraq
[3]Neurology Department, Khoula Hospital, Muscat, Oman
[4]Department of Clinical Pharmacy, Khoula Hospital, Muscat, Oman

***Corresponding author:** Yaman Kassab; Department of Pharmacy Practice, National University of Science and Technology, Muscat, Oman. Tel.: +968-78875985; e-mail: yamankassab@nu.edu.om

ABSTRACT

Background: Epilepsy during pregnancy poses significant clinical challenges, with maternal and fetal outcomes potentially influenced by both the disease itself and the use of antiseizure medications (ASMs). In recent years, prescribing trends have shifted toward newer, comparatively safer ASMs. *Aim*: This study analyzed ASM use, epilepsy control, and medication adjustments among pregnant women with epilepsy (PWWE). *Methodology*: A retrospective cross-sectional study reviewed medical records of 102 PWWE. Data on epilepsy classification, ASM prescriptions, medication adjustments, and therapeutic drug monitoring (TDM) were collected and analyzed. *Results*: Unspecified epilepsy was most common (43%), followed by focal (36%) and generalized (21%) epilepsy. Seizure control was achieved in 63.6% of cases, with levetiracetam (LEV) (33%) being the most prescribed ASM. ASM modifications occurred in 28% of cases, primarily in the first (11.6%) and third (10.3%) trimesters. LEV prescriptions increased during pregnancy, while carbamazepine (CBZ) and valproate (VPA) use declined. Only 5% of patients underwent TDM. *Conclusion*: Most PWWE maintained stable ASM regimens, but a significant proportion experienced medication adjustments. TDM utilization was low despite guideline recommendations. Improved monitoring and individualized ASM management are essential for optimizing maternal and fetal outcomes.

KEYWORDS

epilepsy, pregnancy, anti-seizure medications, prescribing patterns, medication adjustment

How to cite this article: Al Bimani Z., Kassab Y., Al Mawali S., Al Jabri A.: Prescribing patterns of antiseizure medications among pregnant women in Oman: a cross-sectional study. *Epitheorese Klin. Farmakol. Farmakokinet.* 43(Sup1): 47-50 (2025).
DOI: 10.61873/CUAS4506

Publisher note: PHARMAKON-Press stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

1. INTRODUCTION

Pregnancy in women with epilepsy presents clinical challenges related to seizure control and the safe use of antiseizure medications (ASMs). These women face a higher risk of congenital malformations in their offspring (4–6%) compared to the general population (2–3%), likely due to in utero ASM exposure and the effects of maternal seizures [1].

Managing epilepsy during pregnancy requires balancing seizure control with minimizing fetal exposure to teratogenic drugs. Several ASMs have been linked to major malformations, including neu-

ral tube defects, orofacial clefts, cardiac anomalies, and skeletal abnormalities. Treatment must be individualized, prioritizing safer drug choices and appropriate dosing [2].

Newer ASMs like levetiracetam (LEV) and lamotrigine (LTG) are increasingly preferred due to their lower teratogenic risk, though exceptions exist, such as topiramate (TPM), which is associated with higher birth defect rates [3].

International studies support these trends. In India, LEV monotherapy was found to be a safer option [4]. In Australia, a 24-year review showed a shift toward newer ASMs with reduced fetal malformation rates [5].

This study examines ASM prescribing patterns among pregnant women with epilepsy at a tertiary care hospital in Oman. It also assesses adherence to monitoring protocols, including therapeutic drug monitoring (TDM) and seizure control evaluations. Understanding current practices can help identify gaps and support improved maternal and fetal outcomes.

2. METHODOLOGY

2.1. Study design and setting

This retrospective cross-sectional study analyzed ASM prescribing patterns in pregnant women with epilepsy at a 517-bed tertiary hospital in Oman, the country's main neurology referral center offering specialized inpatient and outpatient neurological care.

2.2. Study population and period

Women aged 18–50 with epilepsy who visited the Neurology Department between Jan 1, 2018, and Oct 11, 2023, were included. Each pregnancy was analyzed separately; twin pregnancies counted as one birth. Data were retrospectively collected from EMRs using a structured form, covering all eligible patients.

2.3. Inclusion criteria

- Pregnancies that were delivered at the study hospital, ensuring complete and traceable records.
- Patients who had been prescribed long-term ASMs for a minimum of one month.

2.4. Exclusion criteria

- Women followed up for epilepsy at the neurology clinic without pregnancy during the study period.
- Patients prescribed ASMs only for short-term seizure control, such as in emergency settings.

2.5. Data collection duration

The data collection was conducted over an 8-month period, from January to August 2024.

2.6. Data analysis

Descriptive statistics summarized patient characteristics, seizure control, and ASM prescribing patterns. Categorical variables were reported as frequencies and percentages. Chi-square and McNemar tests assessed associations and changes in ASM use. Data were entered in Excel and analyzed using SPSS version 28.

2.7. Ethical considerations

The study received ethical clearance from the Ministry of Health and institutional review boards. The research protocol was approved under Proposal ID: MoH/CSR/24/28544. Patient confidentiality was strictly maintained, and all data were de-identified prior to analysis.

3. RESULTS

Out of 1,234 women diagnosed with epilepsy, 184 (14.9%) experienced at least one pregnancy during the study period. Of these, 66 were excluded due to a lack of follow-up visits or absence of ASM prescriptions in the year before or during pregnancy. An additional 16 were excluded due to incomplete records or delivery outside the study setting. The final cohort consisted of 102 pregnant women with epilepsy (PWWE).

Among the included patients, 64 (62.7%) had one pregnancy, 33 (32.3%) had two pregnancies, four (3.9%) had three pregnancies, and one (0.9%) had four pregnancies during the study period. The mean age was 31 years (range: 21–44; SD: 5.3), and all patients were Omani nationals.

The most common epilepsy classification was unspecified (43%), followed by focal epilepsy (36%) and generalized epilepsy (21%). Only three patients (2.1%) had their first seizure during pregnancy; the remaining 97.9% had a prior diagnosis of epilepsy.

Seizure control—defined as the absence of seizures during pregnancy—was achieved in 93 pregnancies (63.6%). Among these, the most commonly prescribed ASM was levetiracetam (LEV, 33%), followed by lamotrigine (LTG, 19%)

and carbamazepine (CBZ, 17%). Notably, 15% of patients with well-controlled epilepsy were not prescribed any ASM during pregnancy.

Both older and newer ASMs were used throughout the study period, with CBZ, LTG, valproic acid (VPA), and LEV being the most frequently prescribed. LEV remained the most commonly used ASM both before pregnancy (44%) and during pregnancy (43%), reflecting stable prescribing practices.

Figure 1 presents the distribution of ASM prescribing as monotherapy or combination therapy before and during pregnancy. During pregnancy, 68% of patients were on monotherapy, 17% on dual therapy, 3.4% on triple therapy, and 11% received no ASM. A total of 130 individual ASM prescriptions were documented.

Most patients (71.9%) remained on the same ASM regimen and dose throughout pregnancy. Changes in medication were most frequent during the first trimester (11.6%) and third trimester (10.3%), with fewer changes observed in the second trimester (6.2%). Among those who underwent medication changes, CBZ prescriptions dropped to 7.3%, and VPA use decreased by 2.4%. LEV showed the most significant increase, rising from 14.6% before pregnancy to 26.8% during pregnancy (+12.2%). LTG use also increased during pregnancy (+4.8%).

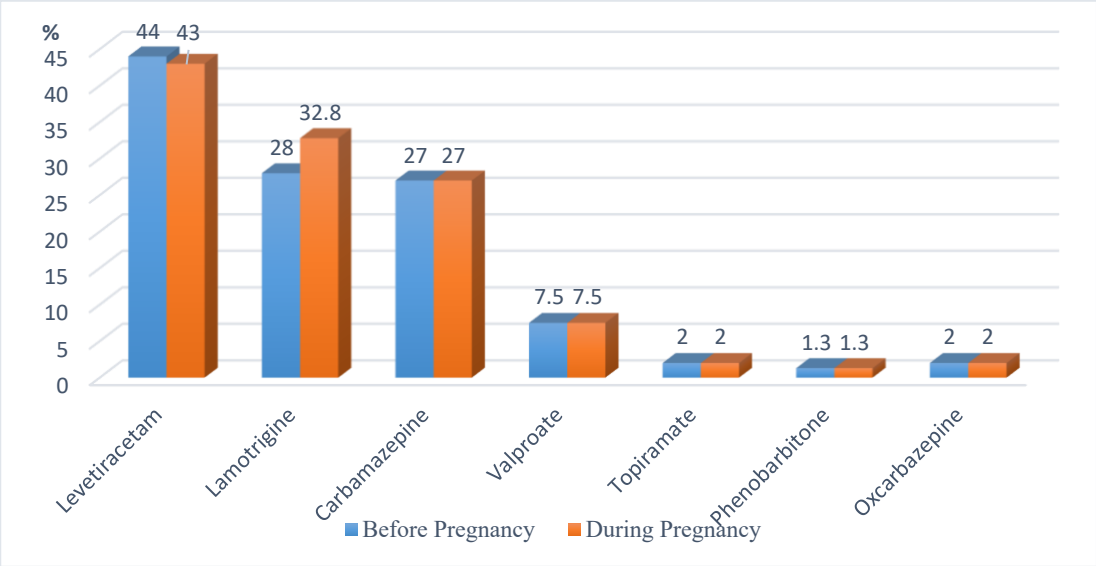

Figure 1. Cases prescribed ASM as monotherapy or combination before and during pregnancy.

4. DISCUSSION

Unspecified epilepsy was the most commonly diagnosed type in this cohort, followed by focal and generalized epilepsy. A similar distribution was observed in an Australian study, where 48% of cases were classified as focal epilepsy and 42% as generalized epilepsy [5].

Levetiracetam (LEV) emerged as the most frequently prescribed ASM during pregnancy. This trend aligns with findings from Japan, where LEV was also the predominant ASM prescribed to pregnant women between 2016 and 2020 [6]. In contrast, a study from Switzerland reported lamotrigine (LTG) as the most commonly dispensed ASM, followed by LEV and pregabalin, with a notable reduction in valproic acid (VPA) use from 2014 to 2018 [7].

Medication changes during pregnancy were observed in 28% of patients in this study, closely matching the 30% reported in a Nordic cohort study of over 21,000 pregnancies between 2006 and 2017. However, data from the Netherlands indicated lower rates of ASM modification during the same period [8].

Despite international recommendations, therapeutic drug monitoring (TDM) was performed in only 5% of patients. This highlights a gap in clinical practice, given the importance of TDM during pregnancy. According to Pennell et al., physiological changes in pregnancy can alter ASM pharmacokinetics, potentially leading to

subtherapeutic drug levels or increased toxicity. Routine TDM is critical to maintain effective seizure control while minimizing risks to both mother and fetus [9].

5. CONCLUSION

This study highlights current prescribing patterns, treatment stability, and monitoring practices for antiseizure medications among pregnant women with epilepsy at a tertiary hospital in Oman. Levetiracetam was the most frequently prescribed ASM, with consistent use before and during pregnancy. While most patients remained on monotherapy, nearly one-third required treatment modifications, primarily during the first and third trimesters. Despite international guidelines, therapeutic drug monitoring was rarely implemented, revealing a significant gap in clinical practice.

These findings emphasize the need to strengthen adherence to monitoring protocols and promote individualized treatment planning during pregnancy. Expanding the use of therapeutic drug monitoring and ensuring safer prescribing of ASMs may improve maternal seizure control and reduce fetal risks. Further prospective studies are warranted to assess long-term outcomes and guide national clinical recommendations.

ACKNOWLEDGMENTS
A special thanks for Al-Bayan University-Iraq for supporting this study.

CONFLICT OF INTEREST STATEMENT
The author declares no conflicts of interest.

REFERENCES

1. Algahtani H., Shirah B., AlKahtani F., Alrefaei K., Alamri A., Aldarmahi A.: Antiepileptic drugs usage in pregnant women with epilepsy in Saudi Arabia. J. *Epilepsy Res.* 9(2): 134–138 (2019).
DOI: 10.14581/jer.19014

2. Kashif T., Fathima N., Usman N., Qaseem A., Jayaraj J.S.: Women with epilepsy: Anti-epileptic drugs and perinatal outcomes. *Cureus*. 11(9): e5642 (2019).
DOI: 10.7759/cureus.5642

3. De Jong J., Garne E., de Jong van den Berg L. T. W., Wang H.: The risk of specific congenital anomalies in relation to newer antiepileptic drugs. *Drugs Real World Outcomes.* 3(2): 131–143 (2016).
DOI: 10.1007/s40801-016-0078-1

4. Sharma S. R., Sharma N., Hussain M., Mobing H., Hynniewta Y.: Levetiracetam use during pregnancy in women with active epilepsy: a hospital-based, retrospective study from a tertiary care hospital in North-Eastern India. *Neurol. India*. 69(3): 692–697 (2021).
DOI: 10.4103/0028-3886.319234

5. Vajda F., O'Brien T., Graham J., Hitchcock A., Perucca P., Lander C., Eadie M.: Changes over 24 years in a pregnancy register – Teratogenicity and epileptic seizure control. *Epilepsy Behav*. 148: 109482 (2023).
DOI: 10.1016/j.yebeh.2023.109482

6. Kikuchi D., Obara T., Miura R., Nakashima K., Ishikawa M., Yamaguchi S., et al.: Trends in the prescription of anti-seizure medicines for pregnant women outpatients with epilepsy during 2016–2020 in Japan. *Seizure*. 98: 101–104 (2022).
DOI: 10.1016/j.seizure.2022.04.007

7. Spoendlin J., Blozik E., Hersberger K. E., Schwenkglenks M.: Use of valproate in pregnancy and in women of childbearing age between 2014 and 2018 in Switzerland: a retrospective analysis of Swiss healthcare claims data. *Swiss Med. Wkly*. 151: w20436 (2021).
DOI: 10.4414/smw.2021.20436

8. Houben E., Benson R. J., Steegers E. A. P., Herings R. M. C.: Twenty-year trends in the use of anti-seizure medication among pregnant women in the Netherlands. *Epilepsy Behav*. 127: 108439 (2022).
DOI: 10.1016/j.yebeh.2022.108439

9. Li D., Franco S., Pennell P. B.: The impact of pregnancy related hormonal and physiological changes on antiseizure medications: expert perspective. *Expert Rev. Clin. Pharmacol*. 17(8): 655–663 (2024).
DOI: 10.1080/17512433.2024.2356617