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Original Article

Utilization of NCCMERP Index to Assess and Categorize Medication Discrepancies among Pediatric Patients: A Hospital Based Epileptic Cohort Study

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ABSTRACT

Background: Recurrent seizures characterize epilepsy, affecting 50 million globally, with 12 million in India. Prevalence rates in North India are 6.99 per 1,000 in rural areas and 5.48 in urban areas. Medication errors pose significant risks, necessitating improved pediatric medication reconciliation to enhance treatment outcomes **Objectives:** This study aimed to assess medication discrepancies and their severity using the NCCMERP scale in pediatric patients with epilepsy. **Materials and Methods:** The study aimed to identify and assess the severity of medication discrepancies in a cohort of 110 pediatric epilepsy patients at a tertiary care hospital, and then intervene to address the discrepancies. **Results:** This study screened 247 pediatric epilepsy patients, recruiting 123 eligible participants, with 110 completing a follow-up. Findings revealed a male predominance (70.90%) and diverse socio-economic backgrounds. Common medication discrepancies included drug omissions 38(46.9%) and non-adherence 16(19.73%), emphasizing the need for improved management strategies to enhance patient safety and treatment outcomes in pediatric epilepsy care. **Conclusion:** Study identifies key challenges in pediatric epilepsy management, highlighting the need for tailored treatment approaches, improved medication adherence, and enhanced communication among healthcare providers and increased parental involvement for better outcomes.

Keywords: Epileptic, Pediatric, Medication Discrepancies, Patient Education.

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INTRODUCTION

Recurrent seizures are a hallmark of epilepsy, a neurological condition marked by aberrant brain electrical activity (Duncan *et al*., 2006). The World Health Organization (WHO) estimates that 50 million people worldwide have epilepsy, with nearly 80% living in low- and middle-income countries. In India, approximately 12 million individuals are affected. A study of children in North India found prevalence rates of 6.99 per 1,000 in rural areas, 5.48 per 1,000 in urban areas, and 4.07 per 1,000 for active epilepsy (Singhi *et al*., 2021). Childhood epilepsy syndromes include self-limited focal epilepsy, generalized epilepsy, and developmental and/or epileptic encephalopathy. Individuals with epilepsy often face social stigma and challenges managing a chronic condition that disrupts daily life (Moshé *et al*., 2015). Medication discrepancies in healthcare settings contribute to Adverse Drug Reactions (ADRs), impacting hospital stays and patient outcomes (DeCourcey *et al*., 2017). Pediatric patients are particularly vulnerable to medication errors due to factors like individualized dosing and complex medical conditions, leading to higher rates of adverse events compared to adults (Bédard *et al*., 2011).

In hospitals, medication discrepancies at admission or discharge affect over 50% of patients, necessitating accurate medication reconciliation to ensure safe and effective treatment Despite these risks, there is limited research on pediatric medication discrepancies, highlighting the need for targeted interventions to improve medication safety for children (Louiselle *et al*., 2021). A BPMH compiles all medications a patient use, from prescriptions to over-the-counter drugs, herbal supplements, and vitamins. It's crucial in hospitals to prevent errors, ensure safety, and improve treatment results. BPMH includes patient interviews, caregiver input, and external verification for an accurate, current medication record, pivotal for personalized healthcare and seamless continuity of care. So, developing pediatric-specific medication reconciliation models is essential to mitigate Drug-Related

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Problems (DRPs) and optimize treatment outcomes, similar to protocols used for adults (Mangas *et al.*, 2021).

Studies have shown that medication errors in pediatric patients are often due to inadequate communication among healthcare providers, inadequate patient education, and inadequate medication labeling (Trinkle and Wu, 1996). Additionally, the use of Electronic Health Records (EHRs) can help reduce medication errors by providing a centralized platform for medication management and reconciliation (Selbst *et al.*, 1999).

The current study aimed to assess medication discrepancies and the category of severity using the NCCMERP among pediatric epileptic patients. This is crucial to identify and address medication-related issues, ultimately improving the quality of care and treatment outcomes for children with epilepsy.

MATERIALS AND METHODS

The study was conducted at a tertiary care hospital over a period of 10 months, focusing on pediatric patients diagnosed with epilepsy. a hospital based epileptic cohort study aimed to assess Medication Discrepancies among a sample size of 110 patients. Epilepsy, a condition characterized by recurrent seizures due to abnormal brain activity, poses significant challenges for pediatric patients, impacting their cognitive development and overall quality of life. By examining medication discrepancies.

Study Eligibility Criteria

This research focuses on patients who have a history of epilepsy and are between the ages of 2 and 18. The study will not include participants with past kidney transplant history, mental health diagnoses, or cognitive impairment. As a result, a targeted study investigating the effects of epilepsy within the selected age range can be conducted, guaranteeing a distinct and narrow participant group.

Study procedure

After ensuring that the eligibility criteria were met and obtaining consent and assent from epilepsy patients, they were enrolled in a study. Medication discrepancies were identified using a Best Possible Medication History (BPMH) form, capturing types of discrepancies. Outcomes and results from these assessments were gathered and analyzed, and categorized Schematic representation. The methodology implemented in this study encompasses several critical steps designed to assess medication discrepancies among pediatric patients with epilepsy. Initially, patients aged 2 to 18 years, irrespective of gender, were screened based on established inclusion criteria. Comprehensive data collection was facilitated through well-structured and validated forms. To identify medication discrepancies, a Best Possible Medication History (BPMH) form was utilized, effectively capturing various types of discrepancies. The outcomes and results from these assessments were systematically compiled and analyzed. The evaluation process involved categorizing medication discrepancies by severity, following the guidelines set forth by the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP). This categorization is vital, as it enables healthcare professionals to comprehend the potential impact and harm associated with medication errors, thereby facilitating appropriate responses and preventive measures (Figure 1).

Medication Discrepancies category of severity by using NCCMERP

NCCMERP is an independent organization established in 1995, consisting of 27 national healthcare organizations dedicated to enhancing medication safety and minimizing errors. It has developed a standardized system for classifying medication errors based on their severity, which helps healthcare professionals understand their potential impact and implement appropriate preventive measures. The NCCMERP classification includes nine categories, ranging from errors with no impact to those resulting in patient death, facilitating a clearer understanding of medication discrepancies and supporting efforts to improve patient safety.

We obtained a comprehensive medication history by consulting patients or caregivers familiar with the Best Possible Medication History (BPMH) process. After documenting the current prescriptions issued by the attending physician, we categorized the results by severity using the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP) guidelines (Figure 2).

RESULTS

Demographic data

During our study, we screened 247 pediatric epilepsy patients, recruiting 123 who met the eligibility criteria. Out of these, 110 participants enthusiastically joined, with 13 excluded due to declining (8) or being unreachable (5). All 110 participants successfully completed a 2-month follow-up.

The study revealed a notable male predominance, constituting 70.90% of participants, with females at 29.09%. Age distribution was diverse: 36.36% aged 2-6, 43.63% aged 7-13, and 20% aged 14-18. Parental education varied: 36.36% had primary education, 33.63% secondary, 20.90% were graduates, 1.81% post-graduates, and 7.27% were illiterate. Occupations of parents spanned across various fields: 30% were farmers, 30% businesspeople, 27.27% private sector workers, and 12.72% government employees. Socio-economic status was diverse, with no participants in the upper-income bracket (over 50,000 INR), 46.36% classified as upper-middle class (21,000-50,000 INR), 41.81% as lower-middle class (11,000-20,000 INR), and 11.81% as lower class (under 10,000 INR). Epilepsy onset was varied, with 50% experiencing it from birth to 1 year, 27.27% between 1-3 years, 10.90% between 3-6 years, 9.09% between 6-12 years, and 2.72% between 12-18

years. Seizure types painted a broad picture: a majority (60.90%) had generalized seizures, followed by temporal lobe epilepsy (16.36%), focal seizures (10%), occipital lobe epilepsy (9.09%), frontal lobe epilepsy (2.72%), and Lennox-Gastaut syndrome (0.90%) (Table 1).

Class of Drugs Prescribed to Patients

In this study, we analyzed the pharmacological management of pediatric epileptic patients, focusing on the distribution and utilization of various drug classes. A total of 110 patients were assessed, revealing a diverse range of medications across several therapeutic categories, primarily anticonvulsants and CNS stimulants.

Anticonvulsants were the cornerstone of therapy, with Sodium Valproate and its combination with Valproic Acid being the most prescribed agents, used by 29 and 26 patients respectively. Oxcarbazepine, another key anticonvulsant, was administered to 27 patients, reflecting its significant role in managing seizure activity. Clobazam, a benzodiazepine, was prescribed to 34 patients, highlighting its importance as an adjunctive therapy for seizure control. Other notable anticonvulsants included Perampanel (10 patients), Lamotrigine (7 patients), and Lacosamide (8 patients). Less commonly utilized anticonvulsants comprised Topiramate (5 patients), Brivaracetam (5 patients), Levetiracetam (4 patients), and Carbamazepine (3 patients). Single-patient use was recorded for Phenytoin, Ethosuximide, Gabapentin + Methylcobalamine, and Divalproex.

CNS stimulants and antipsychotics were also prevalent, with Risperidone leading this group, prescribed to 28 patients. Olanzapine and Methylphenidate were used by 1 and 3 patients, respectively, indicating their more limited but targeted application. Among antidepressants, Sertraline (an SSRI) and Amitriptyline (a tricyclic antidepressant) were each used by 2 patients, addressing comorbid conditions such as anxiety or mood disorders. Anticholinergics were less frequently prescribed, with Trihexphenedyl being used by 2 patients, while Levocetrizine and Glycopyrrolate each served a single patient. Antidiabetic medication was minimal, with Metformin being the only drug prescribed to 1 patient. Antihypertensive therapy included Clonidine, used by 4 patients, possibly reflecting its role in managing comorbid conditions like ADHD.

For GIT agents, Milk of Magnesia and a combination of Cyproheptadine + Tricholine citrate + Sorbitol were each prescribed to 1 patient, indicating their occasional use for managing gastrointestinal symptoms or appetite enhancement. Nutritional supplements played a supplementary role, with iron supplements being the most common, including Ferrous ascorbate + Folic acid + Mecobalamin used by 4 patients. Other supplements like Mecobalamin + Alpha lipoic acid + Vit. D3 + Folic acid + Pyridoxine HCL and Cholecalciferol catered to specific nutritional needs. Analgesics and antipyretics were used sparingly, with Paracetamol being prescribed to 3 patients for managing pain or fever, while Naproxen + Domperidone was used by 1 patient (Table 2).

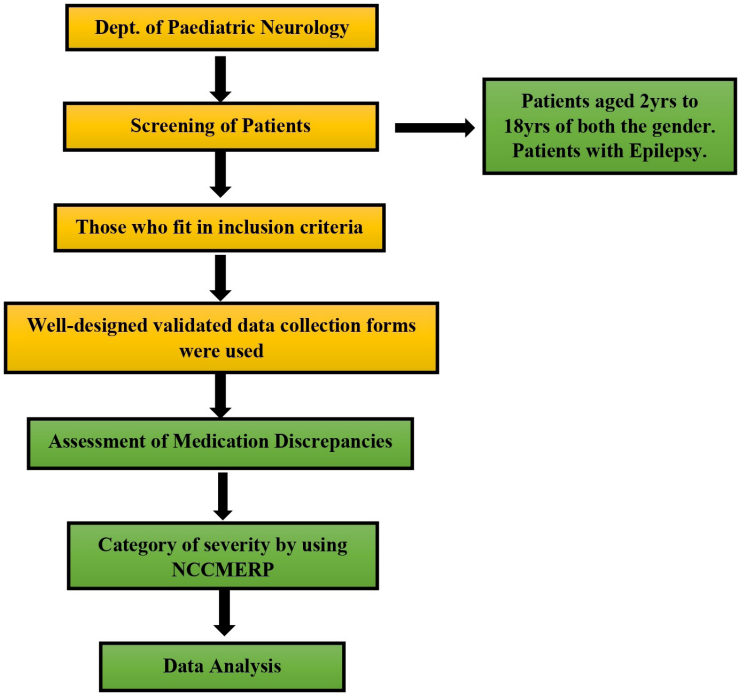

Figure 1: Schematic representation.

Medication Discrepancy and category of severity by using NCCMERP

Discrepancies in pediatric epileptic patients, focusing on their causes, frequency, and severity as classified by the NCCMERP Index. A total of 81 discrepancies were identified, with incomplete medication histories being the most common, occurring 38 times. This issue was attributed to standardization problems, patient factors, and communication gaps, leading to 8 instances classified as category A (potential for harm) and 21 instances in categories B-D (actual harm). Additionally, drug duplication was noted 3 times, primarily due to medication reconciliation errors, with 2 instances in category A and 1 in category B-D. Incorrect dosing information appeared 5 times, linked to changes in clinical status and treatment variability, resulting in 3 instances classified as category A. Furthermore, drug omissions accounted for 19 occurrences, with significant contributions from inadequate reconciliation and critical omissions leading to 7 instances in category A and 21 in categories B-D. Lastly, non-adherence was documented 16 times, often stemming from miscommunication among healthcare providers and complex treatment regimens, resulting in 4 instances classified as category A and 9 in categories B-D. Overall, this analysis underscores the urgent need for improved medication management processes and communication strategies to enhance patient safety and treatment outcomes for pediatric patients with epilepsy (Table 3).

Category of discrepancy with respect to drug

The data reveals various medication-related issues that occurred over a certain period. The most prevalent issue was Drug Omission, which affected 38 instances. This primarily involved sodium valproate (7 instances), risperidone (4), sodium valproate + Valproic acid (3), Levetiracetam (3), oxcarbazepine (3) and carbamazepine (2). This suggests that patients may have been taking these medications for longer or shorter durations than recommended.

Non-adherence was the second most common issue, affecting 16 instances, with risperidone (2), oxcarbazepine, and sodium valproate being the most affected medications. This indicates that patients may have missed doses or stopped taking their medications without consulting their healthcare providers. Drug duplication occurred in 3 instances, involving sodium valproate + Valproic acid, Clobazam, and oxcarbazepine. This could lead to potential adverse effects or interactions if not properly managed. Changed frequency affected 19 instances, with sodium valproate + Valproic acid being the most affected (5), followed by Clobazam (3) and carbamazepine (2).

Finally, Wrong Duration occurred in 5 instances, primarily involving sodium valproate, sodium valproate + Valproic acid, Carbamazepine, Topiramate, Phenytoin. This could lead to suboptimal treatment outcomes if not addressed promptly (Table 4).

Rate of Polypharmacy

The investigation into polypharmacy among pediatric patients with epilepsy, involving a sample of 110 patients, reveals important trends in the prescription of antiepileptic medications. The analysis shows that 36.36% of these patients were treated

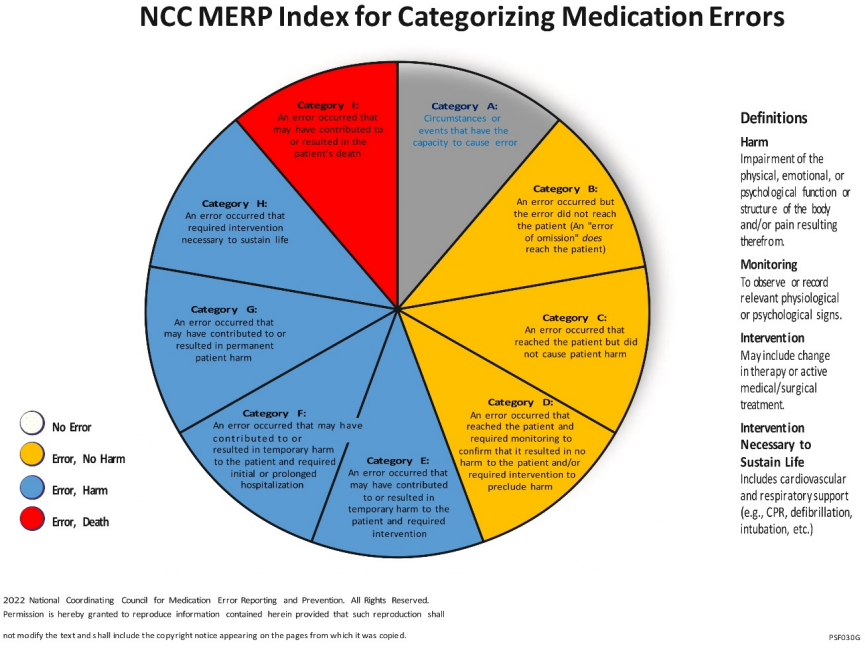

Figure 2: "NCC MERP Index for Categorizing the Severity of Medication Discrepancies".

Table 1: Distribution of Demographic details among study population.

Sl. No.	Characteristics	Category	Frequency (*n*=110)	Percentage (%)
1	Gender	Male	78	70.90%
		Female	32	29.09%
2	Age	2-6	40	36.36%
		7-13	48	43.63%
		14-18	22	20%
3	Parents Education	Primary	40	36.36%
		Secondary	37	33.63%
		Graduation	23	20.90%
		Post Graduate	02	1.81%
		Illiterate	08	7.27%
4	Parents Occupation	Farmer	33	30%
		Business	33	30%
		Private Sector	30	27.27%
		Government Sector	14	12.72%
5	Socio-Economic Status	Upper (More than 50,000)	00	00%
		Upper Middle (21,000-50.000)	51	46.36%
		Lower Middle (11,000-20.000)	46	41.81%
		Lower (less than 10,000)	13	11.81%
6	Age of onset of seizures	Early Infancy (Birth- 1 Year)	55	50%
		Toddlerhood (1-3 Years)	30	27.27%
		Preschool Age (3-6 Years)	12	10.90%
		School Age (6-12 Years)	10	9.09%
		Adolescence (12-18 Years)	03	2.72%
7	Types of Epilepsy/Seizure)	Generalized Seizures	67	60.90%
		Focal Seizures	11	10%
		Temporal Lobe Epilepsy	18	16.36%
		Occipital lobe Epilepsy	10	9.09%
		Frontal Lobe Epilepsy	03	2.72%
		Lennox Gaustat Syndrome	01	0.90%

with a single antiepileptic medication, while a significant 49.09% were prescribed two to three medications. A smaller group, comprising 14.55%, received four to five medications. Overall, 43.14% of patients were on monotherapy, indicating they received only one antiepileptic drug, whereas 56.86% were on polytherapy, which involves multiple medications. This trend towards polytherapy likely reflects the complexities associated with managing pediatric epilepsy, especially for children who do not respond sufficiently to monotherapy, as indicated by various studies highlighting the prevalence of polypharmacy in pediatric populations with chronic conditions like epilepsy.

The data further breaks down the specific combinations of antiepileptic drugs prescribed to individual patients. Among those studied, 43.14% were on one drug, 30.39% received two drugs, and 17.65% were treated with three drugs; even fewer were prescribed four (5.88%) or five (2.94%) medications. This suggests that while many pediatric patients can be effectively managed with one or two medications, a significant number require more extensive treatment regimens to achieve optimal seizure control.

When categorized by type of epilepsy, the study revealed varying rates of monotherapy and polytherapy. For generalized epilepsy, 26.47% of patients were on monotherapy compared to 33.33% receiving polytherapy. In contrast, focal epilepsy showed lower rates for both treatment types, with only 1.96% on monotherapy and 5.88% on polytherapy. Temporal lobe epilepsy exhibited equal distributions for both treatment approaches at 9.80% (Table 5).

The analysis also highlighted specific drug regimens tailored to various forms of epilepsy. In Frontal Lobe Epilepsy, notable combinations included Risperidone (0.5 mg) with Vigabatrin (500 mg) and Sodium Valproate with Perampanel, each prescribed to individual patients (0.98%). For Occipital Lobe Epilepsy, regimens such as Levetiracetam (500 mg) combined with Topiramate (50 mg) and Oxcarbazepine (300 mg) with Clobazam (10 mg) were similarly noted for one patient each (0.98%). Temporal Lobe Epilepsy demonstrated a wider variety of treatment options, including Sodium Valproate (300 mg) combined with Risperidone (2 mg). In Lennox-Gastaut Syndrome, a regimen consisting of Topiramate (100 mg) and Clobazam (100 mg) was administered to one patient (0.98%). Generalized Epilepsy was represented by combinations such as Carbamazepine (100 mg) and Oxcarbazepine (300 mg) with Clobazam (10 mg).

DISCUSSION

This prospective observational study aimed to identify and quantify the various types of medication discrepancies among pediatric epileptic patients admitted to a tertiary care hospital in Karnataka. Study mainly focused on various types of epilepsy, identification of Medication Errors using BPMH and categorization of Medication Errors Using NCCMERP Scale.

In a total of 110 patients, 78 (70.90%) were male and 32 (29.09%) were female. Similar to a study led by Niriayo *et al.*, which

Table 2: Classification of Drugs Prescribed to the Patients.

Target class	Class of drugs	Drugs	ATC Code	Frequency (%) *n*=110
CNS stimulant	Antipsychotics	Risperidone	N05AX08	28(25.45%)
		Olanzapine	N05AH03	1(0.91%)
		Methylphenidate	N06BA04	3(2.73%)
	Selective serotonin reuptake inhibitors	Sertraline	N06AB06	2(1.82%)
	Tricyclic antidepressant	Amitriptyline	N06AA09	2(1.82%)
Anticonvulsants	GABA uptake inhibitors	Vigabatrin	N03AG04	3(2.73%)
	Aliphatic carboxylic acid	Sodium valproate	N03AG01	29(31.9%)
	Succinimide	Ethosuximide	N03AD01	1(0.91%)
	Iminostillbene	Oxcarbazepine	N03AF02	27(24.55%)
	Kainate receptor antagonists	Topiramate	N03AX11	5(4.55%)
	Iminostillbene	Carbamazepine	N03AF01	3(2.73%)
	Aliphatic carboxylic acid	Sodium valproate + Valproic acid	N03AG01	26(23.64%)
	Selective Non-competitive antagonist of AMPA	Perampanel	N03AX22	10(11%)
	Phenyltriazine	Lamotrigine	N03AX09	7(6.36%)
	HCN channel enhancers	Lacosamide	N03AX18	8(7.27%)
	Cyclic GABA analogues	Gabapentin + Mathylcobalamine	N03AX12, A11EA	1(0.91%)
	SV2A protein ligand	Briveracetam	N03AX23	5(4.55%)
		Levetiracetam	N03AX14	4(4.4%)
	Hydantoin	Phenytoin	N03AB02	1(0.91%)
	GABA modulators	Ox carbamazepine	N03AF02	1(0.91%)
	Aliphatic carboxylic acid	Divalproex	N03AG01	1(0.91%)
	Benzodiazepines	Clobazam	N05BA09	34(30.91%)
		Diazepam	N05BA01	1(0.91%)
Anticholinergics	Antihistamines	Levocetrizine	R06AE09	1(0.91%)
	Antimuscarinics	Glycopyrrolate	A03AB02	1(0.91%)
		Trihexphenydil	N04AA01	2(1.82%)
Antidiabetic	Biguanide	Metformin	A10BA02	1(0.91%)

Target class	Class of drugs	Drugs	ATC Code	Frequency (%) *n*=110
Antihypertensive	Alpha Agonist's	Clonidine	C02AC01	4(4.4%)
Drugs acting on GIT	Laxative	Milk of magnesia	A02AA01	1(0.91%)
	Appetite Enhancer	Cyproheptadine + Tricholine citrate + Sorbitol	R06AX02, A11HA	1(0.91%)
	Selective norepinephrine reuptake inhibitor	Atomoxetine	N06BA09	1(0.91%)
	NMDA receptor antagonists	Mementine	N06DX01	1(0.91%)
Nutritional supplements	Calcium	Cholecalciferol	A11CC01	1(0.91%)
	Iron supplements	Ferrous fumarate + Folic acid	B03AD03	1(0.91%)
		Ferrous ascorbate + Folic acid + mecobalamin	B03AE10	4(4.4%)
		Iron + Zinc + Vit. B12	B03AE	1(0.91%)
		Ferrous fumarate + Folic acid + Zinc sulphate	B03AE04	1(0.91%)
	Vitamin supplements	Mecobalamin + alpha lipoic acid + Vit. D3 + Folic acid + pyridoxine HCL	B03BA03, A11HA02, A11CC05, B03BB01, A11HA02	5(4.55%)
		Pyridoxine HCL	A11HA02	1(0.91%)
Analgesics and Antipyretics	NSAIDs and Antipyretic	Naproxen + Domperidone	M01AE02, A03FA03	1(0.91%)
		Paracetamol	N02BE01	3(2.73%)

reported 152 (60.8%) males and 98 (39.2%) females[11]. Regarding age categories, the highest number of patients with epilepsy were in the 7-13 age group, with 48 patients (43.6%), whereas Shamil Ahmed Dima *et al.*, had 68 (35.4%) patients in the 10-14 age group (Mehta *et al.*, 2023). In the present study, a significant proportion of patients were in the Upper Middle (46.36%) and Lower Middle (41.81%) categories. In contrast, Mehta *et al.*, found that the majority of patients (97%) were in the Lower socioeconomic category, with only 1% in the Lower Middle category and none in the Upper Middle categories. Understanding these socioeconomic factors is crucial for developing targeted interventions to reduce medication errors and improve care for pediatric epileptic patients across different socioeconomic groups (Mohammed *et al.*, 2022).

In the present study, generalized seizures were the most prevalent, accounting for 60.90% (67 cases) of the total seizures. This finding aligns closely with the study by Hawi Mohammed *et al.*, where generalized seizures also predominated, making up 61.2% (104 cases). In the present study, focal seizures represented 10% (11 cases) of all seizures recorded, whereas in Hawi Mohammed *et al.*'s study, they constituted a higher proportion at 17.6% (30 cases). Focal seizures, on the other hand, showed some variation between the two studies (Joshi *et al.*, 2023).

In this study, the primary treatment focus was on anticonvulsants, with Clobazam prescribed to 34 patients and sodium valproate to 29 patients, making them the most commonly used medications. Oxcarbazepine (27 patients) and a combination of sodium valproate with Valproic acid (26 patients) were also frequently administered. Additionally, Perampanel (10 patients), Lacosamide (8 patients), and lamotrigine (7 patients) were prescribed. Contrastingly, Joshi *et al.*, study reported significantly higher use of anticonvulsants, with valproate prescribed to 174 patients, followed by carbamazepine (61 patients), Levetiracetam (30 patients), and Clobazam (8 patients). These differences likely stem from varying clinical approaches and regional treatment guidelines in managing epilepsy and related conditions (Onatade *et al.*, 2017). Besides anticonvulsants, antipsychotics, primarily risperidone (28 patients), were prominently prescribed, followed by vitamin and iron supplements, as well as antihypertensive medications.

The analysis of discrepancies in pediatric epilepsy management reveals a total of 81 issues categorized by severity according to the NCCMERP index. These discrepancies include incomplete medication histories, drug duplication, drug omissions, incorrect dosing duration, and non-adherence, each shedding light on the challenges in managing this condition.

Table 3: Discrepancy and category of severity by using NCCMERP.

Discrepancy	Causes of Discrepancies	Frequency (*n*=81)	Category of severity By using NCCMERP Index	Frequency	Percentage (%)
Changed Frequency	Incomplete medication history	19	A	8	9.87%
	Standardization, patient factors, and communication issues contribute		B-D	9	11.10%
	Inadequate reconciliation and communication gaps		E-H	2	2.46%
	- NIL-		I	0	0%
Drug Duplication	Incorrect dosing information	03	A	2	2.46%
	Medication reconciliation errors and overlapping prescriptions.		B-D	1	1.23%
	Overlapping prescriptions and adverse reactions		E-H	0	0%
	- NIL-		I	0	0%
Drug Omission	Incomplete medication histories	38	A	7	8.64%
	Communication gaps, patient non-adherence, and treatment misunderstandings.		B-D	21	25.92%
	Omitted medications and critical omissions		E-H	10	12.34%
	- NIL-		I	0	0%
Wrong Duration	Incorrect dosing information	05	A	3	3.70%
	Changes in clinical status, treatment variability, and lack of follow-up.		B-D	1	1.23%
	Incorrect duration and prolonged treatment		E-H	1	1.23%
	- NIL-		I	0	0%
Non-Adherence	Miscommunication between healthcare providers	16	A	4	4.93%
	Complex regimens, side effects, and lack of adherence education.		B-D	9	11.10%
	Monitoring needs and adherence complications		E-H	3	3.70%
	- NIL-		I	0	0%
Total Discrepancies				81	100%

Table 4: Category of discrepancy with respect to drug.

Changed Frequency	(n)	Drug Duplication	(n)	Drug Omission	(n)	Wrong Duration	(n)	Non-Adherence	(n)
Naproxen + Domperidone	1	Sodium Valproate + Valproic Acid	1	Sodium Valproate	7	Sodium Valproate	1	Risperidone	2
Methylphenidate	1	Clobazam	1	Brivaracetam	1	Phenytoin	1	Oxcarbazepine	1
Vigabatrin	1	Oxcarbazepine	1	Risperidone	4	Carbamazepine	1	Amitriptyline	1
Lobazam	1			Sodium Valproate + Valproic Acid	3	Sodium Valproate + Valproic Acid	1	Naproxen + Domperidone	1
Carbamazepine	2								
Oxcarbazepine	1			Cholecalciferol	1	Topiramate	1	Sodium Valproate	1
Sodium Valproate	1			Trihexphenedyl	1			Lamotrigine	1
Sodium Valproate + Valproic Acid	5			Perampanel	1			Clobazam	1
				Metformin	1			Paracetamol	1
Diazepam	1			Levetiracetam	3			Pyridoxine	1
Levetiracetam	1			Oxcarbazepine	3			Clonidine	1
Clobazam	3			Pyridoxine	1			Oxcarbazepine	1
Cyproheptadine + Tricholine Citrate + Sorbitol	1			Lamotrigine	1			Lacosamide	1
				Levocetrizine	1			Phenytoin	1
				Diazepam	1				
				Carbamazepine	2			Sodium Valproate + Valproic Acid	1
				Milk of Magnesia	1				
				Olanzapine	1			Mecobalamin +Alfa Lipoic Acid +Vit D3 + Folic Acid + Pyridoxine HCL	1
				Sertraline	1				
				Naproxen + Domperidone	4				
Total	19	Total	03	Total	38	Total	5	Total	16

A total of 81 discrepancies were identified in medication management, with Drug Omission being the most frequent at 38 occurrences. According to Raliat Onatade *et al.*, a study of pharmacist-written discharge medication orders revealed only 10 errors among 509 prescriptions, resulting in a significantly lower error rate of 2%. This stark contrast indicates that while both settings encounter medication management challenges, the frequency and nature of errors differ notably depending on who is responsible for writing the orders (Reddy et al., 2019).

The findings of our study indicate that 38 cases (46.9%) involved discrepancies related to drug omissions, while 5 cases (6.16%) were associated with incorrect durations. In comparison, research conducted by Peddolla Sushma Reddy *et al.*, reported similar findings, with drug omissions accounting for 14 cases (45.16%) and wrong duration discrepancies for 3 cases (9.67%). These results suggest that the majority of discrepancies stem from drug omissions (Gattari *et al.*, 2015).

Our study identified several factors contributing to medication discrepancies, with 3 cases (3.70%) linked to incorrect dosing information and 7 cases (8.64%) associated with incomplete medication history errors. In contrast, research by Theresa B. Gattari *et al.*, reported 3 cases (9%) of dosing errors and 18 cases (26%) related to documentation errors. These findings highlight the significance of dosing and documentation issues in medication discrepancies (Satish *et al.*, 2024).

Our data indicates a varied distribution of medication errors, showing a notable prevalence of non-harmful errors (Categories A and B-D), while instances of harm (Categories E-H) are less frequent. This highlights the necessity for ongoing monitoring and enhancement of medication administration practices to reduce potential risks to patient safety. In contrast, the study by Satish s *et al.*, found that a significant proportion of medication errors falls under Categories C and D, where errors reached patients but did not result in harm or only required monitoring (52.54% and 36.07%, respectively) (Wang *et al.*, 2021).

Table 5: Rate of Polypharmacy(Antiepileptics) According to Types of Epilepsy.

Rate of Polypharmacy (Antisezure Medications)					
Sl. No.	**Category of Polypharmacy**	**Frequency (*n*=102)**		**Percentage(%)**	
1	Monotherapy Antisezure Med's	44		43.14%	
2	Ploytherapy Antisezure Med's	58		56.86%	
According to no of Antiepileptic Drug Combinations Prescribed to Individual Patients					
Sl. No.	**No of Aniepileptic Drug Combinations**	**Frequency (Patients) (n=102)**		**Percentage(%)**	
1	One Drug	44		43.14%	
2	Two Drug	31		30.39%	
3	Three Drug	18		17.65%	
4	Four Drug	06		5.88%	
5	Five Drug	03		2.94%	
According to Type of Epilepsy					
Sl.No.	**Epilepsy Type**	**Monotherapy Frequency**	**%**	**Polytherapy Frequency**	**%**
1	Generalized	27	26.47%	34	33.33%
2	Focal	02	1.96%	06	5.88%
3	Temporal Lobe Epilepsy	10	9.80%	10	9.80%
4	Occipital Lobe Epilepsy	05	4.90%	04	3.92%
5	Frontal Lobe Epilepsy	00	0%	03	2.94%
6	Lennox Gaustaut Syndrome	00	0%	01	0.98%

The findings indicate significant medication-related challenges in the patient population, particularly concerning drug omission and non-adherence. Sodium Valproate was the most frequently omitted medication, with 7 instances, highlighting critical gaps in medication management due to communication deficiencies and inadequate patient education. Additionally, Levetiracetam was omitted 3 times, further emphasizing the need for improved provider communication. Drug duplication occurred in 3 cases, including overlaps like Sodium Valproate + Valproic Acid (5 instances), raising concerns about potential adverse effects and increased healthcare costs. Furthermore, non-adherence was reported in 16 cases, driven by side effects from medications such as Diazepam and Olanzapine, along with financial constraints affecting access to essential drugs like Metformin and Carbamazepine. These findings underscore the urgent need for enhanced communication strategies and improved patient education initiatives to effectively address these issues.

Our study revealed that 44 patients (43.14%) were treated with monotherapy antiseizure medications, while 58 patients (56.86%) received polytherapy. In a comparable study by Yuxuan Wang *et al.*, 135 patients (71.79%) were on monotherapy, and 53 patients (28.19%) were prescribed polytherapy. the breakdown of drug combinations indicates that 43.14% of patients are prescribed a single AED, 30.39% are on two drugs, and 17.65% require three drugs, with smaller percentages on four (5.88%) or five (2.94%) drugs. This suggests that while many patients can be managed with fewer medications, a notable number require more complex regimens due to refractory seizures or comorbidities. When analysed by epilepsy type, generalized epilepsy is most prevalent, with 26.47% on monotherapy and 33.33% on polytherapy. Focal epilepsy shows lower rates of both treatment types (1.96% monotherapy, 5.88% polytherapy), while temporal lobe epilepsy exhibits an equal distribution between the two approaches. Notably, Lennox-Gastaut syndrome is exclusively treated with polytherapy, reflecting its complexity.

CONCLUSION

The study underscores critical challenges in managing pediatric epilepsy, particularly regarding demographic factors, medication adherence, and treatment discrepancies. The significant male predominance and varied socio-economic backgrounds highlight the need for tailored treatment approaches that address individual patient needs. Additionally, resolving identified medication discrepancies is vital for enhancing patient safety and optimizing therapeutic outcomes. Future efforts should prioritize effective communication among healthcare providers and increased parental involvement in treatment plans to improve adherence and enhance the quality of life for pediatric epilepsy patients.

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CONFLICT OF INTREST

The authors declare no conflict of interest.

ABBREVIATIONS

BPMH: Best Possible Medication History; **NCCMERP:** National Coordinating Council for Medication Error Reporting and Prevention; **DRP:** Drug-Related Problem; **ADR:** Adverse Drug Reaction; **EHR:** Electronic Health Record; **INR:** Indian Rupee; **CNS:** Central Nervous System; **ADHD:** Attention-Deficit/ Hyperactivity Disorder; **GIT:** Gastrointestinal Tract; **GABA:** Gamma-Aminobutyric Acid; **AMPA:** Alpha-Amino-3-Hydrox y-5-Methyl-4-Isoxazole Propionic Acid; **SV2A:** Synaptic Vesicle Protein 2A; **HCN:** Hyperpolarization-Activated Cyclic Nucleotide-Gated; **NMDA:** N-Methyl-D-Aspartate; **NSAID:** Non-Steroidal Anti-Inflammatory Drug.

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