



Outpatient anti-epileptic drug prescribing errors in a Children's Hospital: An audit and literature review



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ABSTRACT

Purpose: Prescription errors are a common and potentially hazardous problem and may cause patient harm. This review evaluates all new anti-epileptic drug (AED) outpatient prescriptions over one year and reviews the subject literature.

Methods: A 12-month retrospective review of all outpatient prescriptions of AEDs within a large Children's Hospital. Copies of all prescriptions were obtained from the Trust's Pharmacy. The evaluation included the completeness of the required information, prescribing errors and the need for pharmacist intervention before the drug could be dispensed. It did not address the severity of prescribing errors or the potential harm to the patient.

Results: Two hundred and sixty two new prescriptions were evaluated. Incomplete prescriptions (that omitted at least one piece of required information) were found in 72.1%. The most common omission was the dose strength (mg/ml) or actual dose (mg) of the AED. No clinical diagnosis was documented in 62.6% and in 22%, only the word 'epilepsy', was stated with no reference to the epilepsy syndrome or seizure type. Pharmacist intervention was required in approximately 17% (approximately 1 in 6) of all prescriptions before the AED could be dispensed.

Conclusion: This review highlights the importance of clinical information on prescriptions and that incomplete or poor documentation may contribute to prescribing errors. It also emphasises the importance of pharmacists in the identification and correction or resolution of potential prescribing errors. There is a need to develop a well-validated measure to assess the severity of prescribing errors that will better address their clinical significance and risk.

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1. Introduction

Prescription errors occur in all healthcare settings and all healthcare professionals are encouraged to reduce prescribing errors to optimise patient safety and reduce the consequences of such errors. Studies from the USA suggest that at least one error per prescription occurs in up to 1.9% of all prescriptions and is estimated to cause harm in up to 1% of all inpatient episodes.¹ Potential fatal prescribing errors may occur in up to 1–2% of all prescriptions.²

The literature on paediatric prescribing has addressed medical prescribing and pharmacological dispensing errors and interventions by pharmacists or clinicians to reduce prescribing errors.^{2–11}

Prescribing for children is more complicated than that for adults because of their different ages, weights and metabolism of drugs. This may be partly accounted for by prescriptions based on body weight or body surface area. A recent study of outpatient paediatric prescriptions suggested that 15% of children were dispensed medications with a potential dosing error⁵; errors were more frequent when the child's weight was <35 kg with incorrect doses identified in up to 32% of prescriptions.⁵ In contrast, another study of inpatient prescriptions found that the most common error was incomplete clinical or demographic information, with an overall error rate of 19.1%.²

Anti-epileptic drugs (AEDs) add an extra level of complexity for the prescriber. This is because there is a large number of AEDs that offers the clinician a wide choice and even wider combination. Many demonstrate significant interactions with both other anti-epileptic and non-anti-epileptic drugs; this may be of clinical relevance because a significant minority of children will require

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two AEDs to achieve seizure control. Finally, all AEDs may be associated with significant adverse side effects. To demonstrate the complexity of AED prescribing one study looked at AEDs and changes between outpatient prescription and medication received in ambulatory care at a later date. There were frequent and significant changes in medications and brands administered over time.¹²

This paper evaluates all new prescriptions of AEDs issued within the outpatient department of a large children's hospital; to the best of our knowledge it is the largest study that has reported AED prescription in children. The paper focuses on the completeness and accuracy of the prescriptions and need for pharmacist intervention before the AED could be dispensed and within the context of prescribing errors in children.

2. Methods

The study was a retrospective and observational study of all new prescriptions for an AED issued from the general paediatric and paediatric neurology outpatient departments over a 12 month period (1st January 2012 to 31st December 2012). Repeat prescriptions for an AED that children were already receiving were excluded. All outpatient prescriptions in this institution (a large children's hospital) are completed in writing using a single side and in-triplicate, A4 proforma.

All outpatient prescriptions are processed and medications dispensed from the hospital's single pharmacy department. It is likely that all relevant prescriptions were identified for evaluation during the study period primarily because all new outpatient prescriptions are processed from this hospital's only outpatient pharmacy department.

Prescriptions were evaluated for the following information: patient demographics, diagnosis/indication for the AED, medication details including clarity of instructions for dose regimes, prescriber details and whether pharmacist intervention was required to clarify or alter medication details and before the medication could be dispensed. Data were collected on whether the prescription was written by a consultant or a trainee but not whether it was written by a member of the paediatric or paediatric neurology team.

The epilepsy nurse specialists in our institution do not prescribe AEDs.

All statistical analysis of data was performed using 'Microsoft Excel'.

Ethical approval was not required as this was a survey (audit). However, the study was carried out in accordance with the guidelines of the Declaration of Helsinki for medical research. All data reported were anonymised.

3. Results

3.1. Prescription completion

Two hundred and sixty two new prescriptions were evaluated for 243 patients; 19 patients received more than one new prescription. Seventy three (27.9%) prescriptions were complete; 72.1% were incomplete with at least one piece of missing information.

3.2. Diagnosis recorded

One hundred and sixty four (62.6%) of all prescriptions did not state any diagnosis or indication for the prescribed medication. Of the remaining 98, 50 cited only the single word, 'Epilepsy' and 48 cited a non-epileptic diagnosis – 'Migraine', 'Behavioural problems' and 'Chronic pain'.

Table 1

Numbers of anti-epileptic drugs (AEDs) prescribed (all diagnoses).

AED	Number (%)
Sodium valproate	48 (18.3)
Carbamazepine	36 (13.7)
Levetiracetam	36 (13.7)
Gabapentin	27 (10.3)
Lamotrigine	22 (8.4)
Clobazam	21 (8)
Midazolam	16 (6)
Topiramate	11 (17.8)
Phenobarbital	8 (3.1)
Zonisamide	8 (3.1)
Rufinamide	5 (1.9)
Clonazepam	5 (1.9)
Vigabatrin	4 (1.4)
Ethosuximide	4 (1.4)
Stiripentol	3 (2.1)
Nitrazepam	2 (0.7)
Piracetam	2 (0.7)
Sulthiame	2 (0.7)
Diazepam	1 (0.4)
Phenytoin	1 (0.4)

3.3. Prescriber details

Prescribers recorded their details (designation and immediate contact details) in only 109/262 (41.6%) of all prescriptions. Of the prescriptions with prescriber details recorded, 71/109 (65.1%) were written by a consultant (i.e. senior doctor), 19/109 (17.4%) were by a registrar (i.e. paediatric specialist trainee) or senior house officer (i.e. junior doctor) and 19 (17.4%) were unclear as to the grade of prescriber (un-recorded or illegible).

3.4. Choice of AED prescription (all diagnoses)

The most commonly prescribed AEDs were: sodium valproate (48 [18.3%]), carbamazepine (36 [13.7%]) and levetiracetam (36 [13.7%]) (Table 1). For those prescriptions where there was a stated non-epileptic diagnosis, gabapentin was the most commonly prescribed AED.

3.5. Pharmacy intervention

Prescribers were contacted by a pharmacist in 44 prescriptions (16.8%). Fifteen of the 44 prescriptions (34%) were due to an error in dose or frequency of administration and the remaining 29 were for other queries. Dosing errors were identified for the following AEDs: carbamazepine, gabapentin, lamotrigine, levetiracetam, midazolam and topiramate. All prescriptions with dosing errors were amended prior to the AED being dispensed.

4. Discussion

Overall, 72.1% of the prescriptions were incorrectly or inadequately completed. This compares unfavourably with similar studies.^{2,5} Using the definition of a prescription error as described by Dean et al.¹ this review included the omission of required information detail on the prescription proforma as an error because this might still result in an "unintentional significant reduction in the probability of treatment being timely and effective".¹ Possible explanations for the high omission rate could include time-constraint in clinic, illegible hand-writing or the perception by the prescriber that the required information was unnecessary. Electronic prescribing has been shown in some^{5,11} but not all^{9,10} studies to reduce prescribing errors. McPhillips et al. determined whether their error rates were improved at a second

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