Drug utilization study of antiepileptic drugs in the pediatric department, tertiary care hospital, Bangalore, India

Zahra Khoshdel¹, Shibi Tomas¹, Marziye Jafari²

¹Department of Pharmacy Practice, Karnataka College of Pharmacy, Bengaluru, Karnataka, India, ²Department of Clinical Pharmacy, Faculty of Pharmacy, Guilan University of Medical Science, Rasht, Iran

Abstract

Objective: The main objective of the present study is to find out the loose links between prescription of medication and its utilization in the pediatric department, especially with drugs that belong to the antiepileptic medication category. Methodology: This prospective observational study was carried out for 6 months in the Department of Pharmacy Practice, Tertiary Care Hospital, Bangalore. The study was conducted on 100 patients receiving antiepileptic medication. The patient demographics and all medically relevant information were noted in a predefined data collection form. Results: The study showed that the maximum number of patients receiving antiepileptic medication belongs to the age group of 2–6 years. While comparing the prevalence of ADR levetiracetam, phenytoin and clobazam were identified which are associated with ADR. The highly prescribed drug was valproic acid and carbamazepine. The ADRs documented were loss of appetite, vomiting, anemia, and Steven–Johnson syndrome. Evaluation of prescription was performed, which is a major factor in drug-related ADRs. In the discussion part, various methods of improvement in the prevention of ADRs due to prescription error have been suggested which can improve drug utilization and precaution. An economic study was done in the end to put a light on the cost-effective treatment therapy which might improve patient adherence. Conclusion: It was concluded that valproic acid was a highly prescribed drug and carbamazepine was the second-most prescribed drug. It was found that majority of prescription was without a generic name and with inappropriate abbreviations.

Keywords: Antiepileptic drugs, drug utilization, epilepsy, pediatric, prescription

Introduction

Drug Utilization Research (DUR) was defined by WHO in 1977 as “The advertising, dissemination, prescription, and utilization of drugs in a society, with an exceptional accentuation on the subsequent medical, social and monetary results.” The aim of DUR is to encourage reasoning utilization of drugs in populaces. For individual patients, reasoning utilization of a drug infers the prescription of an all-around recorded drug in an ideal portion for a correct sign, with the right information and at a moderate cost. Without the information on how drugs are being endorsed and utilized, it is difficult to start a conversation on reasoning drug use and to propose measures to improve recommending propensities to the executives. Information on the past execution of prescribers is the key part of any evaluating system.[¹]

Drug utilization studies are powerful exploratory tools to ascertain the role of drugs in society.[²] They create a sound sociomedical and health-economic basis for health care decision making.[³] It is one of the most effective methods to assess the prescribing pattern of physicians.[⁴] Drug utilization studies play

Access this article online

Quick Response Code: Website: www.jfmpc.com DOI: 10.4103/jfmpc.jfmpc_542_21

How to cite this article: Khoshdel Z, Tomas S, Jafari M. Drug utilization study of antiepileptic drugs in the pediatric department, tertiary care hospital, Bangalore, India. J Family Med Prim Care 2022;11:2393-8.

© 2022 Journal of Family Medicine and Primary Care | Published by Wolters Kluwer - Medknow
a pivotal role in directing towards rational drug prescription, thereby minimizing the possibilities of adverse effects, and helping the improvement of patient compliance and the resultant quality of life.

Over the past two decades, a few new antiepileptic drugs (AEDs) have been affirmed for the treatment of epilepsy. While the utilization of these new-generation drugs is developing, a portion of the old-generation drugs are as yet favored due to cost and accessibility. Comparable adequacy and well-being have been accounted for the two generations of AEDS; in any case, there are contrasts between explicit drugs. Patient-explicit factors like age, sexual orientation, the kind of epilepsy, and the accessibility of monitoring likewise impact the decision of AEDs used. The expanding utilization of new AEDs presents a new test of recognizing new poison levels and drug collaborations. For instance, the expanding utilization of lamotrigine in Sweden test of recognizing new poison levels and drug collaborations. The expanding utilization of new AEDs presents a new test of recognizing new poison levels and drug collaborations.

Epilepsy is the most widely recognized neurological issue in kids with a rate of around 8 for each 1000 kids younger than seven years. This childhood epilepsy stays a test to treat. Regardless of the increase in the number of Antiepileptic Drugs (AEDs), over 25% of youngsters with childhood epilepsy continue to have seizures. Around 4–10% of youngsters endure at any rate one seizure in the initial 16 years of life. The occurrence is most noteworthy in youngsters under 3 years old, with a diminishing recurrence in older children. Epidemiological examinations uncover that approximately 150,000 youngsters will experience a first-time unjustifiable seizure consistently, and of those, 30,000 will develop epilepsy.

Drug treatment forms one of the most important forms of therapy for a vast majority of epilepsy patients. Clinical experience has shown that AEDs can control a high proportion of cases of epilepsy. However, certain general principles or guidelines should be followed to get the best results of medical management. Clinical practice has shown that a precise diagnosis combined with a better understanding of the mechanism of action of AEDs gives the most effective use of drug treatment. Various factors like age of onset, type of seizure and frequency, electroencephalography (EEG) and imaging results, etc., enable the neurologist to reach a precise syndromic diagnosis and to select the most appropriate AEDs for the individual patient. Treatment is a reasonable compromise between benefits and toxicity, i.e., between control of seizures and side effects. It is important to explain to the patient and family members that various drugs may have to be used at various dosages to reach the best possible drug with the appropriate dose. This will increase their cooperation during this chronic treatment. Whenever possible, the initial drug choice must be based on a specific syndromic diagnosis.

Childhood epilepsy poses unique challenges to the threading physician First of all, and more than in adults, epilepsy should be considered as a symptom of an underlying brain dysfunction and a thorough diagnostic work-up to be done in many children presenting with epileptic seizures. Imaging is vital for making such a determination. Neuroimaging is significant in building up etiology, giving prognosis, and arranging appropriate care. The International League Against Epilepsy (ILAE) suggests neuroimaging for children younger than 2 years experiencing febrile seizures, where there is proof for limitation-related epilepsy except for ordinarily favorable idiopathic epilepsy, in abnormal neurological assessment, and in youth epilepsy refractory to the underlying two antiepileptic drugs. X-ray is the favored imaging methodology due to better anatomic definition and portrayal of pathology. Computed tomography (CT) scan may not recognize various abnormalities obvious on MRI yet is all the more generally accessible, less exorbitant, and for the most part, doesn’t require sedation of the child. CT scan is simpler to convey in emergency circumstances and can identify tumors, mutations, stroke, and calcified and bone lesions. In any case, it has a moderately useless yield in recognizing focal brain lesions.

It is important to develop a twin concept of therapeutic formulation and essential drugs list, which is considered to be the main reason for studying drug utilization. Hence, it becomes important in establishing a selected list of drugs, which needs to be guided, to an extent, not just by epidemiological statistics and scientific considerations toward efficacy and safety, but also by the present pattern of treatment. Therefore, the mainstay in the management of epilepsy is antiepileptic drugs (AEDs). The comparison between conventional and newer drugs concerning their beneficial effects is still under debate. Treatment of epilepsy in children or adults is either by monotherapy or by the combination of AEDs. Treatment with AEDs should be aimed and focused in such a way that controlling seizures with lesser side effects, possibly with monotherapy, allows the child to contribute actively to society with cost-effective treatment. Childhood epilepsy remains a challenge to treat; despite an increase in the number of AEDs, children continue to have seizures. This includes detailed neuroimaging genetic and tailored metabolic workup. Not uncommonly, this diagnostic workup together with the uncertainty around seizure type delays the exact epileptic syndrome diagnosis. The purpose of the present study is Medication safety of Anti-epileptic Drugs in inpatient pediatric department in tertiary care hospital.

### Materials and Methods

This prospective observational study was carried out for 6 months in the Department of Pharmacy Practice, Tertiary Care Hospital, Bangalore. The study was conducted on 100 patients receiving antiepileptic medication. The patient demographics and all medically relevant information were noted in a predefined data collection form. Alternatively, these case charts were reviewed for potential drug interactions, drugs involved in interactions (dose, route, frequency, therapy duration, indication), laboratory investigations, followup for assessing
observed adverse drug interaction, and pharmacist’s intervention. Micromedex, Medscape, and references books were used as tools to review the prescription and case charts. The clinical pharmacist’s intervention was done by suggesting physician about the drug-related problems.

**Results**

The present study was conducted in the pediatric department and the sample size was 100. Out of 100 patients, 34 were females (34%) and 66 were males (66%). 14 patients (14%) were of the age group Newborn <1 month and out of this age group, 4 were females (4%) and 10 were males (10%). 20 were of the age group of 1 month to 2 years (20%) and out of this, 6 were females (6%) and 14 were males (14%). 42 patients were of the age group of 2–6 years (42%) and out of this, 16 were females (16%) and 26 were males (26%). 24 patients belonged to the age group of 6–12 years (24%) and out of this, 8 were females (8%) and 16 were males (16%). Figure 1 shows the distribution of different seizures in male and female populations. Out of 100 patients, 60 suffer from generalized seizure (60%), 48 were of generalized tonic-clonic seizures group (48%), 7 were of generalized tonic seizures group (7%), 5 were of Akinetic, absence and myoclonic seizures group (5%), 10 were of Partial to general, breath holding attacks and unclassified (2%).

Table 1 shows the utilization pattern of antiepileptic drugs. In the table, we can see valproic acid is a highly prescribed drug which is about 43 (36.7%) followed by Carbamazepine 20 (17.1%), Lamotrigine 11 (9.4%), Phenobarbital 10 (7.7%), Topiramate 10 (8.5%), Phenytoin 8 (6.8%), Clobazam 5 (4.3%), Levetiracetam 5 (4.3%), and Vigabatrin 3 (2.6%).

A total of 100 prescriptions were collected and analyzed. Prescription was without a generic name in 13%, drugs mentioned without drug capital is 3%, legibility was not clear in 15% of prescriptions, inappropriate abbreviations were present in 27%, the rout of administration was in 4%, frequency was not mentioned in 6%, mislabeling was found in 10%, variation in dose was not mentioned in 9%, and 3% of prescriptions were without a signature. In another study conducted in Andhra Pradesh by Thiruthopu et al.[10] drug utilization and the prescription audit were found. Percentage of drugs prescribed by generic name was 19.16% which was less than our study. Most important part of writing generic name is reducing the cost of prescription as generic name are more economic compared to the brand name [Table 2].

The study shows that in 100 prescriptions, 52 drug interactions were present out of which 15 was major (28.8%), 20 was moderate (38.5%), and 17 minor (32.7%). Further, drug interaction was categorized as pharmacokinetic and pharmacodynamic. It was found that there were 28 pharmacokinetic and 26 pharmacodynamic interactions [Table 4].

Table 5 shows the results of ADR due to drug interaction. Drugs involved were levetiracetam, phenytoin and clobazam. Out of 100 cases, 5 were identified as having ADR, i.e., 5% ADR.

**Discussion**

Drug utilization studies are primarily conducted to encourage rational usage of drugs. The utilization pattern could be of

![Figure 1: Distribution of different seizure types among 100 patients](image)

### Table 1: Utilization of antiepileptic drugs in pediatric ward

| Drug            | Male n | Male % | Female n | Female % | Total n | Total % |
|-----------------|--------|--------|-----------|-----------|---------|---------|
| Carbamazepine   | 11     | 9.4%   | 9         | 7.7%      | 20      | 17.1%   |
| Clobazam        | 3      | 2.6%   | 2         | 1.7%      | 5       | 4.3%    |
| Clonazepam      | 2      | 1.7%   | 1         | 0.9%      | 3       | 2.6%    |
| Lamotrigine     | 6      | 5.1%   | 5         | 4.3%      | 11      | 9.4%    |
| Levetiracetam   | 3      | 2.6%   | 2         | 1.7%      | 5       | 4.3%    |
| Phenytoin       | 5      | 4.3%   | 3         | 2.6%      | 8       | 6.8%    |
| Phenobarbital   | 5      | 4.3%   | 4         | 3.4%      | 9       | 7.7%    |
| Topiramate      | 5      | 4.3%   | 5         | 4.3%      | 10      | 8.5%    |
| Valproic Acid   | 28     | 23.9%  | 15        | 12.8%     | 43      | 36.7%   |
| Vigabatrin      | 2      | 1.7%   | 1         | 0.9%      | 3       | 2.6%    |
| Total           | 70     | 59.8%  | 47        | 40.2%     | 117     | 100%    |

### Table 2: Prescription errors

| Different medication error | Total n | Total (%) |
|----------------------------|---------|-----------|
| Without generic name       | 31      | 31%       |
| Not in capital letter      | 3       | 3%        |
| Prescription not legible   | 15      | 15%       |
| Inappropriate abbreviations| 27      | 27%       |
| Route not mentioned        | 4       | 4%        |
| Frequency not mentioned    | 9       | 9%        |
| Without signature or name  | 3       | 3%        |
| of the physician            |         |           |
| Mislabeling                | 10      | 10%       |
| Variation in dose           | 9       | 9%        |
drug groups (like analgesics) for various indications or could be in particular diseases (use of various drugs in conditions like epilepsy). These studies help us in understanding the target patients, the various indications as well as the rationality of drug usage.

In the present study, a higher prevalence of epilepsy was found in males compared to females. The reasoning behind lower rate of epilepsy in females is that the female sex hormones are supposed to protect against seizures. The same results are echoed in other studies as well.[17,18] Generalized tonic-clonic seizure (GTCS) was the most frequent type of epilepsy seen in our study. Most of the previous studies have proved GTCS to be the most predominant type of epilepsy overall. Phenytoin (40%) was the most common antiepileptic drug prescribed as mono-therapy followed by sodium valproate (38%). This is similar to previous studies.[18,19] But in some of the other studies, sodium valproate was the most frequently prescribed drug. The difference between the two drugs in this study was very little and this in congruency with other studies may be due to the limited sample size of our study.[17,20] Moreover some of these studies have considered either pediatric or adult patients and not both.

Table 3: Severity and mechanism of drug interaction

| Drug-drug interaction | Type of interaction | Total | Total (%) |
|-----------------------|--------------------|-------|-----------|
| Severity              |                     |       |           |
| Major                 | 15                  | 28.8% |
| Moderate              | 20                  | 38.5% |
| Minor                 | 17                  | 32.7% |
| Total                 | 52                  | 100%  |
| Pharmacokinetic       |                     |       |           |
| Absorption            | 9                   | 32.2% |
| Distribution          | 5                   | 17.8% |
| Metabolism            | 13                  | 46.5% |
| Excretion             | 1                   | 3.5%  |
| Total                 | 28                  | 100%  |
| Synergism             | 18                  | 70%   |
| Pharmacodynamic       |                     |       |           |
| Antagonism            | 8                   | 30%   |
| Neutralization        | 0                   | 0     |
| Total                 | 26                  | 100%  |

Table 4: Effect of important drug-drug interaction

| Drug-drug interaction | Interaction effect                                    | Severity | Management                      |
|-----------------------|-----------------------------------------------------|----------|---------------------------------|
| Carbamazepine + clonazepam | Reducing plasma levels of clonazepam            | Major    | Monitoring clonazepam plasma level |
| Carbamazepine + phenytoin      | Decreasing phenytoin and carbamazepine concentration | Major     | Monitor both dosage             |
| Clonazepam + phenobarbital   | Additive respiratory depression                    | Major    | Reduction in dose of one or both drugs |
| Phenobarbital + clonazepam   | Additive respiratory depression                    | Major    | Monitor both dosage             |
| Carbamazepine + ethosuximide | Loss of efficacy of ethosuximide                | Moderate | Monitor, dose adjustment        |
| Carbamazepine + levetiracetam | Carbamazepine toxicity                           | Moderate | Monitoring                      |
| Carbamazepine + phenobarbital | Decreased carbamazepine exposure                | Moderate | Monitoring                      |
| Carbamazepine + Valproate acid | Carbamazepine toxicity                           | Moderate | Monitoring for carbamazepine   |
| Ethosuximide + phenobarbital | The decreased ethosuximide serum concentration | Moderate | Monitoring                      |
| Ethosuximide + Valproate acid | Increased risk of ethosuximide toxicity          | Moderate | Monitoring                      |
| Phenobarbital + Valproate acid | Phenobarbital toxicity                           | Moderate | Monitoring for phenobarbital toxicity |
| Phenytoin + clobazam     | Increased risk of phenytoin toxicity              | Moderate | Monitoring for phenytoin toxicity |
| Phenytoin + Valproate acid | Altered valproate acid                           | Moderate | Monitoring                      |

Based on the WHO prescribing indicators, some parameters were favorable while some showed poor prescription practices. The average number of medications per prescription was 6 which was not optimal as per the WHO indicators. This could be because the study was carried out in a tertiary care hospital and most of the patients presenting with epilepsy had other serious forms of illnesses including bacterial infections which could have necessitated increased number of drug usage. The same could be the reason behind higher usage of antibiotics and injections per prescription.[16,21]

The study shows different types of seizure cases; out of 100 patients, 60 suffer from generalized seizure (60%), 48 from generalized tonic-clonic seizures (48%), 7 from generalized tonic seizures (7%), 5 from akineti, absence and myoclonic seizures (5%), 40 from partial seizure (40%), 10 from simple partial seizures (10%), 25 from complex partial seizures group (25%), 3 from temporal lobe seizures (3%), 2 from partial to general, breath holding attacks and unclassified seizures (2%).

The average duration of hospital stay was about 3 days where minimum was 1 day and maximum was 5 days. Out of 100 patients, 16 patients had stayed for 1 day (16%) and out of this 10 were male (15%) and 6 were female (17%). 26 patients had to stay for 2 days (26%) and out of this, 18 were male (27.2%) and 8 were female (23%). 31 patients had to stay for 3 days (31%) and out of this, 11 were female (32%) and 20 were male (30%). 15 patients had to stay for 4 days (15%) and out of this, 10 were male (15%) and 5 were females (14.7%). 12 patients had to stay for 5 days (12%) and out of this, 8 were female (21.2%) and 4 were male (12%). The study shows that the drug which was highly prescribed was valproic acid followed by carbamazepine. Valproic acid was the most prescribed drug which was about 43 (36.7%) followed by carbamazepine 20 (17.1%), lamotrigin 11 (9.4%), phenobarbital 10 (7.7%), topiramate 10 (8.5%), phenytoin 8 (6.8%), clobazam 5 (4.3%), levetiracetam 5 (4.3%), and vigabatrin 3 (2.6%).

The study shows that in 100 prescriptions, 52 drug interaction were present, out of which 15 were major (28.8%), 20 were
Table 5: Adverse drug reactions

| Suspected drug | Effect of interaction | Incidence | Management |
|----------------|-----------------------|-----------|------------|
| Levetiracetam   | Loss of appetite      | 1         | Monitoring |
| Phenytion      | Anemia                | 3         | Adding vit B, reducing the dose |
| Clobazam       | Stevens–Johnson syndrome | 1    | Drug withdrawal |

moderate (38.5%), and 17 minor (32.7%) [Table 3]. Further drug interactions were categorized as pharmacokinetic and pharmacodynamic. It was found that there was 28 pharmacokinetic and 26 pharmacodynamic interactions. It was noted that the major interaction drugs were clonazepam, phenytion, phenobarbital, clobazam with carbaamzepine. The study showed that there was 5% incidence of ADR which included drugs such as levetiracetam causing loss of appetite, phenytion causing anemia, and clobazam causing Steven–Johnson syndrome. While doing drugs economic behavior study, it was concluded that phenytion, levetiracetam, and valproic acid were very costly compared to phenobarbital and carbamazepine though the drugs have low side effects, but was 10 times as costlier than regular drugs.

**Conclusion**

The study result shows that the majority of seizure cases were in the male patients, which may be because of the higher male-to-female ratio. And the age group that was highly affected was 2–6 years. Generalized tonic–clonic seizures accounted for half of all diagnoses and complex partial seizures accounted for one-fourth of total diagnoses. It was concluded that valproic acid was a highly prescribed drug and carbamazepine was the second highly prescribed drug. It was found that majority of prescription was without a generic name and with inappropriate abbreviations. The study showed that carbamazepine was interacting with phenytion, phenobarbital, clonazepam, and clobazam, and those were major interactions. It was noted that adverse drug reactions were due to drug interaction and the drugs involved were levetiracetam, phenytion, and clobazam. While performing economic analysis, it was concluded that phenytion, levetiracetam and valproic acid were the most expensive drugs used in the treatment of similar kinds of seizure disorders even though the cheaper alternative, phenobarbital and carbamazepine, was available for treatment.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. World Health Organization. Introduction to Drug Utilization Research. shaping the future, World Health Organization; 2003 Geneva.

2. Sutharson L, Hariharan RS, Vamsadhara C. Drug utilization study in diabetology outpatient setting of a tertiary hospital. Indian J Pharmacol 2003;35:237.

3. Baksaa S, Lunde PK. National drug policies: The need for drug utilization studies. Trends Pharmacol Sci 1986;7:331-4.

4. Yuen YH, Chang S, Chong CK, Lee SC, Critchley JA, Chan JC. Drug utilization in a hospital general medical outpatient clinic with particular reference to antihypertensive and antidiabetic drugs. J Clin Pharm Ther 1998;23:287-94.

5. Huwer C. Are colloids solutions essential for the treatment of pediatric trauma or burn patients. Review for the Expert Committee on the Selection and Use of Essential Medicines, Violence and Injury Prevention and Disability, Geneva, Switzerland, 2012.

6. Weijenberg A, Offringa M, Brouwer OF, Callenbach PM. RCTs with new antiepileptic drugs in children: A systematic review of monotherapy studies and their methodology. Epilepsy Res 2010;91:1-9.

7. Marson AG, Al-Kharusi AM, Alwaidh M, Appleton R, Baker GA, Chadwick DW, et al. The SANAD study of effectiveness of carbamazepine, gabapentin, lamotrigine, oxcarbazepine, or topiramate for treatment of partial epilepsy: An unblinded randomised controlled trial. Lancet 2007;369:1000-15.

8. Kimland E, Rane A, Ufer M, Panagiotidis G. Paediatric adverse drug reactions reported in Sweden from 1987 to 2001. Pharmacoepidemiol Drug Saf 2005;14:493-9.

9. Pahl K, De Boer HM. Epilepsy and rights. Atlas: Epilepsy Care in the World. Geneva: WHO; 2005. p. 72-3.

10. Aicardi J, Arzimanoglou A. Treatment of the childhood epilepsy syndromes. The Treatment of Epilepsy. London: Blackwell Science; 1996. p. 199-214.

11. Reynolds EH, Shorvon SD. Monotherapy or Poly therapy for Epilepsy? Epilepsia 1981;22:1-10.

12. Martricardi M, Brincioti M, Benedetti P. Outcome after discontinuation of antiepileptic drug therapy in children with epilepsy. Epilepsia 1989;30:582-9.

13. Samia P, Odero N, Njoroge M, Ochieng S, Mavuti J, Waa S, et al. Magnetic resonance imaging findings in childhood epilepsy at a tertiary hospital in Kenya. Front Neurol 2021;12:623960.

14. Gerstl L, Willimsky E, Rémi C, Noachtar S, Borggräfe I, Tacke M. A systematic review of seizure-freedom rates in patients with benign epilepsy of childhood with centrotemporal spikes receiving antiepileptic drugs. Clin Neuropharmacol 2021;44:39-46.

15. Djwajani S, Adarsh E, Nirmala KS, Sahajananda H. Sociodemographic, rationale drug use of antiepileptic drugs among pediatric patients with epilepsy: A prospective study at a tertiary care hospital. J Neurosci Rural Pract 2019;10:474-8.

16. Thiruthopu HS, Mateti UV, Baier R, Silva D, Martha S. Drug utilization pattern in South Indian pediatric population: A prospective study. Perspectives in Clinical research 2014;5:178-83.

17. Chandrarathna N, Parida A, Manju V, Adiga US. Drug utilization study in epilepsy in a tertiary care hospital. Biomed Pharmacol J 2019;12:967-701.

18. Mathur S, Sen S, Ramesh R, Kumar SM. Utilization pattern of antiepileptic drugs and their adverse effects, in a teaching hospital. Asian J Pharm Clin Res 2010;3:55-9.
19. Bhatt KM, Malhotra SD, Patel KP, Patel VJ. Drug utilization in pediatric neurology outpatient department: A prospective study at a tertiary care teaching hospital. J Basic Clin Pharm 2014;5:68-73.

20. Hanssens Y, Deleu D, Al Balushi K, Al Hashar A, Al-Zakwani I. Drug utilization pattern of anti-epileptic drugs: A pharmacoepidemiologic study in Oman. J Clin Pharm Ther 2002;27:357-64.

21. Narwat A, Sharma V. Prescription pattern of antiepileptic drugs in indoor patients at tertiary care hospital in Haryana, India. Int J Basic Clin Pharmacol 2018;7:537.

22. Naseeb TA, Nasser MA. Drug prescribing indicators in primary health care centers in Bahrain. Saudi Med J 2005;26:1436-8.