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STUDY ON DRUG UTILIZATION EVALUATION OF ANTI EPILEPTIC DRUGS

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Abstract

Introduction: Drug utilization evaluation (DUE) also referred as drug utilization reviews (DUR) or medication utilization evaluation (MUE) are defined as an authorized, structured, ongoing review of healthcare provider prescribing, pharmacist dispensing, and patient use of medication. Anti-epileptic drugs (AEDs) are those which are used for epilepsy and also for other neurological disorders.

Methodology: A prospective observational questionnaire based cross sectional study in 200 patients of various departments receiving at least one AEDs. The subjects were included in the study only after they met the criteria for the study and after properly filling a informed consent form. The data was obtained by a questionnaire format and it is evaluated for utilization patterns, medication adherence. The cost of AEDs were calculated to evaluate total costs on each drug.

Results: Out of 200 patients, 140 were male and 60 were female. The age group 11- 20 years were found prominent with epilepsy. The average number of AEDs per patient was found to be 1.54. Among all the drugs prescribed phenytoin was the most common drug prescribed 148 (47.89%) for the treatment, followed by lorazepam 59 (19.09 %) and sodium valproate 27 (8.73 %). Maximum of the patients are high in utilization patterns and also in medication adherence. The chi-square value was 1.1373 and 1.3886 for medication adherence and utilization patterns respectively.

Conclusion: Medication adherence was also high in patients which were found using morisky medication adherence scale. The utilization pattern was also 82 % by the patients. The cost effectiveness was done by comparing the costs of drugs prescribed during the study. It was found that topiramate is having high cost which can be burden to patient to adhere the therapy.

Keywords: Drug utilization evaluation, DUR, Cost Effectiveness, Epilepsy.

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Introduction

Drug use is a complex process. Uncertainties in diagnosis, treatment and medication adherence contribute to wide variations in the way drugs are used for any given condition. In any country, a large number of socio-cultural factors also contribute to the way drugs are used. In India, these include national drug policy, illiteracy, poverty, use of multiple healthcare systems, drug advertising and promotion, sale of prescription drugs without prescription, competition in the medical and pharmaceutical marketplace and limited availability of

independent, unbiased drug information. The complexity of drug use means that optimal benefits of drug therapy in patient care may not be achieved because of underuse, overuse or misuse of drugs. Inappropriate drug use may also lead to increased cost of medical care, anti-microbial resistance, adverse effects and patient mortality. One method to evaluate and improve drug use is conducting drug use evaluation DUE studies [1].

Antiepileptic drugs (AEDs) are among the most commonly prescribed centrally active agents. In a recent survey of 471,873 persons carried out in Denmark, 5,426 were found to be receiving AEDs, which corresponds to a prevalence of 1.1% [2]. The use of these drugs also increases with increasing age. A U.S. study of 10,168 elderly nursing home residents revealed that 1,132 (11.1%) were prescribed AEDs, and in 19% of these, the indication was unrelated to seizures or epilepsy [3]. This underlines the fact that some AEDs are widely used to treat conditions other than epilepsy, including migraine,

neuropathic pain, bipolar disorder, anxiety, and many other disorders [4].

Importance of DUEs

DUE programs play a key role in helping managed health care systems understand, interpret, evaluate and improve the prescribing, administration, and use of medications. Employers and health plans find DUE programs valuable because the results are used to foster more efficient use of scarce health care resources. Pharmacists play a key role in this process because of their expertise in the area of pharmaceutical care and medication therapy management [5]. DUEs afford the managed care pharmacist the opportunity to identify trends in prescribing within groups of patients such as those with asthma, diabetes, or high blood pressure. Pharmacists can then, in collaboration with other members of the health care team, initiate action to improve drug therapy for both individual patients and covered populations. DUEs serve as a means of improving the quality of patient care, enhancing therapeutic outcomes, and reducing inappropriate pharmaceutical expenditures, thus reducing overall health care costs [6].

DUE - An overview:

DUE is an ongoing, authorized and systematic quality improvement process, which is designed to:

- Review drug use and / or prescribing patterns,
- Provide feedback of results to clinicians and other relevant groups,
- Develop criteria and standards which describe optimal drug use and
- Promote appropriate drug use through education and other interventions

Drug use/ usage/ utilization evaluation DUE was originally known as drug utilization review (DUR) in the 1970's and early '80s. The terms DUR and DUE are interchangeable. Medication use evaluation (MUE) is another term that has been used in place of DUE by some authors since 1994[7]. According to the World Health Organization (WHO), MUE is similar to DUE in all respects, except that it is patient outcome- oriented and places emphasis on assessing clinical outcomes, MUE mainly aims at assessing and improving patient outcomes and thereby improving the individual patient's health- related quality of life (HRQOL). Regardless of the terminology, the main aim of DUE studies is to promote rational drug use [8].

DUE is a discipline that aims to understand how and why drugs are used as they are, so that drug use and health outcomes can be improved. DUE can play a key role in helping the healthcare system understand, interpret and improve the prescribing, administration and use of medications[9]. DUE information may assist healthcare systems and hospitals to design educational programmers that may improve prescribing and drug use. Some DUE programmers may provide physicians with feedback on their performance and prescribing patterns compared to predetermined criteria or treatment protocols. DUE

information may also allow physicians to compare their approach to treating certain diseases with their peers. The "peer pressure" generated by these comparisons may be useful in motivating physicians to change their prescribing habits in an effort to improve care [10].

Aims of DUE

The main aim of any DUE study is to promote rational drug use by

- Reducing drug and health related treatment costs,
- Improving health related quality of life,
- Improving quality of medical treatment,
- Improving coordinated healthcare,
- Decreasing the number of medication related problems and medication errors,
- Decreasing the number of hospital admissions and
- Improving prescriber awareness and practice towards appropriate prescribing

Prospective DUR

A prospective DUR involves evaluating a patient's planned drug therapy before a medication is dispensed. This process allows the pharmacist to identify and resolve issues before the patient actually receives the medication [11]. Pharmacists routinely perform prospective reviews in their daily practice by assessing a prescription medications dosage and directions and reviewing patient information for possible drug interactions or duplicate therapy. When part of an online claims adjudication process, prospective DUR often relies on computerized algorithms to perform key checks including drug interactions, duplications or contraindications with the patient's disease state or condition.

Issues Commonly Addressed by Prospective DUR:

- Therapeutic interchange
- Incorrect drug dosage
- Inappropriate duration of drug treatment
- Drug dosage modification

Establishment of a DUE Programme

Although individuals may conduct DUEs both in hospital and community settings, the more common approach in hospitals is to develop a coordinated DUE programme. The body is responsible for planning and implementing DUE programmes in hospitals.

Aim and Objectives

Aim

The main of the study is drug utilization evaluation of antiepileptic drugs among patients of different age groups in Jayabharath Hospital, Nellore, A.P.

Objectives

- To assess drug utilization pattern of anti-epileptic drugs.
- To measure the medication adherence with regard to patient.
- To assess cost effectiveness of prescribed antiepileptic drugs.

Study Design

A prospective observational questionnaire based cross-sectional study.

Study Participants

The subjects included in the study are 200 patients of both sex receiving at least one anti-epileptic drug in various departments. This was eligible for in patients during the entire study period. Patients who met the study protocol criteria were included and the required data were collected for in patients from case sheets and prescriptions respectively.

Selection of Subjects:

Inclusion criteria:

- Patients of any age group including both sex.
- Patients receiving at least one anti-epileptic drug.

Exclusion criteria

- Pregnant women and neonates were excluded.
- Patients with liver complications are not involved in the study.

Study Period

The prospective observational study will be conducted for a period of six months from OCT-2022 to March 2023.

Results and Discussion

The drug utilization evaluation was done from Oct to March 2023 in Jayabharath Hospital, Nellore. 200 patients were included in the prospective observational study. The demographic data revealed that number of male and female patients were 70% (140) and 30% (60), respectively.

Total no of patients in the study = 200

a) No. of male patients =140 (70%)

b) No. of female patients=60 (30%)

Ratio = Male / Female = 140/60 =2.333

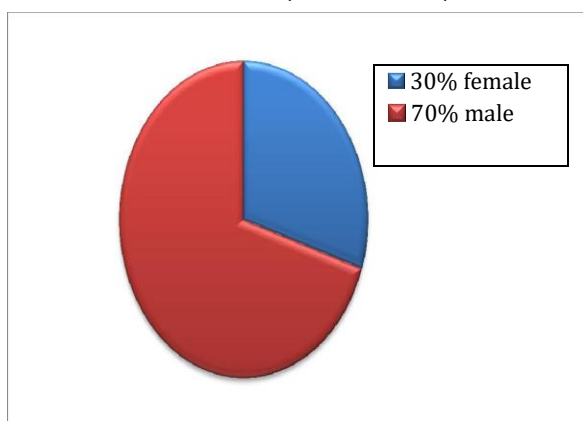


Figure. NO. 1: Graphical representation of distribution of patients based on gender

Demographic data of patients

The age ranged from 1 to 80 years. Maximum number of patients was enrolled in age group of 21–30 years. Overall 4 patients belonged to the age group of 1–10 years, accounting for 2 % of total. A total of 39 patients belonged to the age group of 11–20 years, accounting for

19.5 %. 50 patients belonged to the age group of 21–30 years, accounting for 25 %, 37 patients belonged to the age group of 31–40 years, accounting for 18.5 % , 26 patients belonged to the age group of 41–50 years, accounting for 13 %, 28 patients belonged to the age group of 51–60 years, accounting for 14 % , 12 patients belonged to the age group of 61–70 years, accounting for 6 % . The remaining 4 patients belonged to age group of 71–80 years, accounting for 2 % of total patients included in the study. The age of patients was expressed as mean ± SD that is 35.2 ± 17.012.

TABLE NO. 1: Distribution of age groups in patients

Age in years	Total (%)	Male (%)	Female (%)
1-10	4 (2)	2 (1.42)	2 (3.33)
11-20	39 (19.5)	21 (15)	18 (30)
21-30	50 (25)	35 (25)	15 (25)
31-40	37 (18.5)	29 (20.71)	8 (13.33)
41-50	26 (13)	18 (12.85)	8 (13.33)
51-60	28 (14)	20 (14.28)	8 (13.33)
61-70	12 (6)	11 (7.85)	1 (1.66)
71-80	4 (2)	4 (2.85)	0 (0)

Categorization of different patients prescribed with AED:

Out of 200 patients monotherapy (54.5 %) was found to be superior to others in controlling seizures. In this study population 54.5 % (109) were prescribed an AED in immunotherapy and 38.5 % (77) needed dual therapy. Triple therapy used in 6.5 % (13) and polytherapy (≥ 3 AEDs) and was used only in 1 % (0.5) of patients.

Table NO. 2: Overall AEDs utilization

Therapy	Total (N = 200)	%
Monotherapy	109	54.5
Dual therapy	77	38.5
Triple therapy	13	6.5

Polytherapy	1	0.5
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AED utilization pattern:

A total of 309 AEDs were prescribed over the study period, corresponding to An average of 1.53 AEDs per patient. Average number of AEDs prescribed per patient: It is obtained by using a formula that is Average number of AEDs prescribed/patient ____ 309/200= 1.54

AED use profile

From the 200 prescriptions analyzed, phenytoin was the most common drug prescribed 148 (47.89%) for the treatment, followed by lorazepam 59 (19.09%) and sodium valproate 27 (8.73%), levetiracetam 22 (7.11 %), diazepam 16 (5.17%), clonazepam 13 (4.20 %), carbamazepine 11 (3.55%), clobazam 5 (1.61%), topiramate 4 (1.29%), phenobarbitone 4 (1.29 %).

TABLE NO. 3: Graphical representation age specific distribution of AEDs

Age in Years	PH Y	LO R	DI A	LEV E	VA L	CLO N	PH B	CB Z	TO P	CLO B
1-10	4	1	1	0	1	0	0	0	0	1
11-20	28	10	2	2	12	1	3	3	0	2
21-30	33	14	2	10	6	7	0	3	0	1
31-40	28	14	3	4	2	4	0	3	3	0
41-50	19	9	4	3	3	0	0	1	1	1
51-60	21	9	3	1	3	1	1	1	0	0
61-70	12	2	1	1	0	0	0	0	0	0
71-80	3	0	0	1	0	0	0	0	0	0

The utilization of all AEDs in male and female were almost equal except topiramate.

TABLE NO. 4: Gender specific distribution of AEDs

Drugs	Tot al	Per cent age	Mal e	%	Fema le	%
Phenytoin	148	47.89	104	49.52	44	44.44
Lorazepam	59	19.09	40	19.04	19	19.99
Diazepam	16	5.17	10	4.76	6	6.06
Levetiracetam	22	7.11	16	7.61	6	6.06
Sodium Valproate	27	8.73	13	6.19	14	14.14
Clonazepam	13	4.2	8	3.8	5	5.05
Phenobarbitone	4	1.29	3	1.42	1	1.01
Carbamazepine	11	3.55	9	4.28	2	2.02
Topiramate	4	1.29	4	1.9	0	0
Clobazam	5	1.61	3	1.42	2	2.02

Utilization patterns:

Based on the questionnaire method, 164 (82 %) patients were showing foremost utilization, 29(14.5%) patients were showing modest utilization and 7 (3.5%) patients were under slight utilization of drugs. Medication utilization of patients has increased significantly. The chi-square value was 1.3886 which is insignificant at 95% confidence interval and p value < 0.05.

Table NO. 5: Gender specific distribution of drug utilization

Groups	Foremost utilization(%)	Modest utilization (%)	Slightest utilization (%)	Total (%)
Male	117(80.13)	23(15.75)	6(4.1)	146(73)
Female	47(87.03)	6(11.11)	1(1.85)	54(27)
Total	164(82)	29(14.5)	7(3.5)	200

Chi square analysis

The medication adherence data was treated statistically with chi-square test. The null hypothesis was also assumed.

TABLE NO. 6: Chi-square analysis of utilization patterns.

Group	Foremost utilization (%)	Modest utilization (%)	Slightest utilization (%)	Total (%)	Chi-square value	P Value
Male	117	23	6	146	1.3886	<0.05
Female	47	6	1	54		
Total	164	29	7	200		

Null hypothesis: Assuming that the both population that is male and female are homogenous in utilization of drugs.

TABLE NO. 7: Chi-square calculations of utilization patterns.

Gender	Observed frequency	Expected Frequency	Diff b/w observed and expected frequency	(O-E) ² /E
Male				
Foremost	117	119.72	-2.72	0.0617
Modest	23	21.17	1.83	0.1581
Slightest	6	5.11	0.89	0.1550
Female				
Foremost	47	44.28	2.72	0.1670
Modest	6	7.83	-1.83	0.4277
Slightest	1	1.89	-0.89	0.4191
				1.3886

Table value > Calculated value
5.991 > 1.3886

At 5% level of significance the standard table value of chi square is 5.991 with 2 degrees of freedom and calculated value is 1.3886. Therefore CV < TV so the data is insignificant. Hence we have to accept the null hypothesis and P value <0.05; therefore both populations that is male and female groups are homogenous with respect to utilization pattern.

Conclusion

Epilepsy is the most common neurological disorder, and it is characterized by a spontaneous propensity for recurrent and unprovoked seizures. The AEDs of choice has to be made carefully. Unlike other studies, it is probably explaining the unique drug utilization pattern.

Monotherapy was most frequently used in all types of seizures. The most commonly prescribed AEDs was phenytoin, followed by lorazepam, sodium valproate for epilepsy. Most patients were effectively managed with the conventional oral AEDs.

Medication adherence and utilization of drugs in patients was high which was obtained from morisky medication adherence scale and questionnaire format respectively. The chi-square test was used which proved that both male and female groups are homogenous in using their medications.

Cost effectiveness was measured in terms of amount associated with the drug. Phenytoin was found to have low cost and topiramate with high cost. The cost was calculated for a period of 6 months. The cost spent per patient per day and the average cost per patient on each drug was found more for topiramate and low for phenytoin. As phenytoin is highly used drug and its cost is also low it may avert the burden of epilepsy treatment.

The present study provides valuable data of utilization patterns of AEDs and also the level of patient’s adherence to therapy.

Conflict of Interest

Author are declared No Conflict of Interest

Acknowledgement

Not Applicable

Author Contribution

All authors are contributing equally.

Ethical Considerations

Not Applicable

Inform Consent

Not Applicable

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