



ANALYSIS OF PRICE VARIATIONS OF DIFFERENT BRANDS OF ANTI-EPILEPTIC DRUGS AVAILABLE IN INDIAN PHARMACEUTICAL MARKET

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ABSTRACT **Background:** The study was performed to assess the cost ratio and percentage cost variations of commonly prescribed brands of anti-epileptic drugs available in Indian pharmaceutical market.

Methods: CIMS January to April 2021 edition and Drug today June 2020 edition was used to determine the maximum and minimum price of various brands of the drug in INR . The cost ratio and the percentage cost variation for individual drug brands was calculated. In case of oral drugs the cost of one bottle of 100ml syrup and 10 tablets/capsules was calculated and the cost of one 1 vial or ampoule was noted in case of injectable drugs. In the end cost ratio and percentage cost variation of various brands was computed and compared.

Results: After calculation of cost ratio and percentage cost variation for each brand of anti-epileptic drug tablet clonazepam (2mg) shows highest cost ratio and percentage cost variation as: 10.26 and 926.66, gabapentin (100mg tablet) shows lowest cost ratio and percentage cost variation as: 1.15 and 15.11.

Conclusions: Epilepsy being one of the commonest chronic neurological disorder , the drugs are prescribed for long durations. Prescribing a costly brand can affect patient compliance in terms of affordability. There is a wide difference in the cost of different brands of anti-epileptic drugs available in India. Awareness among the medical practitioners about the price variation could bring down the cost of therapy considerably.

KEYWORDS : Anti-Epileptic drugs, Cost ratio, Percentage cost variation

INTRODUCTION

Epilepsy is a chronic neurological disorder characterised by recurrent and unprovoked seizures due to neuronal hyperactivity.^{1,3} It is a fairly common disorder, with around 65 million people afflicted across the world. Most cases present in childhood which reflects the vulnerability of the developing brain. An increased proportion of cases have been identified with genetic etiologies.⁴ The cause of most cases of epilepsy is widely unknown with others occurring as a result of brain injury, stroke, brain tumors, infections of the brain, and birth defects through a process known as epileptogenesis. Globally, around five million people are diagnosed with epilepsy each year. In high-income countries, there are estimated to be 49 per 100 000 people diagnosed with epilepsy each year. In low- and middle-income countries, this figure can be as high as 139 per 100 000. This is attributed to the increased risk of endemic conditions such as malaria or neurocysticercosis , higher incidence of road traffic injuries , birth-related injuries, the availability of preventive health programmes and accessible care. About 80% of people with epilepsy live in low- and middle-income countries.⁵ The diagnosis involves ruling out other conditions such as alcohol withdrawal or electrolyte problems.⁶ Diagnostic test like EEG to look for abnormal brain wave patterns and neuroimaging with CT or MRI to visualize the structure of brain are commonly used.⁷

Anticonvulsants form the main stay of medical management of epilepsy and in most of the cases are continued for the persons lifetime. International consensus is that an anticonvulsant drug should be administered for any tonic-clonic convulsion that has been continuing for at least five minutes. Benzodiazepines (diazepam, lorazepam, midazolam) are traditionally regarded as first-line drugs and phenobarbital, phenytoin and paraldehyde as second-line drugs.⁸ The choice of anticonvulsant is based on seizure type, epilepsy syndrome, other medications used, other health problems, and the person's age and lifestyle. Therapy is initiated with a single medication.⁹

Cost of the drug plays a major role when it comes to patient compliance specially for patients coming from poor socioeconomic background. Poor compliance means inability to adhere to the treatment leading to increase morbidity. Increase in the patient medication cost was found to be associated with decrease adherence to prescription medication.¹⁰ Indian pharmaceutical industry presents a gross variation in cost of different brands of same generic drugs available.

Hence the present study was conducted to assess the cost ratio and percentage cost variation amongst the different brands of anti-epileptic drugs available in Indian market.

METHODS

Cost of available anti-epileptic drugs in different strengths , manufactured by different pharmaceutical companies , were obtained from Current index of medical specialists (CIMS) January to April 2021 edition and from drug today June 2020, vol-1 .

The cost of 10 tablets/capsules, syrup of one bottle and that of one ampoule/vial were calculated. The cost of drugs were also crosschecked at retail drug store. Difference in the maximum and minimum price of the same drug formulation manufactured by different pharmaceutical companies and percentage variations in prices were calculated

The cost ratio was calculated as the ratio of the costliest brand to that of the cheapest brand of the same drug .

Cost ratio= Price of the costliest brand/Price of the least costly brand

The percentage cost variation of each drug was calculated as follows:

Percentage cost variation = (Maximum cost-Minimum cost/ minimum cost) x 100

Maximum and minimum percentage cost variation and cost ratio of a particular drug was noted down.

Inclusion criteria

- Drugs belonging to anti-epileptic group only were included.
- Dosage form of anti-epileptic drugs will be capsule/tablet, syrup, ampoule/vial.
- Drugs brands of reputed and genuine manufacturing companies were included.

Exclusion criteria

- Anti-Epileptic drugs in combination with other drugs were excluded.
- Drugs belonging to bogus manufacturing companies were excluded

RESULTS

In this study we saw that tablet Clonazepam (2mg) showed highest cost ratio and percentage cost variation as: 10.26 and 926.66, tablet Gabapentin (100mg tablet) showed lowest cost ratio and percentage cost variation as: 1.15 and 15.11. Drugs with cost ratio less than 2 and percentage cost variation less than 100 are usually preferred.

Epilepsy is a common disorder of central nervous system and oral medication are to be prescribed for a prolonged period. Prescribing a

costly brand could put patients in financial distress as they have to pay more money unnecessarily for their treatment.

Awareness about these variations in cost can reduce the cost of drug therapy. It is felt that physicians could provide better services and reduce costs of drugs if information about drug prices was readily available.

Therefore, this study aims to draw attention to the prices of various drug formulation brands available to reduce the cost of therapy. The treating physician should be made aware of the cheapest drug available among the various brands so that the patient bears lesser burden of treatment cost.

DISCUSSION

Sixty per cent of the population in India does not have regular access to essential medicines. This despite the fact that India produces 8 per cent of the medicines available in the global market in terms of volume and ranks 13th in world production by value¹¹. The private health sector provides majority (80%) of the outpatient health care in India¹². Out of pocket expenditure is the main source of health funding and has remained above 90 per cent for more than a decade¹³. About 60-90 per cent of healthcare spending by poor people is on medicines^{12,13}.

Affordability of medicines thus, is a major issue determining access to medicines, as social insurance especially for people in the unorganized sector is lacking. Large variation in costs of medicines was observed. In India the pricing policy for medicines in existence in the country, is a major reason for the price variation^{14,15}. The prices of all medicines not under price control have been left to the market forces¹⁵. The maximum allowable post manufacturing expense (MAPE) permitted for

medicines under price control is 100 per cent and ceiling prices have been fixed for these¹⁵. For the other medicines, there is no restriction on the MAPE, resulting in large and variable prices. Costs of drugs are controlled by the drug cost control order 2013 (DCCO)¹⁶. A wide variation in medicine prices may result in prescribing of those brands which are more costly. The burden of such prescribing has to be borne by the patient¹⁷. Studies have shown that providing a manual of comparative drug prices annotated with prescribing advice to compararians reduced their patients drug expense especially in a disease like hypertension which needs long term treatment¹⁸.

There is a need to draw attention to the prices of various drug formulation brands available to reduce the cost of therapy. The medical practitioners should be made aware of the cheapest drug available among the various brands to reduce the financial burden on the patient¹⁹.

CONCLUSION :

In the market driven world that we live in price of a commodity is the single largest determinant for its usage in day to day life. A medical practitioner needs to maintain a fine balance between the cost of therapy and socioeconomic status of the patient so as to avoid excess financial burden on the patient. Moreover cost of therapy should not deter the physician from using a particular drug for salvaging the life of the patient. A national policy to minimise the huge price variation in drugs is the need of the hour. The government along with policy makers, health care providers and pharmaceutical manufacturers should intervene to form strict guidelines for minimising the price variation in drugs so as to make the healthcare delivery more cost effective.

Table 1: Cost ratio and percentage cost variation of anti-epileptic drugs available in Indian pharmaceutical market.

| Drug | Dose | No. of brands | Maximum price (Rs) | Minimum price (Rs) | Price ratio | % Price variation | |
|---------------|---------------------------|------------------|--------------------|--------------------|-------------|-------------------|--------|
| Carbamazepine | 200mg CR tablet | 4 | 22.40 | 15 | 1.49 | 49.33 | |
| | 200mg ER tablet | 2 | 23.50 | 15.95 | 1.47 | 47.33 | |
| | 200mg SR tablet | 3 | 16 | 13.85 | 1.15 | 15.5 | |
| | 200mg tablet | 20 | 21.40 | 11 | 1.94 | 94.53 | |
| | 400mg CR tablet | 2 | 41.70 | 26.50 | 1.57 | 57.35 | |
| | 400mg ER tablet | 2 | 46 | 32 | 1.43 | 43.75 | |
| | 400mg tablet | 10 | 43.70 | 24.50 | 1.79 | 78.50 | |
| | Phenytoin | 50mg tablet | 4 | 13.50 | 7.26 | 1.85 | 85.95 |
| | | 100mg tablet | 9 | 21.50 | 6.00 | 3.58 | 258.3 |
| | | 300mg ER tab/cap | 3 | 59 | 50.19 | 1.17 | 17.55 |
| | Inj 50mg/ml (2ml ampoule) | 4 | 122 | 62 | 1.96 | 96.7 | |
| | Sodium Valproate | 200mg tablet | 12 | 42 | 22.50 | 1.86 | 86.60 |
| | | 200mg/5ml syrup | 5 | 65 | 47.50 | 1.36 | 36.84 |
| | | 250mg tablet | 6 | 67 | 46.50 | 1.44 | 44.08 |
| | | 500mg tablet | 13 | 90 | 46.81 | 1.92 | 92.26 |
| | 500mg ER tablet | 5 | 119.50 | 62 | 1.92 | 92.70 | |
| | 500mg CR tablet | 5 | 93 | 34 | 2.74 | 173.52 | |
| | Pregabalin | 75mg capsule | 24 | 101 | 56.00 | 1.80 | 80.35 |
| | | 150mg capsule | 12 | 158 | 117 | 1.35 | 35.04 |
| | Lamotrigine | 25mg tablet | 8 | 58 | 21 | 2.76 | 176.19 |
| 50mg tablet | | 9 | 93 | 39 | 2.38 | 138.46 | |
| 100mg tablet | | 8 | 157 | 69 | 2.27 | 127.53 | |
| Gabapentin | 100mg tab/cap | 6 | 49.50 | 43 | 1.15 | 15.11 | |
| | 300mg tab/cap | 12 | 313 | 69 | 4.53 | 353.62 | |
| Levetiracetam | 250mg tablet | 10 | 83.50 | 44 | 1.89 | 89.77 | |
| | 500 mg tablet | 16 | 164 | 75 | 2.18 | 118.66 | |
| | Inj 100mg/ml | 6 | 149 | 42 | 3.54 | 254.76 | |
| Topiramate | 25mg tablet | 6 | 58.50 | 32 | 1.82 | 82.81 | |
| | 50mg tablet | 6 | 89 | 58 | 1.53 | 53.44 | |
| | 100mg tablet | 4 | 16 | 10.80 | 1.48 | 48.14 | |
| Clonazepam | 0.25 mg tablet | 25 | 23.50 | 9.50 | 2.47 | 147.36 | |
| | 0.5mg tablet | 46 | 39 | 11 | 3.54 | 254.54 | |
| | 1mg tablet | 26 | 44 | 18.50 | 2.37 | 137.83 | |
| | 2mg tablet | 32 | 77 | 7.50 | 10.26 | 926.66 | |

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