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Original Article

A COST VARIATION COMPARISON AMONG ORAL ANTI-MIGRAINE DRUGS AVAILABLE IN THE INDIAN MARKET

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ABSTRACT

Objective: Our study aimed to evaluate the cost percent variation and cost ratio of different brands of oral anti-migraine drugs available in Indian market.

Methods: The cost of various commonly used oral anti-migraine drugs were taken from the latest issue of Current Index of Medical Specialities January 2022, Drug Today January-April 2022 and 1 mg online site. Cost percent variation and Cost ratio were calculated.

Results: A total of 7 single anti-migraine drugs and 9 Fixed-Dose Combinations (FDCs) showed a wide range of cost variation. The highest cost percent variation of 433% was seen in Sumatriptan 50 mg with a cost ratio of 5.33, whereas Amitriptyline 10 mg showed the lowest cost percent variation of 47.9% with a cost ratio of 1.47. Among FDCs Naproxen 500 mg+Sumatriptan 85 mg showed the highest cost per cent variation of 400% with a cost ratio of 5.25 and Propranolol 40 mg+Flunarizine 10 mg showed the lowest cost per cent variation of 46.56% with a cost ratio of 1.46.

Conclusion: Our study showed a wide variation in the cost of oral anti-migraine drugs available in the Indian market, which provides insight to the healthcare professional and gives Drug Price Control Order (DPCO) authorities to minimize the financial burden and improve patient compliance.

Keywords: Anti-migraine drugs, Cost ratio, Cost percent variation, Migraine prophylaxis, Cost analysis

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INTRODUCTION

Migraine is the world's second most common disabling disorder [1] and the top cause of years lived with disability in those aged 15-49 y [2]. For those affected and for the healthcare system(s), migraine is a financially burdensome condition [3]; this includes both direct costs, such as hospitalisation and medications, and indirect costs resulting from work leave [4]. Migraine is a type of headache disorder that is typically unilateral, throbbing and pulsatile and is often accompanied by nausea, vomiting, photophobia and phonophobia, usually called aura. It can affect a pati ent's work, school, job and social activities and harms the quality of life [5].

The contribution of migraine to total neurological disorder (Disability-Adjusted Life Years) in India is 16% [6]. It is the second most common cause of headache and the most common headache-related cause of disability in the world, afflicts approximately 15% of women and 6% of men annually [7]. Though we have many drugs for prophylaxis and treatment of migraine, the cost of these anti-migraine drugs largely varies in the Indian pharmaceutical market. There is a substantial variation in drug costs that creates problems to both the prescriber as well as the patient [8].

The wide variation in the costs of the same drug, along with ignorance and insufficient information on drug costs, quality and bioequivalence, makes it difficult for the physician to prescribe the most cost-effective treatment [9]. Cost analysis studies are important to evaluate the price variations of commonly prescribed medicines so that physicians can use this information to reduce the cost of treatment significantly. Cost variation analysis is measuring and comparing the costs of drugs [10]. Our study aims to find out the cost variation and cost ratio of different brands of drugs used in the treatment of migraine in the Indian market. Secondly, to study the cost percent variation and cost ratio of various Fixed Dose Combinations (FDCs) used for migraine.

MATERIALS AND METHODS

This study is a comparative type of economic analysis of commonly available anti-migraine drugs available in India. We obtained the information about the available branded price of 7 single and 9 FDCs of Anti-migraine drugs; the cost of various commonly used oral anti-migraine drugs was taken from the latest issue of Current Index of Medical Specialities January 2022 [11], Drug To-day January-April 2022 [12], and 1 mg online site as these are readily available sources of drug information.

The drugs being manufactured by only one company or being manufactured by different companies; however, in different strengths and FDCs were included. Injectables were excluded. Cost percent variation cost ratio was calculated using Microsoft Excel Software.

1) Cost Ratio=Maximum cost/Minimum cost [13].

2) Cost variation%= Maximum Cost-Minimum cost/Minimum cost x100 [14-16].

RESULTS

A total of 7 single anti-migraine drugs and 9 FDCs showed a wide range of cost variation. The highest cost percent variation of 433% was seen in Sumatriptan 50 mg with a cost ratio of 5.33, whereas Amitriptyline 10 mg showed the lowest cost percent variation of 47.9% with a cost ratio of 1.47.

Among FDCs Naproxen 500 mg+Sumatriptan 85 mg showed highest cost percent variation of 400% with a cost ratio of 5.25 and Propranolol 40 mg+Flunarizine 10 mg showed lowest cost percent variation of 46.56% with a cost ratio of 1.46. Cost variation and cost ratio of single formulation and FDCs are presented in table 1 and table 2.

Table 1: Cost variation and cost ratio of single anti-migraine drugs

Drugs	Dose (mg)	No of brands	Cost min/unit (INR)*	Cost max/unit (INR)*	Cost ratio	Cost variation %
1)Propranolol	20	12	2.2	7.1	3.55	222
	40	10	1.65	5.1	3.09	209
2)Metoprolol	25	13	2.7	4.45	1.64	64.81
	50	12	4.5	6.45	1.43	43.33
	100	7	9.5	18.5	1.94	94.7
3)Sumatriptan	25	6	19.58	37.38	1.9	90.05
	50	6	37.5	200	5.33	433
	100	4	72	199	2.76	176
4)Rizatriptan	5	12	3.2	5.35	1.67	68
	10	14	1.45	7.55	5.8	420
5)Flunarizine	5	15	1.95	9.2	4.7	371
	10	17	2.8	5.5	1.96	96.42
6)Sodium valproate	200	9	2.2	5.3	2.457	140
	300	10	3.4	6.7	1.97	97
	500	14	5.4	12.4	2.29	129.6
7)Amitriptyline	10	10	1.92	2.84	1.47	47.9
	25	12	1.3	4.5	6.53	350

INR = Indian National Rupee; *Cost calculated per oral tablet formulations.

Table 2: Cost variation and cost ratio of FDCs of anti-migraine drugs

Fixed dose combinations (Drugs)	Number of brands	Cost min/unit	Cost max/unit	Cost ratio	Cost variation %
1a) Paracetamol 500 mg+Domperidone 10 mg	14	3.5	5.65	1.61	61.42
1b) Paracetamol 325 mg+Domperidone 10 mg	9	1.5	3.5	2.33	133
2a) Naproxen500 mg+Domperidone 10 mg	13	5.22	16	3.01	206
2b) Naproxen 250 mg+Domperidone 10 mg	11	3.44	9.9	2.87	187
3) Naproxen 500 mg+Sumatriptan 85 mg	12	12.6	63	5.25	400
4) Ergotamine 1 mg+Caffeine 100+Paracetamol 250 mg+Prochlorperazine 2.5 mg	10	2.8	7	2.5	150
5) Flunarizine 10 mg+Propranolol 40 mg	17	8.87	13	1.46	46.56
6a) Gabapentin 300 mg+Methyl cobalamin 500mcg	17	10.3	27.3	2.65	165
6b) Gabapentin 100 mg+Methyl cobalamin 500mcg	12	7.9	15.2	1.92	92.4
7) Pregabalin 75 mg+Nortriptyline 10 mg	15	11.4	23.8	2.08	108
8) Pregabalin75 mg+Amitriptyline 10 mg	10	7.7	27.1	3.51	251
9) Amitriptyline 10 mg+Gabapentin 300 mg	14	7.77	27.1	3.48	248

INR = Indian National Rupee, *Cost calculated per oral tablet formulations.

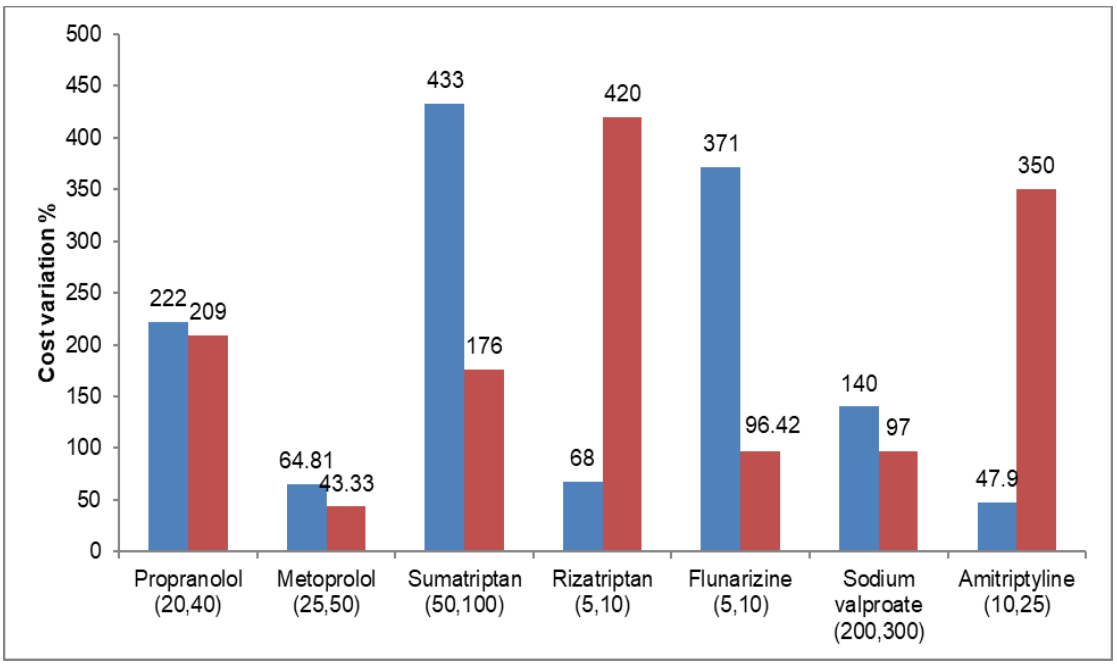

Fig. 1: Cost variation % among branded single anti-migraine drugs

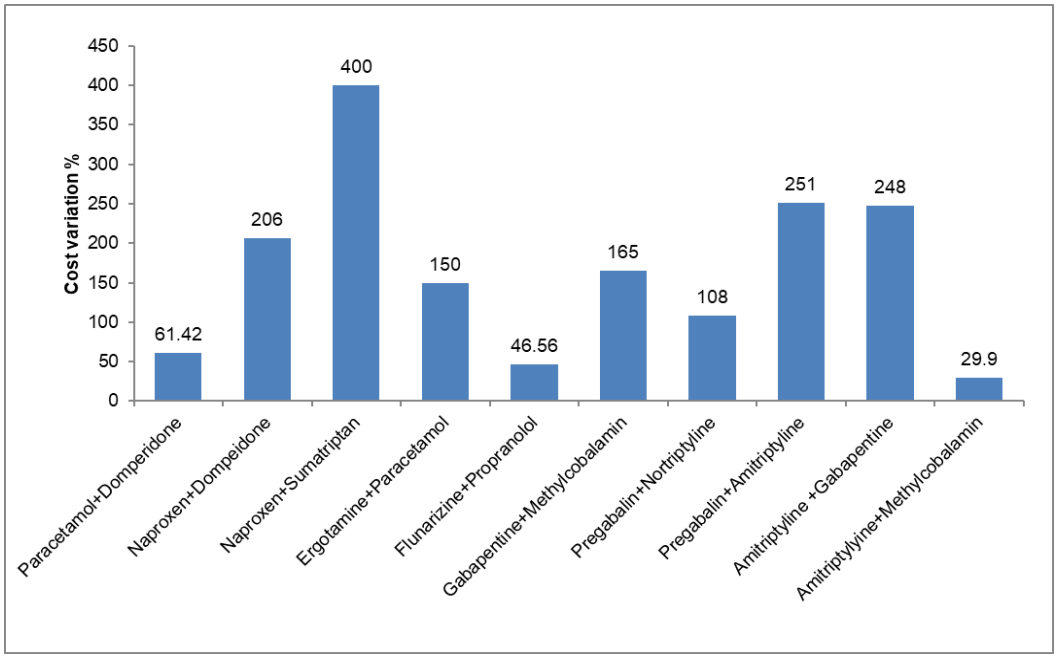

Fig. 2: Cost variation % among branded FDCs of anti-migraine drugs

DISCUSSION

The study revealed that various anti-migraine formulations of different brands available in India have huge cost variation. Long drawn treatment inflicts financial burden on the patients. Drug cost is an important factor affecting patient compliance. The main reason for high drug prices is branded drugs. The difference in price of the drug is from two to more than a hundred times. Lack of information on how to compare the cost and quality of drugs makes it difficult for doctors to prescribe the most affordable treatment, an essential part of good medicine [17]. Therefore, these studies comparing the costs of different classes of drugs and their different brands can provide doctors with information about the costs of different drugs for specific diseases. The cost of generic drugs is lower than branded drugs, if doctors prescribe generic drugs, they can reduce the cost of treatment to some extent [18]. Generic drugs are widely believed to table be bio-equivalent and they have same therapeutic effects as the innovator products [19]. Sometimes physicians are concerned about the quality of medication and this might be a reason for prescribing costly brand [20]. Although generic medicines are produced in similar facilities as branded manufacturing companies [21], these are considered as inferior in their therapeutic efficacy and quality to branded products [22, 23]. There is a need for incorporating analysis of prescription costs in the medical curriculum and by providing updated and complete information regarding bioequivalence, quality and cost of the pharmaceutical preparation to the doctors.

This study also revealed that cost variation was positively correlated to the number of companies manufacturing a particular drug. Competition usually brings about a decline in costs of the products and is expected to decrease the cost variation. However, on the contrary, in the present study, it was observed that more is the number of companies manufacturing a particular formulation wider is the cost variation and vice versa. The pricing practices of the drug manufacturers indicate that information on product quality and costs would force firms to compete on the cost level, thus reducing pharmaceutical product pricing to the “true market cost” [24]. Pharmaceutical manufacturers cite the high cost of research and development as a reason for the excessive pricing of drugs. However, a lot of money is spent on advertising products and overhead [25]. Results of this study indicate that there is an urgent need of controlling cost variation among different brands of available anti-migraine drugs; drug costs are controlled according to Drug Price Control Order (DPCO) [26]. The maximum price of the drug is determined by the government of India's National Pharmaceutical Pricing Authority (NPPA) under DPCO. The procurement price of drugs included in the DPCO should not be higher than the price fixed by the government. Despite these efforts to prevent unnecessary costs of drugs, the cost of drugs still varies depending on different types of drugs. The introduction of cost management is not the end of reducing the cost of treatment, but it should be constantly monitored. The drug list in the DPCO should be regularly updated and revised according to the availability of new, better and safer drugs Indian government has recently opened pharmacies across the country to provide medicines at cheaper prices [27]. The quality of generic medicines available in these stores at cheaper rates should be tested and compared with popular brands to build confidence among prescribers, pharmacists, and consumers for promoting the use of generic drugs. Pharmacoeconomic analysis would help in therapeutic decision-making, formulary decision-making, program justification, drug policy decisions and treatment guidelines, ultimately benefitting society in terms of availability of affordable drugs and reduction in healthcare expenses.

CONCLUSION

Anti-migraine drugs are widely prescribed in India for the treatment and prophylaxis of migraine and need to be used by a large population for a longer period of time. This imposes a great economic burden on the patients and adversely affects compliance. In India, different branded anti-migraine single formulations and FDCs are manufactured by a large number of pharmaceutical companies with wide cost variation, moreover, to regulate the prices, prices of drugs have been fixed by DPCO. Despite these regulations, our study revealed a large cost variation, especially among the most commonly prescribed drugs such as Propranolol and Triptans The drugs which are to be used for prophylaxis as well as treatment of chronic diseases with high prevalence must be available at affordable prices to increase patient care. Also, manufacturing companies must strictly comply with the prices fixed by NPPA in accordance with DPCO. Such cost analysis studies would help the physician with therapeutic decision-making and promote rational prescription. The limitation of our study is that we included only those drugs whose prices were mentioned in our source.

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ABBREVIATIONS

FDCs-Fixed Dose Combinations; DPCO-Drug Price Control Order; NPPA-National Pharmaceutical Pricing Authority

AUTHORS CONTRIBUTIONS

Conceptualization: Dr. Akash Mishra, Methodology: Dr. Akash Mishra and Dr. Pooja Mishra, Formal Analysis: Dr. Akash Mishra, Dr. Pooja Mishra, Dr. Anjali Kushwah and Dr. Kamayani Gupta, Data Collection: Dr. Akash Mishra, Writing: Dr. Akash Mishra and Dr. Pooja Mishra, Final Review: Dr. Pooja Mishra, Dr. Anjali Kushwah and Dr. Kamayani Gupta.

CONFLICT OF INTERESTS

Declared none

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