Original Article

Cost analysis of different brands of anxiolytic and sedative-hypnotic drugs available in India

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Abstract

Background: Significant proportion of population suffers from anxiety and sleep disorders. Sedative-hypnotics are one of the most commonly prescribed classes of psychotropic drugs. Cost of treatment can determine compliance of patient in developing country like India. Hence we decided to study the cost variations among commonly prescribed anxiolytic and sedative-hypnotic drugs. **Methods:** The prices of 17 single anxiolytic and sedative-hypnotic drugs and their 6 combinations manufactured by 24 different companies were analysed. Costs of different brands of a particular generic drug being manufactured by different companies, in the same strength and dosage forms were used to calculate percentage cost variation and cost ratio. **Results:** This study shows that there is a wide variation in the prices of different brands of same anxiolytic and sedative-hypnotic drug in Indian market. The highest cost ratio and percent cost variation was found for diazepam 10 mg/2 ml inj followed by alprazolam 0.25 mg tab. The highest average cost variation (865.34%) was seen with Diazepam, followed by Lorazepam (244.34%). Highest numbers of brands (24) were seen with Alprazolam 0.25 and 0.5 mg tab, followed by (21) Clonazepam 0.5 mg tab. **Conclusion:** There is wide price variation of different brands of the same generic sedative-hypnotic drug in Indian market. There is a need to increase physician's awareness about such cost variation.

Keywords: Compliance, Adherence, Anxiolytics, Sedative Hypnotics, Health Economics, Cost variation.

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INTRODUCTION

Sleep disturbance is a common problem in today's fast paced society because of emotional stress, excessive work load, financial and other worries. Approximately 10-15% of the population suffers from insomnia.[1,2] Patients of Insomnia complain about difficulty in falling asleep and/or maintaining sleep throughout the night. It is associated with many psychophysiological symptoms like anxiety, tension headache, muscle tension or pain, gastrointestinal symptoms and can affect all aspects of an individual's life.[3] Many studies have found a bidirectional relationship between insomnia, anxiety and depression, suggesting that each contribute to the development and are a consequence of one another.[4] Increasing numbers of adults are utilizing sedative-hypnotic drugs. Benzodiazepines are most commonly used but non-benzodiazepines like Z-drugs are less likely to cause dependence, while barbiturates are least preferred due to their adverse effects. With proper dosing and professional monitoring, these drugs can have a positive impact on an individual's life.[5] Studies have shown that anxiolytic and sedative-hypnotic drugs are more commonly used than antidepressants, antipsychotics and mood stabilizers in psychiatry outpatient departments.[6] Many studies have found that there is a gross variation in the cost of different brands of same generic Drug[7,8] In developing country like India, the cost of the drug plays a crucial role in patient care because people purchase what they can afford and not what is needed. Financial constraints are a reality which cannot be ignored in any aspects of a medicine.[9] One of the major reasons for poor or non compliance is inability to afford the standard medicine. A large survey

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showed that even significant percentage of participants belonging to high income group indicated cost related non-compliance.[10] Awareness about costs of different drugs in clinicians is poor.[11] Hence there is a need to make them aware about such variation in cost, otherwise they may continue to prescribe more expensive brands unknowingly. The present study was aimed at investigating the cost differences in various brands of the generic anxiolytic and sedative-hypnotic agents, so that whenever possible, a cheaper effective brand can be prescribed.

MATERIALS AND METHODS

Current Index of Medical Specialties CIMS (July-September 2016 edition, India) was used for dosage and prices of the different brands of commonly prescribed anxiolytic and sedative-hypnotic groups of drugs because it is considered as an authentic source of commercial drug information. Cost of drugs per10 tablets were considered for comparison in the same strength and dosage forms. If the number of tablets per strip differed, then the cost was calculated for ten tablets before comparing. Maximum and minimum drug cost for the same formulation but marketed by different pharmaceutical companies was noted. The variation between the two was calculated by –

1. Cost ratio = Maximum cost/ Minimum cost. It gives idea about how many times costliest brand priced more than the cheapest one in each generic group.
2. Percentage cost variation was calculated as follows: Cost variation (%) = (Maximum cost – Minimum cost) ×100 / Minimum cost

Numbers of brands for all drugs were counted in the same strength and dosage forms. Mean percentage cost variation was also calculated for every drug. The drugs being manufactured by only one company or being manufactured by different companies but in different strengths were excluded

RESULT

The prices of total 17 single drugs and 6 combinations available in 58 formulations and marketed by 24 manufacturing companies were analysed. Highest numbers of brands[24] were seen with Alprazolam 0.25 and 0.5 mg tab, followed by[21] Clonazepam 0.5 mg tab. This study shows that there is a wide variation in the prices of different brands of anxiolytic and sedative-hypnotics drugs in Indian market. Out of 58 formulations, 6 brands showed > 300 % variations and 24 brands showed > 100 % variation. The highest percent cost variation (2486.96%) was found for Diazepam 10mg/2ml Inj, followed by Alprazoplam 0.25 mg tab (413.55%). The lowest percent cost variation was found Clonazepam 0.50 mg dispersible tab (0%), followed by Clonazepam 2mg mouth dissolving tablet (1.85%) and clonazepam 0.25 mg Dispersible Tab (4.36 %). The highest average cost variation (865.34%) was seen with Diazepam, followed by Lorazepam (244.34%). The lowest percent average cost variation was found with Trazodone (7.41%) and Midazolam (18.77%). Drug used primarily as anti-epileptic (Pregabaline), anti-psychotic (Trifluperazine) and anti-depressant (Trazodone and Venlaflaxine) were mentioned in under anxiolytic category. Out of 6 combinations, 3 were found with Chlorodiazepoxide with total (18) brands. Chlorodiazepoxide + Amitriptyline (10 + 25 mg) showed maximum variation (227.24%) while the lowest variation (10.42) was with Chlorodiazepoxide + Trifluperazine (10+1mg) tablet.

Table 1:

Group/ Drug name Benzodiazepines	Dose and formulation	No of brands	Min cost (INR)	Max cost (INR)	Cost Ratio	% variation
Alprazolam	0.25 mg tab	24	7.01	36	5.14	413.55
	0.5 mg tab	24	12.81	36	2.81	181.03
	1 mg tab	10	11	38	3.45	245.45
	0.5 mg SR tab	4	23	29.5	1.28	28.26
	1 mg SR tab	3	28	32.5	1.16	16.07
Chlordiazepoxide	10 mg tab	3	17	35	2.06	105.88
	25 mg tab	3	25.3	52.5	2.08	107.51
Clobazem	5 mg tab	7	23	53.52	2.33	132.70
	10 mg tab	8	43	106.37	2.47	147.37
	20 mg tab	2	115.48	124.7	1.08	7.98
Clonazepam	0.25 mg tab	12	10	27	2.70	170.00
	0.5 mg tab	21	14.64	36	2.46	145.90
	1 mg tab	16	24	43	1.79	79.17
	2 mg tab	16	38	67	1.76	76.32
	0.25 mg Disper tab	3	19.5	20.35	1.04	4.36
	0.5 mg Disper tab	2	29.5	29.5	1.00	0.00
	0.25 mg MD tab	4	10	18	1.80	80.00

	0.5 mg MD tab	4	17	30	1.76	76.47
	2 mg MD tab	2	54	55	1.02	1.85
Diazepam	2 mg tab	4	5	20	4.00	300.00
	5 mg tab	7	7	33.21	4.74	374.43
	10 mg tab	4	10	40	4.00	300.00
	10 mg/2ml inj	2	9.2	238	25.87	2486.96
Etizolam	0.25 mg tab	5	19.5	23.5	1.21	20.51
	0.5 mg tab	8	32.5	42	1.29	29.23
Lorazepam	1 mg tab	10	8	30	3.75	275.00
	2 mg tab	10	11	34.5	3.14	213.64
Midazolam	1 mg/ml inj	4	26.48	33.7	1.27	27.27
	5 mg/ ml inj	2	29.2	32.2	1.10	10.27
Nitrazepam	5 mg tab	3	13	16	1.23	23.08
	10 mg tab	4	18.5	35	1.89	89.19
Barbiturates						
Phenobarbitone	200 mg/ml inj	2	13.93	24.71	1.77	77.39
Z Drugs						
Zolpidem	5 mg tab	5	9.9	41	4.14	314.14
	10 mg tab	7	26.67	65	2.44	143.72
	5 mg FC tab	4	23	51	2.22	121.74
	10 mg FC tab	4	33	91	2.76	175.76
Zopiclone	7.5 mg FC tab	3	36.75	90	2.45	144.90
Others						
Hydroxyzine	10 mg tab	3	6.5	19	2.92	192.31
	25 mg tab	4	23	34.5	1.50	50.00
	10mg/ 5 ml syr	2	40	85	2.13	112.50
Pregabaline	75 mg tab	3	68	95	1.40	39.71
	150 mg tab	2	138	144.38	1.05	4.62
	75 mg cap	6	56.83	96.75	1.70	70.24
	150 mg tab	4	114.14	150.1	1.32	31.51
Trazodone	25 mg tab	2	17	18	1.06	5.88
	50 mg tab	2	32	34	1.06	6.25
	100 mg tab	2	41	45.15	1.10	10.12
Trifluperazine	5 mg tab	3	16	21	1.31	31.25
Venlaflaxine	37.5 mg tab	5	37	47	1.27	27.03
	75 mg tab	3	60	86	1.43	43.33
	37.5 mg ER tab	2	25	52	2.08	108.00
	75 mg ER tab	2	47	98	2.09	108.51
Combinations						
Alprazolam + Fluoxetine	0.25 mg + 20 mg tab	3	30	42	1.40	40.00
Chlordiazepoxide + Trifluperazine	10 mg + 1 mg tab	2	24	26.5	1.10	10.42
Chlordiazepoxide + Amitriptyline	5 mg + 12.5 mg tab	5	10.9	24	2.20	120.18
Chlordiazepoxide + Amitriptyline	10 mg + 25 mg tab	11	13.4	43.85	3.27	227.24
Clonazepam + Escitalopram	0.5 mg + 10 mg tab	2	85	95	1.12	11.76
Diazepam + Imipramine	2 mg + 25 mg tab	3	9.5	15.11	1.59	59.05

Disper = Dispersible, ER = Extended release, FC = Film coated, MD = mouth dissolving, SR = Sustained release

DISCUSSION

In India, multiple brands are available for almost every single drug and they are manufactured by domestic and foreign manufacturers which contribute to variations in the prices of these brands. It has been estimated that over two billion people in developing countries have no access to drugs. They lack access because prices are high and their purchasing power is low.[12] Poor patient compliance is a worldwide problem and can result in patients receiving inappropriate doses of medication.[13] In India, major portion of cost of treatment is borne by patients because government hospitals have limited number of

drugs on their schedule and they are not available all the time. It is necessary to evaluate the costing mechanisms and the huge difference between the pricing of brands.[14] the Government of India introduced mechanisms such as drug price control order and the National Pharmaceutical Pricing Authority to control affordability and availability of medicine,. Drug Price Control Orders (DPCOs) are issued by the government to decide ceiling price for essential and life saving medicine.[15] Despite the implementation of price control, brand price variations still exist widely for commonly used drugs. There is a need to asses pricing policy and implementation of quality norms.[8] Correlation between the qualities of medicines and their prices do not always exist. Their prices have been found to be correlated with their marketing strategies because they spend significant amount of money on marketing of their brands.[16] National List of Essential Medicines (NLEM) 2011 had 348 medicines which were increased to 376 medicines in 2015. Thus, number of drugs covered under the price regulation by DPCO 2013 has increased. Although Clonazepam and Zolpidem were added for anxiety and sleep disorders, alprazolam and diazepam were deleted from 2011 list.[17] There is lack of knowledge among the doctors about the magnitude of cost variation of drugs. Doctors usually overestimate the price of inexpensive drugs and underestimate the price of expensive ones and their prescribing habit is influenced by information given by medical representatives. This may ultimately leads to increased overall drug expenditures.[11] Medical education curriculum should include pharmacoeconomics to ensure provision of effective economical health related services especially to poor patients. Improving physician awareness about pharmacoeconomics, increasing the number of anxiolytic drugs covered under DPCO and sensitization about impact of cost of drugs as a part of medical education and provision of drug manual of comparative prices can play an important role in reinforcing cost effective drug therapy.

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