Research Article

Cost analysis of oral antidepressant drugs available in India

Abhinay P Paunikar, Kiran A Bhave

Department of Pharmacology, Topiwala National Medical College and BYL Nair Charitable Hospital, Mumbai, Maharashtra, India.

Correspondence to: P. Abhinay Paunikar, E-mail: abhinay.pauniker@gmail.com

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Abstract

Background: Depression is a disorder that disrupts the public health through factors such as its occurrence, distress, ill health, and economic burden. There is a wide variation in the prices of antidepressant drugs marketed in India. **Aims and Objective:** To find out the price variations in the oral antidepressant drugs available in India either as a single drug or in combination and to evaluate the differences in the cost of various brands of the same oral antidepressant drug by calculating the percentage variation in cost in Indian rupees**. Materials and Methods:** The cost of a particular drug being manufactured by different companies, in the same strength and dosage forms, was obtained from "Current Index of Medical Specialties" July–October, 2014, and "Indian Drug Review, 2014;21(4)". The difference between the maximum and minimum prices of the same drug and the percentage variation in the prices was calculated. **Result:** The prices of a total of 25 drugs (21 single and 4 combination preparations) available in 66 different formulations were analyzed. In single drug therapy, among tricyclic antidepressants, reboxetine (2 mg) showed the maximum price variation of 900%. In atypical antidepressants, bupropion hydrochloride (150 mg) showed the maximum price variation of 447.94%. In selective serotonin reuptake inhibitors (SSRIs), paroxetine (37.5 mg) showed the maximum price variation of 1116.66%. In serotonin norepinephrine reuptake inhibitors (SNRIs), Venlafaxine hydrochloride (37.5 mg) showed the maximum price variation of 246.15%. In monoamine oxidase (MAO)-A inhibitors, moclobemide (150 mg) showed the maximum price variation of 246.15%. In combination therapies, chlordiazepoxide with amitriptyline showed the maximum price variation of 227.23%. **Conclusion:** The average percentage variations of different brands of the same drug manufactured in India is very wide. The management of the marketing drugs should be directed toward maximizing the therapeutic benefits to the community and minimizing the economic burden.

KEY WORDS: Antidepressants; Price Variation; DPCO

Introduction

The prices of drugs in developing nations cause important concerns for the doctors and patients. The Indian pharmaceutical industry currently represents USD 6 billion of the global market and is growing at the rate of 10% annually.[1] Globally, ranked fourth by volume and 13th in value, the Indian pharmaceutical industry is a leading producer of high-quality and low-cost generic drugs.[2] The pharmaceutical market of India was expected to reach a size of USD 20 billion by 2015, according to the view of Mckinscy and Co. About 4% of the gross domestic product (GDP) is spent on health care in India. A majority of health-care expenditures are paid by the population (67%–70%), whereas the government accounts for only 30%–33%.[3] Pharmacoeconomics plays a major role in the practice of medicine. The compliance of the patient may be significantly dependent on the cost of the prescribed medicines.[4]

Depression is a disorder that disrupts the public health through factors such as its occurrence, distress, ill health, and economic burden.[5] Globally, about 121 million people are

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Table 1: Price variation in TCA group of drugs

Drugs	Formulations	Doses (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price of variation (%)
Amitriptyline	4	10	14	6.05	24.40	303.3
		25	17	10.70	39.20	263.63
		50	5	16.23	69.3	326.98
		75	8	20	66.60	233
Amoxapine	2	50	2	38.82	45.70	17.72
		100	2	71.93	89.25	24.07
Clomipramine	4	10	3	15.29	54	253.17
		25	5	31.30	61	94.88
		50	4	54.50	94.50	73.39
		75	4	94.90	137	44.36
Dosulepin	3	25	10	14.74	42	184.93
		50	4	34.50	83	140.57
		75	9	35.25	79.50	125.53
Doxepin	3	10	2	14.90	28.30	89.93
		25	4	25.08	46.20	84.21
		75	3	28.50	67	135.08
Imipramine	2	25	8	6.75	13.58	101.18
		75	7	15.20	28.25	85.85
Nortriptyline	1	25	5	12.50	23.70	89.6
Reboxetine	1	2	2	16	160	900

affected by depression, and depression is estimated to be the fourth leading contributor to the global burden of diseases. Depression is the second most common cause of disability-adjusted life years (DALYs) in the age group of 15–44 years. Depression is associated with high suicidality. About 50% of individuals who had committed suicide carried a primary diagnosis of depression.[6]

Indian pharmaceutical market has over 20,000 medicine formulations.[7] The drugs are mainly sold under brand names.[8] Indian markets are flooded with a huge number of formulations of antidepressant drugs, and the same formulations are sold under different brands.[9] This creates a lot of problems for the physicians in deciding the drug of choice for individual patients. Hence, the study was designed to evaluate the cost of antidepressant drugs of different generic classes and different brand names and to analyze the price variation among the various antidepressant drugs available in the Indian market.

Materials and Methods

The study was done in the Department of Pharmacology at Topiwala National Medical College. "Current Index of Medical Specialities (CIMS)" July–October, 2014 and "Indian Drug

Table 2: Price variation in atypical antidepressants

Drugs	Formulation	Doses (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price variation (%)
Bupropion HCL	1	150	4	73	400	447.94
Mianserin	2	10	3	17.20	26.90	56.39
		30	3	45.70	65.50	43.32
Mirtazapine	4	7.5	5	35	48.30	38
		15	10	58	74	27.58
		30	7	110	130	18.18
		45	2	150	165	10
Trazodone HCL	3	25	5	11.50	26	117.39
		50	5	20.60	44	113.59
		100	2	38.81	45.15	16.33

Table 3: Price variation in SNRI group of drugs

Drugs	Formulations	Dose (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price variation (%)
Duloxetine	4	20	20	14.90	62.38	318.65
		30	17	55	89	61.81
		40	6	79.50	105	32
		60	8	110	152	38
Venlafaxine HCL	4	25	4	9	32	255.55
		37.5	12	13.50	99.80	639.25
		75	11	26.50	98	269.81
		150	9	75	150	100

Table 4: Price variation in MAO-A group of drugs

Drug	Formulations	Dose (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price variation (%)
Moclobemide	1	150	2	19.50	67.50	246.15

Table 5: Price variation in SSRI group of drugs

Drug	Formulations	Dose (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price variation (%)
Citalopram	3	10	14	15.29	15.29	161.6
		20	16	37.50	37.60	94.66
		40	11	68.25	115	68.49
Escitalopram	3	5	20	25	119	376
		10	30	49	178.57	284.49
		20	22	85	132.70	55.29
Fluoxetine	4	10	4	15	33	12
		20	23	23.65	52.80	123.25
		40	2	42.50	46	8.33
		60	4	55.80	98	75.62
Fluvoxamine	2	50	6	94.10	120	27.52
		100	6	158.20	203.35	28.53
Paroxetine	6	10	6	70	87.50	25
		12.5	4	80	95	18.75
		20	5	100	110	10
		25	3	110.30	130	17.84
		30	2	140	142	14.28
		37.5	4	15	190	1,166.66
Sertraline	3	25	10	17	39	129.41
		50	23	24	63	162.50
		100	17	44	102	131.81

Review (IDR) 2014;21(4)" drug manuals were used to analyze the prices of antidepressant drugs**.** (1) The cost of a particular drug (single drug or drug combinations) in the same strength, number, and dosage forms being manufactured by different companies was compared. (2) The drugs manufactured by only one company or by different companies, however, in different strengths were excluded. (3) Parenteral formulations were excluded. (4) The difference between the maximum and

Table 6: Price variation among combination therapy

Drug combinations	Formulations	Dose (mg)	Number of manufacturing companies	Minimum price (Rs)	Maximum price (Rs)	Price variation (%)
Chlordiazepoxide + amitriptyline	2	5 + 12.5	8	9.90	20	102.02
		10 + 25	14	13.40	43.85	227.23
Diazepam + imipramine	2	2 + 25	6	8.40	15.11	79.88
		5 + 25	6	8.62	14.50	68.21
Escitalopram + clonazepam	1	10 + 0.5	10	63	92	46.03
Fluoxetine + alprazolam	1	20 + 0.25	5	30	31.20	4

minimum costs of the same drug manufactured by different pharmaceutical companies was calculated. The following formula was used to calculate the price variation.[10]

$$\text{Percentage pricevariation} = \frac{\text{Price of the most expensive brand} - \text{Price of the least expensive brand}}{\text{Price of the least expensive brand}} \times 100$$

The findings of our observational study were expressed as absolute numbers and percentages.

Result

The prices of a total of 25 drugs (21 single and 4 combination preparations) available in 66 different formulations were analyzed.

Single Drug Therapy

Table 1 shows the price variation between tricyclic antidepressant (TCA) groups of drugs. In this group, reboxetine (2 mg) showed the maximum price variation of 900%, while amoxapine (50 mg) showed the minimum price variation of 17.72%.

Table 2 shows the price variation between atypical antidepressants. In this group, bupropion hydrochloride (150 mg) showed the maximum price variation of 447.94%, while mirtazapine (45 mg) showed the minimum price variation of 10%.

Table 3 shows the price variation in serotonin norepinephrine reuptake inhibitor (SNRI) group of drugs. In this group, venlafaxine (37.5 mg) showed maximum price variation of 639.25%, while duloxetine (40 mg) showed the minimum price variation of 10%.

Table 4 shows the price variation in MAO-A inhibitors group of drugs. Moclobemide (150 mg) showed a price variation of 246.15%.

Table 5 shows the price variation in selective serotonin reuptake inhibitors (SSRI) group of drugs. In this group, Paroxetine (37.5 mg) showed the maximum price variation of 1166.66%, while fluoxetine (40 mg) showed the minimum price variation of 8.33%.

Combination therapy

Table 6 shows a total of four combination of drugs that were analyzed. In this group, chlordiazepoxide (10 mg) + amitriptyline (25 mg) showed the maximum price variation of 227.23%, while fluoxetine (20 mg) + alprazolam (0.25 mg) showed the minimum price variation of 4%.

Discussion

Our findings revealed that the prices of various antidepressant formulations showed great variation. The findings of our study were similar to the study done by Kunwar et al., in which only the price variation of escitalopram was studied. So, the study was designed to analyze the price variation of antidepressant drug available in Indian market. These 25 drugs are the most commonly used drugs in our hospital setup.

Depression is associated with social, occupational, and physical impairment and mortality.[11] The cost of antidepressant drugs is a major deciding factor for patient's compliance. Owing to lack of information on comparative drug prices and quality, it is difficult for health-care providers to prescribe the most economical treatment. The difference in cost between the trade-named products and generic products varies from less than twofold to more than 100-fold.[12] The reasons for this price variation could be under patent protection and the present market structure for new chemical entities is monopolistic in nature. In this market structure, the sellers retain appreciable influence over the price of a product.[13] Health-care providers may be influenced by biased information such as formularies, promotional literature, and patient's specific therapeutic parameters. Asymmetry of information decreases both prescribers and consumer choices.[13] Pharmaceutical manufacturer cites the high cost of research and development as a reason for the excessive pricing of drugs. However, considerable money is spent on product promotion and

overhead cost.[13] The distribution channels within pharmaceutical industry are several and independent. These channels have a different price elasticity of demand, based on their level of bargaining power with suppliers of pharmaceutical products, leading to price discrimination among market segment.[13]

Different government regulation and pricing policies account for the varying prices of pharmaceutical agents among countries. Drug price control order (DPCO) is an order issued by the Indian government to fix the price of drugs. Once any medicine is brought under the purview of DPCO, it cannot be dispensed at a price higher than that fixed by the government. In India, over the years, the number of the drugs under DPCO has decreased. Owing to this, the cost of therapy has increased tremendously. Among antidepressants only amitriptyline, fluoxetine, and imipramine are included in the list of essential medicines, while many other newer and more effective antidepressants were not included in the list.[14] People in developing countries pay the cost of medicines out of pocket. In India, more than 80% of health financing is borne by the patients[15] Government should have a policy whereby prices of branded/generic drugs can be made realistic and affordable to common man. The limitation of this study is that the price variations in parenteral antidepressant formulation were not analyzed. Miscellaneous drugs used in the treatment of depression were not included in the analysis.

Conclusion

This study shows the wide variation in the prices of oral antidepressant drugs available in India. There is need on the part of the government to bring all the essential medicines under DPCO. Health-care providers must keep in mind the financial feasibility of successful treatment.

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