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Original Research Article

Cost variation analysis of antipsychotic drugs available in Indian market: an economic perspective

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ABSTRACT

Background: Pricing of drugs plays a very important role in a developing country like India especially in the management of chronic conditions. There exists a huge price variation among the different brands of the same drug. Hence this study was planned to find out variation in prices of antipsychotic drugs marketed in India. The objective was to compare the percentage price variation and cost ratio of various formulations of oral and parenteral antipsychotic drugs available in the Indian market.
Methods: Cost of oral and parenteral antipsychotic drugs available in the Indian market manufactured by different companies, in the same strength, number and dosage form was obtained from http://www.medguideindia.com. The percentage price variation and cost ratio of each formulation was calculated.
Results: Among the typical group of antipsychotic drugs, Tab Haloperidol 0.25mg shows maximum price variation of 650% and a cost ratio of 7.5 followed by Tab Trifluoperazine 1mg having a price variation of 555.5% and a cost ratio of 6.55. Among the atypical group of drugs, tab Risperidone 3mg shows a price variation of 2282.35% with a cost ratio of 23.82 followed by Tab Risperidone 4mg with a price variation of 1976.92 % and a cost ratio of 20.76.
Conclusions: There is a wide variation between the minimum and maximum cost among the different brands of the same drug in the same formulations. Combined efforts are needed from the regulatory authorities, pharmaceutical companies, physicians and pharmacist towards controlling the prices and attaining maximum economic benefits for the patient.

Keywords: Antipsychotic drugs, Branded generics, Cost variation, Pharmacoeconomics

INTRODUCTION

Pharmaceutical industry has grown at a tremendous pace in India since last few decades.[1] The Indian market is flooded with enormous number of branded generic drugs both from the domestic and foreign manufacturers.[2,3] There are more than 1 lakh formulations available for all the category of drugs under various brand names and there is no system of registration of these medicines.[3,4] This has led to a wide price variation in the cost of different brands of the same formulations.[2]

Pharmacoeconomics plays a very important role in a developing country like India where the cost of drug therapy is one of the major obstacles for effective treatment of a disease[5].Increasing health care cost causes an economic burden to the patients.[5] In fact, many studies have indicated that drug prices play a significant role in therapeutic compliance.[1] To ensure that the essential drugs are available at an affordable price, the Government of India exercises control over the prices through an order called DPCO (Drug Price Control Order).[6] National Pharmaceutical Pricing Authority (NPPA) implements DPCO.[6,7] Previously only 74 drugs were under price control in 1995.[6,8] However under the provision of DPCO 2013, currently 348 drugs are controlled by NPPA.[6] However only 3 antipsychotic drugs namely Chlorpromazine (25 mg, 50mg, 100mg tablets, 25mg/5ml syrup and 25mg/ml injection), Haloperidol (5mg/ml injection) and olanzapine (5mg,10mg tablets) are under price control.[7]

Antipsychotic drugs have been prescribed with an increasing frequency for a variety of psychiatric disorders.[9] This ranges from acute psychosis, manic and psychotic depressive disorders as well as in chronic conditions like schizophrenia, schizoaffective disorders and delusional disorders.[10] Most of these are chronic conditions requiring lifelong treatment.[11] This is responsible for higher medication cost and thus, cost related poor medication adherence is related to adverse health outcomes.[12]

Regarding antipsychotic drugs, with the best of our knowledge hardly any studies are available which compares the cost of different brands available in Indian market. The current study projects a representative view of the existing situation of the cost of various antipsychotic drugs available in Indian market.

Aim of the study was to evaluate the cost of oral and parenteral antipsychotic drugs of different brands currently available in the Indian market.

Objectives

1. To analyse the difference in cost of different brands for the same dosage of same active drug by calculating percentage variation of cost and cost ratio.
2. To compare the percentage price variation and cost ratio of single drug therapy of oral and parenteral antipsychotic agents across the different brands available in the Indian market.

METHODS

1. A list of all oral and parenteral antipsychotic drugs available in the Indian market was found out from http://www.medguideindia.com.
2. Cost of same drug in same strength, dosage form manufactured by different companies was found out from the same website.
3. The difference in the maximum and minimum price of the same drug formulation manufactured by different pharmaceutical companies was noted.
4. The percentage variation in price was calculated using the formula:

$$\frac{\text{Price of most expensive brand-Price of least expensive brand} \times 100}{\text{Price of least expensive brand}}$$

5. Drugs were classified into 5 categories depending on the percentage range of price variation. These were as follows:
    - $\leq$24.99%
    - 25-49.99%
    - 50-99.99%
    - 100-499.99%
    - $\geq$500 %
6. Cost ratio, the ratio of the cost of the costliest brand to cheapest brand of the same formulation was calculated. This tells us how many times the costliest brand cost more than the cheapest brand in each formulation
7. The drugs being manufactured by only one company and combinations of antipsychotic drugs were excluded.

Statistical analysis

Findings of our study were expressed as absolute numbers as well as percentage.

RESULTS

The prices of a total of 16 antipsychotic drugs available in the Indian market in 72 different formulations were analysed. These formulations are manufactured by different pharmaceutical companies.

Table 1 shows the price variation between typical antipsychotic drugs.

In this group, Tab Haloperidol 0.25mg shows maximum price variation of 650% and a cost ratio of 7.5 followed by Tab Trifluoperazine 1mg having a price variation of 555.5 % and a cost ratio of 6.55.

Inj.Haloperidol 50mg (1ml) shows minimum price variation of 3.5 % with a cost ratio of 1.03.

Highest numbers of brands among the typical group are for Tab.Haloperidol 5mg (40) followed by Tab Haloperidol 10mg (32).

Table 2 shows the price variation among the atypical group of antipsychotic drugs.

In this group, tab Risperidone 3mg shows a price variation of 2282.35% with a cost ratio of 23.82, indicating that the costliest brand is about 23 times more expensive than the cheapest available brand. Next highest is Tab Risperidone 4mg with a price variation of 1976.92% and a cost ratio of 20. 76 .Price variations is maximum in Risperidone group.

Tab Loxapine shows the lowest price variation of 2.63% and a cost ratio of 1.02.

Highest number of brands was seen for Tab Olanzapine 5mg (94).

DISCUSSION

This study was carried out with the main objective of computing the cost and percentage price variation among the different antipsychotic drugs across the different brands available in the Indian market.

Table 1: Price variation among typical antipsychotic drugs.

Drug	Formulation	Dose	Manufacturing company	Min price (INR)	Max price (INR)	Cost ratio	% Price variation
Chlorpromazine	7	10mg	2	0.23	0.4	1.73	73.91
		25mg	12	0.18	0.72	4	288.88
		50mg	16	0.28	0.9	3.21	221.42
		100mg	18	0.51	1.2	2.35	135.29
		200mg	9	0.9	1.95	2.16	116.66
		Inj.25mg/ml	2	4.22	8.5	2.01	101.42
		Inj.50mg/2ml	6	1.06	2.5	2.35	135.84
Haloperidol	11	0.25mg	18	0.2	1.5	7.5	650
		0.5mg	3	0.8	2.32	2.9	190
		1.5mg	31	0.41	1.84	4.48	348.7
		3mg	3	1.3	1.8	1.38	38.46
		5mg	40	0.93	4.21	4.52	352.6
		10mg	32	1.6	6.24	3.9	290
		20mg	8	4	6.66	1.66	66.5
		Inj. 5mg/ml	11	4.5	8	1.77	77.77
		Inj. 50mg/ ml	2	114	118	1.03	3.5
		Inj.50mg/10ml	5	110	176	1.6	60
		30ml syrup	5	28	59.19	2.11	11.39
Triflupromazine	1	Inj 10mg/ml	2	3.5	6.03	1.72	72.28
Trifluoperazine	3	1mg	3	0.36	2.36	6.55	555.5
		5mg	13	0.45	2.68	5.95	495.55
		10mg	5	0.5	1.4	2.8	180
Fluphenazine	1	25mg/ml Amp	6	23.76	30.45	1.28	28.15
Penfluridol	1	20mg	4	8	9.13	1.14	14.12
Flupenthixol	5	0.5mg	7	1.87	3.5	1.87	87.16
		1mg	6	2.66	4.39	1.65	65.03
		3mg	4	6.71	9.45	1.4	40.83
		Inj 20mg/ml	2	97.7	131.8	1.34	34.9
		Inj 40mg/2ml	3	89.2	127.78	1.43	43.5
Thioridazine	4	10mg	7	0.9	1.19	1.32	32.22
		25mg	17	1.33	3.4	2.55	155.6
		50mg	14	3.05	5.2	1.70	80.32
		100mg	10	5.5	8.8	1.6	69.23

Our study findings showed a high fluctuation in the minimum and maximum price of antipsychotic drugs which are being manufactured by several companies.

The cost of many of the antipsychotic formulations has a percentage price variation above 100% reaching a maximum of 2282.85%. This is in accordance with similiar studies done for antidiabetic, antiepileptic and antihypertensive drugs.[1-4,6,12-14]

Possible reasons for this could be due to companies offering incentives to the physician for prescribing a particular brand.[3] Also at times, pharmacist does not dispense the same brand as prescribed by the doctor and substitute it with some other brand, quoting the reason as non-availability.[15] This is done for the economic gains as some brands have a higher profit margin.[15] Inadequate government regulation and pricing policies, raw material cost, promotion and distribution cost, existing market structure, asymmetry of information etc. could also be the possible reasons.[1-3,13-15]

In India, most of the patients are paying the medical bills out of their own pockets and are not covered by insurance schemes like developed countries.[1,13] Hence, there is a urgent need to control the price variation among different brands available in the market.[1]

Hence, the concerned authorities should frame policies for regulating the drug prices.[13] Also the prescribers should be sensitized regarding the cost of different drugs and a manual of comparative drug prices of different generic and brand drugs should be provided.[13]

Table 2: Cost variation among atypical antipsychotic drugs.

Drug	Formulation	Dose	Manufacturing company	Min price (INR)	Max price (INR)	Cost ratio	% Price variation
Olanzapine	7	2.5mg	61	1.1	2.5	2.27	127.27
		5mg	94	1.79	5.5	3.07	207.26
		7.5mg	43	2.8	9.67	3.45	245.35
		10mg	89	2.5	11.19	4.47	347.6
		15mg	30	5.5	9.57	1.74	74
		20mg	23	7	12.4	1.77	77.14
		Inj 10mg	2	44	55	1.25	25
Risperidone	6	0.5mg	2	1.4	1.9	1.35	35.71
		1mg	50	0.68	13.5	19.85	1885.29
		2mg	58	1.29	26.6	20.62	1968.99
		3mg	39	1.7	40.5	23.82	2282.35
		4mg	35	2.6	54	20.76	1976.92
		60ml suspension	3	97	764.1	7.87	687.73
Clozapine	4	25mg	20	1.3	2.85	2.19	119.23
		50mg	14	2.6	4.8	1.84	84.61
		100mg	19	3.9	7.7	1.97	97.43
		200mg	3	10.59	15	1.41	41.64
Quetiapine	6	25mg	19	1.6	3.8	2.37	137.5
		50mg	18	2.5	5.1	2.04	104
		100mg	28	4	11	2.75	175
		200mg	25	7.8	14	1.79	79.48
		300mg	13	11	16.5	1.5	50
		400mg	4	15.27	21.8	1.42	42.76
Aripiprazole	5	5mg	8	3	4.7	1.56	56.66
		10mg	29	5.2	14.4	2.76	176.9
		15mg	27	7	19.5	2.78	178.57
		20mg	19	9.6	23.7	2.46	146.87
		30mg	23	11.47	20.65	1.79	79.72
Amisulpride	5	50mg	23	4.5	7.59	1.68	68.66
		100mg	27	7.6	12	1.57	57.89
		200mg	22	14.76	20.11	1.36	36.24
		300mg	6	19.85	23	1.15	15.86
		400mg	4	27.2	39.29	1.44	44.44
Pimozide	2	2mg	10	1.15	5.1	4.43	343.47
		4mg	10	1.72	7.28	4.23	323.25
Loxapine	4	10mg tab	3	3.8	3.9	1.02	2.63
		25mg tab	3	7.78	8.5	1.09	9.25
		10mg cap	3	3.39	4.5	1.32	32.7
		25mg cap	3	7.06	10	1.41	41.64

Table 3: Percentage price variations and number of formulations.

Percentage price variation	No of formulations
≤ 24.99 %	6
25-49.99 %	14
50-99.99 %	19
100-499.99 %	26
≥ 500 %	7

Also the doctors should be encouraged to write the generic names of the drug and a cheaper brand should be prescribed whenever possible because the superiority of one particular brand over the others has not been scientifically proved.[13] These steps can help in providing cost effective therapy to the patients thereby improving the compliance.

At present, only a few drugs are under the Drug Price Control Order.[12,13] For the overall betterment of the

healthcare of our country, it is desired that government should try and get all the drugs under the DPCO.[13]

Lastly, Pharmacoeconomics should be an integral part of undergraduate and post graduate medical education in order to create awareness about the impact of cost on the treatment of the disease.[12]

CONCLUSION

This study highlights the enormous price variation among different antipsychotic drugs in the Indian Market. Hence it is recommended that necessary measures be taken to maximize the benefits of therapy and minimize the negative economic and personal consequences.

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