

A study on the price variability of branded medicines and Jan aushadi versions of selected commonly prescribed psychiatric medications in India using a cost-comparative approach and a passive evaluation of the Jan aushadhi scheme in India

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ABSTRACT

Introduction: The cost of medications poses a significant financial burden on patients. It limits access and adherence to treatment. Psychiatric disease burden is rising and it needs treatment for long durations. The high cost of branded medicines and lack of access to medicines at affordable prices can limit adherence. **Methodology:** A cost comparison study was done to investigate the price difference between branded and Jan aushadhi versions of 20 selected psychiatric drugs was done at the Department of Community Medicine of a Government medical college in Southern India. The average (mean) price of branded medicines of each drug was calculated with minimum, and maximum using online data, and comparison was done by calculating the percentage price difference between branded and Jan aushadhi medicines. The overall percentage price difference between branded and Jan aushadhi medicines was calculated. **Results:** The overall percentage price difference between the mean price of branded medicine and Jan aushadhi medicine was + 252% for antipsychotics, indicating that the mean branded price was 252% (2.52 times) Jan aushadhi price. Similarly, the overall percentage price difference between the mean branded price and Jan aushadhi price among antidepressants was +277.54%, and the overall percentage price difference between mean branded price and Jan aushadhi was +227.73% for anticonvulsants. Similarly, price differences of maximum and minimum branded prices and Jan aushadhi were high. **Conclusion:** The study was able to estimate variation in the price of branded drugs and compare the price of branded medicines with Jan aushadhi by estimating price differences. The results of the study are useful in further reference regarding the subject for public, policy makers and healthcare providers. It gives valuable evidence into medication costs in India.

Keywords: Cost-comparison, Jan aushadhi, price difference, price of branded medicine

Introduction

The cost of medications can pose a financial burden on patients, leading to disparities in access and adherence to treatment. The

worldwide Psychiatric disease burden necessitates affordable treatment options. However, the high cost of brand-name medications can limit treatment access for many patients, especially in low-income and middle-income countries.^[1] The prescription of low-cost generic drugs can improve treatment adherence and follow-up visits and help primary care physicians follow-up patients regularly and get their patient's diseases in

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control. This can build confidence in patients towards treating physician.^[2]

The Jan aushadi stores, established under the Government of Indian government's initiative, provide affordable generic drugs, aiming to make quality medications accessible to the masses.^[3]

This study aimed to investigate price differences between major brands and Jan aushadi stores, focusing on psychiatric medications. Through this comparative analysis, this study seeks to shed light on the pricing variations between major brands and Jan aushadi stores for psychiatric medications. The findings should be of interest to primary care physicians, healthcare providers, patients and policymakers. The results could also be helpful for future initiatives to optimize drug pricing strategies and dispensing strategies through hospitals and clinics and ensure equitable access to medications for individuals with psychiatric disorders.

Methodology

The study was devised with the aim of finding out the cost of different drug brands and its variations with Jan aushadhi. The following describes the objectives and methods adopted in doing so.

Objectives

The objectives of the study were to determine the average (mean) price of branded medicines of commonly prescribed psychiatric medications in India and to compare the price difference between the branded and Jan aushadi medicines for selected psychiatric medications.

Study design

It is conducted as a descriptive study and was undertaken during the month of July 2023 and was done in the Department of Community Medicine and the learning resource center at a government medical college in southern India. The commercially available brands of most commonly prescribed antipsychotic medicines were taken as the study unit. The most commonly prescribed drugs in treating psychiatric illness in India were obtained from a multicentric study of Indian Psychiatric Association; the details of the study are given in reference.^[4] There were total of 20 drugs included for the study.

Among them, the antipsychotic drugs studied were olanzapine, quetiapine, amisulpride, thioridazine, trifluoperazine, and haloperidol. The antidepressants were fluoxetine, escitalopram, amitriptyline, sertraline, duloxetine, and mirtazepine. Antiepileptics were clonazepam, lorazepam, carbamazepine, oxcarbazepine, diazepam, lamotrigine, and valproate. The antimanic drug was lithium.

Sampling and sample size

This is the first study of its kind conducted on the topic. The average price was calculated by averaging the cost of 30 brands

selected randomly out of total available brands (if there were more than 30 brands available) of each medicine or the cost of total available brands for each medicine (if the number of available brands listed or meeting inclusion criteria is less than 30).^[5] The cost was studied for a strip of 10 tablets per brand for each medicine. Only the cost of tablet formulation was included; price of different dosage formulations of the same drug was also studied. Brands without price specified or any information missing and combination medicines were excluded.

Study variables

The following variables were studied: the average cost of branded medicine for each drug, cost of each drug in Jan aushadhi, maximum cost for branded medicine for each generic drug, minimum cost for branded medicine for each generic drug, percentage price difference between Jan aushadhi and average branded medicine price for each drug (among the 20 drugs), percentage price difference between Jan aushadhi and maximum branded medicine price for each drug, percentage price difference of each drug between Jan aushadhi and minimum branded medicine price, choice of dosages available for each drug in Jan aushadhi, choice of dosages available for the branded drugs, and average of percentage price difference of Jan aushadhi across the categories of drugs.

Data collection

We searched for the brands of each one of the above drugs. The study was conducted by searching on the CIMS website. It is a reliable website used widely in the country by medical practitioners and health professionals to get drug-related information. It contains information related to drug brands, prices, doses and formulations of drugs used for treating illnesses across systems and specialties.

The search was done on the site under the title "Find Drugs" and under the title "Central nervous system" included drugs prescribed for psychiatric illnesses. It contained information regarding the categories of drugs used to treat psychiatric illnesses. From the listing of brands for each drug given, all the brands meeting the inclusion criteria were studied according to the sampling criteria mentioned above. Jan Aushadhi mobile application was used to collect the cost of each generic drug in Jan aushadhi and was used for comparison.

Statistical analysis

Data was entered into MS Excel and analysed using SPSS Version 28. For quantitative variables, descriptive statistics like mean, and standard deviation and for qualitative variables proportions were generated. The average measure used in the study was the mean.

Calculation percentage price difference between the average price of branded medicine and the Jan aushadhi price for each medicine was done by calculating the price difference between the two and dividing the difference by Jan aushadhi price. It gave the price difference ratio, i.e. how many times Jan aushadhi price

is the average price of branded medicine. It is then expressed as a percentage by multiplying it with 100. Similarly, the percentage price difference between the maximum/highest priced brand and Jan aushadhi price for each of the medicine was done by calculating the difference between the two and dividing the price difference by Jan aushadhi price to get the price difference ratio and then it was multiplied by 100. The percentage price difference between the minimum/lowest priced brand and Jan aushadhi was done by calculating the difference between the two and then dividing the difference by Jan aushadhi price to get the price difference ratio and it was multiplied by 100. Then, these percentage price differences for individual drugs were used to calculate the overall average percentage price difference of the category of drug, like antipsychotics, antidepressants, and sedative-hypnotics, to obtain the price comparison between branded drugs and Jan aushadhi.

The choice of dosages available for each drug among branded medicines and Jan aushadhi were studied and documented. The choice of dosages available for each drug in Jan Aushadhi was also documented.

Ethical approval

The study was conducted after the approval of the Institutional Ethics Committee.

Results

Price difference of antipsychotic medicines

The mean price of branded medicines, price of drugs at Jan aushadhi, maximum and minimum price for each drug and percentage price difference of each medicine are given in Table 1.1.

Among the antipsychotic medicines studied, haloperidol was the medicine with the lowest price across the dosage formulations, whereas amisulpride had the highest price in terms of the mean cost as well as the maximum and minimum prices of the brands. Jan aushadhi prices were not available for trifluoperazine, haloperidol and thioridazine. For amisulpride and olanzapine, only one dose/strength is available in Jan aushadhi, whereas it is available in multiple doses among the branded medicines.

The percentage price difference was highest for Olanzapine and was lowest for quetiapine, when the mean price, maximum price and the minimum price were compared with Jan aushadhi across the dosage formulations studied. Olanzapine 10 mg tablet showed the maximum percentage price difference (+877%).

The overall percentage price difference between the mean price of branded medicines and Jan aushadhi medicines was +252% for antipsychotics. (2.52 times the price of Jan aushadhi medicine). The overall percentage price difference between the maximum price of branded medicine and Jan aushadhi medicine for antipsychotics studied was + 436.17%. (4.36 times the price

of Jan aushadhi medicine). Overall percentage price difference between the minimum-priced branded medicine and Jan aushadhi medicine for antipsychotics studied was + 128% (1.28 times the price of Jan aushadhi medicine).

Price difference of antidepressant medicines

Mean price of each drug, Jan aushadhi price, maximum and minimum price and percentage difference in the price of antidepressant medicines are given in Table 1.2.

Among the branded antidepressant medicines studied, duloxetine had the highest mean price, maximum and minimum price across the dosage formulations. The percentage price difference between the maximum branded price and Jan aushadhi was the highest for setaline 100 mg (+1236%), followed by escitalopram 5 mg (+800%). Escitalopram showed the highest price difference between the mean branded price and Jan aushadhi price among the medicines (+614% and + 520% for 10 and 20 mg tablets, respectively).

The overall percentage price difference between the mean branded price and Jan aushadhi price among the antidepressants studied was +277.54%. (2.77 times the price of Jan aushadhi medicine). Overall percentage price difference between the maximum price of branded medicine and Jan aushadhi for antidepressants was +616.27%. (6.16 times the price of Jan aushadhi medicine). The overall percentage price difference between the minimum priced branded medicine and Jan aushadhi for antidepressants was +82.1% (0.82 times the price of Jan aushadhi medicine).

Price difference of sedative hypnotics and anticonvulsants

The mean price of each drug, Jan aushadhi price, maximum and minimum price, percentage difference in price of sedative hypnotics and anticonvulsants are given in Table 1.3.

Among the anticonvulsant drugs, clonazepam 0.5 mg tablet had the highest price difference (+474%) between its mean branded price and Jan aushadhi price. The least price difference was for lithium 400 mg tablet (+71%). The price difference between the minimum branded medicine price and Jan aushadhi was the highest for clonazepam 0.5 mg (+1736), followed by valproate, whereas for lorazepam 1 and 2 mg tablets, the minimum branded medicine price was lower than Jan aushadhi (-27% and -25%).

The overall percentage price difference between the mean branded price and Jan aushadhi was +227.73% for the anticonvulsants (2.27 times the price of Jan aushadhi medicine). Overall Percentage price difference between the Maximum branded price and Jan aushadhi was +718%. For anticonvulsants (7.18 times the price of Jan aushadhi medicine). The overall percentage price difference between the minimum branded price and Jan aushadhi was + 132.86%. (1.32 times the price of Jan aushadhi medicine)

Table 1.1: Price of branded antipsychotic medicines and comparison with Jan Aushadhi

Medicine Dosage	Mean Price (Sd)	Maximum Price	Minimum Price	Jan Aushadhi Price*	Price Difference of Maximum Branded Price and Jan Aushadhi (%)	Price Difference Of Minimum Branded Price And Jan Aushadhi (%)	Difference Btwn Avg. Price and Jan Aushadhi (%)
Olanzapine							
2.5	25.23 (9.06)	55.75	14.33	-	-	-	-
5	33.41 (6.33)	55	20	6.6	48.5 (+733%)	13.4 (+203%)	(+406%)
7.5	53.24 (13.82)	91	29	-	-	-	-
10	61.76 (11.49)	86	36	8.8	77.2 (+877%)	27.2 (+309%)	(+602%)
Quetiapine							
25	33.79 (10.00)	58	19	11	47 (+427%)	8 (+73%)	(+207%)
50	54.95 (13.34)	90	35	-	-	-	-
100	69.47 (17.26)	110	40	36.3	73.7 (+203%)	3.7 (+10%)	(+91%)
200	121.67 (33.38)	178	57.50	65	113 (+174%)	120.5 (-12%)	(+87%)
Trifluoperazine							
5	14.95 (8.40)	29.30	4.85	-	-	-	-
Amisulpride							
50	67.74 (15.70)	94	45	31	63 (+203%)	14 (+45%)	(+119%)
100	117.85 (29.01)	211	75	-	-	-	-
200	207.15 (61.63)	386.61	46.60	-	-	-	-
Thioridazine							
10	14.68 (6.37)	27	9.22	-	-	-	-
25	34.60 (17.13)	55.70	9.22	-	-	-	-
50	61.79 (22.32)	95	30.50	-	-	-	-
100	93.85 (47.57)	175	54	-	-	-	-
Haloperidol							
0.25	9.05 (3.43)	15.75	4.90	-	-	-	-
1.5	14.94 (4.93)	26.40	6.35	-	-	-	-
5	29.41 (10.37)	57.11	10.50	-	-	-	-
10	40.15 (10.13)	60.50	18.55	-	-	-	-

*(-) indicates medicine is not available in Jan Aushadhi. #(+) indicates that the price is higher for branded medicine than Jan Aushadhi and vice versa. It divided by 100 gives the ratio of cost difference

Table 1.2: Price of branded antidepressant medicines and its comparison with Jan Aushadhi

Medicine Dosage	Average (mean) Price (Sd)	Maximum Branded Price	Minimum Branded Price	Jan Aushadhi Price	Price Difference of Maximum Branded Price and Jan Aushadhi (%)	Price Difference of Minimum Branded Price and Jan Aushadhi (%)	Difference Btwn Avg. Price and Jan Aushadhi (%)
Fluoxetine							
20	30.73 (10.43)	68	6	8.8	59.2 (+673%)	2.8 (-32%)	(+219%)
Escitalopram							
5	39.47 (8.80)	51	24	-	-	-	-
10	70.39 (14.47)	90	32	10	80 (+800%)	22 (+203%)	(+614%)
20	124.05 (20.39)	143	63	20	123 (+615%)	43 (+215%)	(+520%)
Sertaline							
25	39.90 (17.67)	82.85	17	15	67.85 (+452%)	2 (+13%)	(+166%)
50	54.40 (30.40)	159	26	18	141 (+783%)	8 (+44%)	(+202%)
100	101.95 (60.20)	294	45	22	272 (+1236%)	23 (+105%)	(+363%)
Amitriptylline							
10	20.22 (5.39)	29	10	6.6	22.4 (+339%)	3.4 (+52%)	(+206%)
25	22.69 (4.83)	36.9	9	8.8	28.1 (+319%)	0.2 (+2%)	(+158%)
Duloxetine							
20	65.56 (33.99)	207	38.5	27	180 (+667%)	11.5 (+43%)	(+143%)
30	97.33 (40.35)	198	48	-	-	-	-
40	115.84 (48.35)	198	30.80	-	-	-	-
Mirtazepine							
7.5	52.29 (14.90)	90	35	13	77 (+592%)	22 (+169%)	(+302%)
15	78.01 (23.92)	121	32	30	91 (+303%)	2 (+7%)	(+160%)
30	140.83 (43.19)	233	58	-	-	-	-

*not available in Jan Aushadhi. #(+) indicates that the price is higher for branded medicine than Jan Aushadhi and vice versa. It divided by 100 gives the ratio of cost difference

Table 1.3: Price of branded anticonvulsant medicines and its comparison with Jan Aushadhi

Medicine Dosage	Average (mean) Price	Maximum Branded Price	Minimum Branded Price	Jan Aushadhi Price	Price Difference of Maximum Branded Price and Jan Aushadhi (%)	Price Difference of Minimum Branded Price and Jan Aushadhi (%)	Difference Btwn Avg. Price and Jan Aushadhi (%)
Clonazepam							
0.25	17.44 (4.26)	27	10	-	-	-	-
0.5	31.56 (15.05)	101	17	5.5	95.5 (+1736%)	11.5 (+209%)	(+474%)
1	38.61 (11.57)	71	19	8.8	62.2 (+707%)	10.2 (+116%)	(+339%)
Lorazepam							
1	19.38 (11.35)	67	8	11	56 (+509%)	3 (-27%)	(+76%)
2	26.16 (10.81)	68	9	12	56 (+467%)	3 (-25%)	(+118%)
Diazepam							
5	18.48 (14.24)	60	2	-	-	-	-
Valproate							
200	69.37 (27.90)	161.79	38	16	145.79 (+911%)	22 (+138%)	(+334%)
500	108.30 (37.82)	193	50	22	171 (+777%)	28 (+127%)	(+392%)
750	140.84 (32.47)	195	100	-	-	-	-
Lithium							
300	19.53 (13.30)	57.50	7.18	-	-	-	-
400	34.25 (13.26)	55	19	20	35 (+175%)	1 (-5%)	(+71%)
450	33.46 (11.89)	50	16.41	-	-	-	-
Carbamazepine							
100	14.28 (7.73)	33	7	8	25 (+313%)	1 (-13)	(+79%)
200	19.37 (19.62)	120	33	8	112 (+1400%)	25 (+313%)	(+142%)
400	30.44 (8.89)	51.63	16.30	-	-	-	-
Oxcarbazepine							
150	55.38 (17.60)	88	23	-	-	-	-
300	109.78 (40.74)	183	24	40	143 (+358%)	16 (-40%)	(+174%)
450	149.83 (52.53)	240	54	-	-	-	-
600	177.50 (59.30)	340.46	93.21	-	-	-	-
Lamotrigene							
25	53.59 (20.88)	86	21	-	-	-	-
50	103.43 (36.75)	164.00	38.41	-	-	-	-
100	178.72 (64.79)	284	69	44	240 (+545%)	25 (+57%)	(+306%)

*not available in Jan Aushadhi. #(+/-) indicates that the price is higher for branded medicine than Jan Aushadhi and vice versa. It divided by 100 gives the ratio of cost difference

Discussion

Mean price of the medicines

The mean price of the medicines was higher than the Jan aushadhi prices for all the medicines studied.

Price difference of the medicines

There was a higher price difference for most commonly prescribed drugs like olanzepine, quetiapine, clonazepam, and escitalopram. The study shows that even an average-priced brand shows a high price difference compared to Jan aushadhi. The range of the price difference between the maximum branded price and minimum branded price and Jan aushadhi, respectively, is very high as indicated in the results. This indicates that in the market medicines are available at greater price variations for these drugs. The costliest brand when prescribed can be a burden to low socioeconomic classes.

Availability of medicines and dosage formulations

Out of the tablet/capsule formulation of the 20 psychiatric medicines studied, 4 (20%) were not available in Jan aushadhi.

Making more drugs available might help people by reducing the need to buy expensive medicines. Also the choice of dosages available for each medicine was less compared to branded counterparts in Jan aushadhi. This is a limitation we identified in our study.

Affordability

The price difference study reveals the huge difference in the price of branded and Jan aushadhi versions of the medicines. This indicates the need for making medicines available at cheaper rates so that it is accessible to the poor who are in need of these drugs for a longer duration of time as part of treatment. The out-of-pocket expenditure can be considerably minimized by Jan aushadhi.

Importance in family practice and primary care

The knowledge of price variability is of importance to family physicians as we come across patients with psychiatric comorbidities. Physicians running own clinics deal with patients from diverse social backgrounds, in outpatient departments. Prescription of drugs in generics can be made to those few, and

can be advised to Jan Aushadhi. Initiatives similar to Jan aushadhi can be made locally by clinicians at pharmacies and drug stores attached to clinics and hospitals to dispense low-cost generics. It can reduce treatment cost, increase patient visits to clinics^[2] and motivate people to visit private clinics. Price variability knowledge is helpful in treating patients requiring long-term therapy.

Benefits for the patients and family

Buying low-cost medicines can enable people to buy all necessary prescribed medicines. Considering that mental illness and having a mentally ill person in the family has a serious psychosocial impact on caregivers and family, the following points become important.^[6] It reduces their concern over money. Reduces out-of-pocket expenditure for receiving healthcare. Reduces catastrophic health care expenditure and Improve overall quality of life. Improves social security and increases mental well-being. This can decrease their inhibition for performing hospital and clinic visits. Better follow-up visits, frequency of visits, medicine adherence, drug compliance and treatment success.^[7]

Conclusion

The study was able to describe the price of branded medicines of psychiatric drugs as well as compare its price difference with Jan aushadhi. The findings show that there is a stark price difference between the branded and Jan aushadhi medicines and also the mean branded prices are higher. The results are of importance to primary care and family physicians who treat such patients and need frequent follow-ups of patients in providing long-term care. It can also benefit patients, caregivers and family. Initiatives can be made to reduce medicine costs by increasing generic prescriptions and making generics available at pharmacies. The study gives insight into medicine prices in India

and the effect of initiatives like Jan aushadhi, and hence means of increasing affordability to poor and socioeconomically vulnerable people.

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Conflicts of interest

There are no conflicts of interest.

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