



A Drug Compendium based analysis of Selective Serotonin Reuptake Inhibitors (SSRIs) Drugs available in Indian market

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ABSTRACT

Background: Depression is a prevalent mental health disorder requiring lifelong pharmacological treatment. Selective Serotonin Reuptake Inhibitors (SSRIs) are widely prescribed due to their favourable safety and efficacy profiles. In India, the presence of multiple brands with varied pricing calls for an evaluation to guide rational prescribing.

Aim: To evaluate different brands of Selective Serotonin Reuptake Inhibitors (SSRIs) available in the Indian market.

Objectives: To assess the spectrum of brands, explore available formulations and strengths, determine the cost variation among different SSRIs, and identify key factors influencing pricing differences.

Materials and Methods: An observational study was conducted at GCS Medical College and Hospital. Data were sourced from the latest edition of the Indian Drug Review (IDR), Issue 3, 2024. Analysis included brand names, formulations, strength variations, and maximum and minimum costs, excluding incomplete entries.

Results: Wide cost variations were observed among SSRIs. The maximum variation was seen with Paroxetine 20 mg (229%), followed by Sertraline 50 mg (211.42%), and Escitalopram 5 mg (174.28%). Fluoxetine showed the highest formulation variety (tablets, capsules, suspension, syrup), while Paroxetine demonstrated the broadest range of strengths (10 mg to 40 mg). Among Fixed Dose Combinations (FDCs), Fluoxetine 20 mg + Olanzapine 5 mg had the highest cost variation (69.14%), and Escitalopram combined with Clonazepam was the most common FDC observed.

Conclusion: Significant cost disparities among SSRIs underline the need for cost-conscious prescribing practices to enhance treatment adherence and reduce economic burden on patients.

Keywords: Selective Serotonin Reuptake Inhibitors (SSRIs), Cost Variation Analysis, Indian Pharmaceutical Market, Depression Management.

INTRODUCTION

“Depressive disorder or depression is a mental disorder that is characterized by low mood or loss of pleasure or interest in activities for long period of time” according to WHO. [1] Amongst mental disorders, depression contributes about 37.3 %, mainly due to its high prevalence, its tendency to become chronic, and frequency of relapse. [1] This makes depression the leading cause of disability among mental health conditions.

Major depression is characterized by symptoms like depressed mood, loss of interest or pleasure (anhedonia), significant weight or appetite changes, sleep disturbances, psychomotor agitation or retardation, fatigue or loss of energy, feelings of worthlessness or excessive guilt, difficulty concentrating or making decisions, recurrent thoughts of death or suicide. [14]

In severe condition, depression patients will have symptoms and episodes of delusion, hallucination. Patients with depression may also experience insomnia, suicidal thoughts, poor concentration, decreased sex activity and memory problems. [2] Recently the awareness about the disease has increased leading to more often diagnosis. [1] Depression is a mental illness which affected approximately above 264 million individuals around globally. A 2024 study analysing data from 1990 to 2021 reported that DALYs due to depressive disorders peaked in the 55-59 age group for men and 60-64 for women, with higher rates observed in females across all age groups. [3] A 2024 trend analysis focusing on individuals aged 10-24 years indicated that females experienced the highest burden of depression. [3] In India the prevalence was slightly higher in females (8.1%) compared to males (7.0%), aged 60 years and above. [4] The highest prevalence was observed in the 40–59 age group (3.6%). [4] There are two treatment modalities necessary for depression which includes psychotherapy and pharmacotherapy. Generally, treatment required for depression is lifelong so cost factor plays major role in deciding drug therapy and patient compliance and also it requires multiple drugs and the cost per unit of antidepressant drugs is high. Here, high expense is not only because of direct treatment cost but also because of indirect cost such as loss of productivity and opportunity. [2] The first drug class chosen for major depressive disorder would be amongst Selective Serotonin Reuptake Inhibitors (SSRI), Selective Norepinephrine Reuptake Inhibitors (SNRI), Tricyclic Antidepressants, Norepinephrine Dopamine Reuptake Inhibitors, and other atypical antidepressants. [1] SSRIs are one of the most frequently prescribed group of drugs for major depressive disorder. Their effectiveness and relatively less adverse effects have made them the most popular class of drugs to be prescribed for major depressive disorder. Anti-depressant drugs available in market takes around 3 to 4 weeks to start their action and only one third of the patient get relief from single drug, so majority of the time the combination therapy is needed. If the patient does not response even after 8 weeks of therapy shifting to another medication is considered. [8]

With large scale of production, these industries manufacture all of the drugs and different brands of the same drugs that are available in market. So, they are having variety of cost variation among themselves. The market is flooded with different brands of same drugs, so the requirement of this study is to evaluate different variety of formulations, their costs, strengths in order to help the prescribing practitioner and patients as well. [9].

MATERIALS AND METHODS

The observational study was conducted in the Department of Pharmacology, GCS Medical College and Hospital. Details of various brands of SSRIs were taken which were enlisted in latest edition of Indian Drug review (IDR), Issue 3 ,2024. [5]

Different SSRIs was analysed under following headings:

Analysis check list	Brand name/ Generic name of different SSRIs	Available Formulations of different SSRIs	Different Strength/Dose of various SSRIs	Maximum cost and minimum cost per unit of Different SSRIs	Cost variation between different SSRIs
SSRIs as monotherapy	✓	✓	✓	✓	✓
SSRIs as FDCs	✓	✓	✓	✓	✓

- Brands Of SSRIs that are not enlisted in latest edition of IDR and SSRIs which are having improper information regarding brand name, formulation, cost and strength were excluded from current study.
- Percentage cost variation was calculated as follows: (Highest branded price of a particular drug formulation- Lowest branded price of the same drug formulation)/Lowest branded price of the same drug formulation × 100.(1)
- Percentage cost variation (%) = $\frac{\text{Maximum price} - \text{Minimum price}}{\text{Minimum price}} \times 100$

RESULTS

The prices of SSRIs manufactured and marketed by several pharmaceutical companies were analysed.

Table 1 contains drug names, formulations, number of formulations available, number of drugs per unit, dose, number of brands, maximum and minimum price, and percentage cost variation of various brand of SSRIs

Sr. No	Name of Drug	Formulation (Tablets + dose)	Number of brands	Maximum cost per unit	Minimum cost per unit	Cost variation (%)
1	Escitalopram	Tablets (10mg)	17	10.07	5.36	87.87

		Tablets (5mg)	11	7.68	2.8	174.28
		Tablets (20mg)	13	21.54	9.9	117.57
2	Citalopram	Tablets (20mg)	1	11	11	0
		Tablets (10mg)	5	6.47	2.8	131.10
		Tablets (40mg)	4	12.8	10	28
3	Fluoxetine	Tablets (10mg)	1	3.38	3.38	0
		Tablets (20mg)	4	4	2.5	60
		Tablets (40mg)	1	5.3	5.3	0
		Capsules (20mg)	6	4.08	2.5	63.2
		Capsules (40mg)	2	4.6	3.55	29.57
		Capsules (60mg)	3	10.98	6	83
		Suspension(20 mg/60 ml)	2	8.5	3.7	129.72
		Syrup(20 mg/60 ml)	1	2.7	2.7	0
4	Fluvoxamine	Tablets (50mg)	5	19.4	12	61.67
		Tablets (100mg)	6	29.8	19.6	52.04
		Tablets (200mg)	1	14	14	0
		Tablets (150mg)	1	38	38	0
5	Paroxetine	Tablets (10mg)	4	14.5	5.76	151.74
		Tablets (20mg)	6	32.90	10	229
		Tablets (12.5mg)	4	16.4	10.45	56.93
		Tablets (25mg)	4	18.75	14.30	31.11
		Tablets (37.5mg)	4	31.01	19	63.21
		Tablets (30mg)	2	22.53	21	7.29
		Tablets (40mg)	1	17.44	17.44	0
6	Sertraline	Tablets (25 mg)	7	6.6	2.4	175
		Tablets (50mg)	15	10.9	3.5	211.42
		Tablets (100mg)	9	17.2	8.7	97.70

Figure 1 represents cost variation (%) between SSRIs class of drugs available in Indian market.

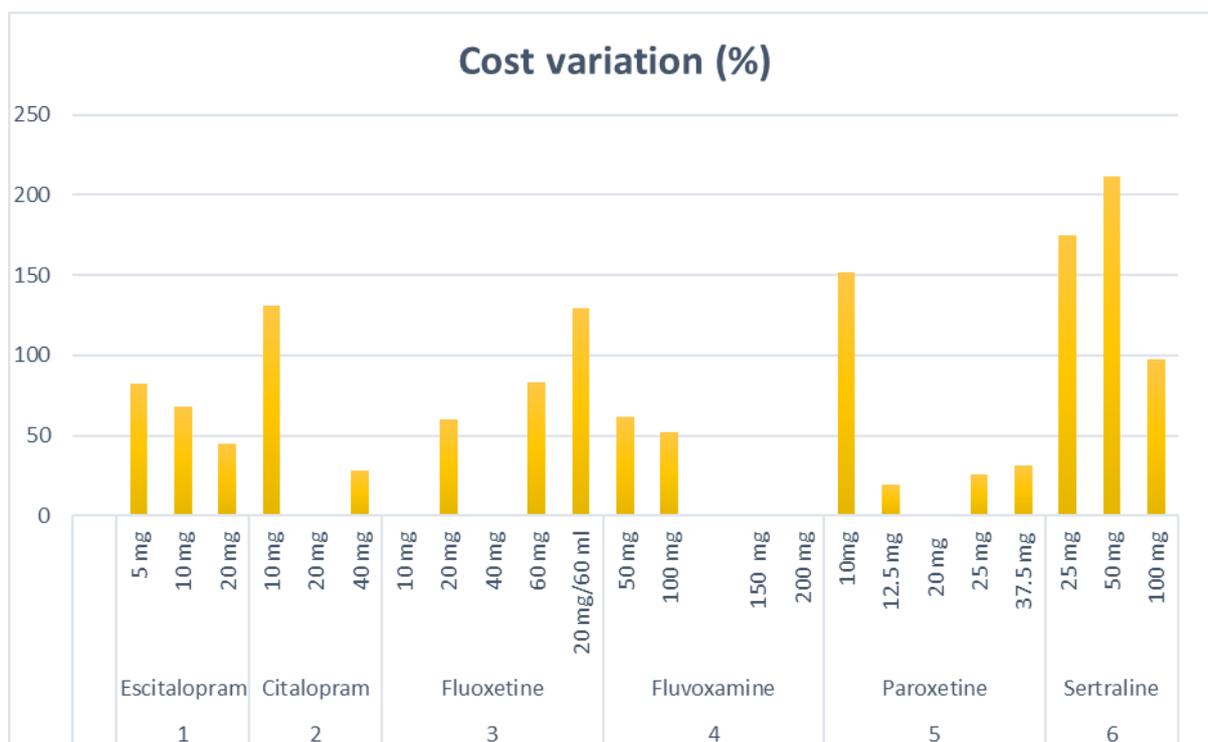


Figure 1 X axis represents different SSRIs class of drugs with different strengths that are available
Y axis represents cost variation in (%) between different SSRIs class of drugs

- There was wide variation seen among the prices of several brands of the same drug in the same dose and dosage form.
- Maximum cost variation was observed with paroxetine 20 mg (229%), followed by sertraline 50 mg (211.42%) and escitalopram 5 mg (174.3%) tablet whereas lowest cost variation was with paroxetine 30 mg (7.29%).
- Fluoxetine had maximum variety of formulations (2).
- Paroxetine had widest range of strengths in tablet formulation (7).

Table 2 contains SSRI drug names, its dose, concomitant drug name, its dose, formulation, total brands available, maximum and minimum price, and percentage cost variation of various brands of SSRIs which are part of Fixed drug combinations (FDCs)

Drug	Dose	Concomitant drug	Dose	Formulation	Total brands	Highest cost per unit	Lowest cost per unit	Cost variation (%)
Escitalopram	10 mg	Etizolam	0.5 mg	Tablets (10)	2	15	8.90	68.54
Escitalopram	10 mg	Clonazepam	0.5 mg	Tablets (10)	5	13.1	9	45.55
Escitalopram oxalate	10 mg	Clonazepam	0.5 mg	Tablets (10)	1	8.5	8.5	N/A
Escitalopram oxalate	5 mg	Clonazepam	0.25 mg	Tablets (10)	2	5.9	5.6	5.35
Escitalopram	20 mg	Clonazepam	0.5 mg	Tablets (10)	1	14	14	N/A
Escitalopram	5 mg	Clonazepam	0.5 mg	Tablets (10)	2	8.1	7.5	8
Escitalopram	10 mg	Clonazepam	0.5 mg	FC Tablets (10)	1	10.5	10.5	N/A
Escitalopram	10 mg	Clonazepam	0.25mg	Tablets (10)	2	8.7	8.5	2.35
Escitalopram	5 mg	Clonazepam	0.25 mg	FC Tablets (10)	1	5.5	5.5	N/A
Escitalopram	10 mg	Clonazepam	5 mg	Tablets (10)	1	7.2	7.2	N/A

Fluoxetine	20 mg	Olanzapine	5 mg	Tablets (10)	2	11.84	7	69.14
Fluoxetine	20 mg	Olanzapine	10 mg	Tablets (10)	1	9	9	N/A
Paroxetine	25 mg	Clonazepam	0.5 mg	Tablets (10)	1	19	19	N/A
Paroxetine	12.5 mg	Clonazepam	0.5 mg	Tablets (10)	1	14	14	N/A
Paroxetine HCL	25 mg	Clonazepam	0.5 mg	Tablets (10)	1	15.7	15.7	N/A
Paroxetine HCL	12.5 mg	Clonazepam	0.5 mg	Tablets (10)	1	13.2	13.2	N/A

Figure 2 represents cost variation (%) between SSRIs class of drugs available in Indian market as FDCs.

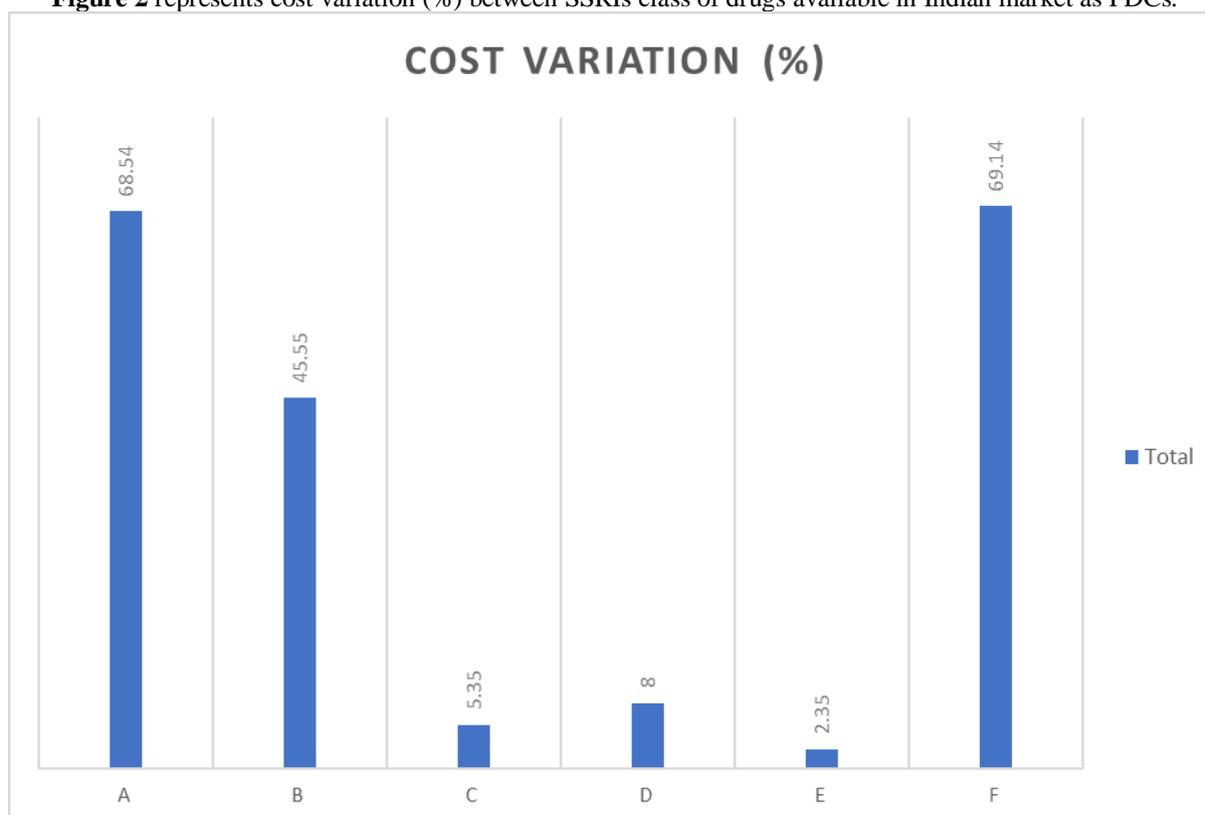


Figure 2: X axis represents different SSRIs class of drugs with different strengths that are available as FDCs, Y axis represents cost variation in (%) between different SSRIs class of drugs available as FDCs

In Figure 2:

- A:** Escitalopram(10mg) + Etizolam (0.5mg)
- B:** Escitalopram(10mg) + Clonazepam (0.5 mg)
- C:** Escitalopram oxalate (5 mg) + Clonazepam (0.25 mg)
- D:** Escitalopram (5 mg) + Clonazepam (0.25 mg)
- E:** Escitalopram (10 mg) + Clonazepam (0.25 mg)
- F:** Fluoxetine (20 mg) + Olanzapine (5 mg)

- Among FDCs maximum cost variation was observed with Fluoxetine (20 mg) + Olanzapine (5 mg)-69.14% and minimum was with Escitalopram (10 mg) + Clonazepam (0.25 mg)- 2.35%.
- Escitalopram had maximum number of FDCs [10] and out of which clonazepam was the commonest concomitant drug.

DISCUSSION

Our study had deviation in findings as compared to a study conducted by Raghav MV, Geetha regarding escitalopram cost variation. In our study the cost variation of escitalopram 10 mg tablets was 67.72 % which was contradictory as compared to the cost variation of above study that was 1288.99 % .[8] This could be because of different resource

material used for data collection i.e. in our study data collection was done from IDR latest edition 2024 whereas in reference study it was from Monthly Index of Medical Specialties November 2020 online, Jan Aushadhi Sugam (Generic drugs), National Pharmaceutical Pricing Authority.[6] [7]

In our study we have found 3 different variety of doses for citalopram (10 mg, 20 mg, 40 mg tablet formulations) which were in line with the study conducted by Raghav MV, Geetha.[8] The significance of the study is the restricted dose range simplifies prescribing practices, making it easier for clinicians to start treatment and adjust dosages without confusion. Also, fewer options may reduce dosing errors, particularly for patients managing their own medications.[4] But unlike fluoxetine or paroxetine, which offer incremental dose options, citalopram's minimal range can restrict fine-tuned titration. Simple dosing schedule may enhance adherence by reducing complexity, the inability to make small dose adjustments could affect tolerability in population.

It was depicted in our results that fluoxetine as single drug formulation was available in 3 different formulations i.e. (Tablets, Suspension, Syrup). This finding was contradictory to the findings of a study carried out by M. Nizamudin.[9] This was because at the time of M. Nizamudin's study, certain formulations were not yet available or were not widely marketed in India. The significance of our study is that the availability of multiple formulations allows clinicians to personalize treatment plans based on patient preferences, tolerability, and comorbid conditions. For instance, oral solutions can provide a convenient weekly dosing. option for those struggling with daily adherence. Different formulations contribute to cost variation, as capsules and liquid forms often come at a higher price point compared to standard tablets. This price gap may limit access for economically disadvantaged patients, reinforcing the need for prescribers to balance clinical efficacy with affordability.

It was depicted in our results that paroxetine as single drug formulation was available in seven different dose range i.e. (From 10 mg to 40 mg Dose). This finding was in line with the findings of a study carried out by Ankita Y. Sawant.[10] This suggests that international guidelines such as NICE (National Institute for Health and Care Excellence), APA (American Psychiatric Association), and the Indian Psychiatric Society recommend different doses of paroxetine depending on symptom severity and patient tolerance and this is consistent through all other similar studies.[15] The significance of this is that the availability of multiple strengths allows for more precise dose titration, helping clinicians tailor treatment to individual patient needs. Another advantage is smaller dose increments enable a gradual increase in dosage, improving patient tolerability and reducing the likelihood of discontinuation due to adverse effects. Paroxetine's extended dose range is particularly beneficial for elderly patients or those with hepatic impairment, where lower doses may be required.[10]

Regarding the cost variation among different SSRIs available in Indian market, in our study sertraline 50 mg tablet have highest cost variation i.e. 211.42 % which was contradictory to the cost variation in the study conducted by Raman K. Tripathi i.e. 80 %.[11] This could be due to aggressive pricing competition results in a wide cost variation among different brands of sertraline and also due to different time period newer generic brands had entered the market, further increasing competition and contributing to the higher cost variation observed in our study. Patients prescribed higher-priced brands of sertraline may struggle to maintain consistent usage due to financial constraints, leading to non-compliance.[11]

Regarding FDCs, in our study escitalopram + clonazepam had seven different strengths available as contrast to only four different strengths noted in the study conducted by Nayantara Nair.[12] The reason for this variation can be that over time, there had been a growing clinical need for individualized treatment regimens in psychiatric care. Pharmaceutical companies had responded to this demand by introducing additional FDC strengths to allow for:

- Flexible dose titration
- Gradual up/down tapering
- Reduced pill burden for combination therapy.

The second reason can be post-study drug approvals by the Central Drugs Standard Control Organization (CDSCO) may have led to the availability of newer strength combinations not captured in earlier research.

CONCLUSION

This study provides a valuable reference for clinicians and prescribers in selecting cost-effective SSRI formulations, helping them make informed decisions that balance clinical efficacy with affordability. By showcasing the wide price variations among brands of the same drug, it highlights the potential for significant cost savings without compromising treatment quality. Increased adherence to the therapy can be ensured by decreasing the price of therapy by changes in government policies and regulations and creating awareness among curing physicians for switching to cost-effective therapy and thus help in rational prescribing.

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