

## Cost variation among anxiolytic drugs

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### ABSTRACT

**Background:** Indian pharmaceuticals market stands third and thirteenth largest in terms of value and volume in the Global Pharmaceutical Industry respectively. Anxiety disorders are one of the most common mental illnesses affecting more than 15% of the population at some point in their life span. Treatment of anxiety disorders usually follows a long term treatment. Cost of the treatment is an important factor determining the adherence to the treatment.

**Methods:** Data relevant to various brands of anxiolytic drug available in the Indian market particular drug obtained from “Current Index of Medical Specialties” (CIMS) October 2017 - January 2018 was used to calculate the cost ratio and percentage cost variation.

**Results:** There are 16 anxiolytic drugs in the form of 44 different formulations and 384 brands available in the Indian market. Among anxiolytic drugs, highest cost ratio and percent cost variation is for diazepam 5mg, followed by alprazolam 1mg and hydroxyzine 10mg. Highest number of brands of anxiolytic drugs available in Indian market are for clonazepam 0.5mg followed by alprazolam 0.5mg and escitalopram 10mg.

**Conclusions:** In Indian market, there is availability of large number of brands with wide and variable cost variations among the various brands of the anxiolytic drugs.

**Keywords:** Anxiety disorders, Compliance, Cost variation, Health economics

### INTRODUCTION

Indian pharmaceuticals market stands third and thirteenth largest in terms of value and volume in the Global Pharmaceutical Industry respectively. In terms of volume, India is the largest provider of generic drugs.

It is expected that by 2020, Indian pharmaceutical market will emerge as the sixth largest market at the global level on the basis of absolute size. Indian pharmaceutical market is mainly dominated by the branded generics.

In terms of revenue, branded generics occupy around 80% of the market share.<sup>1</sup>

In India, two third of the health expenditure is out of pocket.<sup>2</sup> In India, 28% of the rural population and 20% of the urban population do not seek for the treatment of medical ailments due to financial constraints.<sup>3</sup>

Studies done to analyze cost variation analysis of brands of various classes of drugs available in the Indian market including antipsychotics, antidepressants, antiepileptics and antidyslipidemic drugs have found very wide cost variations.<sup>4-7</sup>

Anxiety disorders are one of the most common mental illnesses affecting more than 15% of the population at some point in their life span. Anxiety is type of human emotion which can be viewed from psychobiological

perspective as a component of adaptive function. Anxiety disorders include generalized anxiety disorder, panic disorder, obsessive-compulsive disorder, acute stress disorder, posttraumatic stress disorder, social phobia, separation anxiety disorder, and specific phobias.<sup>8</sup>

Anxiety is often associated with depression and other comorbid conditions. When symptoms of anxiety interfere with normal functioning of the individual then it is an indication for the drug treatment. Pharmacological treatment of anxiety involves management of anxiety episodes by acute drug treatment and management of continuing and unrelieved anxiety disorders by long term treatment.<sup>9</sup>

Treatment of anxiety disorders primarily includes Selective Serotonin Reuptake Inhibitors (SSRIs), Serotonin Norepinephrine Reuptake Inhibitors (SNRIs), benzodiazepines, buspirone, and  $\beta$  adrenergic antagonists.<sup>8</sup> Venlafaxine and SSRIs have anxiolytic action as well as antidepressant effect. Benzodiazepines have been found to be effective for both acute and chronic treatment of anxiety.

Potential of benzodiazepines for negative effects on cognition and memory as well as for abuse and dependence has been a matter of concern. Buspirone has been found to be effective for chronic treatment of anxiety.  $\beta$  Adrenergic antagonists with higher lipophilicity have been used for performance anxiety. Numerous significant side effects  $\beta$  adrenergic antagonists have limited their use.<sup>9</sup>

Treatment of anxiety disorders usually follows a long-term treatment. Compliance to the treatment is necessary for the successful treatment of the disorder. Treatment failure can significantly compromise the quality of life of the patient. Cost of the treatment is an important factor determining the adherence to the treatment.<sup>10</sup>

This study was aimed to evaluate cost differences for the various brands of the same generic anxiolytic drug. The purpose of the study is to determine if there are any variations in the costs of various brands of anxiolytic agent. The awareness of the same information can be applied to ensure successful treatment by employing treatment regimen of lower cost thus improving the patient compliance.

## METHODS

Anxiolytic drug of various strengths manufactured by different pharmaceutical companies available in the Indian market were analyzed for the cost variations.

In this study, authors gathered the data regarding cost of a particular brand (cost per 10 tablets) of anxiolytic drugs available in the Indian market from "Current Index of Medical Specialties" (CIMS) October 2017 - January 2018.

## Inclusion criteria

- Anxiolytic drugs which are available as individual preparations.
- Anxiolytic drugs manufactured by two or more pharmaceutical companies.
- Anxiolytic drugs with complete verifiable information regarding strengths, formulations, brand name and cost.
- Anxiolytic drugs available as oral tablets/capsule.

## Exclusion criteria

- The drugs being manufactured by only one company.
- Fixed dose combinations of anxiolytic drugs.
- Anxiolytic drugs with incomplete or non-verifiable information regarding strengths, formulations, brand name or cost.
- Anxiolytic drugs available as formulation other than oral tablets/capsule.
- Cost ratio was calculated by dividing the maximum cost with the minimum cost of the various brands of the same drug.
- Percentage cost variation was calculated as follows:<sup>11</sup>

$$\text{Cost variation (\%)} = \frac{\text{Max. cost} - \text{Min. Cost} \times 100}{\text{Min. cost}}$$

## RESULTS

There are 16 anxiolytic drugs in 44 different formulations are available in 384 brands available in the Indian market.

In this study, it was found that there are wide and variable cost variations in the various brands of the anxiolytic drugs available in the Indian market. There are large numbers of brands of the anxiolytic drugs available in the Indian market.

Among anxiolytic drugs, highest cost ratio (1:4.74) and percent cost variation (374.43) was found for diazepam 5mg, followed by alprazolam 1 mg [(1:4.6) and 360] and hydroxyzine 10mg [(1:3.52) and 252.31] (Table 1). Highest number of brands of anxiolytic drugs available in Indian market are for clonazepam 0.5mg (28) followed by alprazolam 0.5mg (26) and escitalopram 10mg (25) (Table 2).

## DISCUSSION

Anxiolytic drugs available in the Indian market have wide and variable cost variations. There are large numbers of brands of the different anxiolytic drugs available in the Indian market. Among the 16 anxiolytic drugs available in 44 different formulations available in Indian market, only three drugs with ten formulations have been included in National List of Essential Medicines (NLEM) 2015. These anxiolytic drugs are escitalopram, fluoxetine and clonazepam.<sup>12</sup>

**Table 1: Variation in cost of anxiolytic drugs.**

Anxiolytic Drug	Strength	Min. cost in Indian Rupees (INR)	Max. cost in Indian Rupees (INR)	Cost ratio	% cost variation
Alprazolam	0.25mg	7.50	19.33	2.58	157.73
	0.5mg	12.87	44.50	3.46	245.77
	1mg	11.00	50.60	4.60	360
Buspirone	10mg	17.00	35.00	2.06	105.88
	25mg	25.30	52.50	2.08	107.51
Clobazam	5mg	23.00	53.52	2.33	132.70
	10mg	43.00	106.32	2.47	147.26
	20mg	115.48	124.70	1.08	7.98
Clonazepam	0.25mg	10.00	27.00	2.70	170
	0.5mg	15.00	36.00	2.40	140
	1mg	24.00	43.00	1.79	79.17
	2mg	39.00	67.00	1.72	71.79
Citalopram	10mg	22.00	38.50	1.75	75
	20mg	40.00	67.00	1.68	67.5
Diazepam	2mg	5.00	20.20	4.04	304
	5mg	7.00	33.21	4.74	374.43
Escitalopram	10mg	10.00	40.85	4.09	308.5
	5mg	23.80	44.00	1.85	84.87
	10mg	30.00	78.00	2.60	160
Fluoxetine	20mg	75.00	142.00	1.89	89.33
	10mg	21.00	30.00	1.43	42.86
	20mg	26.85	52.80	1.97	96.65
Fluvoxamine	60mg	59.00	90.00	1.53	52.54
	50mg	100.70	115.00	1.14	14.20
	100mg	160.85	192.00	1.19	19.37
Hydroxyzine	10mg	6.50	22.90	3.52	252.31
	25mg	23.00	36.90	1.60	60.43
Lorazepam	1mg	8.00	30.00	3.75	275
	2mg	11.00	34.50	3.14	213.64
Paroxetine	10mg	70.00	87.50	1.25	25.00
	12.5mg	80.00	118.00	1.48	47.50
	20mg	103.00	110.20	1.07	6.99
	25mg	112.00	130.00	1.16	16.07
	30mg	140.00	155.00	1.11	10.71
	40mg	170.00	170.00	1.00	0
Pregabalin	75mg	54.89	96.75	1.76	76.26
	150mg	76.82	150.00	1.95	95.26
Sertraline	25mg	20.00	30.00	1.50	50
	50mg	35.00	49.00	1.40	40
	100mg	50.00	90.00	1.80	80
Trazodone	25mg	17.00	18.00	1.06	5.88
	50mg	32.00	34.00	1.06	6.25
	100mg	41.00	45.00	1.10	9.76
Venlafaxine	37.5mg	25.00	86.00	3.44	244
	75mg	47.00	98.00	2.09	108.51

If a particular drug is a component of NLEM then the price of that drug is covered under the Drug Price Control organization (DPCO) 2013.<sup>13</sup> Inclusion of more number of anxiolytic drugs in NLEM will also lead to availability of

more cost effective treatment options. Among the treating physicians, there has been lack of awareness about the extent of cost variation among different brands of the same drug. They have tendency to underestimate and

overestimate the cost of expensive and inexpensive brands respectively. This can consequentially result in higher treatment cost.<sup>14</sup>

**Table 2: Brands and formulations of anxiolytic drugs.**

Anxiolytic drug	Formulation	Strength (mg)	Number of brands
Alprazolam	3	0.25	22
		0.5	26
		1	14
Buspirone	2	10mg	3
		25mg	3
Clobazam	3	5	7
		10	8
		20	2
Clonazepam	4	0.25	18
		0.5	28
		1	16
		2	19
Citalopram	2	10	3
		20	3
Diazepam	3	2	4
		5	7
		10	6
Escitalopram	3	5	18
		10	25
		20	19
Fluoxetine	3	10	4
		20	13
		60	7
Fluvoxamine	2	50	3
		100	3
Hydroxyzine	2	10	4
		25	6
Lorazepam	2	1	11
		2	11
Paroxetine	5	10	3
		12.5	8
		20	3
		25	6
		30	3
		40	3
Pregabalin	2	75	10
		150	8
Sertraline	3	25	4
		50	8
		100	5
Trazodone	3	25	2
		50	2
		100	2
Venlafaxine	2	37.5	7
		75	7

For a chronic condition like anxiety disorders, long term treatment is required to ensure the success of the treatment.

Higher treatment cost can affect the compliance to the treatment.<sup>15</sup> Decreased compliance can adversely affect the prognosis of the condition.

For the unawareness of the treating physician regarding cost variation of various brands of the same drug, provision of manual having information regarding comparative drug costs along with prescribing advices can be done.<sup>16</sup>

Medical council of India has issued a circular regarding prescription of drugs only by their generic names.<sup>17</sup> Although from this regulation, it can ensure the prevention of any specific brand of a drug but it does not specify the role of pharmacist to dispense the brand with lesser cost. The regulation should also specify the pharmacist to decrease the treatment costs.

It has been found that differing cost of a brand of the same drug are linked to marketing strategy of that particular brand. The brands with aggressive marketing promotion have higher costs as compared to the brands with no marketing promotion. In contrast to the popular myth, there has been no relation found between the cost and the quality of that particular brand of drug.<sup>18</sup>

In a developing country like India where majority of the health expenditure are out of pocket, higher treatment costs can result in non-adherence to the treatment and thus, affecting the quality of life as well as prognosis of the patient.<sup>2</sup>

In the undergraduate and postgraduate medical curriculum, there should be inclusion of various aspects of Pharmacoeconomics. This will lead to better comprehension of treating physicians about the treatment costs and its short term and long-term consequences.

Government should also undertake more stringent efforts in the regulation of costs of those drugs also which are not the component of NLEM. This will lead to marked reduction in health care costs. This intervention will be particularly valuable in India where majority of the health expenditure is out of pocket expenditure.

## CONCLUSION

There is wide and variable cost variations and presence of large number of brands of anxiolytic drugs in the Indian markets.

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