

ORIGINAL RESEARCH

Cost analysis of second- generation antihistamines

¹Dr. Pawan Gupta, ²Dr. Ayush Chauhan, ³Dr. Smriti Chaturvedi, ⁴Dr. Lily Dubey

¹Consultant Dermatologist, Yuva Skin Clinic, Tilli Road, Sagar, M.P, India

²Consultant Orthopaedic Surgeon, Chatrapati Shivaji Hospital, Sagar M.P., India

³Assistant Professor, Department of Pathology, Bundelkhand Medical College, Sagar, M.P., India

⁴Associate Professor, Department of Pharmacology, Bundelkhand Medical College, Sagar, M.P, India

Corresponding Author

Dr. Lily Dubey

Associate Professor, Department of Pharmacology, Bundelkhand Medical College, Sagar, M.P, India

Email: Lilydubey@gmail.com

Received Date: 10 January, 2024

Acceptance Date: 16 February, 2024

ABSTRACT

Background: Pharmaceutical treatments are necessary for the treatment of histamine-mediated responses such as urticaria and allergic rhinitis. The present study was cost analysis of second- generation antihistamines. **Materials & Methods:** 8 antihistamines produced by several pharmaceutical companies was priced from highest to lowest. For every medication, the cost ratio and % change in cost were computed. **Results:** WHO (DDD)(mg), no. of manufacturing brands, least expensive INR and most expensive INR for levocetirizine HCL found to be 5 mg, 188, 8.90 and 90.0 respectively. For desloratadine, it was 5 mg, 34, Rs. 26 and Rs. 94, for Ebastine, it was 10 mg, 13, Rs. 44 and Rs. 96, for Mizolastine, it was 10 mg, 3, Rs. 40 and Rs. 152, for Bepotastine, it was 10 mg, 7, Rs. 100 and Rs. 110.2, for Cetirizine dihydrochloride, it was 10 mg, 132, it was Rs. 2 and Rs. 85.0, for Loratadine, it was 10 mg, 59, Rs. 18 and Rs. 102.4 and for Fexofenadine, it was 120 mg, 88, Rs. 27.2 and Rs. 170.6 respectively. The cost ratio and cost variation (%) of levocetirizine HCL was 10 and 901, for Desloratadine was 3.54 and 256, for Ebastine was 2.0 and 118.4, for Mizolastine was 3.82 and 284.6, for Bepotastine was 1.2 and 10.4, for Cetirizine dihydrochloride was 42.4 and 4012.6, for Loratadine was 5.2 and 448.2 and for Fexofenadine was 6.2 and 504.2. The difference was significant ($P < 0.05$). **Conclusion:** The pricing of antihistamine medications varies greatly, according to this study, particularly when it comes to second-generation medications that are sold in India. Healthcare practitioners must use affordable medications to lessen the financial strain on society.

Keywords: Antihistamines, Bepotastine, Cetirizine

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INTRODUCTION

Pharmaceutical treatments are necessary for the treatment of histamine-mediated responses such as urticaria and allergic rhinitis. According to a 2011 report by the World Allergy Association, a global umbrella organization for regional and national allergy and clinical immunology societies, the prevalence of allergic conditions including urticaria, food and medicine allergies, anaphylaxis, and rhinitis is increasing globally in both developed and developing countries.¹ An estimated 30–40% of people on the planet are thought to have an allergy condition at any given moment, and 40–50% of schoolchildren worldwide are thought to be sensitized to one or more common allergens. Worldwide, 40% of children and up to 30% of adults suffer from allergic rhinitis. Though deemed insignificant in India, 75% of children and 80% of adults suffering from asthma reported having AR2. It interferes with social life, sleep, academics, and other aspects of a

patient's quality of life and has a significant indirect economic impact.²

Antihistamine drugs are medications used to treat allergies and allergic reactions. Antihistamines work by blocking the action of histamine, a substance released by the body during an allergic reaction. Histamine is responsible for symptoms such as itching, sneezing, runny nose, watery eyes, and hives. By blocking histamine receptors, antihistamines alleviate these symptoms.³

First-generation antihistamines are older and tend to cause more sedation as a side effect. Examples include diphenhydramine (Benadryl), chlorpheniramine (Chlor-Trimeton), and promethazine (Phenergan).⁴ Second-generation antihistamines are newer and are less likely to cause sedation because they are designed to have reduced penetration into the central nervous system. Examples include loratadine (Claritin), cetirizine (Zyrtec), fexofenadine (Allegra), and desloratadine (Clarinex).⁵

The present study was cost analysis of second-generation antihistamines.

MATERIALS & METHODS

The prices of the several antihistamine medications that are sold in India were sourced from Indian Drug Today and CIMS (current index of medical specialties). 8 tablets or capsules of each second-generation antihistamine were priced, with the highest and lowest prices being examined. Each antihistamine produced by several pharmaceutical companies was priced from highest to lowest. For every medication,

the cost ratio and % change in cost were computed. The following formula was used to get the percentage variation in the medicine costs- Most expensive formulation of the same antihistamine-Least expensive formulation of the same antihistamine)/(Least expensive formulation of the same antihistamine) x 100. Cost ratio=Most expensive formulation of the same antihistamine /Least expensive formulation of the same antihistamine. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table: I Cost analysis of second-generation antihistamines

Drug Name	WHO (DDD)(mg)	No. of manufacturing Brands	Least expensive INR	Most expensive INR
Levocetirizine HCL	5 mg	188	8.90	90.0
Desloratadine	5 mg	34	26	94
Ebastine	10 mg	13	44	96
Mizolastine	10 mg	3	40	152
Bepotastine	10 mg	7	100	110.2
Cetirizine dihydrochloride	10 mg	132	2	85.0
Loratadine	10 mg	59	18	102.4
Fexofenadine	120 mg	88	27.2	170.6

Table I, graph I shows that WHO (DDD)(mg), no. of manufacturing brands, least expensive INR and most expensive INR for levocetirizine HCL found to be 5 mg, 188, 8.90 and 90.0 respectively. For desloratadine, it was 5 mg, 34, Rs. 26 and Rs. 94, for Ebastine, it was 10 mg, 13, Rs. 44 and Rs. 96, for

Mizolastine, it was 10 mg, 3, Rs. 40 and Rs. 152, for Bepotastine, it was 10 mg, 7, Rs. 100 and Rs. 110.2, for Cetirizine dihydrochloride, it was 10 mg, 132, it was Rs. 2 and Rs. 85.0, for Loratadine, it was 10 mg, 59, Rs. 18 and Rs. 102.4 and for Fexofenadine, it was 120 mg, 88, Rs. 27.2 and Rs. 170.6 respectively.

Graph: I Cost analysis of second-generation antihistamines

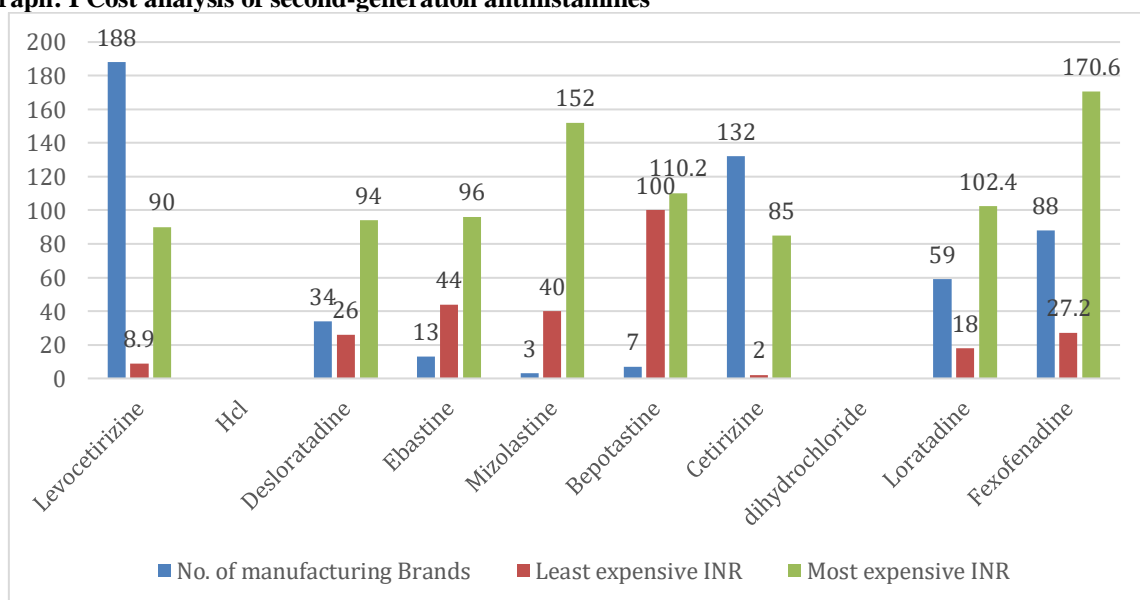


Table: II Assessment of cost ratio and cost variation

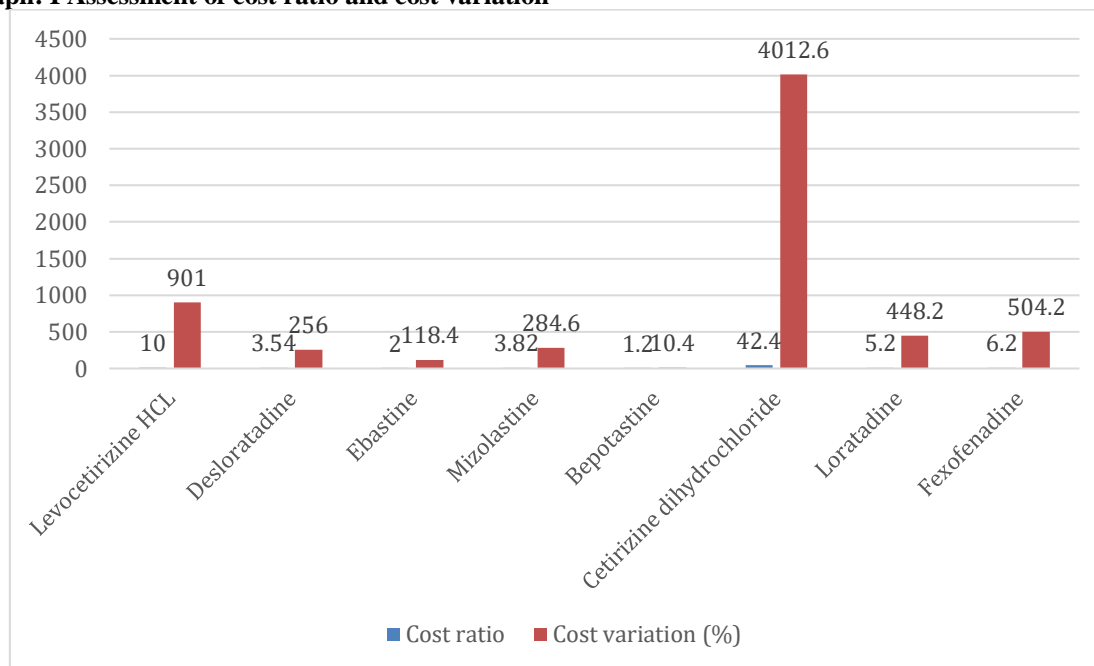
Drug Name	Cost ratio	Cost variation (%)
Levocetirizine HCL	10	901
Desloratadine	3.54	256
Ebastine	2.0	118.4
Mizolastine	3.82	284.6

Bepotastine	1.2	10.4
Cetirizine dihydrochloride	42.4	4012.6
Loratadine	5.2	448.2
Fexofenadine	6.2	504.2

Table II, graph I shows that cost ratio and cost variation (%) of levocetirizine HCL was 10 and 901, for Desloratadine was 3.54 and 256, for Ebastine was 2.0 and 118.4, for Mizolastine was 3.82 and 284.6, for

Bepotastine was 1.2 and 10.4, for Cetirizine dihydrochloride was 42.4 and 4012.6, for Loratadine was 5.2 and 448.2 and for Fexofenadine was 6.2 and 504.2. The difference was significant ($P < 0.05$).

Graph: I Assessment of cost ratio and cost variation



DISCUSSION

A subfield of health economics known as Pharmacoeconomics focuses specifically on the costs and benefits of medication therapy, offering guidance on resource allocation and planning decisions.⁶ In order to reduce healthcare expenses, government and commercial healthcare institutions are focusing on reducing drug expenditures.⁷ One significant factor influencing patients' adherence to their therapy is the expense of their medications.^{8,9,10} The present study was cost analysis of second-generation antihistamines. We found that WHO (DDD) (mg), no. of manufacturing brands, least expensive INR and most expensive INR for levocetirizine HCL found to be 5 mg, 188, 8.90 and 90.0 respectively. For desloratadine, it was 5 mg, 34, Rs. 26 and Rs. 94, for Ebastine, it was 10 mg, 13, Rs. 44 and Rs. 96, for Mizolastine, it was 10 mg, 3, Rs. 40 and Rs. 152, for Bepotastine, it was 10 mg, 7, Rs. 100 and Rs. 110.2, for Cetirizine dihydrochloride, it was 10 mg, 132, it was Rs. 2 and Rs. 85.0, for Loratadine, it was 10 mg, 59, Rs. 18 and Rs. 102.4 and for Fexofenadine, it was 120 mg, 88, Rs. 27.2 and Rs. 170.6 respectively. Nagarjan et al¹¹ in their study the cost of various second-generation antihistamine drugs available in the Indian market were selected. The highest and lowest price for ten (10) tablets/capsules of each second-

generation antihistamine was analyzed. A total of eleven oral Second Generation Antihistamines available in the Indian market and 566 oral tablets or capsules manufactured by different companies were identified for all the second-generation antihistamines. Huge variation was found in the cost of different branded preparations for the same drug (40.14% for cetirizine; INR 2.06 to INR 84.76). The most expensive cetirizine was 11.39 times costlier than the least expensive cetirizine. The least-cost variation and cost ratio saw with Bepotastine (10%) and (1.1) respectively. We found that cost ratio and cost variation (%) of levocetirizine HCL was 10 and 901, for Desloratadine was 3.54 and 256, for Ebastine was 2.0 and 118.4, for Mizolastine was 3.82 and 284.6, for Bepotastine was 1.2 and 10.4, for Cetirizine dihydrochloride was 42.4 and 4012.6, for Loratadine was 5.2 and 448.2 and for Fexofenadine was 6.2 and 504.2. Singh et al¹² in their study studied eight oral SGAs with a total of 1050 oral tablets or capsules manufactured by different companies are available for use in AR in India. The highest number of manufacturers were for levocetirizine (483), and lowest for mizolastine (2). Fexofenadine (INR 123.56) was the costliest and levocetirizine the cheapest (INR 2.3) SGA. Maximum variation in price was seen with cetirizine (4300%). The cost ratio was

highest for cetirizine (44), and lowest for mizolastine (1.1). Cetirizine is the only SGA from the National List of Essential Medicines (NLEM) 2015 of India; also the only SGA in the DPCO 2013 list of controlled drugs and formulations.

CONCLUSION

Authors found that the pricing of antihistamine medications varies greatly, according to this study, particularly when it comes to second-generation medications that are sold in India. Healthcare practitioners must use affordable medications to lessen the financial strain on society.

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