

## Cost Variation Analysis of various brands of topical medications used in Acne vulgaris currently available in Indian Pharmaceutical Market

Vishakha<sup>1</sup>, A Geetha<sup>2</sup>

1 Post-graduate, 2. Corresponding author/Professor, Department of Pharmacology, Bangalore Medical College and Research Institute, Bengaluru

\*Corresponding author: Dr. Vishakha

Department of Pharmacology Bangalore Medical College & Research Institute  
K.R Road, Bangalore Pincode-560002

### Abstract

Acne vulgaris is a chronic inflammatory skin disease affecting 90% individuals between puberty and 30 years, causing significant physical & psycho-social impact. Cost of drugs are important factor influencing compliance with the treatment. To analyze the cost variation of different brands of topical acne medications available in Indian market. Minimum and maximum cost of various topical medications used in treatment of Acne vulgaris of same strength and formulation were obtained from Current Index of Medical Specialties (CIMS) October-December 2019 edition, Drug Today October 2019- January 2020 edition and Pharma Sahi Daam mobile app (developed by National Pharmaceutical Pricing Authority, GoI). Drugs manufactured by only 1 company were excluded. Cost ratio (Maximum cost/ Minimum cost) and percentage cost variation ( $\frac{\text{Max cost} - \text{Min cost}}{\text{Min cost}} * 100$ ) were calculated. The percentage cost variation was maximum for Clindamycin 1% 10grams gel (467%) with maximum cost ratio followed by Clindamycin 1% + Nicotinamide 4% 15grams gel (335.8%) and Adapalene 0.1% 15grams gel (190.6%). Percentage cost variation was minimum with Clindamycin 1% + Nicotinamide 4% 15grams ointment (7.1%). This study highlights price variation among different brands of drugs in CIMS, Drug Today and Pharma Sahi Daam app. Wide variation in the prices cause dissatisfaction with treatment and unnecessary economic burden on young population. There is a strong need to create awareness about this price variation among the general public and health care providers.

**Key Words:** Cost analysis, Acne vulgaris, Percentage cost-variation, Pharma Sahi Daam

Date of Submission: 07-01-2021

Date of Acceptance: 23-01-2021

### I. Introduction

Acne vulgaris is a chronic inflammatory skin disease of the pilosebaceous unit.<sup>1</sup> It affects approximately 90% individuals between puberty and 30 years of age at some point with peak prevalence in adolescence.<sup>1-2</sup> It has polymorphic clinical presentation characterized by seborrhea, lesions like comedones, papules, pustules, nodes predominantly on the face which vary in number over the course of the disease and their sequelae - pigmentary changes and pitted or hypertrophic scarring.<sup>3</sup> Acne has significant negative physical and psychosocial impact on young population, resulting in emotional problems, withdrawal from society, anxiety & depression which affects the Quality of Life (QoL).<sup>4</sup> According to Global Burden of Disease study conducted in 187 countries in 2010, acne is among top ten most prevalent disease worldwide and skin conditions are top cause of years lived with disability.<sup>5</sup>

Acne pathogenesis is multifaceted and 4 relevant factors are recognized - follicular epidermal hyper proliferation, excess sebum production, inflammation and presence & activity of Propionibacterium acne.<sup>4</sup>

There is an array of treatment available targeting various pathological factors causing Acne vulgaris. Most acne therapies require at least 8 to 12 weeks to see improvement hence the cost of treatment plays a significant role in compliance with the therapy.<sup>1</sup>

Topical treatment is the mainstay for mild to moderate acne vulgaris as well as for maintenance therapy for all grades of acne severity.<sup>1,6</sup>

Pharmacoeconomics is a major factor in practice and prescribing of medicine in developing countries where economic burden can lead to non-compliance and failure of therapy. Treatment success depends on choice of drug based on their efficacy, side effect profile, patient preference as well as the cost. Though branded generics make upto 70-80% of retail market, there is huge price gap and people are unable to afford the medications especially when the treatment requirements are long term.<sup>7</sup>

There are several brands of same formulation manufactured by different pharmaceutical companies with large variation in the market price. As prescribing by brand name is common in India, it is important that both the clinician and the patient are aware of these differences in price of the drugs they choose and make an informed decision with mutual consent.

Limited studies are available in Indian scenario which compare the cost of different brands of drugs for acne vulgaris. Hence the present study was carried out for cost variation analysis of the available topical treatment of acne vulgaris.

## II. Materials And Methods

This is an analytical study comparing cost of different formulations of topical acne medications.

As there were no patients involved and the data was taken from Drug Formularies in the study, the approval from Institutional Ethics Committee was not required for the present study.

A total of Minimum and maximum cost in INR of various topical medications used in treatment of Acne vulgaris of same strength and formulation were obtained from Current Index of Medical Specialties (CIMS) October-December 2019 edition, Drug Today October 2019- January 2020 edition and Pharma Sahi Daam mobile app (developed by National Pharmaceutical Pricing Authority, Ministry of Chemicals and Fertilizers, Government of India and launched in August 2016).

Various drugs with same strength and formulations were included for the study. Considering the variation in packaging cost, formulations of same quantity were compared. Drugs manufactured by only 1 company were excluded. Gels, ointments, lotions and creams were compared separately. Most common topical medications used in acne are Clindamycin 1%, Benzoyl Peroxide 2.5% and 5%, adapalene 0.1%. All costs are given in Indian rupees (INR)

$$\text{Cost ratio} = \frac{\text{Maximum cost}}{\text{Minimum cost}}$$

$$\text{Percentage cost variation (\%)} = \frac{\text{Maximum cost} - \text{Minimum cost}}{\text{Minimum cost}} * 100$$

### Statistical Analysis

Data was analyzed using percentage and proportions.

## III. Results

The prices of topical medications for acne vulgaris manufactured by different pharmaceutical companies were analyzed.

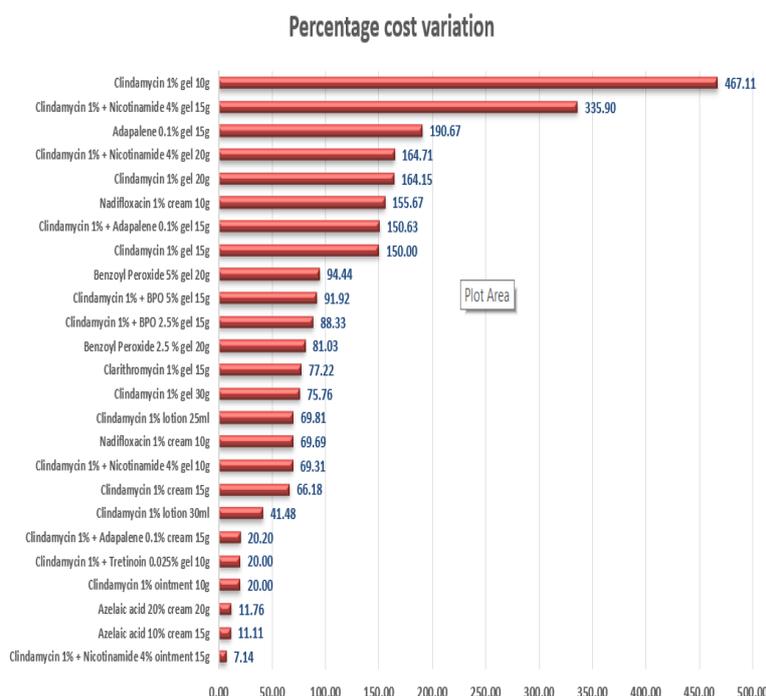


Figure 1 : Percentage cost variation of different formulations and quantity of topical medications used for acne vulgaris

**Table 1 :** Percentage cost variation of different formulations and quantity of topical medications used for acne vulgaris

Drug	Formulation	Amount	Minimum cost (INR)	Maximum cost (INR)	Cost ratio	Percentage cost variation
Clindamycin 1% + Nicotinamide 4% ointment 15g	ointment	15g	112	120	1.07	7.14
Azelaic acid 10% cream 15g	cream	15g	135	150	1.11	11.11
Azelaic acid 20% cream 20g	cream	15g	170	190	1.12	11.76
Clindamycin 1% ointment 10g	Ointment	10g	50	60	1.20	20.00
Clindamycin 1% + Tretinoin 0.025% gel 10g	gel	10g	50	60	1.20	20.00
Clindamycin 1% + Adapalene 0.1% cream 15g	cream	15g	99	119	1.20	20.20
Clindamycin 1% lotion 30ml	lotion	30ml	90.47	128	1.41	41.48
Clindamycin 1% cream 15g	cream	15g	55	91.4	1.66	66.18
Clindamycin 1% + Nicotinamide 4% gel 10g	gel	10g	47.11	79.76	1.69	69.31
Nadifloxacin 1% cream 10g	cream	7.5g	51.27	87	1.70	69.69
Clindamycin 1% lotion 25ml	lotion	25ml	53	90	1.70	69.81
Clindamycin 1% gel 30g	gel	30g	82.5	145	1.76	75.76
Clarithromycin 1% gel 15g	gel	15g	39.5	70	1.77	77.22
Benzoyl Peroxide 2.5 % gel 20g	gel	20g	58	105	1.81	81.03
Clindamycin 1% + BPO 2.5% gel 15g	gel	15g	180	339	1.88	88.33
Clindamycin 1% + BPO 5% gel 15g	gel	15g	198	380	1.92	91.92
Benzoyl Peroxide 5% gel 20g	gel	20g	54	105	1.94	94.44
Clindamycin 1% gel 15g	gel	15g	60	150	2.50	150.00
Clindamycin 1% + Adapalene 0.1% gel 15g	gel	15g	79	198	2.51	150.63
Nadifloxacin 1% cream 10g	cream	10g	39.7	101.5	2.56	155.67
Clindamycin 1% gel 20g	gel	20g	53	140	2.64	164.15
Clindamycin 1% + Nicotinamide 4% gel 20g	gel	20g	85	225	2.65	164.71
Adapalene 0.1% gel 15g	gel	15g	75	218	2.91	190.67
Clindamycin 1% + Nicotinamide 4% gel 15g	gel	15g	39	170	4.36	335.90
Clindamycin 1% gel 10g	gel	10g	15.87	90	5.67	467.11

A total of 25 formulations of various topical medications used in acne vulgaris were compared. It included 16 monotherapy preparations of 6 different drugs and 9 FDCs of 4 different drug combinations. Wide variation in prices of same medications was found in this study manufactured by different companies across various brands.

The percentage cost variation was maximum for Clindamycin 1% 10grams gel (467%) and it had maximum cost ratio of 5.67. This drug's minimum cost was INR 15.87 and maximum cost was INR 90. The next maximum percentage cost variation was observed for Clindamycin 1% + Nicotinamide 4% 15grams gel (335.8%) and Adapalene 0.1% 15grams gel (190.6%).

Percentage cost variation was minimum with Clindamycin 1% + Nicotinamide 4% 15grams ointment (7.1%) with cost ratio of 1.07, minimum cost was INR 112 and maximum cost was INR 120.

#### IV. Discussion

Compliance is Latin word *complire* meaning to fill up/ complete or fulfil an action. It is the extent to which the time history of drug administration corresponds to the prescribed regimen ie in accordance with the given advice. Lack of good compliance affects clinical outcome, delays the desired results, causes emergence of resistance or even failure of treatment. All these undermine faith in the therapy and affects the quality of life and causes overall increase in health care cost.<sup>8</sup> Compliance is affected by cost of therapy, duration and dosing schedule, side effects and patient belief.

Drug prices in India are controlled by DPCO [Drug (Prices Control) Order], 1995. The Pharma Sahi Daam app was developed by National Pharmaceutical Pricing Authority (NPPA), Ministry of Chemicals and Fertilizers, Government of India and was launched in August 2016 with the aim to make medicines available to all at affordable prices. It gives the MRP (Maximum Retail Price) by NPPA of various scheduled drugs on real time basis.<sup>9-11</sup> Indian market has availability of various branded formulations of the same drug in wide range of

prices. Same drugs are manufactured by a number of pharmaceutical producers leading to greater price variations.

The present study showed a very high variation in the maximum and minimum price of various topical formulations of drugs used in the treatment of acne vulgaris which are manufactured by different pharmaceutical companies in India. (Table 1) The cost ratio was also observed to be very high (Fig. 2). The highest % cost variation was found for Clindamycin 1% 10grams gel (467%) and lowest % cost variation was of Clindamycin 1% + Nicotinamide 4% 15grams ointment (7.1%). The percentage variation in the cost was above 100% for 8 out of 25 formulations.

Study of cost variation has been done for antipsychotic, anti depressants, anti diabetics, antihypertensive and anti microbial drugs and these studies also show wide price variation among various brand of drugs. A study conducted by Gupta A et al shows the most common topical medications for treatment of acne were retinoids and antimicrobials like erythromycin and clindamycin. The per day cost of treatment ranged from Rs 15.50 to Rs 155.70. In their study, they found percentage cost variation for tretinoin cream of 176.92% and for adapalene gel of 166.66%.<sup>12</sup>

Substitution of one brand with another maybe done by doctor or pharmacist due to reasons like availability or cost. Price variation also depends on availability and access of raw materials, market structure and demand, advertising and marketing cost, local and government policies as well as information available to the prescribing doctor and pharmacist.<sup>13-14</sup> The variations in cost of same drugs and difference in quality and bioequivalence makes the prescribing of most cost effective treatment difficult. Cost of treatment plays a major role in patient care especially in developing countries. There is widespread ignorance amongst clinicians as well as patients regarding the variation in cost of different brands and its awareness will help improve in prescribing the most cost effective regimen for the patient which will help increase compliance and success of the therapy.

## V. Conclusion

Our study findings show a wide variation in the prices of different brands of same topical drugs used in acne vulgaris in India. In India, the cost of drugs are regulated by NPPA ( National Pharmaceutical Pricing Authority) which is under the Ministry of Chemicals & Fertilizers. This regularizes prices of drugs available in Indian market by publishing a list of drugs and their maximum ceiling prices and ensures the availability of affordable medicines. There is a strong need to create awareness about this higher price variation among the general public, health care providers, health care payers, government agencies, policy makers, pharmacists for appropriate intervention to reduce economic burden on patients as well as the healthcare system. Our study results help the prescriber to select the same generic drug at low cost, which improves patient adherence to the treatment as well as fulfills one of the criteria of rational prescription.

## Acknowledgements

Authors would like to thank all the faculty of department of Pharmacology for helping in this research work.

*Funding: Nil*

*Conflict of interest: No conflict of interest*

*Ethical approval: Not required*

## References

- [1]. A . M. Layton. Disorders of the Sebaceous Glands. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. Rook's Textbook of Dermatology. 8<sup>th</sup> edn. USA: Wiley- Blackwell Publication : 2010 .p.42.1 - 42.89
- [2]. Zaeglein AL, Graber EM, Thiboutot DM, Strauss JS. Acne Vulgaris and acneiform eruptions In: Wolff K, Goldsmith LA, Katz SI, Gilchrist BA, Paller AS, Leffell DJ, editors. Fitzpatrick's Dermatology in General Medicine. 7<sup>th</sup> edn. USA: McGraw Hill; 2008. p.690-703
- [3]. Zaeglein A, Graber EM, Thiboutot D, Strauss JS. Disorders of Sebaceous Glands - Acne Vulgaris and Acneiform Eruptions. In : Wolff K, Goldsmith LA, Katz SI, Gilchrist BA, Paller AS , Leffell DJ, editors. Fitzpatrick's Dermatology in Medicine. 7<sup>th</sup> ed. New York: McGraw-Hill. 2008. p. 690-703.
- [4]. James WD. Acne. New England J of Medicine 2005; 325: 1463 - 72
- [5]. Hay RJ, Johns NE, Williams HC et al. The global burden of skin disease in 2010: an analysis of the prevalence and impact of skin conditions. J Invest Dermatol. 2014; 134(6):1527-34.
- [6]. Gollnick H, Cunliffe W, Berson D, Dreno B, Finlay A, Leyden JJ, et al. Management of Acne. J Am Acad Dermatol. 2003; 49(1): S1-S7.
- [7]. Das SC, Mandal M, Mandal SC. A critical study on availability and price variation between different brands: Impact on access to medicines. Indian J Pharm Sci. 2007; 69(1): 160-3
- [8]. Aronson JK. Compliance, concordance, adherence. Br J Clin Pharmacol. 2007 Apr; 63(4): 383-384.
- [9]. Kumar V, Gupta NV, Kumar KA. A comparison between old and latest systems in DPCO. International Journal of Pharmacy and Pharmaceutical Sciences 2014; 6(2):19-20.
- [10]. Compendium of notified ceiling prices of scheduled drugs – 2015 NPPA. Available from - <http://www.nppaindia.nic.in/ceiling-price>.
- [11]. Drug Price Control Order [Online]. 2019 [cited 2019 Dec 16]; Available from: URL: <http://www.nppaindia.nic.in>
- [12]. Gupta A. Drug Utilizing Pattern of Acne Vulgaris in a Tertiary Care Teaching Hospital. J Basic Clin Pharm 2017; 8:230-234.

- [13]. Patel BS, Chavda FM and Mundhava SG: Cost Variation Analysis of Single Nonsteroidal Anti-Inflammatory Agents Available In Indian Market: An Economic Perspective. *Int J Pharm Sci Res* 2016; 7(5): 2174-80.doi: 10.13040/IJPSR.0975-8232.7(5).2174-80.
- [14]. Panchal SS, Pandit PR, Phatak AM, Lohi KM. Cost analysis of antiretroviral agents available in India. *Int J Basic Clin Pharmacol* 2015;4:479-82.

Dr. Vishakha, et. al. "Cost Variation Analysis of various brands of topical medications used in Acne vulgaris currently available in Indian Pharmaceutical Market." *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(01), 2021, pp. 21-25.