Original Article

Drug Utilization Study in Various Types of Acne and Drug Therapy Variations According to Age and Severity in the Outpatient Department of Dermatology in a Tertiary Care Centre: An Observational Study

Dr. Rachana Ramesh Chavan[1]*, Dr. Vandana Avinash Badar[2], Dr. Parul Gaikwad[3], Dr. Kalyani Pradhan[4]

1. Assistant Professor, Department of Pharmacology, Byramjee Jeejeeboy Government Medical College and Sassoon Hospital, Pune, India.
2. Professor and head of the department, Department of Pharmacology, Indira Gandhi Govt. Medical College, Nagpur, India.
3. Assistant Professor, Department of Pharmacology, Indira Gandhi Government Medical College, Nagpur, India.
4. Senior Resident, All India Institute of Medical Sciences, Nagpur, India.

***Corresponding author's E-mail:** dr.rachanachavan@gmail.com

Received: 05-06-2025; **Revised:** 26-08-2025; **Accepted:** 04-09-2025; **Published online:** 20-09-2025.

ABSTRACT

Introduction: Acne Vulgaris is a common skin disease in developing countries. Management aims to alleviate symptoms, clear lesions, limit disease activity, and avoid negative impacts and hence necessitates study to evaluate treatment choices and drug utilization.

Aims: To study the first-line of drugs used to treat various types of Acne vulgaris according to its severity.

Settings and Design: The study was done in the outpatient department of dermatology in a tertiary care centre and teaching hospital.

Methods and Materials: Study participants were selected based on the inclusion and exclusion criteria after diagnosis, and prescriptions were analyzed for treatment according to their severity.

Statistical analysis: Analysis was done using Microsoft excel sheet 2019.

Results: The most common severity found was moderate degree according to the Global Acne Grading System (GAGS). This drug utilization study on acne vulgaris revealed that keratolytic agents (29%) were the most commonly prescribed drugs, followed by retinoic acid derivatives (22%) and antibiotics (19%), with minimal use of steroids (0.24%). Benzoyl peroxide was the most frequently used keratolytic, aligning with standard treatment guidelines. The most common fixed-dose combination (FDC) was adapalene + clindamycin, followed by adapalene + benzoyl peroxide. Treatment varied with severity, adhering to the American Academy of Dermatology guidelines. The average number of drugs per prescription (3.68) exceeded WHO standards, but antibiotic usage (19%) remained within acceptable limits, indicating rational use without overprescription.

Conclusions: The study highlights the need for a global standardized grading system for acne vulgaris, emphasizing the importance of increased generic prescribing and addressing polypharmacy. It also suggests incorporating a formulary into hospital administration to rationalize prescriptions and not to promote natural solutions, such as Complementary and alternative medicine, for improved patient care.

Keywords: Acne vulgaris, moderate degree, Drug utilization, polypharmacy, Global Acne grading system.

1. INTRODUCTION

Acne vulgaris, a common skin disease in developing countries, affects all age groups and is more severe in late adolescence.[i] It causes inflammation and scarring and can lead to lifelong complications. A 50.9% prevalence rate of acne is seen in women of 20 to 29 years while 26.3% is seen in women of 40 to 49 years of age.[ii] Acne vulgaris disease has a substantial impact on quality of life, it is generally chronic and requires lifelong treatment. Acne vulgaris affects all age groups, necessitating a study to evaluate treatment choices and drug utilization, identifying problematic areas for a better healthcare system.[iii]

Prescription audit plays an important role in constituting guidelines for improving drug utilization patterns and restricting irrational prescribing.[iv] As these types of studies help in identifying the problem areas so that appropriate actions can be taken to overcome the identified issues for a better healthcare system, this study was designed and conducted.

The study aims to find out what are the first line of drugs used in various types of acne vulgaris according to their severity, and whether the treatment differs with different age groups, along with the most preferred oral antibiotic Vs preferred topical antibiotic.

2. MATERIALS AND METHODS

The study was conducted in the dermatology OPD of a tertiary care center and teaching hospital after the Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC) prior to its commencement (IEC approval number:562-63/2021).

Patients of all age groups with complaints of acne were identified and enrolled in the study after informing them about the objectives of the study. The study was conducted for a period of 18 months.

Inclusion criteria: -

A. Patients with complaints of Acne.
B. All age group patients.
C. Patients of both sexes.

Exclusion criteria: -

1. Pregnant and lactating patients with Acne.

2. Patients with any major underlying disorder.

3. Patients not willing to participate.

Once the consultation by the dermatologist was over, details from the prescriptions were recorded in a pre-designed case record form (CRF). To protect the identity of the patient, the record form did not contain the patient's name. During the diagnosis of patients with Acne vulgaris, the severity of the disease was graded according to the GAGS (GLOBAL ACNE GRADING SYSTEM).[v] According to this system, each type of lesion is given a value depending on severity. No lesions=0, comedones=1, papules=2, pustules=3, and nodules=4. The score for each area (local score) is calculated using the FORMULA: LOCAL SCORE=FACTOR X GRADE (0-4). Factor is: forehead= 2, right cheek=2, left cheek=2, Nose= 1, Chin=1, Chest and upper back=3. A score of 1-18 =mild, 19-30=moderate, 31-38= sever, and > 39 =very severe.

The collected data was then analysed for the demographic profile of patients and prescription analysis was done to know the most commonly used class of drugs along with the most preferred route of administration of prescribed medicine. A clinical history with duration and prognosis of the lesion in the past and family history was elicited. The drug details included were dose, route, and frequency of medication. The data collected were entered into MS Excel 2019 spreadsheet and subsequently analysed.

3. RESULTS

Demographic parameters

A descriptive and cross-sectional study was conducted to determine the drug prescribing pattern at the outpatient department of dermatology. A total of nine hundred and eighty-nine (989) patients were included in this study. These 989 patients were enrolled after they were diagnosed with Acne Vulgaris according to the inclusion criteria.

Table 1: Sex and age distribution

Age	Number of male patients	Number of female patients	Total	Percentage
<20 years	341	166	507	51.26%
21-30 years	178	225	403	40.75%
31-40 years	12	54	66	6.67%
More than 40 years	01	12	13	1.31%
Total	531	458	989	100%

Out of the 989 patients, males accounted for 53.69% (n=531) of the study participants, while females accounted for 46.30% (n=458), with a male: female ratio of 1.15:1. The most common age group encountered was age less than 20 years in males and age of 21-30 years in female patients. The patients least encountered were from the age group of more than 40 years. The mean age group of patients with Acne Vulgaris is 21.70 years for both sexes.

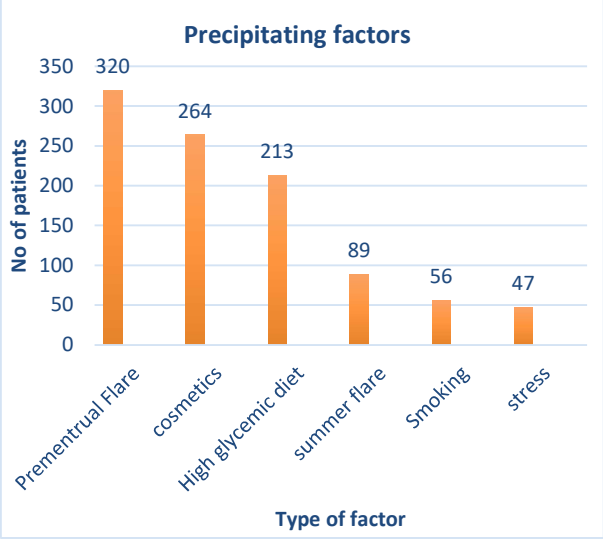

Figure 1: Precipitating Factors

The most common factor was seen to be premenstrual flares in females (n=320, 32.35%).

During the diagnosis of patients with Acne vulgaris, the severity of the disease was graded according to the GAGS (GLOBAL ACNE GRADING SYSTEM). After grading the treatment was given accordingly.

Table 2: Severity of disease according to gags

Severity	Scale	No of patients
Mild	1-18	223
Moderate	19-30	623
Severe	31-38	89
Very severe	>39	54
Total		989

According to this classification, each type of lesion is given a value depending on severity. Our analysis shows that the majority of patients were of moderate severity (62.99%) and the least was graded very severely (5.46%).

The prescription was analyzed for various class of drugs prescribed for the patients. A total of 3641 drugs were prescribed to patients enrolled in this study. The prescriptions analysed showed that the distribution of drugs given for treatment consisted of maximum keratolytic agents (n=1039), antibiotics (n=708), retinoic acid derivative (n=803) and steroids being the least prescribed medicine (

n=9). The other drugs used were kojic acid, carboxylic acid, arbutin, niacinamide, Vitamin E, Resorcinol+ sulfur, and aloe vera extracts.

Table 3: Class of drugs

Class of Drugs	Drugs
Antibiotic	Azithromycin
	Clindamycin
	Doxycycline
	Minocycline
Retinoic acid derivative	Adapalene
	Isotretinoin
	Tretinoin
Antihistamine	Cetirizine
	Levocetirizine
Corticosteroids	Clobetasol
	Mometasone
Keratolytic agent	Salicylic acid
	Benzoyl peroxide
Antioxidants	Azelaic acid
	Allantoin
	Vit C (Ascorbyltetraisopalmitate)
	Glutathione
	Glycolic acid

Prescription analysis was done for topical agents. Out of all the topical formulations prescribed, Benzyl peroxide (70.57%) was the most frequently prescribed medication. Followed by Adapalene (48.12%), clindamycin (44.28%), and salicylic acid (34.47%). Retinoic acid derivative like tretinoin was also commonly prescribed (23.45%).

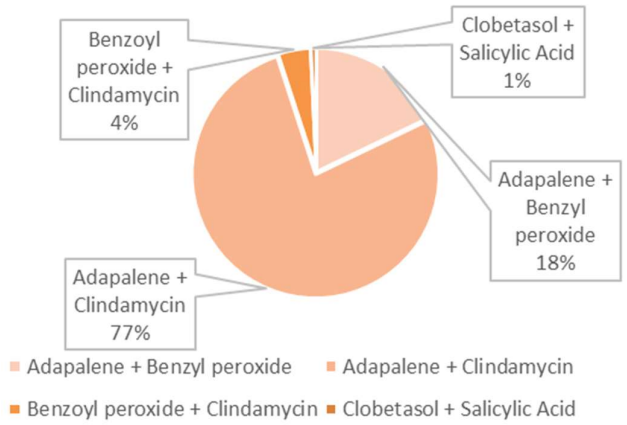

Figure 2: Fixed Dose Combinations

The patients were also prescribed various combination drugs as above. Fixed dose combinations were given for moderate severity of Acne and above severity. The most commonly used FDC was adapalene + clindamycin (n=306) followed by adapalene + benzyl peroxide (n=71). The fixed dose combinations were evaluated for their dose, frequency and duration. All the FDCs given were mostly prescribed with once-a-day daily dosing with the duration of treatment for 14 days. Only a combination of (Clobetasol + salicylic Acid) was given for a period of 7 days.

Table 4: Topical Drug Distribution

Drugs	Total prescriptions	Dose/strength	Frequency
Adapelene	476	0.1% 2.5%	HS
Azithromycin	01	2%	HS
Benzyl peroxide	698	2.5% 5%	OD/BD
Clindamycin	438	1%	OD/BD
Calamine	25	-	HS
Clobetasol	3	0.05%	HS
Salicylic acid	341	0.2% 1% 2%	BD BD HS
Glycolic acid	88	12%	HS
Tretinoin	232	0.025%	HS
Kojic acid	15	2%	HS
Mometasone	04	0.1%	BD/HS

The treatment of the disease was done according to the severity of the disease. Mild-graded patients were only prescribed topical keratolytic agents. Oral preparations were prescribed from moderate grades. Antibiotics were also added to patients of moderate grade. Severe-graded patients were prescribed both topical as well as oral drugs. Corticosteroids were given only to very severe graded patients.

Table 5: Treatment according to severity

Severity of Acne Vulgaris	Oral	Topical
Mild (I)	-	Benzoyl peroxide and or salicyclic acid
Moderate (II)	Azithromycin/ Doxycycline	Benzoyl peroxide/ Adapalene +Clindamycin and salicylic acid and carboxylic acids
Severe (III)	Azithromycin/ Doxycycline and/or Isotretinoin and/or antihistamine and/or glutathione and Vitamin C	Benzoyl peroxide/ Adapalene + Clindamycin and salicylic acid and/ or Vitamin C
Very severe	Azithromycin/ Doxycycline/ Minocycline and/or Isotretinoin and glutathione and Vitamin C	Benzoyl peroxide/ Tretinoin/ Adapalene and Clindamycin and salicylic acid and /or corticosteroids and Vitamin C

Table 6: WHO core parameters

Parameter	Observation
Total number of prescriptions	989
Total number of drugs	3641
The average number of drugs per prescription	3.68%
% of drugs prescribed by generic name	66.79%
% of drugs prescribed by brand name	33.20%
% of antibiotics prescribed	19%
% of drugs prescribed topically	79%
% of drugs prescribed orally	21%
Drugs from National Essential Drug List	45.94%

The prescriptions of 989 patients were analysed according to WHO prescribing indicators. The average number of drugs per prescription was 3.68%. The percentage of drugs prescribed by generic name was 66.79%, while by brand name was 33.20%. Medicines prescribed from the essential medicine list was around 45.94%.

RESULT AND DISCUSSION

Our study found that acne vulgaris is more common in males than females, with a male: female ratio of the patient 1.15:1 (Table 1). This male: female ratio was less compared to Agrawal DA et al[vi] study where the ratio was 1.56:1. The most common age group affected was found to be less than 30 years with a mean age of 21.70 years (Table 1). The onset of disease for a female patient seen in our study was age 12 years while for male patients it was 13 years (Table 1) which is also lower as compared to Adityan B et al[vii] who stated 14 years as the onset age irrespective of sex. This difference seen can be due to the fact that the beginning of acne frequently occurs during the prepubertal period which is different for different people when adrenal androgens stimulate the pilosebaceous unit. Ovarian and testicular androgens play a key role in the development of acne in puberty[viii]. In our study we found that 320 patients,(32.35%) had exacerbation of acne in the premenstrual period (Figure 1),which is in accordance with the Lauren Geller et al[ix] study who highlighted that perimenstrual acne flare is a significant and growing complaint affecting a large number of women. Prematurity flare-ups are also a major aggravating factor, and this result can be due to a pre-menstrual change in the hydration of pilosebaceous epithelium. In our study it was found that most patients had moderate acne severity (62.99%) and the least were graded as very severely (5.46%) (Table 2). This was in accordance to Singh et al[x] which showed Moderate severity was the most prevalent one (45%) and the minimum was very severe grade (7%).

The prescription analysis showed that the distribution of drugs given for treatment consisted of maximum keratolytic agents (n=1039, 29%), retinoic acid derivative (n=802, 22%), and antibiotics (19%, n=708), with steroids being the least prescribed medicine (0.24%, n=9) (Table 3) . These results were in accordance with SB Dharrao's study[xi] which showed the most common group of drugs used in the treatment are antibiotics (50.75%) and keratolytics (20.04%). Benzoyl peroxide (70.57%) was the most common keratolytic agent used (Table 4). This result was in accordance with Yang Z et al[xii] which showed treatment of acne vulgaris with Benzoyl peroxide alone or in combination with other topical treatments (antibiotics, retinoid, salicylic acid, or zinc) at concentrations of (2% to 5%) is the standard of treatment for mild to moderate acne.The most commonly used FDC was adapalene + clindamycin (n=306) followed by adapalene + benzyl peroxide (n=71) (Figure 2) This was in harmony with the Kwon HH study which showed Clindamycin + Adapalene accounted for (60.52%) of FDCs used in the treatment of Acne Vulgaris.[xiii]

The treatment changed with the severity of the disease (Table 5) which was in accordance with the guidelines stated by American academy of dermatology shown by Zaenglein AL et al.[xiv] Fixed dose combinations were given for moderate and above severity of Acne. The average drug per prescription in our study was 3.68% (Table 6), which was not within the range limit of WHO standard[xv]. The percentage of prescriptions with antibiotics prescribed was 19% (TABLE 6) which was less than the range of WHO standards (<40%). Hence there was no overuse of antibiotics.

CONCLUSION

The findings of our study contribute perceptions that are valuable into the clinico-epidemiological and also therapeutic profile of acne vulgaris. Dermatologists continue to struggle with determining the severity of acne vulgaris. Hence there is a need for a global perfect grading system which can help the dermatologist for treating the disease with a minimum number of drugs. The study also focuses on the rise of polypharmacy in hospitals, highlighting the need for regular audits to rationalize prescriptions, reduce errors, and recommend appropriate treatment. It also suggests incorporating a formulary into hospital administration to rationalize prescriptions and not to promote natural solutions, such as Complementary and Alternative Medicine, for improved patient care.

Source of Support: The author(s) received no financial support for the research, authorship, and/or publication of this article

Conflict of Interest: The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

REFERENCES

1. Sumana MH. Prescription analysis of drugs used in the outpatient department of dermatology at tertiary care hospital. Asian Journal of Biomedical and Pharmaceutical Sciences. 2015 Jul 1;5(46):22.
2. Collier CN, Harper JC, Cantrell WC, Wang W, Foster KW, Elewski BE. The prevalence of acne in adults 20 years and older. Journal of the American Academy of Dermatology. 2008 Jan 1;58(1):56-9.
3. Durai PC, Nair DG. Acne vulgaris and quality of life among young adults in South India. Indian journal of dermatology. 2015 Jan 1;60(1):33-40.
4. World Health Organization. (2002). Promoting rational use of medicines: core components. WHO Policy Perspectives on Medicines, No. 005. Geneva: World Health Organization. Available at: https://apps.who.int/iris/handle/10665/67438
5. GAGS (Global Acne Grading System) for assessing acne severity - K B Lim Skin Clinic Pte Ltd Accessed on 19 december 2020
6. Agrawal DA, Khunger N. A morphological study of acne scarring and its relationship between severity and treatment of active acne. Journal of Cutaneous and Aesthetic Surgery. 2020 Jul;13(3):210.
7. Adityan B, Thappa DM. Profile of acne vulgaris-A hospital-based study from South India. Indian Journal of Dermatology, Venereology and Leprology. 2009 May 1;75:272.
8. Katsambas AD, Cunliffe WJ, Zouboulis CC. Clinical aspects of acne vulgaris. In Pathogenesis and treatment of acne and rosacea 2014 (pp. 213-221). Springer, Berlin, Heidelberg.
9. Geller L, Rosen J, Frankel A, Goldenberg G. Perimenstrual flare of adult acne. The Journal of clinical and Aesthetic dermatology. 2014 Aug;7(8):30.
10. Singh A, Dhillion KS. Clinico-Epidemiological Profile of Acne in Northern India. Ann. Int. Med. Den. Res. 2019; 5(3): DT06-DT08.
11. Dharrao SB, Bhansali PB. Study of Drug Utilization Pattern in Acne Vulgaris in Skin Outpatient Department in Tertiary Health Care Centre. MVP Journal of Medical Sciences. 2019 Jun 1:72-7.
12. Yang Z, Zhang Y, Mosler EL, Hu J, Li H, Zhang Y, Liu J, Zhang Q. Topical benzoyl peroxide for acne. Cochrane Database of Systematic Reviews. 2020(3).
13. Kwon HH, Park SY, Yoon JY, Min S, Suh DH. Do tutorials on application method enhance adapalene–benzoyl peroxide combination gel tolerability in the treatment of acne?. The Journal of Dermatology. 2015 Nov;42(11):1058-65.
14. Zaenglein AL, Pathy AL, Schlosser BJ, Alikhan A, Baldwin HE, Berson DS, Bowe WP, Graber EM, Harper JC, Kang S, Keri JE. Guidelines of care for the management of acne vulgaris. Journal of the American academy of dermatology. 2016 May 1;74(5):945-73.
15. World Health Organization. How to investigate drug use in health facilities: selected drug use indicators. World Health Organization; 1993.