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Original Research Article

Comparative Efficacy of 5% Dapsone Gel Vs 1% Clindamycin Gel in the Treatment of Mild to Moderate Acne Vulgaris

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Abstract: *Acne vulgaris is a highly prevalent inflammatory dermatosis affecting adolescents and young adults, often requiring effective topical therapy for mild to moderate disease.* ***Objective:*** *To compare the effectiveness and safety of 5% dapsone gel versus 1% clindamycin gel in patients with mild to moderate acne vulgaris.* ***Methods:*** *A comparative cross-sectional study was conducted at the Department of Dermatology, CMH, Gujranwala, from August 2024 to January 2025, on 100 patients with mild to moderate acne vulgaris, equally divided into two groups of 50 each. Group A received 5% dapsone gel, and Group B received 1% clindamycin gel for 12 weeks. The study was carried out in a dermatology outpatient setting over three months. Acne severity was assessed at baseline and follow-up visits using standard acne grading and the Global Acne Grading System (GAGS). Data were analyzed using SPSS, applying appropriate comparative statistical tests, with a p-value <0.05 considered statistically significant.* ***Results:*** *Baseline acne severity was comparable between the two groups, with no statistically significant difference (p = 0.841). At week 12, complete acne clearance was achieved in 46% of patients in the dapsone group, compared with 18% in the clindamycin group, indicating a significant difference in favor of dapsone (p = 0.004). Mean GAGS scores at week 12 were significantly lower in Group A (6.5 ± 7.11) than in Group B (9.8 ± 8.44) (p = 0.024). Both treatments were well tolerated. Mild adverse effects included erythema (8% in both groups), irritation (8% in Group A vs 4% in Group B), and burning sensation (6% in Group A vs 4% in Group B).* ***Conclusion:*** *Topical 5% dapsone gel is more effective than 1% clindamycin gel in the treatment of mild to moderate acne vulgaris, providing faster and greater lesion clearance with minimal and comparable side effects. Larger multicenter studies are recommended to validate these findings.*

Keywords: Acne Vulgaris, Clindamycin, Dapsone, Dermatological Agents

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Introduction

Acne vulgaris is one of the most common skin conditions worldwide, affecting a large number of adolescents (up to 90%) and adults (1). It is characterized by inflammatory lesions, results from clogged pores and excessive sebum production, and is caused by bacteria such as Propionibacterium acnes (2). The impact of acne goes beyond skin symptoms; it can lead to psychological distress, affecting self-esteem and social interactions, especially in teenagers (3). With the increasing prevalence of acne, especially in urbanized societies with high-stress environments and dietary influences, there is a rising need for effective, accessible treatment options (4).

The treatment options for acne include topical and systemic therapies, with common choices like benzoyl peroxide, retinoids, and antibiotics. Among topical antibiotics, clindamycin is most commonly prescribed by dermatologists for its ability to reduce skin inflammation and bacterial colonization (5). However, concerns over antibiotic resistance are growing, as long-term clindamycin use can lead to resistant strains of Propionibacterium acnes (6). To address this problem, treatments such as dapsone, known for its anti-inflammatory and antimicrobial properties, have emerged as alternatives in acne management (7).

A systematic review and meta-analysis found that 5% dapsone gel significantly reduced inflammatory lesions after 12 weeks, with fewer side effects than other topical treatments (8). Some studies have also shown that dapsone benefits patients with acne who do not respond well to traditional antibiotics (9, 10). Meanwhile, clindamycin remains widely used due to its low cost and ease of access, but its comparative efficacy to newer options like dapsone remains a topic of interest. Although both treatments have proven effective, there is limited direct comparison between them in clinical trials, especially in controlled settings.

Some recent studies have explored the factors influencing acne. A survey by Seetan et al. showed that diet, stress, and environmental factors significantly contribute to acne severity (11), suggesting that treatment may need to address these influences as well. Advances in dermatological therapies have opened new possibilities for treating acne without relying solely on antibiotics. Dapsone, with its unique anti-inflammatory mechanisms, has been noted to reduce acne severity without contributing to bacterial resistance as directly as traditional antibiotics (12), making it a strong candidate for comparison with clindamycin.

Prior research has limitations and gaps, such as small sample sizes, short follow-up periods, and a lack of assessment of the long-term outcomes of these treatments. Some studies have generally not considered factors such as the duration of acne, which may influence treatment outcomes, leaving a gap in understanding that could inform personalized treatment strategies.

This study aims to fill these gaps by comparing the efficacy of 5% dapsone gel and 1% clindamycin gel in patients with mild-to-moderate acne vulgaris over 12 weeks. By focusing on outcomes such as acne grade, Global Acne Grading System (GAGS) scores, and side-effect profiles, this study aims to provide a clear comparison of the two treatments in a controlled setting.

Methodology

This was a comparative cross-sectional study conducted over 12 weeks at the Department of Dermatology, CMH, Gujranwala, from August 2024 to January 2025. Participants were recruited from the clinic's outpatient department, and each participant provided written informed consent before enrollment.

A total of 100 patients with mild-to-moderate acne vulgaris were enrolled in the study. Eligible participants were male and female patients aged 14-35 years with a clinical Diagnosis of mild to moderate acne vulgaris, as determined by the investigator. Exclusion criteria included: (1) severe acne vulgaris, (2) current use of other acne treatments or medications known to affect acne, (3) known hypersensitivity to dapsone or clindamycin, (4) any other skin condition requiring treatment, (5) pregnant or breastfeeding women, and (6) patients who had received any other acne treatment within the previous four weeks.

Participants were divided into two groups, Group A and Group B. Group A received 5% dapsone gel, and Group B received 1% clindamycin gel. The study was single-blinded, with the investigator assessing outcomes blinded to treatment allocation to minimize potential bias.

Participants in Group A were instructed to apply 5% dapsone gel topically to the affected areas once daily. Those in Group B applied 1% clindamycin gel once daily to the affected areas. Participants were advised to clean the treatment area with a mild cleanser before application and to avoid using any other skincare products or medications on the affected areas during the study period. Each participant received instructions on the proper application technique to ensure consistency across the groups. Adherence to the treatment regimen was monitored through weekly follow-up visits and self-reported diaries.

Data were collected using standardized forms that documented baseline demographics, acne history, acne severity, GAGS scores, and any adverse effects. The investigator completed these forms for each included patient at each visit. The study period consisted of baseline assessment and follow-up visits at weeks 4, 8, and 12. At each visit, clinical assessments were conducted to monitor acne severity, treatment adherence, and any adverse effects experienced by participants.

The primary outcome measure was the degree of acne clearance, assessed using standardized acne grades (none, mild, moderate, and severe). Acne severity was recorded at baseline and at each follow-up visit. The secondary outcome was the change in GAGS scores from baseline to each follow-up visit.

During each follow-up visit, participants were asked about any adverse effects, including erythema, irritation, burning sensation, and pruritus. The severity and duration of these side effects were recorded. Participants experiencing severe adverse effects were evaluated for continued participation or required intervention, although no participant had to discontinue treatment.

After confirming that this study complied with all ethical guidelines, the institutional review board approved it. Each participant provided informed consent before enrollment, emphasizing that their involvement was completely voluntary and that their treatment options would not be affected if they chose to withdraw at any time. Data was anonymized and securely stored, and patient confidentiality was rigorously upheld throughout the study. To encourage openness and confidence in the research process, all participants received information about the study's goals, methods, advantages, and limitations.

IBM SPSS version 27.0 was used to analyze the collected data. The chi-square test is used to compare categorical variables, which are displayed as frequencies and percentages. The Mann-Whitney U test is used to compare continuous variables, which are typically reported as the mean and standard deviation (SD). Skewness, kurtosis, Q-Q plots, and the Shapiro-Wilk test were used to assess normality. For ease of interpretation, the results were displayed as graphs whenever feasible. A significance level of 5% was established, and a p-value of less than 0.05 (at 95% CI) was considered significant.

Results

A total of 100 patients with mild to moderate acne vulgaris were enrolled, with 50 patients each in Group A (5% dapsone gel) and Group B (1% clindamycin gel). The demographic characteristics of the participants are summarized in Table 1. The mean age was similar between the groups, with Group A at 22.1 ± 5.81 years and Group B at 22.0 ± 5.26 years. The majority of patients in both groups were female, with 28 (56%) in Group A and 31 (62%) in Group B. Patients were predominantly within the 14-20 age range, comprising 46% of Group A and 36% of Group B, as shown in Figure 1. Disease duration varied slightly, with a greater proportion of Group A having a disease duration of ≤ 3 months (64%) compared to Group B (52%).

Table 1. Clinical and demographic characteristics of study participants

	Group A: Dapsone 5% gel (n=50)	Group B: Clindamycin 1% gel (n=50)
	n (%)	n (%)
Gender		
Male	22 (44%)	19 (38%)
Female	28 (56%)	31 (62%)
Age groups (years)		
14-20	23 (46%)	18 (36%)
21-25	15 (30%)	20 (40%)
26-30	7 (14%)	9 (18%)
31-35	5 (10%)	3 (6%)
Age (years), mean ± SD	22.1 ± 5.81	22.0 ± 5.26
Duration of disease		
≤ 3 months	32 (64%)	26 (52%)
> 3 months	18 (36%)	24 (48%)

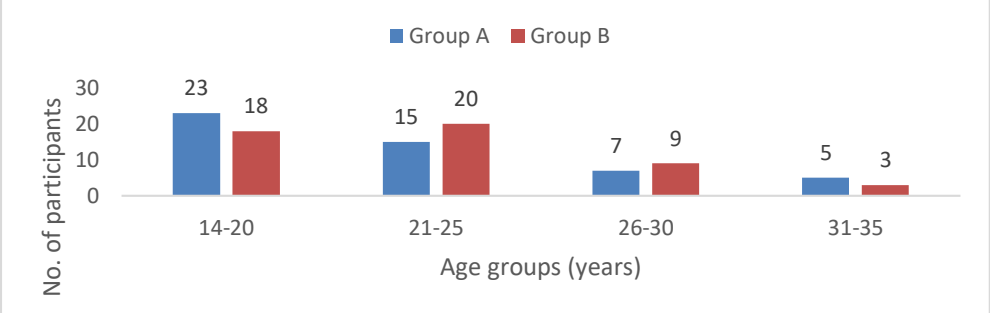

Figure 1. Distribution of patients based on age

Both treatment groups demonstrated a reduction in acne severity over the study period, as assessed by acne grades at weeks 0, 4, 8, and 12 (Table 2). At baseline (week 0), both groups presented with a similar distribution of acne severity, with no significant differences in the proportions of mild and moderate cases (p = 0.841). By week 4, both treatments led to reductions in the number of moderate cases, although the difference between groups was not statistically significant (p = 0.578). Group A showed a more substantial reduction by week 8, with 13 patients (26%) achieving complete acne clearance, compared with five patients (10%) in Group B (p = 0.091). At the final follow-up in week 12, nearly half of the patients in Group A (23 patients, 46%) achieved complete clearance. In comparison, only nine patients (18%) in Group B experienced similar results, a statistically significant difference favoring Group A (p = 0.004). These results suggest that 5% dapsone gel may be more likely to achieve full acne clearance within 12 weeks than 1% clindamycin gel.

Table 2. Comparison of grades of acne on subsequent follow-ups in both groups

Grades	Group A: Dapsone 5% gel n (%)	Group B: Clindamycin 1% gel n (%)	p value *
Week 0			
None	0 (0%)	0 (0%)	0.841
Mild	28 (56%)	27 (54%)	
Moderate	22 (44%)	23 (46%)	
Week 4			
None	5 (10%)	3 (6%)	0.578
Mild	32 (64%)	30 (60%)	
Moderate	13 (26%)	17 (34%)	
Week 8			
None	13 (26%)	5 (10%)	0.091
Mild	31 (62%)	35 (70%)	
Moderate	6 (12%)	10 (20%)	
Week 12			
None	23 (46%)	9 (18%)	0.004
Mild	25 (50%)	33 (66%)	
Moderate	2 (4%)	8 (16%)	

** Chi-square test.*

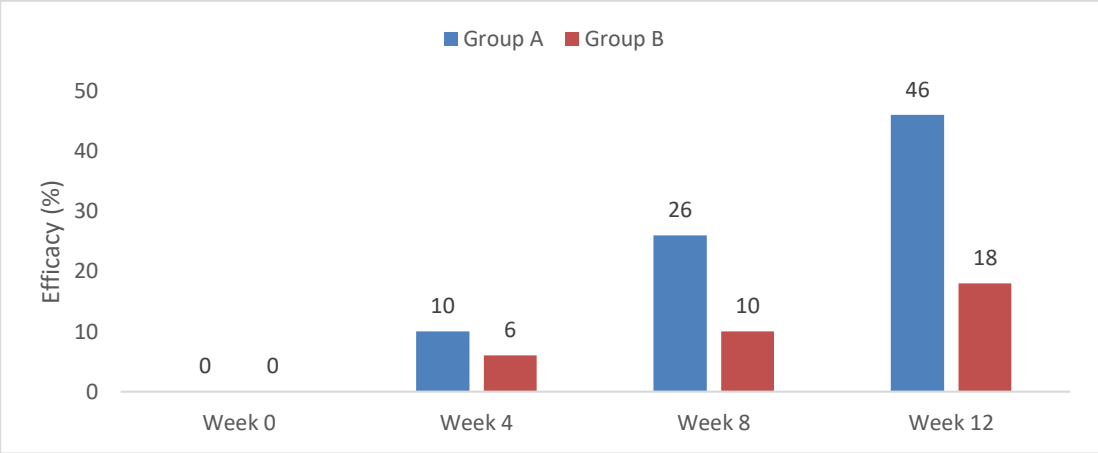

Figure 2. Efficacy of acne clearance in both groups on subsequent follow-ups

The GAGS scores provided further evidence of treatment efficacy, as detailed in Table 3. At baseline, the mean GAGS scores were similar across groups (Group A: 15.1 ± 9.31; Group B: 16.1 ± 9.13; p = 0.590), indicating comparable acne severity at the start of treatment. By week 4, both groups exhibited a moderate decrease in GAGS scores, though the decline was not statistically significant between groups (p = 0.641). Over time, Group A showed a faster reduction in acne severity, with a mean GAGS score of 8.8 ± 8.27 at week 8 compared to 11.5 ± 8.39 in Group B (p = 0.065), approaching significance. By week 12, Group A had a significantly lower mean GAGS score (6.5 ± 7.11) than Group B (9.8 ± 8.44; p = 0.024), confirming the superior efficacy of 5% dapsone gel in reducing overall acne severity.

Table 3. Comparison of the Global Acne Grading System (GAGS) score on subsequent follow-ups in both groups

GAGS score	Group A: Dapsone 5% gel Mean ± SD	Group B: Clindamycin 1% gel Mean ± SD	p value *
Week 0	15.1 ± 9.31	16.1 ± 9.13	0.590
Week 4	12.4 ± 8.66	13.4 ± 9.34	0.641
Week 8	8.8 ± 8.27	11.5 ± 8.39	0.065
Week 12	6.5 ± 7.11	9.8 ± 8.44	0.024

**Mann-Whitney U-test*

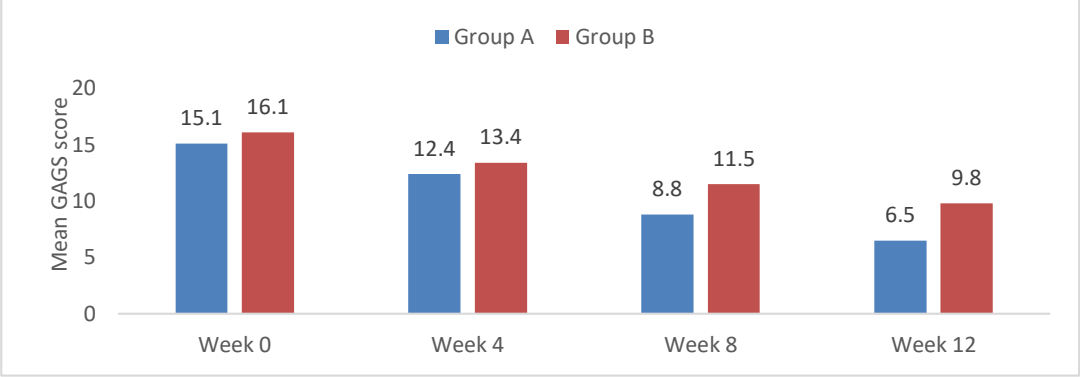

Figure 3. Mean GAGS score in both groups on subsequent follow-ups

Both treatment groups reported a low incidence of mild adverse effects, as summarized in Table 4. In Group A, the most common side effects included erythema (8%), irritation (8%), and burning sensation (6%). Similarly, Group B reported erythema in 8% of patients, with slightly lower rates of irritation (4%) and burning (4%). Pruritus was reported in 4% of Group A and 6% of Group B. Overall, the side effects were mild, with no significant differences between the groups and no serious adverse events reported, indicating both treatments were well-tolerated.

Table 4. Side effects of the drugs in both groups

Side effects	Group A: Dapsone 5% gel n (%)	Group B: Clindamycin 1% gel n (%)
Burning	3 (6%)	2 (4%)
Erythema	4 (8%)	4 (8%)
Irritation	4 (8%)	2 (4%)
Pruritus	2 (4%)	3 (6%)

Discussion

Acne vulgaris, a prevalent dermatological condition, impacts quality of life and often necessitates effective treatment to reduce symptoms. This study compared the efficacy of 5% dapsone gel and 1% clindamycin gel in the treatment of mild-to-moderate acne vulgaris. This study showed that 5% dapsone gel is significantly more effective at achieving acne clearance within 12 weeks than 1% clindamycin gel, aligning with previous research demonstrating dapsone's anti-inflammatory and antibacterial properties in the management of acne (13, 14).

Both treatment groups showed improvement, but Group A (5% dapsone) achieved a faster and more substantial reduction in acne severity, with 46% of patients achieving complete clearance by week 12, compared to only 18% in Group B (1% clindamycin). This finding is consistent with studies by Sanawar et al., which support dapsone's superior efficacy (82%) in reducing inflammatory lesions compared to clindamycin (12%), due to its unique mechanism that targets both inflammation and bacterial overgrowth (15).

In terms of GAGS scores, the study showed a significant reduction for Group A (dapsone) by week 12, with a mean score of 6.5 compared to 9.8 in Group B (clindamycin), confirming dapsone's greater efficacy in lowering overall acne severity. Sanawar et al. also observed that dapsone 5% reduced acne severity more effectively than clindamycin phosphate 1%, especially in patients with higher baseline GAGS scores (15), which may be due to dapsone's ability to penetrate deeply into inflamed lesions (16).

At intermediate time periods, such as weeks 4 and 8, both groups demonstrated reductions in acne grade and GAGS scores, although Group A consistently outperformed Group B. This intermediate improvement without significant statistical differences is consistent with findings by Al-Salama et al., who noted that while both dapsone and clindamycin reduce acne severity over time, dapsone's impact becomes more pronounced in the later weeks (4 and 8 weeks) of treatment (17). This shows that dapsone's effects compound over time, yielding better results, as similarly reported by Sarojini et al. (18).

The observed side effects, such as erythema, irritation, and burning sensations, were mild in both groups and showed no significant differences, indicating that both dapsone and clindamycin are well-tolerated options for acne treatment. Previous studies, including those by Guruputra et al. and Jones et al., corroborate the tolerability of both treatments, with minimal adverse effects reported, making them suitable options even for patients with sensitive skin (19, 20), though dapsone's slightly higher irritation rate warrants monitoring in sensitive patients.

The demographic data revealed that the majority of patients were female and within the 14-20 age range, a trend common in acne studies (21). Both genders responded similarly to the treatments, which is consistent with the findings of Skroza et al., who noted no significant gender-based differences in response to dapsone or clindamycin (22), suggesting that these treatments can be effective across diverse patient demographics.

This study shows that the shorter disease duration among Group A participants may have contributed slightly to their faster acne clearance, as early treatment often leads to better outcomes. However, the significance of this variable in influencing treatment efficacy was minimal, which is consistent with observations by Barbieri, indicating that while early intervention is beneficial, the type of topical agent used plays a more crucial role in achieving long-term clearance (23).

This study notes some limitations. This study has a small sample size (n = 100), which limits the ability to generalize the results to a large population. It focused only on patients with mild to moderate acne, so the findings may not apply to those with severe acne. The 12-week follow-up period, though effective for observing short-term outcomes, may not capture long-term effects or relapse rates after treatment. This study relied on self-reported data for some aspects, which can sometimes introduce bias.

Future studies should examine the effects of dapsone and clindamycin across different severity levels of acne, including a more diverse range of age groups and skin types. A more extended follow-up period would also help assess the treatments' durability and any late-emerging side effects. It would be helpful to compare dapsone and clindamycin with other acne treatments to provide more comprehensive treatment guidelines and to explore potential combination therapies for improved outcomes.

Conclusion

Dapsone gel (5%) is more effective than clindamycin gel (1%) in treating mild to moderate acne vulgaris. Patients using dapsone showed faster improvement, with a significant number achieving full acne clearance by the end of 12 weeks. Both treatments were well-tolerated, with only mild side effects reported, which were similar between the two groups. Hence, dapsone gel can be a better choice for acne treatment, especially for patients seeking faster and more pronounced improvement. Given these positive findings, more research is needed to further explore dapsone's effectiveness across different types of acne and to understand its long-term effects and safety profile in diverse patient populations.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-25)
Consent for publication
Approved
Funding
Not applicable

Conflict of interest

The authors declared no conflict of interest.

Author Contribution

RA, SS, AF, LI, MA, SJ,
All authors contributed equally in Manuscript drafting, Study Design, Review of Literature, Data entry, Data analysis, and drafting articles.

All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the study's integrity.

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