Open Access

Original Article

Comparison of Efficacy Between Superficial Chemical Peels and Microdermabrasion for ACNE Vulgaris

Hira Mubashar, Asher Ahmed Mashood, Maryum Rehman, Hina Mazhar, Madiha Sundus, Sidiqua Javaid

Department of Dermatology, Pak Emirates Military Hospital, Rawalpindi/National University of Medical Sciences (NUMS) Pakistan

ABSTRACT

Objective: To compare the efficacy of microdermabrasion and glycolic acid peeling in the treatment of acne vulgaris in skin of color.

Study Design: Quasi-experimental study.

Place and Duration of Study: Department of Dermatology, Pak Emirates Military Hospital, Rawalpindi Pakistan, from May 2022 to Nov 2022.

Methodology: A total of 150 patients of both gender with age 15-30 years and diagnosis of Acne Vulgaris (mild, moderate or severe) for more than 4 weeks were included. Patients who were already using oral/topical acne treatment including isotretinoin, other skin diseases and polycystic ovarian syndrome were excluded. Patients were divided into the glycolic acid peel Group (Group-A) and the micro-dermabrasion Group (Group-B). The procedure was repeated monthly for 3 months, in both Groups and assessment was done at the end of 3 months on a specially designed Performa.

Results: The mean age of the patients was 21.2±3.3 years and 21.4±3.3 years in Group-A and B, respectively. The mean duration of complaints was 11.3±1.3 weeks in Group-A while 9.7±1.1 weeks in Group B. GAG score for acne assessment was used to see the response of treatment in each Group. The females had a better response as compared to males. Moreover, the efficacy of glycolic acid peel was slightly better in the younger age Group while the efficacy of microdermabrasion showed better results in the older age Group (21 years to 30 years). The microdermabrasion was found to be more efficacious as compared to glycolic acid peeling (p=0.005).

Conclusion: The efficacy of microdermabrasion was statistically significant when compared with glycolic acid peeling suggesting that microdermabrasion is a viable treatment option for individuals with acne vulgaris, specifically in skin of color (skin type III to V) suffering from mild to moderate disease.

Keywords: Acne vulgaris, Glycolic acid peel, Microdermabrasion, Skin of Colour (SOC).

How to Cite This Article: *Mubashar H, Mashood AA, Rehman M, Mazhar H, Sundus M, Javaid S. Comparison of Efficacy Between Superficial Chemical Peels and Microdermabrasion for ACNE Vulgaris. Pak Armed Forces Med J 2025; 75(Suppl-5): S790-S795. DOI: https://doi.org/10.51253/pafmj.v75iSUPPL-5.13087*

INTRODUCTION

Acne vulgaris (AV) is caused primarily by increased sebum production, hyperkeratinisation of the follicles, bacterial colonization and inflammation.[1] Acne lesions are classified as either non-inflammatory, including open (blackheads) and closed (whiteheads) comedones, or inflammatory, consisting of papules, pustules, nodules, and cysts. These lesions can result in scarring and pigmentation, often requiring long-term and consistent treatment. They commonly appear on the face, neck, upper back, and chest.[2] Although generally considered a benign, self-limited condition, AV may cause severe psychological problems and disfiguring scars.[3]

Increasing evidence suggests that diet could play a role in the onset of acne.[4,5] Systematic review in 2021, which analyzed 53 studies (11 clinical trials and 42 observational studies), found that foods with a high glycemic index, dairy, and fatty foods are linked to acne development.[6] Research has indicated that vitamin D deficiency, high doses of vitamin B6 and B12 supplements, as well as whey protein supplements, may be connected to the occurrence of acne.[7]

Many acne treatments are available to physicians for treating acne that specifically interferes with any of the aforementioned processes. Because the resolution of comedones ranges between 2 and 6 weeks, superficial chemical peeling is used in those patients desiring to speed up this process.[8] Chemical peels cause a decrease in corneocyte adhesion or epidermolysis. The intensity of the effect depends on the pH and concentration of the product used. Alpha hydroxy-acid peels are highly popular and effective in this regard.[9] Glycolic acid peel is among the hydroxy-

Correspondence: Dr Hira Mubashar, Department of Dermatology, Pak Emirates Military Hospital, Rawalpindi Pakistan

Received: 11 Jan 2025; revision received: 29 Jun 2025; accepted: 02 Jul 2025

acid peels with the advantage of being simple, inexpensive and with minimum side effects.

Like chemical peels, there are several types of dermabrasion. Dermabrasion involves either manual derma-sanding with sandpaper or wall screen or with mechanized handheld units. Microdermabrasion consists of gently applying aluminum oxide crystals to the skin at varying speeds, accompanied by suction, to exfoliate the surface. A specialized handpiece is used to vacuum off the debris, with adjustable suction pressures that allow the operator to control both the speed of the abrasion and the intensity of suction at the skin's surface.[8] Alam, et al demonstrated patients' acne lesion count decreased by 50% or lower in almost three-quarters of the patients studied after 8 microdermabrasion procedures spaced 7 to 10 days apart10. A study by Vanthitha *et al*., has shown that glycolic acid peel is less effective than microdermabrasion in the treatment of acne vulgaris, with an efficacy 3% in glycolic acid peel as compared to 16.7% in the microdermabrasion Group.[9]

The rationale for this study stems from the growing prevalence of acne vulgaris, which affects a significant proportion of the population, particularly adolescents and young adults. By evaluating the efficacy of two distinct treatment methods, this study seeks to offer valuable insights into their comparative outcomes, helping dermatologists make informed decisions tailored to the specific needs of Pakistani patients and skin of color (SOC) population at large. The importance of this research lies in its potential to refine acne treatment protocols, optimize patient care, and provide evidence-based recommendations for practitioners.

METHODOLOGY

This quasi-experimental trial was done at the Department of Dermatology, Pak Emirates Military Pakistan after proposal was approved by the Ethical Committee of the institute vide certificate no. A/28/ERC/01/2025. The study was carried out over six months from 8th May 2022 to 7 Nov 2022. The sample size was calculated by using the WHO calculator with alpha 5% (two-sided) with power 80%, the efficacy of glycolic acid peel by 3% as compared to 16.7% with microdermabrasion in the treatment of acne vulgaris.[9] The estimated sample size was 150. The informed consent was taken after explaining the objective, methodology and probable outcomes with side effects. Patients were enrolled using a non-probability consecutive sampling technique.

Inclusion Criteria: Patients of either gender with age 15-30 years and diagnosis of AV of all grades of severity for more than 4 weeks were included.

Exclusion Criteria: Patients who were already using oral or topical acne treatment and/ or stopped such treatment in less than one month. Patients who used isotretinoin, less than three months before. Moreover, patients having any other skin disease e.g. eczema, psoriasis, infections on the face and those having polycystic ovarian syndrome (PCOS) or any other endocrine disorder were excluded.

Each patient was assigned a number at a unique enrolment number. The patients were divided into 2 Groups with 75 individuals in each. The Group-A was the glycolic acid peel Group while the Group-B was the microdermabrasion Group. The patients were randomised using computer-based software. Every patient included in the study was prescribed oral doxycycline 100mg OD, but no other topical anti-acne treatment, specialized soaps or face washes were advised. In Group A, sensitive areas like the inner canthus of the eyes and nasolabial folds were protected with Vaseline. After degreasing with acetone, glycolic acid (30%) was applied on the cosmetic units of the face starting from the forehead, right cheek, nose, left cheek and chin in that order. The peel was neutralized with sodium bicarbonate after the predetermined duration of time usually five minutes or if erythema had set in before. It was washed off with water. In Group B, after cleansing, the procedure was performed using a vacuum pressure of 15-20 mmHg, starting from the forehead and progressing to the cheeks, chin, nose, and upper lips in three directions: vertical, horizontal, and oblique. Once the procedure was complete, patients were instructed to wash their faces with water, and sunscreen was applied.). The procedure was repeated monthly for 3 months, in both Groups and assessment was done at the end of 3 months.

Global Acne Grading System (GAGS) score was used to assess response to treatment.[11] Score was noted at baseline and at 3- and 6-months post-treatment. Efficacy of treatment was defined as decrease in GAGS score by 50% at the end of duration of treatment.

Data were analysed with Statistical Package for Social Sciences Statistical Package for Social Sciences (SPSS) version 25. Normality of data was assessed using histogram. The Mean±SD was presented for quantitative variables like age, duration of complaints

and GAGS score. The frequency and percentage were computed for qualitative variables like gender and efficacy. The Chi-square test was applied to compare efficacy in both Groups taking $p<0.05$ as significant. The data were further analyzed by Grouping patients according to age, gender, duration of disease, and GAGS score to assess the influence of these factors on treatment efficacy.

Figure-1: Before Treatment and after Treatment of ACNE Vulgaris with Microdermabrasion

RESULTS

A total of 150 patients (75 in each Group) were enrolled in this study. Group-A was treated with 30 % glycolic acid peel and Group-B with micro-dermabrasion. The mean age of the patients was observed 21.2±3.3 and 21.4±3.3 year in Group-A and B, respectively.

Efficacy of treatment as previously defined was seen in 3(4%) individuals in Group A while in 14(18.7%) in Group B. The difference in efficacy was statistically significant (p=0.005). Stratification based on age revealed no significant difference between Groups in younger populations 20 years or less while in patients above this age micro-dermabrasion was seen to be statistically more efficacious than 30% glycolic acid peel. Gender stratification revealed that females exhibited better outcomes compared to males in both treatment Groups.

The mean duration of complaints was longer in Group A (11.3±1.3 weeks) than in Group B (9.7±1.1 weeks). Both treatments demonstrated greater efficacy in patients with symptoms lasting ≤24 weeks compared to those with symptoms persisting >24 weeks. Stratification based on the GAGS score showed superior efficacy in patients with a baseline GAGS score ≤20 compared to those with scores >20.

Following picture shows the before and after treatment with microdermabrasion results.

Table-I: Demographic Characteristics of Study Population(n=150)

Characteristic		Group A n=75 n (%)	Group B n=75 n (%)
Gender	Male	39(52%)	40(53.3%)
	Female	36(48%)	35(46.7%)
Age	15-20	40(53.3%)	37(49.3%)
	>20	35(46.7%)	38(50.7%))
Duration of illness	≤24 weeks	58(77.3%)	63(84%)
	>24 weeks	17(22.7%)	12(16%)
GAGS score at presentation	≤20	43(57.3%)	58(77.3%)
	>20	32(62.7%)	17(22.6%)

DISCUSSION

Acne is widely recognized as a condition more common in adolescents,[12,13] In present study, the age of the patients ranged between 15-30 years with a mean age of 21.2±3.3 in Group-A and 21.4±3.3 years in Group-B. In their study, Al-Ameer *et al*., found that the average age of acne vulgaris presentation was 19.2±3.0 years, while Kane *et al*. reported a mean age of 25.58 years, which closely aligns with the findings of our study.

In present study, the low p-value (less than 0.05) suggests that there is a significant difference in the efficacy of the two treatments. The Group that received microdermabrasion showed significant improvement in their disease severity and higher efficacy of 18.7% as compared to the Group that received glycolic acid peeling which showed efficacy of 4%. Therefore, based on this study, it appears that microdermabrasion is a more effective treatment option compared to glycolic acid peeling.

As far as the comparison between 30% glycolic acid peel and microdermabrasion for the treatment of acne is concerned, the study by Vanthitha *et al*.[9] reported the efficacy of 30% glycolic acid peel was lower (3%), and in our study it is 4%. Efficacy of microdermabrasion in above mentioned study was 16.7% whereas in our study it was 18.7%. Hence, in one to one comparison, our study had comparable results with the above mentioned study.

In a pilot study by Lloyd JR on the effectiveness of microdermabrasion for acne vulgaris, 25 patients with grade II–III acne were enrolled.[14] The results showed that 38% (9/24) exhibited an excellent response, 34% (8/24) had a good response, 17% (4/24) showed a fair response, and 12% (3/24) had a poor response. The results in our study also show a

Table-2: Efficacy of 30% Glycolic acid Peel (Group A) vs Micro-Dermabrasion (Group B) and SubGroup Analysis(n=150)

Characteristic	Group	Efficacy		Total	*p*-value
		Yes n (%)	No n (%)		
Overall efficacy					
	Group A	3(4%)	72(96%)	75	0.005
	Group B	14(18.7%)	61(81.3%)	75	
Stratification for age					
15-20	Group A	2(5%)	38(95%)	40(100%)	0.194
	Group B	5(13.5%)	32(86.5%)	37(100%)	
21-30	Group A	1(2.9%)	34(97.1%)	35(100%)	0.010
	Group B	9(23.7%)	29(76.3%)	38(100%)	
Stratification for gender					
Male	Group A	0	39(100%)	39(100%)	0.012
	Group B	6(15%)	34(85%)	40(100%)	
Female	Group A	3(8.3%)	33(91.7%)	36(100%)	0.091
	Group B	8(22.9%)	27(77.1%)	35(100%)	
Stratification for duration of complaints					
≤ 24	Group A	03(5.2%)	55(94.8%)	58(100%)	0.035
	Group B	11(17.5%)	52(82.5%)	63(100%)	
> 24	Group A	0	17(100%)	17(100%)	0.029
	Group B	3(25%)	09(75%)	12(100%)	
Stratification for GAGS score					
≤ 20	Group A	03(7%)	40(93%)	43(100%)	0.023
	Group B	14(24.1%)	44(75.9%)	58(100%)	
> 20	Group A	-	32(100%)	32(100%)	-
	Group B	-	17(100%)	17(100%)	

significant efficacy of microdermabrasion on acne vulgaris specifically in case of mild acne with GAG score less than 20.

Ishfaq *et al*.[15] in 2022 demonstrated that microdermabrasion was more effective than 35% glycolic acid peels for treating acne scars in patients with Fitzpatrick Skin Phototypes IV to VI. Group A, treated with microneedling, showed significantly better outcomes, with 73.33% achieving treatment efficacy compared to 33.33% in Group B.[15] Our study replicates these results.

However, Alam *et al.,* in a study on superficial dermabrasion demonstrated it as a "mild treatment that produces mild results," which may be beneficial in patients concurrently using with medical treatment for acne.[10] It is surprising to state that except for the above mentioned studies, there are no other studies in medical literature in which microdermabrasion was used as a treatment modality of acne vulgaris. Therefore, more research is needed to confirm these findings and to determine the generalizability of these results to larger populations.

According to a study conducted by Sharma et al16, patients treated with 35% glycolic acid showed significant improvement in both inflammatory and non-inflammatory acne lesions. 35% GA peel was applied fortnightly and the results were calculated after 6 sessions of treatment.[16] Patients with mild to moderate acne responded better as compared to those with moderate to severe acne. Specifically, comedones, papules, and pustules showed improvement rates of 88.45%, 88.65%, and 89.62%, respectively. Grover *et al*.[17] found that 78% of patients treated with glycolic acid showed a moderate response. In both the studies the GA peel was repeated fortnightly without any other medical treatment for a duration of 12weeks. Good results are probably because of the frequent application of the peel.[17]

Kim et al conducted a split-face study to compare the effectiveness of 70% glycolic acid peels and Jessner's solution (a combination of resorcinol, salicylic acid, and lactic acid in ethanol) in treating acne vulgaris. After third session of the treatment half of the patients treated with either glycolic acid or Jessner's solution showed improvement scores of 0.5 or more.[18] The study found that both treatments were equally effective in improving acne vulgaris. No statistically significant differences in the treatment effect between the two chemical peel methods were observed.

According to a study conducted by In Jae *et al*.[20] patients with mild to moderate acne vulgaris were treated with a combination of 50% glycolic acid and 0.5% salicylic acid solution on one side of their face and the other side of face was treated with Jessner's solution.[19] After two sessions conducted two weeks apart, the lesion count and acne severity were calculated. Both the Groups showed improvement in the disease, however there was no significant difference in the efficacy of both the Groups and the results were comparable. Overall, the study found that 35% of the patients experienced mild improvement, 25% experienced moderate improvement and 40% of the patients did not experience any improvement.

In 2009, Garg and colleagues conducted a study to evaluate the effectiveness of 35% glycolic acid peels and 20% salicylic 10% mandelic acid combination peels (SMP) for patients with active acne, acne scarring, or pigmentation issues.[20] Their findings indicated that although both treatments were effective and safe for the intended population, SMPs were seen to be more effective as compared to 35% glycolic acid peel. The change in total acne score was 27.3% with GA peel and 52.3% with SMPs.

LIMITATIONS OF STUDY

The study primarily evaluated short-term outcomes, limiting insights into the long-term efficacy of the treatments. External factors such as climate, diet, and stress levels, which can influence acne, were not controlled or standardized across participants. Furthermore the side effects profile of both the treatments were not assessed. Since GAGs score was the only tool used for assessment so inter-observer bias is likely.

CONCLUSION

In conclusion, our study has demonstrated that the efficacy of microdermabrasion was statistically significant when compared with glycolic acid peeling. Our study is the first to compare the two therapies in Pakistani population, thus suggesting that microdermabrasion is a viable treatment option for individuals with acne vulgaris.

Conflict of Interest: None

Funding Source: None

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

HM & AAM: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

MR & HM: Data acquisition, data analysis, approval of the final version to be published.

MS & SJ: Critical review, concept, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Leung AK, Barankin B, Lam JM, Leong KF, Hon KL. Dermatology: how to manage acne vulgaris. Drugs Context 2021; 10: 2021-8–6;. https://doi.org/10.7573/dic.2021-8-6
2. Vasam M, Korutla S, Bohara RA. Acne vulgaris: A review of the pathophysiology, treatment, and recent nanotechnology based advances. Biochemistry and Biophysics Reports 2023; 36: 101578. https://doi.org/10.1016/j.bbrep.2023.101578
3. Thiboutot D, Dréno B, Sanders V, Reuda MJ, Gollnick H. Changes in the management of acne: 2009-2019. J Am Acad Dermatol 2020; 82(5): 1268–1269. https://doi.org/10.1016/j.jaad.2019.04.012
4. Baldwin H, Tan J. Effects of Diet on Acne and Its Response to Treatment. Am J Clin Dermatol 2021; 22(1): 55–65. https://doi.org/10.1007/s40257-020-00542-y
5. Barbieri JS. Diet and Acne-Challenges of Translating Nutritional Epidemiologic Research Into Clinical Practice. JAMA Dermatol 2020; 156(8): 841–843. https://doi.org/10.1001/jamadermatol.2020.1601
6. Dall'Oglio F, Nasca MR, Fiorentini F, Micali G. Diet and acne: review of the evidence from 2009 to 2020. Int J Dermatol 2021; 60(6): 672–685. https://doi.org/10.1111/ijd.15390
7. Alhetheli G, Elneam AIA, Alsenaid A, Al-Dhubaibi M. Vitamin D Levels in Patients with and without Acne and Its Relation to Acne Severity: A Case-Control Study. Clin Cosmet Investig Dermatol 2020; 13: 759–765. https://doi.org/10.2147/CCID.S271500
8. Chilicka K, Gold MH, Nowicka D. Acne vulgaris and the most popular and new cosmetological treatments. Journal of Cosmetic Dermatology 2023; 22(7): 1946–1950. https://doi.org/10.1111/jocd.15757
9. Vanthitha PR, Vellaisamy SG, Gopalan K, Nanjappachetty G. A comparative study of the resurfacing effect of microdermabrasion versus glycolic acid peel in the management of acne scars. Journal of Pakistan Association of Dermatologists 2018; 28(2): 224–232.
10. Alam M, Omura NE, Dover JS, Arndt KA. Glycolic acid peels compared to microdermabrasion: a right-left controlled trial of efficacy and patient satisfaction. Dermatol Surg 2002; 28(6): 475–479. https://doi.org/10.1046/j.1524-4725.2002.01144.x
11. Bae IH, Kwak JH, Na CH, Kim MS, Shin BS, Choi HS. A Comprehensive Review of the Acne Grading Scale in 2023. Ann Dermatol 2024; 36(2): 65–73. https://doi.org/10.5021/ad.23.094
12. Al-Ameer AM, Al-Akloby OM. Demographic features and seasonal variations in patients with acne vulgaris in Saudi Arabia: a hospital-based study. Int J Dermatol 2002; 41(12): 870–871. https://doi.org/10.1046/j.1365-4362.2002.01669.x
13. Kane A, Niang SO, Diagne AC, Ly F, Ndiaye B. Epidemiologic, clinical, and therapeutic features of acne in Dakar, Senegal. Int J Dermatol 2007; 46 Suppl 1: 36–38. https://doi.org/10.1111/j.1365-4632.2007.03462.x

14. Lloyd JR. The use of microdermabrasion for acne: a pilot study. Dermatol Surg 2001; 27(4): 329–331. https://doi.org/10.1046/j.1524-4725.2001.00313.x
15. Ishfaq F, Shah R, Sharif S, Waqas N, Jamgochian M, Rao B. A Comparison of Microneedling versus Glycolic Acid Chemical Peel for the Treatment of Acne Scarring. J Clin Aesthet Dermatol 2022; 15(6): 48–52.
16. Sharma P, Shah A, Dhillon A singh. Study of glycolic acid and salicylic acid peels as a sole therapy in treatment of acne vulgaris. International Journal of Medical Research and Review 2016; 4(12): 2205–2210. https://doi.org/10.17511/ijmrr.2016.i12.21
17. Grover C, Reddu BS. The therapeutic value of glycolic acid peels in dermatology. Indian J Dermatol Venereol Leprol 2003; 69: 148.
18. Kim SW, Moon SE, Kim JA, Eun HC. Glycolic acid versus Jessner's solution: which is better for facial acne patients? A randomized prospective clinical trial of split-face model therapy. Dermatol Surg 1999; 25(4): 270–273. https://doi.org/10.1046/j.1524-4725.1999.08251.x
19. In Jae J, Dong Ju H, Dong Hyun K, Yoon MS, Lee HL. Comparative study of buffered 50% glycolic acid (pH 3.0) + 0.5% salicylic acid solution vs Jessner's solution in patients with acne vulgaris. J Cosmet Dermatol 2018; 17(5): 797–801. https://doi.org/10.1111/jocd.12445
20. Garg VK, Sinha S, Sarkar R. Glycolic acid peels versus salicylic-mandelic acid peels in active acne vulgaris and post-acne scarring and hyperpigmentation: a comparative study. Dermatol Surg 2009; 35(1): 59–65. https://doi.org/10.1111/j.1524-4725.2008.34383.x