

# Comparison of the Outcome of 35% Glycolic Acid and 30% Salicylic Acid Peels in the Treatment of patients with Acne Vulgaris

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## ABSTRACT

**Aim:** To compare the outcome of 35% glycolic acid and 30% salicylic acid in patients with acne vulgaris.

**Study design:** It was a randomized controlled trial.

**Plate and duration of study:** Department of Dermatology at Mayo Hospital, Lahore from 31-08-2019 to 29-02-2020.

**Methodology:** This study involved 120 patients of both genders with ages between 15 to 40 years, who presented with mild to moderate acne. These patients were randomly allocated into two treatment groups. Patients in Group-A were treated with 35.0% glycolic acid while those in Group-B with 30.0% salicylic acid. Outcome variable was mean of percentage reduction in acne severity index one month after treatment, which was noted and compared between the groups. A written informed consent was taken from each patient.

**Results:** The mean age of the patients was 21.56±5.09 years. There was a female predominance with male to female ratio of 1:1.2. Majority (67.5%) of the patients had Fitz Patrick Type-V skin phototype while 39 (32.5%) patients had Type-IV phototype skin. The severity of acne was mild in 75 (62.5%) patients and moderate in 45 (37.5%) patients. There was no statistically significant difference in the mean acne severity index between patients treated with 30.0% salicylic acid versus 35.0% glycolic acid (16.52±3.69 vs. 16.48±4.01 p 0.962) at baseline.

**Conclusion:** Chemical peeling with 30.0% salicylic acid was found superior to 35.0% glycolic acid in patients with mild to moderate acne regardless of patients' age, gender, BMI, skin phototype and severity of disease which advocates the preferred use of salicylic acid peeling in the management of patients with acne in future dermatologic practice.

**Keywords:** Acne, Chemical Peeling, Salicylic Acid, Glycolic Acid

## INTRODUCTION

Acne vulgaris is a chronic inflammatory disease involving the pilosebaceous units which include hair follicles and sebaceous glands causing their inflammation and obstruction<sup>1</sup>. It is most commonly seen after puberty and in teenage<sup>2</sup>. It majorly involves the face and the upper limbs. It presents with comedones, pustules, papules, cysts, nodules and lack of treatment leading to hyper-pigmentation and scarring<sup>3</sup>. The major factor involved in its pathogenesis is excessive sebum production causing follicular plugging. There is colonization of the follicles by Propionibacterium acnes which also contributes to the inflammatory process<sup>4</sup>.

Salicylic Acid belongs to the Beta-hydroxy acid group. It is 2-Hydroxy Benzoic Acid. It has keratolytic and comedolytic properties<sup>5</sup>. Salicylic acid has lipophilic nature owing to which it penetrates comedones and pores thus preventing their clogging and neutralizes the bacteria.<sup>6</sup> It is used in strengths of 5-30%. At these concentrations, the peel is safe and self-limiting<sup>7</sup>. Glycolic acid belongs to the Alpha-hydroxy acid group. It is 2 Hydroxyethanoic acid. It is obtained from sugar cane. It has anti-inflammatory, keratolytic, and antioxidant effects. It targets the corneosome by increasing breakdown and decreasing cohesiveness and causing desquamation<sup>8</sup>. It is available in concentrations from 20-70%.<sup>7</sup> Sharmas et al compared the efficacy of Glycolic acid and Salicylic acid peels in Indian patients and found 88.45% vs. 89.6% reduction in comedones, 88.65% vs. 90.36% reduction in papules and 89.62% vs. 84.87% reduction in pustules after six sessions of treatment with glycolic acid and salicylic acid respectively<sup>9</sup>.

Acne vulgaris is a disease of great significance since it can cause cosmetic disfigurement leading to low self-esteem, depression, social isolation, anxiety and embarrassment.<sup>10</sup> No topical therapy aiming at all the factors involved in pathogenesis, has yet been devised. Therefore search for simple and effective

treatment options is of great importance<sup>11</sup>. The current study is designed to compare the outcome of 35% glycolic acid and 30% salicylic acid peels in patients with acne vulgaris. Internationally a couple of researches have proved the efficacy of 30 % salicylic acid and 35% glycolic acid in patients with acne vulgaris but none has been carried out in our local population. Glycolic acid has minimal dermal penetration and is safe for topical application in pregnancy<sup>12</sup> and if we are able to establish its efficacy in acne vulgaris, we shall also be able to use it for treatment in pregnancy and lactation as well, along with the benefit of better tolerance of peel owing to its milder nature<sup>13</sup>.

## MATERIALS AND METHODS

After approval of the hospital ethical committee, a total of 120 patients meeting the inclusion criteria were enrolled. Informed consent was taken. Their age, gender, skin type and baseline ASI was noted. Pre-peel photograph was taken for each patient. The patients were randomly allocated by lottery method in one of the two groups. Group A: 35% glycolic acid and Group B: 30% salicylic acid. A baseline test patch in the retro auricular region was carried out for 3 minutes, 2 weeks following which the patients were subjected to the 1st sitting of peel. Adequate priming with 0.025% tretinoin cream was done two weeks before the peel and stopped 5 days before the procedure. An alcohol-based solution of 35% glycolic acid was applied to the patients' skin in group A and 30% salicylic acid to the patients in group B every 2weeks. During the procedure the patient lied down with head elevated to 45degrees. After cleansing the patient's skin, vaseline was applied to the corner of the eyes, sides of the nose, lips and eyes were covered. The peeling solution was applied on the patient's face with a piece of gauze. The peel was allowed to dry. Timer was set for 4 minutes. For salicylic acid peel frosting appeared once it had dried. For glycolic acid peel, 10% sodium bicarbonate solution was used to neutralize the peel. The peel was removed with water soaked gauze followed by application of a soothing lotion. Patients were

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advised to avoid direct sun exposure for 5 days following the procedure and use sunscreen.

Patients were asked to follow up every 2 weeks for 8 weeks. Initial ASI was calculated at the start of treatment and then one month after the last session. Percent reduction was calculated. All the pre and post treatment assessments were done by a single resident (candidate) and all the treatment sessions were performed by a single consultant dermatologist with five year experience and all the peeling solutions were prepared by the same pharmacy to minimize bias. Confounding variables were controlled by exclusion. Quantitative variables; age, BMI, pre and post treatment ASI score and percent reduction in ASI score have been presented by mean  $\pm$ SD. t-test has been applied for comparison of mean of percent reduction in the ASI score between the two groups taking  $p \leq 0.05$  as statistically significant. Categorical variables; gender, skin type and disease severity have been presented by frequency and percentage.

## RESULTS

The age ranged from 15 to 40 years with a mean of  $21.56 \pm 5.09$  years. There were 55 (45.8%) male and 65 (54.2%) female patients with ratio of 1:1.2. The BMI mean was  $27.91 \pm 3.60$  kg/m<sup>2</sup>. Majority (n=81, 67.5%) of the patients had Fitz-Patrick Type-V skin phototype while 39 (32.5%) patients had Type-IV phototype skin. Mild acne was seen in 75 (62.5%) patients and moderate in 45 (37.5%) patients (Table 1). Both the study groups were comparable in terms of mean age ( $p = 0.986$ ), mean BMI ( $p = 0.938$ ) and distribution of various groups based on patient's age ( $p = 0.769$ ), gender ( $p = 0.855$ ), BMI ( $p = 0.974$ ), skin phototype ( $p = 0.845$ ) and severity of acne ( $p = 0.850$ ) (Table 2).

Table 1: Baseline characteristics of study sample (n=120)

Age (years)	No	%
15-27	107	89.2
28-40	13	10.8
Mean $\pm$ SD	21.56 $\pm$ 5.09	
<b>Gender</b>		
Male	55	45.8
Female	65	54.2
<b>BMI (kg/m<sup>2</sup>)</b>		
20-25 kg/m <sup>2</sup>	33	27.5
25-30 kg/m <sup>2</sup>	45	37.5
30-35 kg/m <sup>2</sup>	42	35.0
Mean $\pm$ SD	27.91 $\pm$ 3.60	
<b>Skin Phototype</b>		
Fitz-Patrick IV	39	32.5
Fitz-Patrick V	81	67.5
<b>Severity of Acne</b>		
Mild	75	62.5
Moderate	45	37.5

Table 2: Baseline characteristics of study groups

Age (years)	30% Salicylic Acid n=60	35% Glycolic Acid n=60	P Value
15-27	54	90.0	0.769
28-40	6	10.0	
Mean $\pm$ SD	21.55 $\pm$ 5.20	21.57 $\pm$ 5.03	0.986
<b>Gender</b>			
Male	27	45.0	0.855
Female	28	46.7	
<b>BMI (kg/m<sup>2</sup>)</b>			
20-25 kg/m <sup>2</sup>	27.93 $\pm$ 3.57	27.88 $\pm$ 3.66	0.938
25-30 kg/m <sup>2</sup>	16 (26.7%)	17 (28.3%)	0.974
30-35 kg/m <sup>2</sup>	23 (38.3%)	22 (36.7%)	
30-35 kg/m <sup>2</sup>	21 (35.0%)	21 (35.0%)	
<b>Skin Phototype</b>			
Fitz-Patrick IV	19 (31.7%)	20 (33.3%)	0.845
Fitz-Patrick V	41 (68.3%)	40 (66.7%)	
<b>Severity of Acne</b>			
Mild	37 (61.7%)	38 (63.3%)	0.850
Moderate	23 (38.3%)	22 (36.7%)	

There was no statistically significant difference in the mean acne severity index between patients treated with 30.0% salicylic acid versus 35.0% glycolic acid ( $16.52 \pm 3.69$  vs.  $16.48 \pm 4.01$ ;  $p = 0.962$ ) at baseline. Upon follow-up, the mean acne severity index was significantly less in patients treated with 30.0% salicylic acid ( $6.42 \pm 1.50$  vs.  $12.21 \pm 2.94$ ;  $p < 0.001$ ) with a greater mean change ( $10.08 \pm 2.23$  vs.  $4.32 \pm 1.23$ ;  $p < 0.001$ ) as compared to 35.0% glycolic acid (Table 3). The mean of percent reduction in the ASI was significantly greater in patients treated with 30.0% salicylic acid as compared to 35.0% glycolic acid ( $61.13 \pm 2.90$  vs.  $26.01 \pm 3.06$ ;  $p < 0.001$ ). Similar significant difference in the mean of percent reduction in ASI was observed between the groups across various subgroups of patients based on age, gender, BMI, skin phototype and severity of acne (Table 4).

Table 3: Comparison of mean acne severity index (ASI) between the study groups

	30% Salicylic Acid	35% Glycolic Acid	P value
Baseline	16.52 $\pm$ 3.69	16.48 $\pm$ 4.01	0.962
Follow up	6.42 $\pm$ 1.50	12.21 $\pm$ 2.94	<0.001*
Change	10.08 $\pm$ 2.23	4.32 $\pm$ 1.23	<0.001*
% Reduction	61.13 $\pm$ 2.90	26.01 $\pm$ 3.06	<0.001*

Table 4: Stratification of mean of percent reduction in ASI between the study groups

Subgroups	% Reduction in ASI (mean $\pm$ sd)		P value
	30% Salicylic Acid	35% Glycolic Acid	
<b>Age</b>			
15-27	61.12 $\pm$ 2.96	26.00 $\pm$ 3.04	<0.001*
28-40	61.17 $\pm$ 2.53	26.02 $\pm$ 3.48	<0.001*
<b>Gender</b>			
Male	61.26 $\pm$ 3.40	26.18 $\pm$ 3.08	<0.001*
Female	61.02 $\pm$ 2.47	25.85 $\pm$ 3.09	<0.001*
<b>BMI (kg/m<sup>2</sup>)</b>			
20-25 kg/m <sup>2</sup>	60.67 $\pm$ 3.21	25.49 $\pm$ 3.02	<0.001*
25-30 kg/m <sup>2</sup>	60.75 $\pm$ 3.12	26.62 $\pm$ 2.82	<0.001*
30-35 kg/m <sup>2</sup>	61.89 $\pm$ 2.35	25.78 $\pm$ 3.37	<0.001*
<b>Skin Phototype</b>			
Fitz-Patrick IV	60.90 $\pm$ 3.20	26.18 $\pm$ 2.95	<0.001*
Fitz-Patrick V	61.23 $\pm$ 2.79	25.92 $\pm$ 3.15	<0.001*
<b>Severity of Acne</b>			
Mild	60.98 $\pm$ 2.89	26.00 $\pm$ 3.01	<0.001*
Moderate	61.36 $\pm$ 2.98	26.01 $\pm$ 3.22	<0.001*

Independent sample t-test, \*observed difference was statistically significant

## DISCUSSION

Acne, also known as acne vulgaris (AV), is a long-term skin disease that occurs when hair follicles are clogged with dead skin cells and oil from the skin. It is characterized by blackheads or white heads, pimples, oily skin and possible scarring. AV is mostly triggered by Propionibacterium acnes in adolescence, under the influence of normal circulating dehydroepiandrosterone (DHEA).<sup>2</sup> It is a very common skin disorder which can present with inflammatory and non-inflammatory lesions chiefly on the face but can also occur on the upper arms, trunk and back. In our study the mean age was  $21.56 \pm 3.60$  years while in a study similar mean age of  $21 \pm 3.9$  years has been reported by Ali et al among patients presenting with acne at Jinnah Postgraduate Medical Centre, Karachi.<sup>14</sup> Previously Ahmed et al reported it to be  $21.4 \pm 3.6$  years among acne patients at Ziauddin Medical University Hospital, Karachi<sup>15</sup> while Rajaret al reported it to be  $18.7 \pm 4.5$  years at Isra University Hospital, Hyderabad.<sup>16</sup> A comparable mean age of  $21.2 \pm 4.8$  years,  $19.3 \pm 1.8$  years and  $18.9 \pm 2.1$  years has been reported by Vidyadhar et al and Agarwal et al among such Indian patients<sup>17-18</sup>.

We observed that there was a female predominance among acne patients with male to female ratio of 1:1.2. Our observation is in line with that of Ahmed et al. who also reported similar female predominance among acne patients presenting at Ziauddin Medical University Hospital, Karachi with a male to female ratio of 1:1.2.<sup>15</sup> A similar female predominance has been reported by Rajar

et al. (1:1.9) at Isra University Hospital, Hyderabad and Khan et al. (1:2) at Lady Reading Hospital, Peshawar.<sup>16,19</sup> Alajlan et al also reported male predominance among acne patients with male to female ratio of 1:2 in Saudi Arabia.<sup>20</sup> Our observation is also in line with that of Agarwal et al who reported similar female predominance (1:1.1) in Indian patients.

In the present study, 67.5% of the patients had Fitz-Patrick Type-V skin phototype while 32.5% patient had Type-IV phototype skin. Ejaz et al. reported similar frequency of Type-IV (19.3%) and Type-V (80.7%) skin in such patients in local population.<sup>21</sup> Similar frequency of Type-IV and Type-V skin has also been reported by Bari et al. who observed it to be 25.0% and 75.0% respectively at Military Hospital, Rawalpindi.<sup>22</sup> It was mild acne in 75 (62.5%) patients and moderate in 45 (37.5%) patients. Rajar et al in a local study observed similar frequency of mild and moderate acne and reported it to be 77.0% and 23.0% respectively.<sup>16</sup> There was no statistically significant difference in the mean area severity index between patients treated with 30.0% salicylic acid versus 35.0% glycolic acid (16.52±3.69 vs. 16.48±4.01; p 0.962) at baseline. Upon follow-up, the mean acne severity index was significantly lesser in patients treated with 30.0% salicylic acid (6.42±1.50 vs. 12.21±2.94; p <0.001) with a greater mean change (10.08±2.23 vs. 4.32±1.23; p <0.001) as compared to 35.0% glycolic acid. The mean of percent reduction in the ASI was significantly greater in patients treated with 30.0% salicylic acid as compared to 35.0% glycolic acid (61.13±2.90 vs. 26.01±3.06%; p<0.001). In Iranian study, Enshaieh et al reported comparable mean ASI score of 14.2±7.6 at presentation in outpatient department.<sup>24</sup> In a recent Egyptian study, Attwa et al also reported comparable mean ASI score of 13.6±8.9 at presentation among acne patients.<sup>25</sup> Our results are also in line with a similar Indian study, where Garg et al.(2009) also observed similar significantly greater mean of percent reduction in ASI with salicylic acid (52.3% vs. 27.3%) as compared to glycolic acid. Sarkar et al and Sherma et al also observed comparable mean of percent reduction in ASI with salicylic acid and reported it to be 74.1% and 89.6% respectively.<sup>26</sup>

## CONCLUSION

Chemical peeling with 30.0% salicylic acid was found superior to 35.0% glycolic acid in patients with mild to moderate acne regardless of patients' age, gender, BMI, skin phototype and severity of the disease, which advocates the preferred use of salicylic acid peeling in the management of acne patients, in future dermatological practice.

**Conflict of interest:** Nil

## REFERENCES

1. Al-Talib H, Al-Khateeb A, Hameed A, Murugaiah C. Efficacy and safety of superficial chemical peeling in treatment of active acne vulgaris. *An Bras Dermatol.* 2017;92(2):212-6.
2. Lynn DD, Umari T, Dunnick CA, Dellavalle RP. The epidemiology of acne vulgaris in late adolescence. *Adolesc Health Med Ther.* 2016;7:13-25.
3. Lee DJ, Van Dyke GS, Kim J. Updates on the pathogenesis and treatment of acne. *Curr Opin Pediatr.* 2003;15(4):405.
4. Sharquie KE, Noaimi AA, Al-Janabi EA. Treatment of active acne vulgaris by chemical peeling using 88% lactic acid. *Our Dermatol Online.* 2014;5(4):337-42.
5. Arif T. Salicylic acid as a peeling agent: a comprehensive review. *Clin Cosmet Investig Dermatol.* 2015;8:455-61.
6. Levesque A, Hamzavi I, Seite S, Rougier A, Bissonnette R. Randomized trial comparing a chemical peel containing a lipophilic hydroxy acid derivative of salicylic acid with a salicylic acid peel in subjects with comedonal acne. *J Cosmet Dermatol.* 2011;10:174-8.
7. Castillo DE, Keri JE. Chemical peels in the treatment of acne: patient selection and perspectives. *Clin Cosmet Investig Dermatol.* 2018;11:365-72.
8. Sharad J. Glycolic acid peel therapy - a current review. *Clin Cosmet Investig Dermatol.* 2013;6:281-8.
9. Sharma P, Shah A, Dhillon AS. Study of glycolic acid and salicylic acid peels as a sole therapy in treatment of acne vulgaris. *Int J Med Res Rev.* 2016;4:2205-10.
10. Hothota A, Bondade S. Impact of acne vulgaris on quality of life and self-esteem. *Cutis.* 2016;98:121-4.
11. Jaffary F, Faghihi G, Saraeian S. Comparison the effectiveness of pyruvic acid and 30% salicylic acid in treatment of acne. *J Res Med Sci.* 2016;21:31-8.
12. Trivedi MK, Kroupouzou G, Murase JE. A review of the safety of cosmetic procedures during pregnancy and lactation. *Int J Womens Dermatol.* 2017;3(1):6-10.
13. Lee KC, Korgavkar K, DufresneRGJr, Higgins HW 2nd. Safety of cosmetic dermatologic procedures during pregnancy. *Dermatol Surg.* 2013;39:1573-86.
14. Ali G, Mehtab K, Sheikh ZA. Beliefs and perceptions of acne among a sample of students from Sindh Medical College, Karachi. *J Pak Med Assoc.* 2010;60:51-9.
15. Ahmad SA, Ahmed I. Frequency and magnitude of anxiety and depression among acne patients: a study of 100 cases. *J Liaquat Univ Med Health Sci.* 2007;6(1):25-9.
16. Rajar UD, Majeed R, Sheikh F, Sheikh I, Siddique AA, Kumar S. Scarring in acne patients--a study done at Isra University Hyderabad. *J Pak Med Assoc.* 2009;59(8):525-7.
17. Vidyadhar SR, Deka YT. Comparison of efficacy of oral azithromycin with oral minocycline in the treatment of acne vulgaris. *Clin Dermatol Rev.* 2017;1(2):37-40.
18. Agarwal US, Besarwal RK, Bhola K. Oral isotretinoin in different dose regimens for acne vulgaris: a randomized comparative trial. *Indian J Dermatol Venereol Leprol.* 2011;77:688-94.
19. Khan MZ, Naeem A, Mufti KA. Prevalence of mental health problems in acne patients. *J Ayub Med Coll Abbott.* 2001;13(4):7-9.
20. Alajlan A, Al Turki YA, AlHazzani Y, Alhowaish N, AlEid N, Alhozaimi Z, et al. Prevalence, level of knowledge and lifestyle association with acne vulgaris among medical students. *J Dermatol Surg.* 2017;21(2):58-61.
21. Ejaz A, Raza N, Iftikhar N, Muzzafar F. Comparison of 30% salicylic acid with Jessner's solution for superficial chemical peeling in epidermal melasma. *J Coll Physicians Surg Pak.* 2008;18(4):205-8.
22. Bari AU, Iqbal Z, Rahman SB. Tolerance and safety of superficial chemical peeling with salicylic acid in various facial dermatoses. *Indian J Dermatol Venereol Leprol.* 2005;71(2):87-90.
23. Vanthitha PR, Govindarajan N. A comparative study of the resurfacing effect of microdermabrasion versus glycolic acid peel in the management of acne scars. *J Pak Assoc Dermatol.* 2018;28(2):224-32.
24. Enshaieh S, Jooya A, Siadat AH, Iraj F. The efficacy of 5% topical tea tree oil gel in mild to moderate acne vulgaris: a randomized, double-blind placebo-controlled study. *Indian J Dermatol Venereol Leprol.* 2007;73(1):22-5.
25. Attwa EM, Al Shimaa MI, El-Halim MF, Mahmoud HM. Efficacy and safety of topical spironolactone 5% gel versus placebo in the treatment of acne vulgaris. *Egypt J Dermatol Venerol.* 2019;39(2):89-94.
26. Sarkar R, Ghunawat S, Garg VK. Comparative study of 35% glycolic acid, 20% salicylic-10% mandelic acid, and phytic acid combination peels in the treatment of active acne and post-acne pigmentation. *J Cutan Aesthet Surg.* 2019;12(3):158.