



## A Comparative Study of Clinical Efficacy of 35% Glycolic Acid and 20% Salicylic Acid Peels in Melasma

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### Abstract

**Introduction:** Melasma is a common, acquired hyperpigmentary disorder that occurs predominantly in women, characterized by symmetrically distributed, brownish macules and patches on the face, which can have a significant impact on the quality of life of affected individuals. It is thought to be due to a combination of genetic, hormonal, and environmental factors. Treatment options for melasma include topical agents, such as hydroquinone, tretinoin, and corticosteroids, as well as chemical peels, lasers, and light-based therapies.

Chemical peels have been used to treat various dermatological conditions, including melasma. They work by inducing controlled damage to the skin, leading to exfoliation and the regeneration of new, healthier skin. Glycolic acid and salicylic acid are two commonly used peeling agents that have been shown to be effective in treating melasma.

However, there is a lack of studies comparing the clinical efficacy of these two agents in treating melasma. Therefore, the present study aims to compare the clinical efficacy of 35% glycolic acid and 20% salicylic acid peels in treating melasma.

The findings of this study could help dermatologists and aesthetic practitioners in selecting the appropriate peeling agent for the treatment of melasma, based on its clinical efficacy, safety, and patient preference. It may also contribute to the development of more effective and personalized treatment strategies for melasma.

**Aims and Objectives:** To study and compare the clinical efficacy and safety of Glycolic acid and salicylic acid peel in melasma.

**Material and Methods:** This prospective study was conducted in the Out-Patient Department (OPD) of the Department of Dermatology, Katihar Medical College and Hospital, Katihar from January 2021 to August 2022. 100 patients were included in this study. Age and sex matched two random groups of 75 each were taken, Group A with Salicylic Acid and Group B Glycolic Acid. The study involved chemical peeling, and the peeling procedure was divided into three steps - prepeel, peel, and post-peel pre-peel program. The peeling was repeated four times at 2-week intervals, and the degree of improvement in pigmentation was assessed at regular intervals using the melasma area and severity index (MASI) and post-peel photographs.

**Result:** The total number of patients were 150, out of those 61 males and 89 females. At the end of 20 weeks, Glycolic acid peel group showed average 46.25% improvement, and Salicylic acid peel group showed 49.02 % improvement. Both peels were well tolerated and there were no severe adverse events.

**Conclusion:** In conclusion, our prospective study has shown that both salicylic acid (SA) and glycolic acid (GA) peels are effective treatments for melasma, with slightly better results observed in the GA group. Our study provides valuable information for clinicians treating patients with melasma, emphasizing the importance of considering sun exposure when selecting a treatment, and highlighting the effectiveness of both SA and GA peels.

**Keywords:** Melasma, Chemical Peeling, Glycolic Acid, Salicylic Acid.

## Introduction

Melasma is a type of hypermelanosis that commonly affects sun-exposed areas such as the forehead, cheeks, temples, nose, upper lip, and chin, as well as occasionally the forearms and V-area of the neck. This condition is characterized by medium to dark brown spots or patches with distinct borders and can be seen in all races and ethnic groups, but is more common in people with darker skin types, such as Fitzpatrick IV-V<sup>[1]</sup>. Melasma predominantly affects women of childbearing age and can present in three clinical patterns: centrofacial, malar, and mandibular<sup>[2]</sup>. Additionally, a rare pattern localized to the forearms is seen in women taking exogenous progesterone<sup>[3]</sup>. The exact cause of melasma remains unknown, but genetics, sun exposure, pregnancy, oral contraceptive use, endocrine dysfunction, hormone treatment, use of cosmetics, and certain medications are all known triggers<sup>[4]</sup>.

The Melasma Area and Severity Index (MASI) is a scoring system used to quantify the severity of melasma, with a maximum score of 48 and a minimum score of 0.3<sup>[5]</sup>. Although various treatments have been utilized, such as topical hydroquinone, corticosteroids, retinoids, azelaic acid, kojic acid, glycolic acid, and chemical peels with alpha hydroxy acids and lasers, melasma is still difficult to treat due to its recurrent and resistant nature<sup>[6]</sup>. Chemical peels, such as glycolic acid and salicylic acid peels, have been shown to be effective and safe for treating melasma, particularly in individuals with skin types IV, V, and VI<sup>[7]</sup>. Glycolic acid peels work via epidermolysis and by spreading melanin in the basal layer, while salicylic acid peels possess keratolytic, comedolytic, and anti-inflammatory properties<sup>[8]</sup>.

Our study aimed to determine the clinical efficacy and safety of glycolic acid and salicylic acid peels in the treatment of melasma. However, there is little published data on the efficacy and safety of salicylic acid peels in Asian skin, despite numerous articles on the use of alpha hydroxy acids as exfoliating agents in the literature<sup>[9]</sup>.

## Aims and Objectives

- To study the clinical efficacy and safety of Glycolic acid and salicylic acid peel in melasma.
- To compare the clinical efficacy and safety of glycolic acid and salicylic acid peel in melasma.

## Material and Methods

The study was a prospective study, conducted at the Department of Dermatology, Venereology & Leprosy at Katihar Medical College, Katihar from January 2021 to August 2022. The study population comprised of patients of either sex with melasma, attending the outpatient department of Dermatology, Venereology and Leprosy during the study period. A total of 150 patients with different ages were randomly allocated into two groups, with 75 patients in each group. Group A received Salicylic acid, while Group B received Glycolic acid. The inclusion criteria for the study were patients of either sex having melasma and patients willing for follow-up, while the exclusion criteria included pregnancy and lactation, patients on immunosuppressive therapy, patients with systemic illness like uncontrolled diabetes, hypertension, mental disorders, and malignancy, active bacterial and viral infections, HIV and HBs Ag positive patients, open wounds on the area to be peeled, history of drug intake like isotretinoin, photosensitive drugs and oral contraceptives, history of tendency to keloid formation, abnormal scarring, atrophic skin, patients with unrealistic expectations, and non-cooperative patients. The study involved chemical peeling, and the peeling procedure was divided into three steps - prepeel, peel, and post-peel pre-peel program. The patients were primed for two weeks with daily sunscreen and tretinoin 0.025% before peeling. The actual peeling was performed by applying the required strength of the peeling agent on the entire face. Salicylic acid 20% peel was used for Group A patients, while 35% Glycolic acid was used for Group B patients. The peeling was repeated four times at 2-week intervals, and the degree of

improvement in pigmentation was assessed at regular intervals using the melasma area and severity index (MASI) and post-peel photographs. The patients were also advised to use sunscreens, moisturizers, and avoid peeling and scratching of the skin. Side effects, if any, were recorded during the study.

### Results and Observations

It was a prospective study of 150 patients of both sexes and different ages with melasma. The patients were randomly allocated into two groups, Group A (Salicylic acid) and Group B (Glycolic acid), with 75 patients in each group. Patients meeting the inclusion criteria were asked to give written consent to participate in the study. The details of duration, onset, use of cosmetics, systemic medication, and history of occupation and duration of sun exposure were recorded. After a detailed history, clinical examination under natural light, hand lens and Wood's light examination, melasma area and severity index was calculated, and baseline photographs were taken.

Analysed details on patient demographics such as age of disease onset, gender, marital status of the individuals, duration of disease, sun exposure, family history, cosmetic have been concisely depicted in **Table 1**. The average age of patients in Group A was 41 and in Group B was 43. There were no patients of indeterminate melasma.

The results were analyzed on the basis of MASI scoring (based on area of involvement, darkness, and homogeneity of pigmentation) done by an independent observer. The results obtained at 3 months were compared with the marital status, predisposing factors, lifestyles, and pattern of melasma; however, no statistically significant results were obtained with respect to these variables. Clinical findings in the patients could be seen in **Table 2**.

The MASI values decrease over time in both groups, indicating a reduction in the severity of melasma. For Group A (Salicylic Acid), the mean MASI score at baseline was 7.23, with a standard

deviation of 1.45. At follow-up, the mean MASI score was 3.69, with a standard deviation of 1.25 and a SE mean of 0.521. The t-value was 5.023, indicating a statistically significant difference between baseline and follow-up scores, with a p-value of less than 0.0001. While for Group B (Glycolic Acid), The mean MASI score for the baseline was 7.33 with a standard deviation of 1.59. The standard error of the mean was 1.24. The t-value was 6.102, and the p-value was <0.0001, indicating a statistically significant difference between the baseline and follow-up measurements. The mean MASI score for the follow-up was 3.85 with a standard deviation of 1.42 and a standard error of 0.524. The % improvement in MASI was 46.25%.

The change in MASI from baseline was significant in both the groups at 12 weeks and 20 weeks. There was no statistically significant difference in improvement between Group A and Group B at 12 weeks ( $p=0.768$ ).

The patients were asked to grade their improvement subjectively at the end of 3 months. Patients in Group B using Glycolic acid had the most favourable response with 41.3 % patients grading it as good response and 17.3% considering it as very good response, while for Group A using Salicylic Acid, Good response was observed by 42.7% patients, but very good response was observed by only 4% patients. Important to observe that there were no patients in both the groups considering no response [Figure 1].

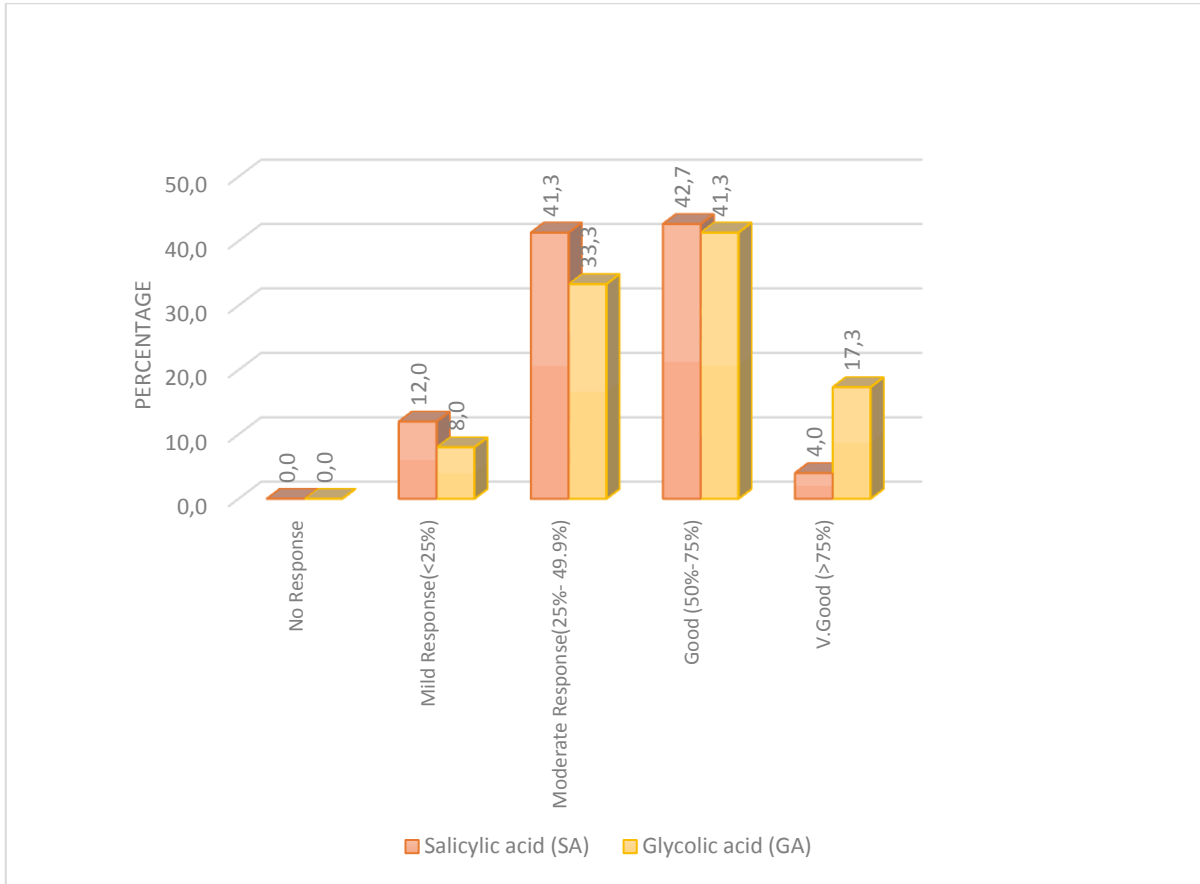
During the peels, all patients developed mild cutaneous erythema and superficial desquamation. Post peel Hyperpigmentation was also observed in both the groups. There was no significant difference in the incidence of adverse effects between the groups [Figure 2].

**Table 1: Patient Demographics**

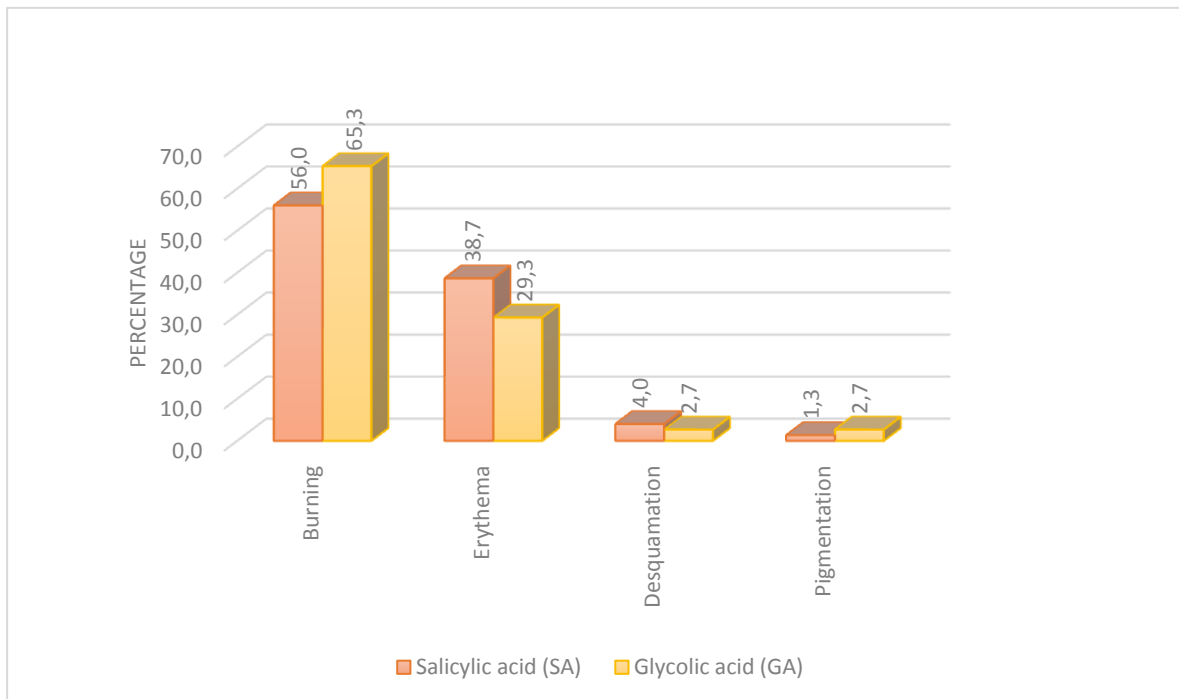
Characteristics	Group A (Salicylic Acid) n (% or SD)	Group B (Glycolic Acid) n (% or SD)
<b>Age of onset (years)</b>		
18-20 years	5 (6.7)	10 (13.3)
21-30 years	16(21.3)	18 (24)
31-40 years	25(33.3)	21 (28)
41-45 years	29(38.7)	26 (34.7)
<b>Sex Distribution</b>		
Male	34 (45.3)	27 (36)
Female	41 (54.7)	48 (64)
<b>Marital Status</b>		
Married	54 (72.0)	57 (76.0)
Unmarried	21 (28.0)	18 (24.0)
<b>Duration of disease</b>		
1-2	43 (57.3)	39 (52.0)
3-5	24 (32.0)	25 (33.3)
6-8	8 (10.7)	11 (14.7)
<b>Sun Exposure</b>		
Present	33 (44.0)	49 (65.3)
Absent	42 (56.0)	26 (34.7)
<b>Family History</b>		
Present	23 (30.7)	27 (36.0)
Absent	52 (69.3)	48 (64.0)
<b>Cosmetic Use</b>		
Present	3 (4.0)	4 (5.3)
Absent	72 (96.0)	71 (94.7)

**Table 2: Clinical Findings in the patients**

Characteristics	Group A (Salicylic Acid)	Group B (Glycolic Acid)
<b>Pattern of Melasma</b>		
Centrofacial	51 (68.0)	49 (65.3)
Mandibular	3 (4.0)	2 (2.7)
Malar	21 (28.0)	24 (32.0)
<b>Histological Type</b>		
Dermal	19 (25.3)	21 (28.0)
Epidermal	35 (46.7)	36 (48.0)
Mixed	21 (28.0)	18 (24.0)
<b>MASI (Mean <math>\pm</math> SD)</b>		
Baseline	7.45	7.89
4 weeks	6.45	6.85
8 weeks	6.42	5.78
12 weeks	5.36	4.78
16 weeks	4.33	4.98
20 weeks	3.29	3.22



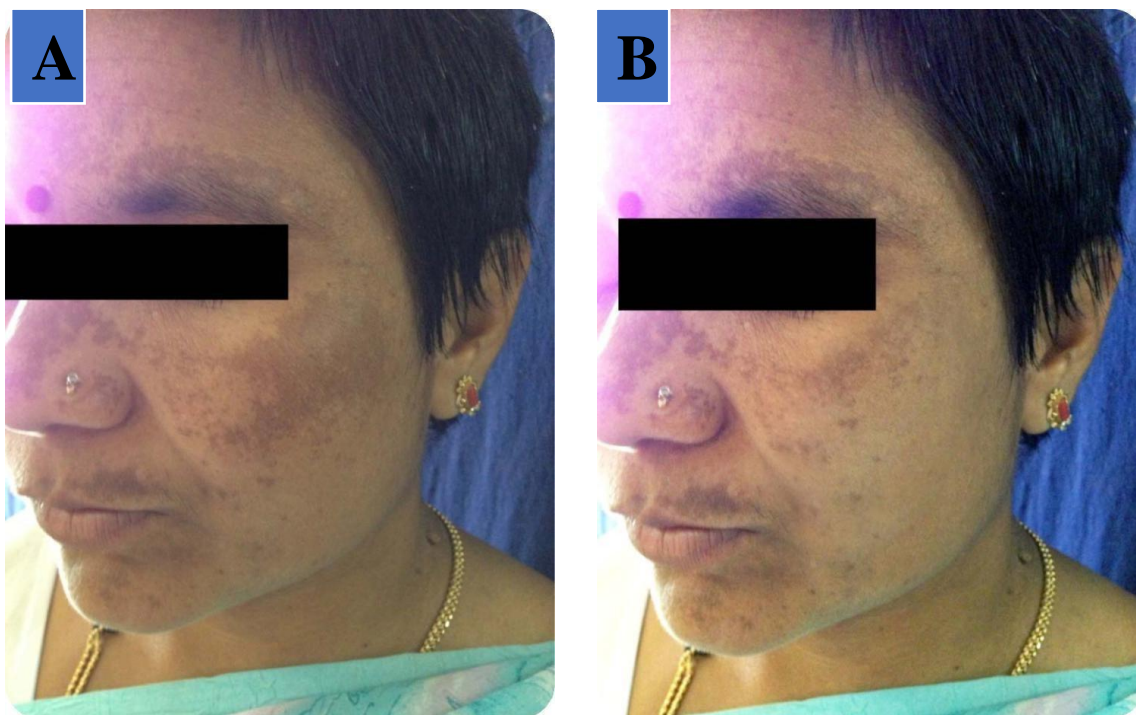
**Figure 1:** Showing Subjective grading at the end of therapy after 3 months



**Figure 2:** Adverse effects observed in patients of both groups



**Figure 3:** Participant's photographs at baseline (A) and at 12 weeks (B) of treatment with GA



**Figure 4:** Participant's photographs at baseline (A) and at 12 weeks (B) of treatment with SA

### Discussion

In this study, 150 patients with melasma were randomly divided into two groups based on the type of chemical peel used. Group A received salicylic acid peels, while Group B received

glycolic acid peels. The patients were evaluated based on their age, sex, marital status, disease duration, and type of chemical peel used.

The study found that chemical peel usage increases with age, with the highest usage in the

41-45 age group. This finding is consistent with a study by Kornhauser et al. (2010)<sup>[7]</sup>, which also found a high proportion of patients between the ages of 40 and 65. However, the study by Al-Talib et al. (2013)<sup>[8]</sup> found a high proportion of patients between the ages of 18 and 30.

In terms of gender, the study found that 45.3% of males used salicylic acid peels and 36.0% used glycolic acid peels, while 54.7% of females used salicylic acid peels and 64.0% used glycolic acid peels. However, the difference in usage between males and females was not statistically significant. Marital status was also not significantly associated with the type of chemical peel used. In the study, 72.0% of married individuals used salicylic acid peels and 76.0% used glycolic acid peels, while 28.0% of unmarried individuals used salicylic acid peels and 24.0% used glycolic acid peels.

In terms of disease duration, 54.7% of patients had a disease duration of 1-2 years, 32.7% had a duration of 3-5 years, and 12.7% had a duration of 6-8 years. These findings are consistent with a study by Li et al. (2019)<sup>[9]</sup>, which found that the majority of patients had a disease duration of less than 5 years.

The results of this study suggest that both salicylic acid and glycolic acid are effective treatments for melasma. The study found a statistically significant difference between baseline and follow-up MASI scores for both treatments, with p-values less than 0.0001. The mean MASI score for salicylic acid decreased from 7.23 at baseline to 3.69 at follow-up, and for glycolic acid, the mean MASI score decreased from 7.33 at baseline to 3.85 at follow-up.

It is interesting to note that the % improvement in MASI was slightly higher for glycolic acid (46.25%) than for salicylic acid (49.02%). However, it is important to consider that these results may not be directly comparable to other studies, as different studies may use different methods for calculating MASI scores or have different baseline characteristics of the study participants.

Overall, the study provides valuable insights into the usage of chemical peels for the treatment of melasma and highlights the importance of considering factors such as age, gender, and disease duration when selecting a treatment approach.

### Conclusion

In conclusion, our prospective study has shown that both salicylic acid (SA) and glycolic acid (GA) peels are effective treatments for melasma, with slightly better results observed in the GA group. The observed complications such as burning, erythema, post-inflammatory hyperpigmentation, and mild desquamation were minimal, transient, and tolerable. We found no significant associations between the type of chemical peel used and age, gender, marital status, duration of disease, or family history of skin disease. However, our study revealed a significant association between the type of chemical peel used and sun exposure. Most of the patients in our study had the centrofacial type of melasma, followed by the malar type, with a small proportion having the mandibular type. Our study provides valuable information for clinicians treating patients with melasma, emphasizing the importance of considering sun exposure when selecting a treatment, and highlighting the effectiveness of both SA and GA peels.

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