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RESEARCH ARTICLE
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EFFICACY OF MESOTHERAPY WITH VITAMIN C IN PATIENTS OF MELASMA WITH FITZPATRICK SKIN TYPE IV & V

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ABSTRACT:
Melasma is a skin disorder that is managed through various topical applications. But still dermatologists are in search for a better management plan.
OBJECTIVE:
To determine the outcome of mesotherapy with topical vitamin C in patients with melasma in Fitzpatrick skin type IV & V.
Study Design: Quasi Experimental Study.
Duration of Study: 02 April, 2022 to 02 October, 2022.
Data Collection Procedure:
Data was collected from patients presenting in OPD of Dermatology Department, Sharif medical city hospital, Lahore fulfilling the selection criteria. After approval from the ethical committee of hospital, an informed consent was obtained to include their data in the study. Melasma Area and Severity Index score(MASI) was calculated before first session and after end of third session by using Wood's light. Microneedling was carried out in vertical, horizontal and both diagonal directions for about ten passes in each direction or till pinpoint bleeding occurs. Pure vitamin C of healer's pharma was applied over all affected area. At the end of the study, photographs were recorded again to compare with baseline photographs, and outcome calculated on a pre-designed proforma. Data entry and analysis was done by using SPSS 23.
Results: Mean age was 32.50±4.79 years. Majority of the cases were female 84(79.2%). Paired sample T test revealed that mean difference of the pre and post treatment MASI score was 3.83±1.86 with a significant difference.
Conclusion: Mesotherapy with topical vitamin C is effective method in terms of the reduction of the mean MASI score.

Key Words: Mesotherpay, Vitamin C, Melasma

INTRODUCTION:

Melasma is most common acquired disorder of hyperpigmentation, present with light to dark brown macules on exposed areas of face.(1) Globally, prevalence is 1 to 5%, while in Arab-Americans, it is 13.4 to 15.5%. Data regarding the prevalence of melasma in our population is limited. (2)

Melasma is multifactorial that is affected by both genetic and environmental factors.[1]UV irradiation exposure, oral contraceptive pills, pregnancy, thyroid dysfunction, phototoxic drugs, cosmetic products and anti-epileptics drugs have been shown as most common causes of melasma. (3)

Melasma is a chronic and recurrent condition. It causes a deleterious impact on quality of life. It increases frequency of anxiety and depression in patients with melasma. (4)(5)

Multiple treatment strategies are available for this disorder including topical agents like hydroquinone, kojic acid, vitamin C, steroids, liquor ice derivatives etc. (6), oral medicine, chemical peeling, microinjections, monotherapy and lasers.

Mesotherapy is the most recent and minimally invasive approach that results in formation of micro-wounds which stimulate growth factors release and induce collagen production. (3)

Efficacy and safety of mesotherapy with vitamin C for treatment of mixed-type melasma has not been established in Asian skin types.(7) However international studies showing efficacy of mesotherapy with glutathione, ascorbic acid and traneaxemic acid are present.

Data pertaining to establish the efficacy of this new treatment modality is limited in melasma in Asian skin type, as there is increase tendency of tanning and post inflammatory hyperpigmentation, therefore decided to determine efficacy and safety of this procedure in melasma with Vitamin C. To the best of our knowledge it is the first study of its kind in the local context.

MATERIALS AND METHODS:

This was a quasi-experimental study conducted in the Department of Dermatology at Sharif Medical and Dental College/Sharif Medical City Hospital, Jati Umra, Lahore. The study duration was six months, from April 2, 2022, to October 2, 2022, following ethical approval of the research synopsis. A total of 106 patients were enrolled using a non-probability consecutive sampling technique. The sample size was calculated based on a previously reported mean change in MASI score of 2.86 ± 0.24, with an absolute precision of 0.05, using WHO sample size estimation criteria.

The objective of this study was to determine the outcome of mesotherapy with topical vitamin C in patients with melasma, specifically in individuals with Fitzpatrick skin types IV and V.

Melasma is defined as a hyperpigmentary disorder that affects sun-exposed areas of the face and neck. Clinically, it is characterized by light brown macules and patches. Under Wood's light examination, the epidermal variant shows enhancement, while the dermal variant remains unchanged. The Melasma Area and Severity Index (MASI) is a standardized scoring system used to quantify the severity of melasma and monitor any changes following treatment. The outcome of this study was determined by the mean change in MASI score, calculated as the difference between baseline and after three treatment sessions.

Inclusion criteria were: patients aged 18–40 years of any sex, with Fitzpatrick skin types IV or V confirmed on physical examination; patients diagnosed with epidermal, dermal, or mixed types of melasma under Wood's lamp examination; patients who had not received any treatment for melasma in the last four weeks; and those with a history of failure to respond to at least one topical treatment.

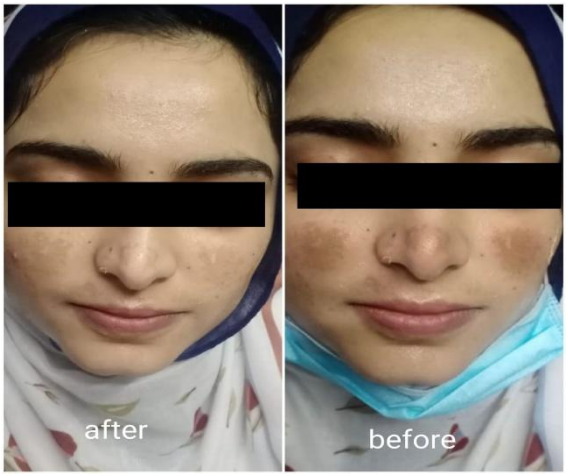
Exclusion criteria included: patients using oral contraceptives, those who were pregnant or lactating, patients with acne or herpes simplex infections, individuals with keloid or hypertrophic scars at the melasma site, those on systemic steroids in the past six months, and patients with vitiligo, photosensitivity, bleeding disorders, anemia, or significant systemic illnesses such as renal, hepatic, or endocrinal disorders.

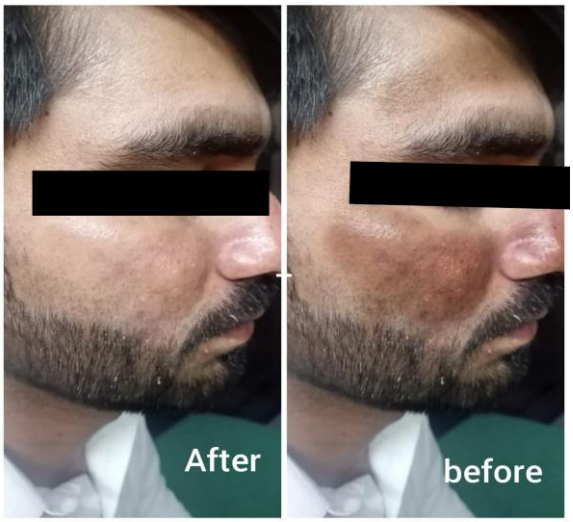
Data collection was carried out from patients attending the dermatology outpatient department. After obtaining approval from the institutional ethical committee and informed consent from each participant, a detailed history—including personal, medical, and socioeconomic data—was obtained.

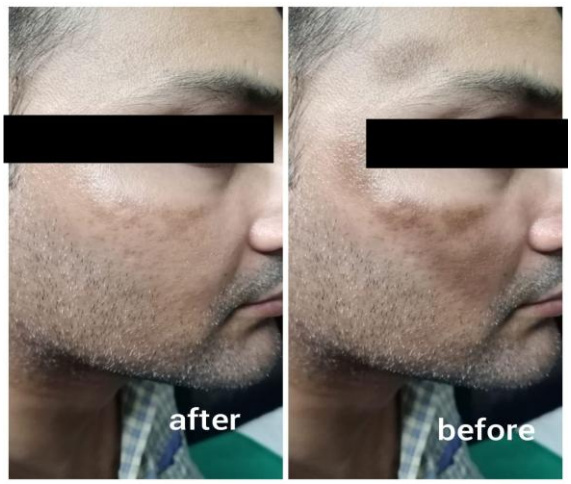
Complete blood count was performed to rule out anemia and thrombocytopenia. The MASI score was recorded before the first session and again after the third session using Wood's light to assess changes in melasma severity. Pre- and post-treatment photographs were taken with patient consent.

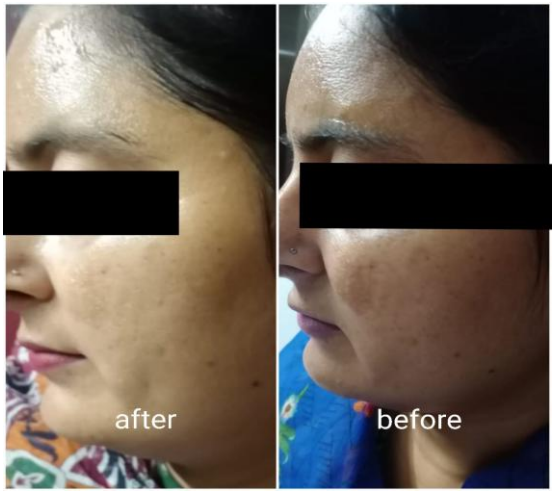
For the treatment, after gentle cleansing of the affected area, a topical anesthetic (lidocaine cream) was applied for 45 to 60 minutes. Microneedling was performed using a dermapen with 36 needles, with needle lengths adjusted based on facial area—1.5 mm for cheeks, and 0.5 mm for nose, forehead, and chin. Microneedling was performed in vertical, horizontal, and diagonal directions, with about ten passes in each direction or until pinpoint bleeding was observed. Immediately after microneedling, pure topical vitamin C (from Healer's Pharma) was applied to the affected areas. Patients were advised to strictly avoid sun exposure and to use sunscreens with SPF 60+ even indoors. The procedure was repeated every four weeks for a total of three sessions, with monthly follow-ups. At the end of the study, outcome data were documented, and photographs were compared with baseline images. The MASI score was used to quantify the results.

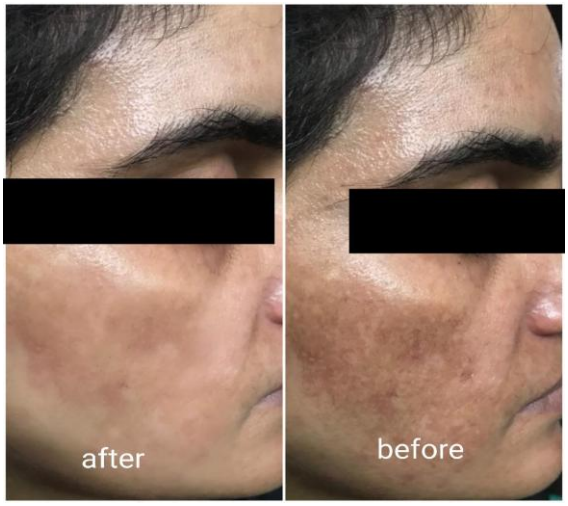
Data entry and analysis were carried out using SPSS version 23. Quantitative variables such as age, baseline MASI score, post-treatment MASI score, mean change in MASI, and duration of disease were presented as mean ± standard deviation. Qualitative variables such as gender were presented as frequencies and percentages. The data were stratified by age, gender, and duration of disease to control for potential effect modifiers. Paired sample t-tests were applied post-stratification, with a p-value ≤ 0.05 considered statistically significant.











RESULTS:

In this study, the mean age of the participants was 32.50 ± 4.79 years. The majority of cases were female (79.2%, n=84) while males comprised 20.8% (n=22). The mean duration of melasma was 13.01 ± 7.09 months. At baseline, the mean MASI score was 8.51 ± 2.42, which significantly reduced to 4.68 ± 2.01 after three sessions of mesotherapy with topical vitamin C. The mean reduction in MASI score was 3.83 ± 1.86, and the difference was statistically significant ($p < 0.001$) as determined by paired sample t-test.

Stratification was performed to control for potential effect modifiers such as age, gender, and disease duration. Results showed statistically significant improvement in MASI scores across all subgroups. The post-treatment MASI score for patients aged ≤30 years was 4.90 ± 2.15, while for those >30 years it was 4.55 ± 1.90. Among males, the post-treatment MASI score was 4.27 ± 1.63, and among females, it was 4.79 ± 2.08. Patients with a disease duration ≤12 months had a post-treatment score of 4.70 ± 2.02, and those with >12 months had a score of 4.67 ± 2.01. All stratified comparisons yielded statistically significant differences ($p < 0.05$).

Table 1: Baseline Characteristics and Treatment Outcome

Variable	n	Mean ± SD	%
Age (years)	106	32.50 ± 4.79	–
Gender	106	–	
• Male			20.8%
• Female			79.2%
Duration of disease (months)	106	13.01 ± 7.09	–
MASI score at baseline	106	8.51 ± 2.42	–
MASI score after 3 sessions	106	4.68 ± 2.01	–
Mean difference in MASI score	106	3.83 ± 1.86	$p < 0.001$

Table 2: Stratification of MASI Score by Age, Gender, and Duration of Disease

Variable	Group	MASI Baseline (Mean ± SD)	MASI After 3 Sessions (Mean ± SD)	p-value
Age	≤ 30 years	8.73 ± 2.49	4.90 ± 2.15	< 0.001
	> 30 years	8.38 ± 2.39	4.55 ± 1.90	< 0.001
Gender	Male	8.68 ± 2.69	4.27 ± 1.63	0.003
	Female	8.47 ± 2.36	4.79 ± 2.08	< 0.001

Duration of Disease	≤ 12 months	8.25 ± 2.59	4.70 ± 2.02	< 0.001
	> 12 months	8.74 ± 2.27	4.67 ± 2.01	< 0.001

DISCUSSION:

Melasma is a chronic and relapsing pigmentary skin illness that causes symmetrical, irregular brown macules and patches on sun-exposed areas like the face, wrists, and forearms. The average age of onset is 20-40 for women. Clinicians usually diagnose reticulated hyperpigmentation. Dermoscopy, biopsy, and ultraviolet light can also assist diagnose pigmentation severity and depth. (9) Despite being a common skin issue, pigmentation can be recurring and resistant to various treatments. Melasma can frustrate patients and doctors. Thus, this study investigates safe and effective melasma treatments, particularly for stubborn instances. (10) Micro-needling is a novel minimally invasive therapy that uses tiny sterilised needles to puncture the skin. The epidermis is barely damaged, and the tiny punctures and channels generated make it a popular transdermal medication delivery technique (11).

Considering the importance to determine some other more effective therapy to deal with the melasma among population, this study is planned. The mean age of the study patients who carry this issue to hospital was 33 years and majority of the cases were females. As females are more conscious about their facial presentation so they presented in higher number as compared to males. These findings were similar as compared to other studies carried out on melasma issue. (12-14)

Tables 1 and 2 highlights the clinical efficacy of mesotherapy with topical vitamin C in managing melasma among patients with Fitzpatrick skin types IV and V. The significant reduction in MASI scores from baseline to post-treatment (mean reduction of 3.83 ± 1.86, $p < 0.001$) confirms the treatment's effectiveness in decreasing the severity of hyperpigmentation. The stratified analysis further strengthens the findings by demonstrating consistent improvements across different subgroups. Whether the patients were young (≤30 years) or older (>30 years), male or female, or had a shorter (≤12 months) or longer (>12 months) duration of disease, all groups showed statistically significant improvements post-treatment. This consistency indicates that the therapeutic benefit of microneedling with vitamin C is not limited by age, gender, or chronicity of melasma. These outcomes support the broader application of this treatment modality in diverse patient populations and suggest its potential use as a standardized and safe option in the dermatologic management of recalcitrant melasma, particularly in patients with darker skin types who are more prone to post-inflammatory hyperpigmentation.

Every procedure has its limitations e.g. non- ablative lasers have common side effects like post inflammatory pigmentation. Mesotherapy may offer a more advantageous safety profile, particularly in Fitzpatrick skin types IV-VI, compared with more conventional resurfacing modalities.1 In Mesotherapy. epidermis remains relatively intact therefore, helping to limit adverse events. In a study by Ismail ESA, baseline MASI score was 8.61±4.4 and MASI score by mesotherapy with vitamin C was 5.75±4.16. (change2.86±0.24) (6) Mechanism of action of vitamin C is that it interacts with copper ions that results into inhibition of tyrosinase enzyme. The active components in vitamin C has better penetration into skin through microneedling has resulted in reduction in melasma. (7)

Several scoring and evaluation tools were developed to assess the efficacy of melasma treatments. One of which is the melasma area and severity index (MASI) which is a valid scale used to score the extent or severity of hyperpigmentation in melasma. Since melasma has a significant impact on appearance, it can cause psychological and emotional distress to patients causing a reduction in their quality of life hence it is important to evaluate and consider the melasma quality of life in the treatment approach. In this study, there was noted improvement in the melasma that leads towards a better sense of well-being of the patients after the treatment. Clinical evaluation was also done through melasma area and severity index score conducted by a dermatologist. (15)

After vitamin C micro-needling, MASI score and Melasma quality of life differed significantly. These findings matched earlier research. Clinical improvement was noted in pre- and post-treatment photos. Melasma treatment with micro-needling was effective in this and earlier investigations, as judged by MASI and MELASQoL. Due to vitamin C and E's depigmenting effect, micro-needling with vitamin C and E reduced MASI score. Vitamin C helps heal pigmentary issues including melasma, according to studies.
(16,17)
Similarly in this study we find the improvement by using Vitamin C therapy. This study further evaluated that the improvement in the melasma is irrespective of the age, gender or the duration of the disease. There was significant improvement even when the data was stratified and blocks were created for age, gender and duration of diseases.
Mesotherapy with topical vitamin C has demonstrated promising efficacy in the treatment of melasma, especially in individuals with Fitzpatrick skin type IV. Evidence from clinical studies indicates a significant reduction in pigmentation severity, as measured by the Modified Melasma Area Severity Index (mMASI). One study involving 60 patients, predominantly of Fitzpatrick type IV (88.3%), reported a 38.3% decrease in mMASI scores following microneedling combined with topical vitamin C. The baseline score of 13.17 reduced to 8.10 post-treatment, a change that was statistically significant (p = 0.004). This underscores the therapeutic potential of vitamin C mesotherapy in effectively reducing melasma in moderately pigmented skin. 18
The treatment's safety profile has also been favorable. Most adverse effects were minor and transient, including erythema and mild edema, which typically resolved without intervention. These findings support the tolerability of the procedure in clinical practice. 16,18 Moreover, when vitamin C was used in combination with glutathione as part of a mesotherapy cocktail, it yielded better results than when combined with tranexamic acid, achieving a greater reduction in mMASI scores (1.82 vs. 3.046). This highlights the potential value of combination therapy in enhancing outcomes.19
However, data on Fitzpatrick skin type V remains sparse, limiting the generalizability of these findings. Given the increased melanin density in darker skin types, there is a heightened risk of post-inflammatory hyperpigmentation, which may influence treatment response and necessitate protocol adjustments. As such, clinicians should exercise caution when applying vitamin C mesotherapy to patients with type V skin and consider individualized treatment modifications.
Several limitations are evident in the existing literature. Most studies focus primarily on Fitzpatrick skin types III and IV, with limited representation of type V and darker skin tones. Additionally, the optimal concentration of vitamin C used in these treatments varies across studies, typically ranging between 3% and 5%. 5,6 new Furthermore, combination regimens consistently demonstrate superior efficacy compared to monotherapy with vitamin C alone.,19,20
Mesotherapy with topical vitamin C is an effective and generally safe option for melasma in Fitzpatrick type IV skin, its application in type V requires cautious interpretation due to limited evidence. Patients should be counseled about potential risks and the current lack of robust data for darker skin types. Further research is essential to refine treatment protocols and confirm efficacy and safety across all skin phototypes.

CONCLUSION:

Microneedling with topical vitamin C is an effective treatment option for epidermal melasma. Microneedling allows the delivery of sufficient concentration of vitamin C into the skin and acts by stimulating the production of collagen and elastin at the dermal level, which helps to decrease the visible pigmentation.
Microneedling with topical vitamin C is safe treatment modality with no side effects except for minimal pain due to microneedling and post-procedure erythema. Therefore, can be used as a maintenance therapy.

LIMITATIONS:

Like most of the clinical studies, this study has also limitations. Due to time bound study only one center was selected to perform this study which was the tertiary care institute. Being a public sector institute most of the cases were from poor class family. Due to bad hygienic conditions the melasma case were presented in a severe level of disease. Patients are not followed or recurrent of the disease which should be done. Hence considering these limitations, more studies are needed on the same pattern for further confirmation of efficacy and safety of this treatment method.

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