MAGNA MEDIKA
Berkala Ilmiah Kedokteran dan Kesehatan
e-ISSN 2774-2318
p-ISSN 2407-0505

Literature Reviews
MAGNA MEDIKA
Berkala Ilmiah Kedokteran dan Kesehatan
Journal Page: https://jurnal.unimus.ac.id/index.php/APKKM

The Effectiveness of *Salicylic acid* Therapy in Mild and Moderate Acne Vulgaris

Alfin Nafila[1], Dodik Nursanto[2], Retno Sintowati[3], Ratih Pramuningtyas[4]

[1,2,3,4)] Medical Faculty of Universitas Muhammadiyah Surakarta

Article Info

Article history:
Received 03 May 2021
Revised 04 January 2024
Accepted 04 January 2024
Available online 02 February 2024

Keywords:
Acne Vulgaris; Salicylic acid; Therapy

Correspondence:
Rp110@ums.ac.id

How to cite this article:
Alfin Nafila, Dodik Nursanto, Retno Sintowati, Ratih Pramuningtyas. The Effectiveness of Salicylic Acid Therapy in Mild and Moderate Acne Vulgaris. MAGNA MEDIKA Berk Ilm Kedokt dan Kesehat. 2024; 11(1):71-82

Abstract

Background: Acne vulgaris is a chronic inflammatory disease of polysebaceous follicles characterized by lesions that include blackheads, papules, pustules, nodules, and cysts. The prevalence of acne vulgaris is most significant among adolescents aged 15 to 18. In mild and moderate acne vulgaris, topical treatment enhances skin conditions. It is believed that the ability of salicylic acid to reach the stratum corneum, which exfoliates due to its comedolytic properties, aids in the healing of acne vulgaris.

Objective: Evaluate the efficacy of salicylic acid as a treatment for mild and moderate acne vulgaris.

Methods: This study's design involved a literature search using the terms acne vulgaris and salicylic acid in Google Scholar, PubMed, and Science Direct.

Results: The investigation found 108 articles were discovered and excluded based on the restriction criteria; 8 articles were reviewed. Salicylic acid substantially improved mild and moderate acne, according to all studies. Improvement was measured based on the lesion's severity, the lesion type, and Goodman's qualitative global scarring grading system. There is an improvement in inflammatory, non-inflammatory, and hyperpigmented lesions.

Conclusion: Salicylic acid is clinically beneficial for mild to moderate acne vulgaris.

e-ISSN 2774-2318
p-ISSN 2407-0505

INTRODUCTION

Acne vulgaris is a dermatological condition characterized by persistent inflammation of the sebaceous glands, resulting in the formation of comedos, papules, pustules, and nodules. These manifestations have the potential to lead to scarring and facial disfigurement. The prevalence of acne vulgaris is predominantly observed in the adolescent population, with a reported occurrence ranging from 70% to 87%[1]. Cutibacterium acnes, a bacterial species under the influence of normal levels of circulating dehydroepiandrosterone, is commonly responsible for its onset during adolescence. Acne vulgaris is cau-sed by the interaction of multiple factors that result in the formation of comedo, its primary lesion[2].

According to the American Academy of Dermatology, acne vulgaris is graded according to the degree of skin lesions. Mild acne vulgaris (comedo 20, pustule 15, and cysts 0), moderate acne vulgaris (comedo 20-100, pustule 15-50, and cysts 5), and severe acne vulgaris (comedo >100, pustule >5, and cysts >5) are all classified as acne vulgaris. Acne vulgaris has multiple causes, including genetics, race, diet, climate, skin type, hygiene, cosmetic use, stress, infection, and occupation. Salicylic acid is a keratolytic that is commonly administered topically. Salicylic acid destroys the desmosome structure of corneocytes and promotes desquamation, particularly in the lipophilic and stratum corneum upper layers. Due to its comedolytic properties, salicylic acid is also referred to as the exfoliating agent for acne vulgaris [3]. Salicylic acid can also be used to treat acne vulgaris in chemical peels. A study discovered that using salicylic acid peels with a pulsed dye laser (PDL) resulted in superior acne control outcomes. While acne patients benefited significantly from a salicylic acid peel alone, they benefited even more from PDL therapy in conjunction with salicylic acid peels[4].

While some studies suggest that salicylic acid can be an effective acne treatment, other studies have yielded contradictory results[5–7]. In one study, supramolecular salicylic acid and intense pulsed light were more efficacious than salicylic acid monotherapy[6]. A combination of glycolic acid, lactic acid, mandelic acid, salicylic acid, citric acid, and gluconolactone was effective in treating acne vulgaris, according to a separate study[8]. A different study, however, found that a combined light therapy mask with and without topical salicylic acid was not substantially more effective than benzoyl peroxide in treating mild-to-moderate acne vulgaris[5].

This research seeks to determine the efficacy of salicylic acid as a treatment for mild to moderate acne vulgaris. Some studies on the use of Salicylic acid as a treatment for acne vulgaris have produced contradictory results; therefore, the researchers conducted the present study to obtain more comprehensive information.

METHODS

This research uses literature review methods and research samples obtained from *Google Scholar and* Pubmed databases using search terms such as "Acne Vulgaris" OR "Acne" AND "Salicylic Acid."

The study implemented specific criteria for literature selection. The research designs utilized in

e-ISSN 2774-2318
p-ISSN 2407-0505

this study encompass many methodologies, such as experimental studies, causal-comparative studies, case studies, cross-sectional studies, correlation analysis, comparative analysis, and quantitative investigations. A body of literary works was published within the timeframe spanning from 2010 to 2020. The literature has been composed in the English language. Primary research, not a systematic review

Based on the question of the clinical problem, then the author can compile the PICO as follows: P: Patient with mild to moderate acne vulgaris, I: The intervention on this scientific search, which discusses the relationship between acne vulgaris and salicylic acid. C: Comparison of intervention with other acne treatments consisting of single or combination therapies. O: Outcomes There are clinical differences after intervention.

RESULT

The research was conducted using the methodology of a literature review. Google Scholar and PubMed can be searched using the keywords acne vulgaris and salicylic acid. PubMed search results provided 22 articles, while Google Scholar search results returned 84 articles, for a total of 106 articles. There were duplicates, no full text was available, and they could not meet the restriction criteria, so 98 articles were removed. A review of eight journals was then conducted.

DISCUSSION

Numerous topical acne treatments are available, and each treatment's efficacy varies depending on the individual's skin type and acne severity. Due to its ability to exfoliate the skin and unclog pores, salicylic acid is a common constituent in numerous acne treatments. Research has shown that salicylic acid peels effectively treat mild to moderate acne vulgaris[17].

The research examined articles discussing salicylic acid as a mild to moderate acne vulgaris treatment. Eight articles using experimental methods were obtained. The entire article discusses salicylic acid as a remedy for acne vulgaris. The entire article describes how salicylic acid is administered as a chemical peeling.

Three studies compare salicylic acid's effectiveness and Jassner's solution as exfoliation treatments for mild and moderate acne [11,13,16]. A 30% solution of salicylic acid is administered as a chemical peeling agent. The third finding of the study demonstrates that salicylic acid is effective in acne therapy, and the results are statistically significant when compared to Jessner solution for non-inflammatory lesions [11,13,16]. According to the articles by Surabhi and Byung, salicylic acid is more effective as a treatment for acne with non-inflammatory lesions or comedonal acne. The potent lipophilic and comedolytic activity of salicylic acid can prevent the formation of comedones by inhibiting excessive keratinization processes in the follicular tract [11,13]. Chemical peels, such as salicylic acid and Jessner's solution, are frequently used to treat acne. Resorcinol, salicylic acid, and lactic acid (latter beta-hydroxy acid) are all components of Jessner's solution [18]. Dr. Max Jessner formulates it in 95% ethanol to minimize the side effects of resorcinol and contact dermatitis and enhance the keratolytic effect [16]. Both peels are helpful in the treatment of acne lesions[18].

e-ISSN 2774-2318
p-ISSN 2407-0505

Table 1. Results of literature searches for research

Writer	Country	Title	Methods	Population	Intervention	Comparison	Outcome
Azza Mahfouz, *et al* /2015 [9]	America	Trichloroacetic Acid Versus Salicylic Acid in the Treatment of Acne Vulgaris in Dark-Skinned Patients	RCT	The adult patient population comprises three males and 17 females, totaling 20 individuals. Acne vulgaris of mild to moderate severity. The individual's skin type is classified as Fitzpatrick skin type III-V.	Trichloroacetic acid (25%) is administered to the right side of the face at two-week intervals for two months, while salicylic acid (30%) is applied to the left.	*Trichloroacetic Acid 25%*	Trichloroacetic acid exhibits more efficacy in treating acne characterized by comedonal lesions, while salicylic acid demonstrates greater efficacy in treating acne characterized by inflammatory lesions.
Monique Narciso Alba, *et al* /2016 [10]	Brazil	Clinical comparison of salicylic acid peel and LED Laser phototherapy to the treatment of acne vulgaris in teenagers	RCT	Twelve- to eighteen-year-old boys and girls with comedone and papulopustular acne types I and II were evaluated.	They were divided into two groups at random. Group I had 10% salicylic acid treatment, and Group II had ten sessions of LED laser phototherapy spaced one week apart.	LED Laser Phototherapy	There was statistical significance ($P<0.05$) observed in both categories. Salicylic acid exhibits a 10% higher efficacy in treating acne characterized by non-inflammatory lesions, whereas LED laser phototherapy demonstrates greater efficacy in treating acne with inflammatory lesions.

doi: 10.26714/magnamed.11.1.2024.71-82
11 (1) February 2024

e-ISSN 2774-2318
p-ISSN 2407-0505

Surabhi Dayal *et al.*/2017 [11]	India	Jessner's solution vs. 30% salicylic acid peels: a comparative study of the efficacy and safety of mild-to-*moderate acne vulgaris*	RCT	Forty patients suffered from mild to moderate acne vulgaris.	Group I received 30% salicylic acid exfoliation therapy, while Group II received Jessner's solution therapy, administered up to six times at two-week intervals.	Jessner's solution	The evaluation of results depends on the type of lesion and the MAS score. With a prevalence of 53.42 percent ($P < 0.05$), comedo acne was significant in the SA therapeutic group. In the SA therapy group, 71.0% of patients presented with papulopustular acne lesions. The average decrease in MAS scores in the SA therapy group was statistically significant at 60.35 percent. It was determined that the SA treatment was more efficacious than the JS therapy.
Rania Abdel Hay, *et al* /2019 [12]	Cairo, Mesir	Clinical and dermoscopic evaluation of combined (salicylic acid 20% and azelaic acid 20%) versus trichloroacetic acid 25% chemical peel in acne: an RCT	RCT single blanded	Thirty-four patients over 18 at the Dermatology Clinic of the University of Cairo suffer from mild to moderate acne.	The face is divided into two halves for treatment. One side is subjected to 20% salicylic acid and 20% azelaic acid, while the other is treated with 25% trichloroacetic acid.	*Trichloroacetic acid 25%*	A statistically significant improvement in treating acne, specifically acne accompanied by inflammatory lesions, was observed with 20% salicylic acid and 20% azelaic acid ($P = 0.001$).

doi: 10.26714/magnamed.11.1.2024.71-82
11 (1) February 2024

e-ISSN 2774-2318
p-ISSN 2407-0505

Byung gi bae, *et al* /2018 [13]	Amerika	Salicylic Acid Peels Versus Jessner's Solution for Acne Vulgaris: A Comparative Study	RCT	Thirteen males with varying degrees of susceptibility, aged between 20 and 28 years. Experienced manifestations of mild to moderate acne. The person's skin type is categorized as Fitzpatrick III-IV.	Each patient was administered 30% Salicylic Acid Peels to one side of their face and Jessner's Solution to the other, undergoing up to three sessions with a two-week interval between each treatment.	*Jessner's Solution*	No significant differences in acne with inflammatory lesions were found between SA and JS, although SA was preferable. For non-inflammatory SA lesions, 30% was much more efficacious than JS.
Surabhi Dayal *et al.*/2019 [14]	India	Comparative study of efficacy and safety of 45% mandelic acid versus 30% salicylic acid peels in mild-to-moderate acne vulgaris	RCT	A total of 50 individuals were diagnosed with moderate to mild acne vulgaris.	One of the two groups, selected at random, was administered mandelic acid at a concentration of 45%, while the other group received therapy with 30% salicylic acid. Both groups experienced six treatment sessions at	*Mandelic acid 45 %*	The outcomes were distinguished by comedo, papula, pustule, and MAS scores. The results indicated that the SA therapy group was more effective at reducing comedo than the MA therapy group (P = 0.44). The percentage of papules decreased more rapidly in the MA therapeutic group than in the SA therapeutic group (p = 0.004). In pustula, there was no significant difference in effectiveness between the SA group dam MA and the early MA group; both gave quite acceptable results (P = 0.86).

e-ISSN 2774-2318
p-ISSN 2407-0505

					two-week intervals.		Both MA and SA are effective in treating acne, with MA specifications superior for dealing with inflammatory lesions and SA specifications superior for dealing with non-inflammatory lesions.
Samra Rafique, *et al* /2020 [15]	Amerika	Clinical Efficacy of Salicylic Acid (20%) and Glycolic Acid (35%) Peel in Post *Acne Scarring; Randomized controlled trials*	RCT	The dermatology department of Jinnah Lihore Hospital selected 100 patients aged 12 and older from community care patients using non-probability sampling. Patients who did not respond to other post-acne hyperpigmentation remedies	The patient's right facial side was treated with a 30% salicylic acid solution. The patient's left sides were also treated with a solution containing 35% glycolic acid. The treatment consists of six sessions, each separated by two weeks.	Glycolic Acid (35%)	Evaluations are conducted using Goodman's qualitative global scoring grading system. Both SA and GA could reduce post-acne hyperpigmentation or acne scars (P<0.001), but SA was 20% more effective than GA at reducing acne scarring.
Kang N. How, *et al* /2020 [16]	Malaysia	Efficacy and safety of Jessner's solution peel in comparison with salicylic acid 30% peel in the	RCT double-blinded	36 people have Fitzpatrick skin type IV-V and are experiencing mild to moderate acne.	In this study, participants were administered either Jessner's solution peel or 30% salicylic acid on each side of	*Jessner's solution peel*	Both JS and SA were determined to be efficacious in treating acne and post-acne hyperpigmentation in individuals with dark skin pigmentation (P = 0.05). However, SA formulations have shown greater effectiveness in treating acne and post-acne

doi: 10.26714/magnamed.11.1.2024.71-82
11 (1) February 2024

e-ISSN 2774-2318
p-ISSN 2407-0505

		management of patients with acne vulgaris and postacne hyperpigmentation with skin of color: a randomized, double-blinded, split-face, controlled trial			their face. The treatments were randomly assigned and conducted throughout three sessions, with a two-week break between each session.		hyperpigmentation, with success rates of 85.3% for both conditions, respectively, than JS therapy presentations (76.4%).

e-ISSN 2774-2318
p-ISSN 2407-0505

Since 1985, the FDA has authorized salicylic acid as an active component in non-prescription topical products for treating acne. With its lipophilicity, this substance possesses anti-inflammatory effects and can reach the deeper layers of the skin [19].

Additional studies have examined the efficacy of salicylic acid and Mandelic acid as acne treatment when administered as a chemical peel [14]. The study found that non-inflammatory or comedonal lesions showed improvement. Additionally, there was a significant association between the number of comedones after four weeks of therapy with salicylic acid exfoliation and mandelate acid. Peeling using a solution containing 30% salicylic acid is more effective than peeling with a solution containing 45% mandelic acid for treating non-inflammatory skin lesions [14]. The results of this study align with those of Jartarkar et al., who also found that salicylic acid peeling was more efficacious than mandelic acid peeling in the treatment of non-inflammatory acne, with a statistically significant difference [20].

A literature search found two publications comparing salicylic acid vs trichloroacetic acid as a treatment for mild and moderate acne [9,12]. Both pieces of evidence indicate that SA exerts a more significant therapeutic effect on inflamematory lesions than TCA. While the combined solution demonstrated superior efficacy in reducing inflammatory and non-inflammatory lesions compared to the 25% TCA peel in the present study, the disparity did not reach statistical significance [12]. The formula demonstrated excellent patient tolerance and a reduced incidence of adverse effects. Therefore, the combination of SA and AA can serve as a viable alternative treatment for TCA, especially in individuals with high skin phototypes [12]. Based on Azza's research findings, a 25% TCA peel is more effective in addressing comedonal lesions, and a 30% salicylic acid peel is more effective in treating inflammatory lesions. Because it possesses a mechanism of action capable of digesting proteins and triggering coagulative necrosis of epidermal cells, trichloroacetic acid is more effective as a therapy for acne with comedonal lesions. Because salicylic acid has lipophilic characteristics and a more substantial comedolytic impact than trichloroacetic acid, it is more successful in treating acne with both inflammatory and non-inflammatory lesions [9]

A literature review describes a study comparing salicylic acid as an exfoliating agent for acne with LED laser phototherapy on mild, moderate, and severe acne. The study results indicate that both therapeutic modalities significantly improve acne lesions before and after therapy. The salicylic acid treatment is more effective for mild acne and moderate non-inflammatory lesions. The added benefit of salicylic acid therapy is that it is more popular with patients because it is more affordable, so that it can be used as an option for adolescents. In reducing pustule lesions, LED-Laser phototherapy produces significantly distinct outcomes [10].

Acne vulgaris is a skin disorder that can result in scarring. Scarring can occur due to the inflamemation induced by acne, and it can significantly impact a patient's quality of life. Acne scars come in various shapes and sizes, including icepick, rolling, and boxcar scars. Acne scars can be treated surgically using subcision,

e-ISSN 2774-2318
p-ISSN 2407-0505

punch excision, and elevation techniques. Additionally, injectable fillers, chemical peels, dermabrasion, microneedling, and energy-based devices are used for this purpose [21]. In the literature search for salicylic acid in acne, salicylic acid also has a therapeutic effect on acne scars. Salicylic acid benefits 67% of patients in the research published in Samra 2020. Chemical peels cause adverse effects in fifteen individuals despite being relatively less hazardous. Both peels minimize post-acne scarring; however, the 20% salicylic acid peel outperforms the 35% glycolic acid peel [15]. It is also stated in the article, which compares the efficacy of salicylic acid to Jassner's Solution, that they compare the efficacy of acne hyperpigmentation with the use of a PAHP index. According to the study, salicylic acid (85.3%) is more efficient in reducing acne hyperpigmentation than Jassner's Solution (76.4%) [16].

Salicylic acid is not only beneficial as an optional treatment for mild and moderate ca-ses of common acne, but it also effectively reduces post-acne hyperpigmentation by decree-sing the activity of the tyrosinase inhibitor, which in turn suppresses the production of melanin[15,16]. Salicylic acid has been demonstrated in studies to help treat post-acne pigmentation when used as part of chemical peels or in conjunction with other therapies. In individuals with moderate to severe acne, research comparing the effectiveness of oral isotretinoin with and without 20% salicylic acid peels found that the combination significantly reduced post-inflammatory hyperpigmentation [22]. The duration for observing outcomes of salicylic acid use for post-inflammatory hyperpigmentation (PIH) can be varied. A salicylic acid-containing dermatocosmetic product was test-ed on individuals with moderate to severe post-acne PIH. In mild and moderate post-acne PIH, the mexametric index dropped by 92.7% and 85.9%, respectively, after 12 weeks [23]. Salicylic acid effectively treats post-inflammatory hyperpigmentation (PIH) by exfoliating the skin and stimulating cellular regeneration, reducing dark patches and improving skin tone. Salicylic acid is a type of beta-hydroxy acid that reduces sebum production and promotes the faster healing of acne with minimal scarring. Additionally, it reduces post-inflammatory hyperpigmentation. Salicylic acid peels are preferred for acne treatment due to their lower risk of post-inflammatory hyperpigmentation, particularly in individuals with darker skin [22].

Topical application of salicylic acid can result in specific adverse effects. Several studies report that the observed adverse effects included a transient burning sensation, mild exfoliation, and erythema that resolved over three days. The side effects caused by salicylic acid therapy are still well tolerated. The predominant adverse effects of using salicylic acid topical treatment include a burning sensation, dryness, desquamation, and exacerbation of acne [24]. To minimize the risk of side effects, it is crucial to adhere to the recommended frequency of use, which is usually limited to two or three sessions per two weeks [25]. Salicylic acid is used as a peeling therapy across the entire article that was discovered in our analysis. Salicylic acid provides clinical improvement in treating mild to moderate vulgar acne in more inflammatory and non-inflammatory lesions. A therapy duration ranging from three to five sessions, with a

e-ISSN 2774-2318
p-ISSN 2407-0505

two-week break between each session, can significantly affect the patient. Salicylic acid can serve as an alternative treatment for reducing post-acne hyperpigmentation in addition to its primary application in acne treatments [25].

CONCLUSION

Salicylic acid is effective as an optional therapy for mild and moderate vulgar acne inflammatory and non-inflammatory lesions. Salicylic acid can also be used for post-inflammatory hyperpigmentation and acne scars. This study suggests that it is expected that this review of literature can be used as a basis for the selection of therapies for mild and moderate degrees of vulgar acne.

REFERENCES

1. Zheng Y, Yin S, Xia Y, Chen J, Ye C, Zeng Q, et al. Efficacy and safety of 2% supramolecular salicylic acid compared with 5% benzoyl peroxide/0.1% adapalene in the acne treatment: a randomized, split-face, open-label, single-center study. Cutan Ocul Toxicol. 2019;38(1):48–54.
2. Lu J, Cong T, Wen X, Li X, Du D, He G, et al. Salicylic acid treats acne vulgaris by suppressing AMPK/SREBP1 pathway in sebocytes. Exp Dermatol. 2019;28(7):786–94.
3. Hadisoebroto G, Budiman S. Determination of Salicylic Acid in Anti Acne Cream which Circulated Around Bandung City Using Ultra Violet Spectrophotometry Method. J Kartika Kim. 2019;2(1):51–6.
4. Lekakh O, Mahoney AM, Novice K, Kamalpour J, Sadeghian A, Mondo D, et al. Treatment of acne vulgaris with salicylic acid chemical peel and pulsed dye laser: A split face, rater-blinded, randomized controlled trial. J Lasers Med Sci. 2015;6(4):167–70.
5. Nestor MS, Macri A, Nicole S, Manway M, Paparone P. Efficacy and Tolerability of Over the Counter Light Therapy Mask. Clin Asthetics Dermatology . 2016;9(3):25–35.
6. Ariyawati A, Chen Y, Pu Y, Zhang Y, Zhang L, Shao X, et al. Efficacy of Supramolecular Salicylic Acid 30% Combined with Intense Pulsed Light Compare to Monotherapy Supramolecular Salicylic Acid 30% in Acne Vulgaris Patients. Open Dermatol J. 2023;17(1):1–8.
7. Zhang J, Lin P, Guo C, Ma C, Liu Y, Wang Y, et al. Effects and safety of fire needle adjuvant chemical peels therapy in acne vulgaris: a systematic review and meta-analysis. J Dermatolog Treat. 2023;34(1).
8. Saxena V, Yadav K. Glycolic Acid, Lactic Acid, Mandelic Acid, Salicylic Acid, Citric Acid, Gluconolactone: Skin Exfoliators in Combination Therapy of Acne Vulgaris. Int J Res Eng Sci Manag. 2020;3(10):54–5.
9. Abdel Meguid AM, Abd Elaziz Ahmed Attallah D, Omar H. Trichloroacetic acid versus salicylic acid in the treatment of acne vulgaris in dark-skinned patients. Dermatologic Surg. 2015;41(12):1398–404.
10. Alba MN, Gerenutti M, Yoshida VMH, Grotto D. Clinical comparison of salicylic acid peel and LED-Laser phototherapy for the treatment of Acne vulgaris in teenagers. J Cosmet Laser Ther. 2017;19(1):49–53.
11. Dayal S, Amrani A, Sahu P, Jain VK. Jessner's solution vs. 30% salicylic acid peels: a comparative study of the efficacy and safety in mild-to-moderate acne vulgaris. J Cosmet Dermatol. 2017;16(1):43–51.
12. Abdel Hay R, Hegazy R, Abdel Hady M, Saleh N. Clinical and dermoscopic evaluation of combined (salicylic acid 20% and azelaic acid 20%) versus trichloroacetic acid 25% chemical peel in acne: an RCT. J Dermatolog Treat. 2019;30(6):572–7.
13. Bae BG, Park CO, Shin H, Lee SH, Lee YS, Lee SJ, et al. Salicylic acid peels versus Jessner's solution for acne vulgaris: A comparative study. Dermatologic Surg. 2013;39(2):248–53.
14. Dayal S, Kalra KD, Sahu P. Comparative study of efficacy and safety of 45% mandelic acid versus 30% salicylic acid peels in mild-to-moderate acne vulgaris. J Cosmet Dermatol. 2020;19(2):393–9.
15. Rafique S, Abaidullah M, Saeed M, Shahzad A, Muqeet N, Hamid H. Clinical efficacy of salicylic acid (20%) and glycolic acid (35%) peel in post acne scarring; randomized

e-ISSN 2774-2318
p-ISSN 2407-0505

controlled trials. Lat Am J Pharm. 2020;39(6):1139–43.
16. How KN, Lim PY, Wan Ahmad Kammal WSL, Shamsudin N. Efficacy and safety of Jessner's solution peel in comparison with salicylic acid 30% peel in the management of patients with acne vulgaris and postacne hyperpigmentation with skin of color: a randomized, double-blinded, split-face, controlled trial. Int J Dermatol. 2020;59(7):804–12.
17. Pavithra S, Gopalakrishnan K, Shanmugam J. Efficacy of 70% Glycolic Acid Peel versus 30% Salicylic Acid Peel in the Treatment of Mild to Moderate Acne Vulgaris: A Retrospective Study. J Clin Diagnostic Res. 2022;5–8.
18. Wacewicz-Muczyńska M, Jankowska K, Leszczyńska K. The effectiveness of Jessner's solution in combination with retinol in reducing acne lesions - a pilot study. Aesthetic Cosmetol Med. 2022;11(5):167–71.
19. Anicescu MC, Dinu-Pîrvu CE, Talianu MT, Ghica MV, Anuţa V, Prisada RM, et al. Insights from a Box–Behnken Optimization Study of Microemulsions with Salicylic Acid for Acne Therapy. Pharmaceutics. 2022;14(1).
20. Jartarkar S, Gangadhar B, Mallikarjun M, Manjunath P. A randomized, single-blind, active controlled study to compare the efficacy of salicylic acid and mandelic acid chemical peel in the treatment of mild to moderately severe acne vulgaris. Clin Dermatology Rev. 2017;1(1):15.
21. Boen M, Jacob C. A Review and Update of Treatment Options Using the Acne Scar Classification System. Dermatologic Surg. 2019;45(3):411–22.
22. Kar B, Panda M, Tripathy S. Comparative study of oral isotretinoin versus oral isotretinoin + 20% salicylic acid peel in the treatment of Active Acne. J Cutan Aesthet Surg. 2013;6(4):204.
23. Круглова ЛС, Kruglova LS. Вопросы терапии поствоспалительной гиперпигментации постакне Issues of therapy for post-acne post-inflammatory hyperpigmentation. 2022;16(13):11–6.
24. ElRefaei AM, Abdel Salam HA, Sorour NE. Salicylic-mandelic acid versus glycolic acid peels in Egyptian patients with acne vulgaris. J Egypt Women's Dermatologic Soc. 2015;12(3):196–202.
25. Khunger N, Chanana C. A perspective on what's new in chemical peels. Cosmoderma. 2022;2:14.