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Effectiveness of Laser and Conventional Acne Treatments: Their Impact on Patient Satisfaction and Self-Confidence

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ABSTRACT

Background: Acne can affect patient confidence and satisfaction with treatment. Topical and systemic therapies, compared to more modern laser therapies, still occur in terms of effectiveness and patient satisfaction. Objective: This study compares the two methods and their impact on patient satisfaction and quality of life. Material and Method: This study compared acne vulgaris patients who underwent topical, systemic, and laser treatments. The efficacy of acne treatments was evaluated using the CADI (Cardiff Acne Disability Index) and the Visual Analogue Scale (VAS). The results showed that laser therapy patients reported significantly higher satisfaction and quality of life than those who underwent conventional treatment. Conclusion: This study shows that laser therapy is more effective than conventional treatments in reducing acne severity, and increasing patient satisfaction, and improving self-esteem. This confirms that laser therapy is a superior treatment option for patients who want faster results with better psychosocial outcomes.

Keywords**:** *Acne treatment, Laser therapy, Conventional therapy, Patient satisfaction, Quality of life*

INTRODUCTION

Acne is a common skin condition that can negatively impact quality of life, patient satisfaction, and self-confidence. Various treatment methods, including conventional therapies such as topical and systemic medications and laser therapy, are gaining popularity due to their effectiveness in reducing acne severity more quickly. Although laser therapy is claimed to provide better results, its effectiveness compared to conventional therapy in terms of patient satisfaction and increased self-confidence is still controversial. Therefore, this study aims to compare the effects of laser and conventional therapy on patient satisfaction and self-confidence after treatment.

A persistent inflammatory skin disorder affecting the pilosebaceous glands is called acne vulgaris. While severe acne can develop into nodules and cysts, it was characterized by the formation of come dones, papules, and pustules (source). It is one of the most prevalent skin conditions in the world, and the incidence varies by nation based on factors including age, ethnicity, and diagnostic technique. According to Anna Hwe, the incidence of acne varies from 35% in young adults to over 100% in teenagers. Despite the fact that acne can affect people of any age, it most frequently affects teenagers and young adults because of hormonal changes brought on by puberty. (Sai Yee

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Chuah).

Even while acne is usually thought of as a harmless skin ailment, it can have serious negative effects on one's physical and mental health, particularly for people who have severe acne and scarring. A patient's quality of life is frequently impacted by more severe acne, which can result in tension, sadness, social impairment, and a decrease in self-esteem (Sai Yee Chuah) (Zsa Zsa Ollyvia). Suicidal thoughts are more likely to occur in individuals with severe instances, particularly in women. Halvorsen, Jon A. Therefore, in order to avoid these psychological repercussions, early identification and adequate treatment are crucial. Reducing acne lesions, avoiding complications, and enhancing the patient's general quality of life all depend on early and efficient acne treatment (Kholoud Tayel).

Many options for treating acne are mainly divided into topical treatment and systemic treatment. The first line of acne treatment is topical therapies such as benzoyl peroxide, topical antibiotics, salicylic acid, topical antibiotics, azelaic acid, and topical retinoids like adapalene, tazarotene, and tretinoin (Kelompok Studi Dermatology Kosmetik Indonesia Perdoski. 2016). (Cpg acne 2022). Nevertheless, the issues surrounding topical therapies are that side effects like skin irritation and redness are common, especially in the early stages of use, which lead to premature discontinuation of therapy (Xuan Lan Lam Goal,2021) (B Sevimli Dikicier,2019). It also takes a long time to show its therapeutic effects, only after six to twelve weeks of continuous usage (Thielitz and Gollnick 2008).

When topical therapy is ineffective or intolerable, or more potent medications are required, especially in moderate to severe acne, systemic medications are often considered. Examples of the medications include oral antibiotics, oral isotretinoin and hormonal therapy. Oral isotretinoin is frequently used for patients with moderate to severe acne as it is considered the most potent agent and effectively targets all mechanisms contributing to acne, such as reducing sebum production, altering abnormal follicular keratinization, inhibiting *Propionibacterium acnes* colonization and posing anti-inflammatory effect (citation). Indications for isotretinoin include acne-induced scarring, severe nodulocystic acne, and unsatisfactory improvement of acne after four to six months of treatment with two topical agents plus antibiotics or hormonal therapies (CPG Malaysia). However, oral isotretinoin is known for its side effects, which require screening and close monitoring. For example, it could lead to mood alteration, skin changes like xerosis and hair loss, dry eye, increased liver enzyme, drug-induced hyperlipidemia, and a risk of teratogenicity (Kapała et al.,2020). Besides, prolonged usage of oral antibiotics could also lead to resistance and ineffective treatment (Thielitz and Gollnick, 2008)

Recently, laser therapy has received significant attention as an alternative treatment for acne. Various lasers and light sources are available, like blue light and red light, c-1064 nm Long-Pulsed Neodymium: Yttrium-Aluminum-Garnet Laser (Nd: YAG), b-pulsed dye laser, c-intense pulsed light laser, and so on. It treats acne by reducing Propionibacterium acnes colonization and regulating sebaceous gland function (Moftah, Mansour, and Ibrahim 2022). Research indicates that laser therapy leads to more rapid improvement in acne lesions, shorter recovery times, and fewer side effects than conventional treatments (Manuskiatti et al, 2024).

Although many studies support the efficacy of laser treatment for acne vulgaris, there is limited research on its cost-effectiveness, particularly given the higher treatment costs compared to conventional acne therapies. Furthermore, no head-to-head trials have been conducted to evaluate the effectiveness of traditional acne treatments, like topical and systemic treatment versus laser treatments. Acne may affect a person's self-esteem and help avoid scarring; therefore, prompt and efficient treatment is crucial. Results from traditional treatments, which have been used for decades and involve topical and systemic medications, take time to manifest. Acne lesions usually take weeks to months to heal, despite the fact that topical and systemic pharmaceutical treatments

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are reasonably priced. On the other hand, laser therapy reduces acne lesions more quickly. Even if the therapy is costly, the total cost could be less because of a quicker recovery period, which means fewer clinic visits, travel expenses, and missed workdays (Morshed et al., 2023; Ferrillo et al., 2019).

Thus, this study aimed to compare the effectiveness of laser plus topical treatment versus topical alone and topical plus systemic to determine whether patients experience faster recovery and higher cost-effectiveness than conventional treatment.

METHODS

All acne vulgaris patients who came to these four clinics for treatment were screened based on the inclusion and exclusion criteria. If they met the inclusion criteria and did not meet the exclusion criteria and were able to follow the treatment and study protocols, they were invited to be recruited into the study.

This study was conducted at four private aesthetic dermatology clinics in Indonesia. Each clinic was assigned to one of the treatment regimens tested in this study to minimize contamination. The clinics were Erha Dermatology Clinic in Medan for topical treatment, Erha Pondok Indah Clinic in Jakarta for topical plus systemic treatment, and Gandaria Clinic and Deli Park Clinic in Medan for topical plus laser plus treatment. Because these clinics are private clinics, patients usually choose their desired treatment after being thoroughly examined and briefed on the treatment options by their treating physician. Thus, no randomization was performed during the study. Instead, this study used a prospective cohort study design in which the treatment regimen was chosen by the patient and outcomes were assessed at each specific study period. (Adler, Kornmehl, and Armstrong 2017).

Inclusion criteria were male and female patients aged 16 years and above with mild to severe acne vulgaris and able to follow the treatment protocol and study. Patients with exclusion criteria, such as pregnant and lactating women, receiving previous acne treatment within 3 months, receiving oral isotretinoin within the last 1 year, receiving antibiotic treatment within the last month, having received lase treatment for acne, having a history of photosensitivity, a tendency to develop keloids or hypertrophic scars, and a history of liver problems were not included in this study. Data collection was conducted from April 2024 to September 2024. A total of 30 patients were recruited for each treatment group. Consecutive sampling was used in this study for patient recruitment. All subjects with inclusion criteria and without exclusion criteria were recruited until the required number of subjects was met. After a thorough history and physical examination, patients were briefed on the treatment options and selected their treatment regimen. All subjects in this study have continued their treatment regimen from the beginning to the end of the study.

Treatment protocol

Many types of topical medications were used in this study. Most of the topical medications were combination therapies, as listed in the Table below. For this study, we grouped patients who received multiple topical medications as one overall topical group. However, patients in the systemic and laser groups also received similar topical medications as listed in the table.

Table 1. Topical medications were used in the study.

No	Topical medication
1	Azelaic acid +clindamycin+ceramide
2	Clindamycin+nicotinamide
3	Clindamycin+Flacinol Acide+ Ceramide
4	Clindamycin+ benzoyl peroxide+ Azelaic acid
5	$AzelaicAcid + Qu \in ol + Climdanyc \in$

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6	Azelaic Acid+Niacinamide +adapalene
7	Adapalene+ benzoyl peroxide + nicotinamide
8	Azelaic Acid+ nicotinamide
9	Azelaic Acid+Niacinamide + Tranexamic

To use the topical medications, the patients were instructed to wash their face with a mild cleanser and dry it using a clean towel with a gentle slap. The topical medication is applied thinly to the acne area, avoiding the eyes, lips, and mucous membranes. The medication must be used daily at night to reduce the risk of irritation and then increased to twice daily, morning and evening, after 2 weeks if the patient can tolerate it. The patients were also advised to use sunscreen with at least a sun protection factor (SPF)of 30 in the morning to avoid sunburn and to use moisturiser if they develop dry skin. If they develop any side effects like irritation, redness or peeling of the skin, they are told to inform the treating doctor. Meanwhile, few systemic medications were used in the study. We also grouped these medications as systemic as a whole. The systemic medications were as in table 2.

Table 2. Systemic medications were used in this study.

No	Systemic medications
1	Doxycycline
2	Clindamycin
3	Cefixime
4	Zincore Erha
5	Cefditoren pivoxil

For the patients who were treated with topical plus systemic therapy, the topical medications were applied as explained before. The systemic antibiotic was administered according to the severity of acne and the patient's medical history, with the treatment limited to 12 weeks to prevent bacterial resistance. Besides, the Zincore was added to support skin healing and reduce inflammation.

Meanwhile, the laser used in this study was the 1064 nm Long-Pulsed Neodymium: Yttrium-Aluminum-Garnet Laser (Nd: YAG). The treatment with laser was instituted at the first (0 weeks) and second visit (2 weeks) within the 2-week interval. Patients who received laser treatment also received topical medication from the beginning up to 12 weeks of treatment.

Before laser treatment at Erha Dermatology, the face is thoroughly cleansed to remove dirt, oil, and makeup for optimal results. The process begins with Erha Simply Delete, which removes makeup and dust using cotton or a compress sponge. The face is then washed with Erha Facial Wash, which contains glycerin or niacinamide to maintain moisture and prevent irritation. After rinsing and drying, an alcohol-free toner can be applied to balance the skin's pH. Some procedures also use a compress sponge that is left on to ensure no residue is left behind. A topical anesthetic is applied before the laser to reduce discomfort. This process ensures that the skin is clean, free of blockages, and ready to receive laser therapy effectively.

Compare With Other People's Research Results

Topical

Despite these limitations, this study sheds light on the acne problem among Egyptian adolescents. The study revealed that acne substantially impacts Quality of Life (QoL) among adolescents. The more severe the disease, the higher the QoL impairment. Timely diagnosis and treatment of acne,

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combined with appropriate mental health support, may be an important factor in reducing psychosocial stress among adolescents. Acne management should be guided by the severity of acne and the degree of QoL impairment. Routine use of QoL assessment tools in caring for patients with acne allows clinicians to better integrate patient values and concerns into their care. A strong doctor-patient relationship and thorough history-taking may help identify adolescents at risk for adverse psychosocial outcomes due to acne. In addition, accessible and accurate health education programs for adolescents and school students are needed to pave the way for appropriate acne management. (Tayel et al. 2020).

Topical+Systemic

This study was designed as a randomized, open-label, parallel-group study of the cost-effectiveness of doxycycline and azithromycin in moderate to severe acne vulgaris. The study was registered prospectively with the Clinical Trial Registry, India, Comparative Efficacy of Topical Adapalene Plus Oral Azithromycin Versus Topical Adapalene Plus Oral Doxycycline in Treatment of Acne Vulgaris (Khan et a. 2022) A comparison of cost-effectiveness between doxycycline and azithromycin with topical clindamycin in the treatment of patients with moderate to severe acne vulgaris: Prospective, randomized study (Penna, Meckfessel, and Preston 2014) Fixed-Dose Combination Gel of Adapalene and Benzoyl Peroxide plus Doxycycline 100 mg versus Oral Isotretinoin for the Treatment of Severe Acne: Efficacy and Cost Analysis (Apoorva et al. 2020) This study concluded that the combination of topical Adapalene and oral Azithromycin is as effective as the combination of topical Adapalene and oral Doxycycline in treating mild to moderate acne vulgaris. (Tayel et al.2020)

Systemic

Since microcomedones play a significant role in developing inflammatory and non-inflammatory lesions, topical retinoids should be considered first-line therapy for treating acne. Oral systemic treatment is preferred when acne patients do not respond to topical treatment or if it presents as nodular lesions on the skin or with scars. Systemic treatment is essential for acne patients to prevent social humiliation and psychological embarrassment. Oral antibiotics, hormonal drugs, and isotretinoin are the most widely used systemic treatments for treating acne vulgaris (Vasam, Korutla, and Bohara,2023).

Laser Nd: YAG 1,064 nm and IPL effectively treat acne lesions with minimal side effects and provide an alternative for patients in whom topical or systemic treatments have failed or are contraindicated. Therefore, newer therapeutic modalities, such as light-based therapies, have been developed to address the need for acne treatment. Treatment with IPL and NdYAG sources may improve inflammatory acne and scarring, with more limited benefits for non-inflammatory acne, such as comedones. (Mohamed, Tawfik, and Elsaie 2016).

Evaluation

During the first or initial visit, their faces were assessed to determine the severity of their acne, using IGA to classify their acne severity into mild, moderate, and severe. Their faces were also examined to see how many acnes lesions they had. AIl treatment modalities were started on the first visit. Patients were instructed to come to the clinic at 2 weeks, 4 weeks, 8 weeks and 12 weeks post-treatment, from which the reduction in acne can be assessed by patient satisfaction and their quality of life. Has improved in patients.

Data Analysis

Visual analogue scale (VAS) data will measure patient satisfaction. The test results showed that the data were not normally distributed($p>0.01$), so the ANOVA test could not be performed. Therefore, the Kruskal-Wallis non-parametric test was used to assess the significance of each

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variable. The analysis results showed a significance value of 0.000 ($p<0.05$), which means: The Cardiff Acne Disability Index (CADI) will be used to assess patient quality of life improvement during the study period. The test results showed that the data were not normally distributed($p>001$), so the statistical analysis did not rely on the necessary normality assumption. Therefore, the Wilcoxon Signed-Rank Test was used to compare the Cardiff Acne Disability Index (CADI) scores before and after treatment to assess patient quality of life changes.

1.A visual analogue scale (VAS) will measure patient satisfaction, with patients rating their satisfaction at each clinic visit.

2.The Cardiff Acne Disability Index (CADI) will assess improvements in quality of life over the study period.

Result: A total of 90 patients participated in the study, consisting of 30 patients for topical treatment, 30 for systemic plus topical therapy, and 30 for laser + topical therapy. The sociodemographic profile is shown in Table 1.

The age group of 16-28 years dominated all treatment modalities, comprising 83.3% of patients in the topical therapy group, decreasing to 66.7% in the systemic plus topical and laser plus topical groups. In contrast, the age groups of 29-38 years and 39-48 years showed an increasing trend in systemic and laser plus topical treatments. Systemic and laser therapies showed identical age distributions, indicating consistency and stability without significant variation. However, the difference in age distribution between the groups was not statistically significant. For gender, the distribution varied significantly among the three types of therapy. All participants in topical therapy were exclusively female. In the systemic plus topical group, male participation was 33.3%, while female participation reached 66.7%. In the laser plus topical group, male participation decreased to 10%, while female participation increased again to 90%. A p-value of 0.001 for gender indicates a significant correlation between gender and choice of therapy.

RESULT AND DISCUSSION

Health Outcome Analysis

Table 3. Socio-demographic characteristics of patients

Characteristic	Topical (n)	Topical (%)	Systemic (n)	Systemic (%)	Laser (n)	Laser (%)	p-value
AGE							
16–28	25	83.3	20	66.7	20	66.7	
29–38	4	13.3	6	20.0	6	20.0	
39–48	1	3.3	4	13.3	4	13.3	0.514
Total	30	100.0	30	100.0	30	100.0	
Gender							
Male	0	0.0	10	33.3	3	10.0	
Female	30	100.0	20	66.7	27	90.0	0.001
Total	30	100.0	30	100.0	30	100.0	
Education							
High School (SMA)	1	3.3	5	16.7	7	23.3	
Diploma (D3)	3	10.0	9	30.0	12	40.0	
Bachelor (S1)	26	86.7	16	53.3	11	36.7	0.003
Master (S2)	0	0.0	0	0.0	0	0.0	
PhD (S3)	0	0.0	0	0.0	0	0.0	
Total	30	100.0	30	100.0	30	100.0	
Occupation							

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Government	0	0.0	8	26.7	7	23.3	
Student	1	3.3	5	16.7	19	63.3	
Self-employed	29	96.7	17	56.7	4	13.3	0.007
Pensioner	0	0.0	0	0.0	0	0.0	
Not working	0	0.0	0	0.0	0	0.0	
Total	30	100.0	30	100.0	30	100.0	
Salary							
<123.68 USD	1	3.3	1	3.3	0	0.0	
123.68–309.21 USD	15	50.0	5	16.7	27	90.0	
>309.21 USD	14	46.7	24	80.0	3	10.0	0.000
Total	30	100.0	30	100.0	30	100.0	
Relationship							
Married	14	46.7	15	50.0	11	36.7	
Not married	16	53.3	15	50.0	19	63.3	0.557
Total	30	100.0	30	100.0	30	100.0	

Table 4. Satisfaction Score of Topical, Systemic+topical and Laser+topical

No	Treatment	Satisfaction					Sig.
		baseline	2-weeks	4-weeks	8-weeks	12-weeks	
		Mean	Mean	Mean	Mean	Mean	
1	Topical	2.97	4.57	6.47	8.13	9.63	0.000
2	Systemic+Topical	2.80	7.83	6.50	7.80	9.93	0.000
3	Laser+Topical	3.70	7.90	9.97	9.97	9.97	0.000

Table 5: Quality of Life Score of Topical, Systemic+topical and Laser+topical with Friedman Test

No	Treatment	CADI					Sig.
		baseline	2-weeks	4-weeks	8-weeks	12-weeks	
		Mean	Mean	Mean	Mean	Mean	
1	Topical	13.87	9.53	5.03	4.00	0.30	0.000
2	Systemic+Topical	15.00	10.00	5.00	3.30	0.00	0.000
3	$Laser + Topical$	14.97	5.10	0.07	0.00	0.00	0.000

Sociodemographic Data

Based on sociodemographic data, the 16-28 age group dominates all types of therapy, especially topical therapy (83.3%). However, the number decreases for systemic and laser treatments (66.7%). The 29-48 age group tends to prefer systemic and laser therapy, although this difference is not statistically significant. Meanwhile, gender distribution shows a more striking difference: topical therapy is exclusively performed by women (100%), systemic treatment involves more men (33.3%), and laser therapy is mostly performed by women (90%). These gender differences are statistically significant, indicating that gender influences treatment choices.

Satisfaction

The analysis showed that all treatments (topical, systemic+topical, and laser+topical) significantly improved patient satisfaction from baseline to week 12(p=0.000). Topical treatment experienced a gradual increase from 2.97 to 9.63, while systemic + topical increased sharply in the first two

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weeks.

(7.83), fluctuated slightly, and then reached 9.93 in week 12. Laser + topical treatment showed the fastest and most stable increase from 3.70 to 9.97 from week 4, reflecting consistent effectiveness. The Friedman test confirmed that each treatment method significantly impacted patient satisfaction, with 1aser+topical showing the most optimal results.

Cardiff Acne Disability Index (CADI)

The results showed that CADI scores decreased significantly in all treatment groups, with the highest initial value in the systemicic+topical group (15.00) and the lowest in the topical group (13.87). In the topical group, CADI scores decreased from 13.87 to 0.30 in 12 weeks, indicating the effectiveness of the treatment. The systemic + topical group decreased from 15.00 to 0.00 in 12 weeks, reflecting substantial improvement. Meanwhile, the laser + topical group showed the most drastic decrease from 14.97 to 0.00 in just 8 weeks and maintained until week 12. The Friedman test showed a p-value of 0.000 for alI groups, confirming that all treatment methods were statistically significant in decreasing CADI scores and improving patient clinical outcomes.

Data Analysis

The data in this study analyzed patient satisfaction with various acne vulgaris treatment modalities in dermatology clinics using descriptive and inferential approaches. CADI data before and after therapy using ANOVA or Kruskal-Wallis tests. At the same time, patient satisfaction scores for Topical, Systemiic+Topical and Laseer+TopicaI treatments were analyzed using the Friedman Test. The results are presented in tables of effectiveness and satisfaction levels, as well as significant relationships between variables, which provide deeper clinical insights.

CONCLUSION

This study showed that all treatment methods (topical, systemic + topical, and laser + topical) were effective in improving patient satisfaction and significantly reducing Cardiff Acne Disability Index (CADI) scores (p=0.000). Laser + topical therapy provided the most optimal results with rapid and stable improvement in satisfaction and the fastest decrease in CADI scores, reaching 0.00 in 8 weeks. Systemic + topical therapy also showed significant improvement, while topical therapy experienced a gradual increase. Gender distribution significantly influenced the choice of treatment(p=0.001),,with men more likely to choose systemic + topical therapy than laser+ topical or topical alone. In addition, treatment groups had significant differences in education level, occupation, and income. Overall, laser + topical therapy proved to be the most effective in improving patient satisfaction and quality of life in a shorter time compared to other methods.

Problem Statement

The problem formulated in this study is to evaluate the effect of using CADI (Acne Disability Index) on improving the quality of life of patients during acne treatment. In addition, this study aims to measure patient satisfaction using the Visual Analogue Scale (VAS) at each clinic visit. This study also attempts to compare the effectiveness of various acne treatments by seeing which treatment is more effective between Laser with topical and systemic to determine which treatment is the most effective treatment for acne vulgaris

Justification of The Study

Indonesia is a tropical country with a hot and humid climate, which can worsen acne growth. This is supported by the high prevalence of acne in Indonesian society, which is estimated to affect 60% to 70% of adolescents and young adults. It can be concluded that 2 out of 3 Indonesians experience acne growth, with both men and women affected by this condition. Timely and effective acne treatment is very important, because it can affect a person's self-satisfaction and

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self-confidence and prevent scarring. Conventional treatments using topical and systemic therapies, which have been used for decades, take time to show results. Although these treatments are inexpensive, acne lesions usually take several weeks to months to improve. In contrast, laser treatment takes a shorter time to reduce acne lesions. Although the treatment is expensive, the overall cost can be lower due to faster recovery times, resulting in fewer clinic visits, reduced travel costs, and fewer lost workdays (25) (26). (Ferrillo M, Vastarella M, Cantelli M, Mazzella C, Fabbrocini G. Instrumental, clinical and subjective evaluation of the efficacy of cosmetic treatments for home use. 2019;21(4):190-5).

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