



Original Article

Comparative Efficacy of Diode Laser System versus Intense Pulse Light (Ipl) In Management of Unwanted Hair

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ARTICLE INFO

Key Words:

Diode Laser System, Unwanted Hair, Intense Pulse Light System

How to Cite:

Ilyas, S., Hussain, M., Siddiqui, M. A., Muzaffar, B., Gul, K., & Sajjad, D. (2023). Comparative Efficacy of Diode Laser System versus Intense Pulse Light (Ipl) In Management of Unwanted Hair : Diode Laser System versus Intense Pulse Light . Pakistan Journal of Health Sciences, 4(12), 163-167. <https://doi.org/10.54393/pjhs.v4i12.1226>

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ABSTRACT

Unwanted hair growth can be caused by several factors, including genetics, systemic illness, and even drug reactions. According to the underlying medical condition, excessive hair growth was labelled as either hirsutism or hypertrichosis. **Objective:** To compare the efficacy of diode laser system versus intense pulse light in the management of unwanted hair among female patients. **Methods:** Patients in this randomized controlled study had hirsutism. Group A received powerful pulse light therapy for three sessions, one month apart, while Group B received diode laser treatment. To determine the effectiveness and side effects in both groups, patients were monitored for four months and subsequently assessed clinically. **Results:** Out of these total 60 patients, intense pulse light system was more efficacious in achieving patient satisfaction (73.3%) at the end of three months as compared to diode laser (26.7%) (p value < 0.001). **Conclusions:** This randomized controlled trial showed that intense pulse light therapy was more efficacious in management of unwanted hair compared to diode laser therapy.

INTRODUCTION

Heredity, systemic disease, and even pharmacological reactions can lead to unwanted hair growth. Excessive hair growth was classified as hypertrichosis or hirsutism based on the underlying medical condition [1]. A study reported that after the third session, 31% of patients chose diode laser and 66.20% preferred IPL [2]. The characteristic of the female disorder hirsutism is an overabundance of terminal hair arranged in a pattern reminiscent of men [3]. The majority of hirsutism instances are reported by women who have preexisting medical conditions. It is possible to lessen facial hair development in people with hirsutism by

treating the underlying systemic diseases that cause it [4]. Nevertheless, this medical disease has been treated with a variety of local and systemic approaches [5]. There are a number of medical issues that can manifest as unwanted facial hairs, and numerous topical treatments have been developed and put into therapeutic use to alleviate this problem. Neerja Puri examined the efficacy of laser and intense pulsed light treatments for hirsutism in 2015 [6]. Diode laser treatment, she reasoned, could work best on dark-skinned patients. But in 2015, Jo et al., set out to study the function of long-pulsed dye laser (LPDL) for hair

removal, which addresses the method's insufficient patient application [7]. Research comparing the efficacy and safety of Nd: YAG and IPL in reducing hair among hirsutism patients was carried out by Szima et al. in 2017[8]. According to their results, this therapy method has been successful with few adverse effects. Their main finding was that the two therapies did not differ significantly from one another. There were fewer side effects and more patient satisfaction with IPL treatment. Locals here have a history of being extremely self-conscious about their looks, and they still go to extreme lengths to hide any facial blemishes that require medical attention. Doctors treating skin disorders in Pakistan often refer to international recommendations because there is a paucity of locally collected data. Rizwan et al., investigated the efficacy of medroxyprogesterone acetate (MPA) iontophoresis in treating idiopathic facial hirsutism in a group of patients residing in Islamabad, Pakistan. Iontophoresis with monophenyl amine (MPA) was determined to be a safe, effective, and well-tolerated treatment for idiopathic face hirsutism by the study's authors [9]. The purpose of this study was to compare efficacy of diode laser system versus intense pulse light in the management of unwanted hair among female patients as there has been relatively little research done on IPL and diode laser for hirsutism in our setting, therefore, we conducted this study to determine which method was more effective in getting rid of unwanted facial hair in females.

METHODS

It was a randomized controlled trial (ClinicalTrials.gov having ID: NCT05739799) conducted at the Department of Dermatology, CMH Abbottabad, from May 2022 to Nov 2022. Ethical approval (Ref: CMHAtd-ETH-18-DERM-22) was obtained from the Ethical Committee. Using an 80% power of test and a 5% significance level, the sample size was determined using the WHO Sample Size calculator. The proportion of patients' satisfactory responses for diode laser therapy was 31% [1], whereas the proportion for intense pulse laser therapy was 66.20%. The sample for this study was collected using a nonprobability sequential sampling strategy. The study comprised female patients identified with hirsutism by a consultant dermatologist based on clinical presentation, who were between the ages of 18 and 50 and had no apparent underlying cause. Exclusion criteria included the following: pregnancy or lactation, keloid or hypertrophic scarring propensity, history of treatment for undesirable facial hair within the past two years, hormonal imbalance, and polycystic ovary syndrome. Once all participants had been adequately explained the study, they were asked to sign an informed

consent form. A consulting dermatologist made the diagnosis of unwanted facial hair based on the patient's symptoms. In order to guarantee that the patients were randomly assigned to the study groups, the lottery method was employed. Prior to beginning the trial, a series of baseline examinations were performed, including blood tests for hormones including luteinizing hormone (LH) (normal levels 2-15 IU/L) and follicle-stimulating hormone (FSH)(normal levels 1-10 IU/L), as well as ultrasounds of the abdomen and pelvis. Patients in Group B used a diode laser system for treatment, whereas those in Group A used intense pulse light (IPL). While the diode laser used three different wavelengths (1064, 810, and 755 nm), the 690 nm frequency was used for IPL. All told, there were three sessions, with a month separating each. The reduction in hair count on the affected side of the face was evaluated by a consultant dermatologist who measured the thickness of the hair and the number of hair follicles in a 1cm² area on both sides of the face before the first session and again at the end of therapy in the fourth month. With the patient's permission, we took pictures of them both before and after the research period. There were four levels of hair loss severity: less than 25%, 25%-50%, 50-75%, and >75%. Satisfaction was evaluated using a 0-10 scale for patients adopted by Załęska et al [13]. For the technique, a score greater than 6 was considered enough satisfaction. Efficacy in both groups was ascertained in terms of hair reduction > 75 percent, and patient satisfactory response (>6 on patient satisfaction scale was labeled as sufficient satisfaction) and fewer side effects (transient erythema, photosensitivity, hyperpigmentation, moderate pain, and skin burns) were confirmed on physical examination of the affected area at the end of final session in the 4th month. We used SPSS 23.00, the Statistical Package for the Social Sciences, to do all of our statistical analyses. The demographic and clinical characteristics of the patients in both groups were characterized using descriptive statistics. In order to compare the two sets of data, we utilized the chi-square test for qualitative features and the independent t test for quantitative variables, with p-values <0.05 serving as the significance criterion.

RESULTS

A total of 60 patients with unwanted facial hair were divided into two groups. 30 patients were managed by intense pulse laser therapy, while 30 patients were managed by diode laser therapy after the randomization. Table 1 shows that in Group A, mean + SD for age was 26.30 + 5.370 years while in Group B, mean + SD for age 32.0 + 7.92 years. (p-value 0.001). In Group A, 23 (76.7%) patients were recorded in < 30 years age group while 07 (23.3%) patients were recorded in > 30 years age group. In Group B (DL), 17(56.7%)

patients were recorded in < 30 years of age group while 13 (43.3%) patients were recorded in > 30 years age group. (p-value 0.100). In Group A, mean + SD for FSH was 10.16 ± 2.4 mIU/while in Group B, mean + SD for FSH was 13.7 ± 3.01 mIU/mL (p-value: 0.000). In Group A, mean + SD for LH was 9.23 ± 2.8 while in Group B, mean \pm SD for LH was 7.77 ± 1.65 , p-value: 0.018. (Table 1).

Table 1: Demographic characteristics of patients in both groups (n=60)

Quantitative Variable	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Mean + SD			
Age	26.80 + 5.70	32.20 + 7.9	0.001
FSH	10.16+2.4	13.7+3.01	0.000
LH	9.23+2.8	7.77+1.65	0.018
Qualitative Variable	Group A (n=30)	Group B (n=30)	p-value
Age Groups, n (%)			
< 30 Years	23 (76.7%)	17 (56.7%)	0.100
> 30 Years	07 (23.3%)	13 (43.3%)	

Table 2 shows that as per final clinical evaluation in both groups after three sessions in the 4th month, in Group A (IPL), 04 (13.3%) had <25% of hair reduction, 3 (10.0%) patients had 25-50% of hair reduction, 05(16.7%) patients had 50-75% of hair reduction and 18 (60.0%) patients had >75% percent of hair reduction while in Group B (DL), 08 (26.7%) had <25% of hair reduction, 06(20.0%) patients had 25-50% of hair reduction, 09 (30.0%) patients had 50-75% of hair reduction and 07(23.3%) patients had >75% percent of hair reduction. (p-value < 0.040). In Group A (IPL), 4 (13.3%) patients had transient erythema, 6(20.0%) patients had photosensitivity, 8(26.7%) patients had hyperpigmentation, 6 (20.0%) patients had moderate pain and 6 (20.0%) patients had skin burns while in Group B (DL), 2(6.7%) patients had transient erythema, 4(13.3%) patients had photosensitivity, 11(36.7%) patients had hyperpigmentation, 08 (26.7%) patients had moderate pain and 5(16.7%) patients had skin burns(p-value 0.751). Finally, as per patients' response, intense pulse light therapy was more efficacious in achieving patients' satisfactory response (73.3%) after three sessions in the 4th month as compared to diode laser (26.7%)(p value < 0.002). It was interesting to note that intense pulse light therapy was effective on thick hair whereas diode laser was effective on thin hair of patients in both groups.

Table 2: Final clinical evaluation of various outcome variables in both groups (n=60)

Outcome Variables	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Hair Reduction, n (%)			
< 25 %	4 (13.3%)	08 (26.7%)	0.040
25-50	3 (10.0%)	06 (20.0%)	
51-75%	5 (16.7%)	09 (30%)	
> 75 %	18 (60.0%)	07 (23.3%)	

Side Effects, n (%)			
Transient Erythema	04 (13.3%)	02 (6.7%)	0.751
Photosensitivity	06 (20.0%)	04 (13.3%)	
Hyperpigmentation	08 (26.7%)	11 (36.7%)	
Moderate Pain	06 (20.0%)	08 (26.7%)	
Skin Burns	06 (20.0%)	05 (16.7%)	
Patients Response, n (%)			
Satisfactory	22 (73.3%)	10 (33.3%)	0.002
Unsatisfactory	08 (26.7%)	20 (66.7%)	

Table 3 shows that intense pulse light therapy was superior to diode laser (73.3% vs 26.7%; p value 0.002) in the management of unwanted hair among female patients.

Table 3: Efficacy in both groups (n=60)

Outcome Variables	Study Groups		p-value
	Group A (n=30)	Group B (n=30)	
Efficacy, n (%)			
Hair Reduction > 75% and PSS >6	22 (73.3%)	10 (33.3%)	0.002
Hair Reduction < 75% and PSS <6	08 (26.7%)	20 (66.7%)	

DISCUSSION

Unwanted hair is a very upsetting problem for women, particularly younger ladies. A number of metabolic or endocrine diseases may cause it, or it may be present independently. Researchers Moghadam, Behboodi Moghadam *et al.*, and others finished a thorough evaluation in 2018 [14]. Regardless of the procedure used to eliminate facial hair, people with an illness that causes it to grow reported a reduction in quality of life, according to an intriguing study by Alizadeh *et al* [15]. Their primary goal in studying the effects of laser treatment for hirsutism was to enhance quality of life rather than reduce hair growth. They concluded that laser therapy improves the quality of life for these women by reducing hirsutism. When it comes to managing female pattern baldness, this is just one of several options. But there is very little data on what might benefit our people. The safety and effectiveness of long-pulsed Nd: YAG Laser (1064 nm) over IPL-755 nm for the treatment of idiopa Shrimal thic facial hirsutism was determined by Shrimal *et al.*, while our study differs from theirs [16]. Nonetheless, we contrasted IPL with a laser treatment. When it came to eliminating unwanted hair in women, we discovered that IPL was both more effective and well-tolerated than Diode Laser. This phenomenon, however, could be better understood with additional studies using bigger samples. The incidence of treatment-related side effects, such as transient erythema and pain, were comparable in both groups, which is noteworthy given that there were no statistically significant differences between the groups. Thaysen-Petersen *et al.*, and Załęska *et al.*, both reported that laser and IPL treatments can cause transitory redness of the skin, mild to severe local pain, hyperpigmentation, skin irritation, burns, and hypersensitivity as side effects [12, 13]. Previous research by Goh *et al.*, examined the efficacy and safety of two hair removal systems, one using a short-wavelength strong pulse light system and the other using a

long-pulsed Nd: YAG (1064nm) laser, on a variety of skin types in 2003 [17]. We were able to conduct IPL using a 690 nm frequency and a diode laser with triple wavelengths (1064, 810, and 755 nm) thanks to the equipment mentioned earlier. However, he found that patients with darker skin types had better results when using the 1064 nm Nd: YAG laser, which has a long pulse width and can reach the entire length of the hair follicle by penetrating five to seven millimeters into the dermis. Another study found that because IPL improved patient happiness, increased primary results, and decreased side effects, 42.4% of patients were very delighted with it. However, powerful pulse light therapy did achieve statistically significant efficacy in terms of superior patient satisfaction response (p -value 0.002), which contradicts the current study's findings. However, there was no statistically significant difference ($p=0.3$) in the amount of patient satisfaction created by the two methods. Large multicentered randomized control trials should be conducted to obtain strong results and generalize them to the total population of this province, as this study is primarily limited by its small sample size and single center design [19, 20].

CONCLUSIONS

This comparative study demonstrated that intense pulse light therapy was more efficacious in terms of hair reduction and patients' satisfactory response in the management of unwanted facial hair.

Authors Contribution

Conceptualization: SI

Methodology: BM, MAS, SI

Formal analysis: MAS, KG

Writing-review and editing: MH, SI, DS

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

Source of Funding

The authors received no financial support for the research, authorship and/or publication of this article.

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