

## The Efficiency of Intense Pulse Light in the Treatment of Hirsute Ladies

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### ABSTRACT

**Background:** Hirsutism results in severe cosmetic and psychological problems. Many types of lasers and intense lights have been developed for the treatment of hirsute ladies. Intense pulse light (IPL) is one of the most useful broadband light for hirsutism.

**Objectives:** To evaluate the efficiency of IPL in ladies with hirsutism.

**Materials and methods:** This prospective study was conducted at the private dermatological clinic in Hit city, Anbar province, Iraq from May 2018 to May 2019. A hirsute ladies subjected to 6 sessions of IPL were enrolled in the study. The age of the females, Fitzpatrick skin type, site, history of polycystic ovary disease, patient satisfaction, and hair reduction rate were recorded and analyzed.

**Results:** The mean age of the enrolled 62 patients was 32.02 years  $\pm$  7.939 (range 18-51 years). The highest age group affected was 18-40 years (n = 55, 88.7%). Most of the patients were of skin type 3 (n = 36, 58.1%). The most common site was "upper lip, chin, and sides of the face" in 23 patients (37.2%). Thirty-five (56.5%) ladies were with polycystic ovary disease. Good and Excellent hair reduction rates to IPL treatment were 62.9 and 25.8% respectively. The satisfied and very satisfied feeling of the treated ladies was 71 and 25.8% respectively. No statistically significant difference between treatment response and age of the patient, skin type, and site (P-Value > 0.05). While there was a high statistically significant difference (P-Value = 0.000) between hair reduction in relation to patients' satisfaction and history of polycystic ovarian disease. Most patients complained from transient erythema after treatment for 1- 2 hours.

**Conclusion:** IPL is a safe and efficient mode for facial hair removal in hirsute ladies.

**Keywords:** Intense Pulse Light; Hirsutism; Chromophore.

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### INTRODUCTION

**H**irsutism is defined as an abnormal growth of coarse hair in a female in the male pattern due to increased circulating levels of androgens or increased sensitivity of hair follicles to normal levels of circulating androgens. The etiological factors of hirsutism may be polycystic ovary disease (PCOD), ovarian tumors, adrenal tumors, congenital adrenal hyperplasia, familial or drugs like steroids, androgen, minoxidil, cyclosporine, and phenytoin [1].

Intense pulsed light (IPL) devices like lasers in hair removal. However, IPL is non-synchronous non-coherent poly-

chromatic light that means IPL rays are non-condensed, emitting at different times and having the different wavelengths while the laser light is coherent monochromatic and synchronous means that laser rays are condensed, emitting at the same time and having the same wavelengths. There are many ways of hair removal include: shaving, plucking, waxing, tweezing, epilation and chemical depilatories were undertaken by women but they are not beneficial then devices include ruby, alexandrite, diode lasers, and an IPL are developed [2-4].

Many types of laser are introduced in this field: Diode laser 800 nm, Alexandrite laser 755 nm, Nd: YAG laser 1064 nm, Ruby 694 nm, and IPL 400-1200 nm. The hair reduction depends on: skin type, the number of sessions, energy or fluence (joules/cm<sup>2</sup>) and the intensity of hair color, dark hair on fair skin is the most affected target in IPL [5, 6].

The principle of the hair removal by light e.g IPL or laser

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depends on the theory of selective photothermolysis which causes thermal trauma to a hair follicle when the pulse duration is shorter than the time of thermal relaxation of the hair follicle [7].

Pulse duration varies in the millisecond (ms) domain, multiple passes 2-4 times with a various pulse delay interval may be used in a single session. In IPL machine, the use of cut-off filters with a wavelength range from 400 to 1200 nanometer that is emitted to the cutaneous target to prevent long wavelength to reach the target [8–10].

Filters can be placed in the handpiece of the machine as these cut-off filters with wavelengths ranging from 590 to 1200 nm for hair removal, these filters are used to prevent long wavelengths to emit to the target [11, 12]. We aimed to assess the efficiency of IPL in females with hirsutism.

## MATERIALS AND METHODS

This prospective study was conducted at our private dermatology clinic in Hit city, Anbar province, Iraq in the period from May 2018 to May 2019. 62 females were enrolled in the study. The ladies 18 years old and older, hirsute with different presentations involving the upper lip, chin, sides of the face, and their skin types were Fitzpatrick 2,3,4 and 5 were included in the current study. The study was approved by the scientific committee of the hospital. The informed consent was taken from each patient submitted to the study.

The ladies who had photosensitivity, hormonal therapy or hormonal disturbance, infertility, white hair hirsute, pregnancy, and history of keloid or hypertrophic scar were excluded from the study. The patients were divided into two groups according to their ages: 18-40 years, and over 40 years.

IPL machine (QUANTA SYSTEM Eterna Giovinezza IPL Machine, Milano, Italy) was used in the present study. After a thorough history and physical examination, investigations for the females were done for serum testosterone, dehydroepiandrosterone sulphate (DHEA), follicle-stimulating hormone (FSH), luteinizing hormone (LH), serum prolactin, and abdominopelvic ultrasound. The patient washed the area with soap and water, the cooling gel was applied over the area before the procedure. A 625 nm cut-off filter was used. Fluence started at 18 J/cm<sup>2</sup>. Treatment was given for six sessions, with one month apart. Parameters were selected according to Fitzpatrick skin type, the density of hair, and fluency, the fluence was increased subsequently depending upon the response of the patient.

For the purpose of the study:

1. The treatment response or hair reduction ratio of the patients was classified according to final hair reduction: excellent 76-100%, good 51-75%, moderate 26-50% and mild 0-25% hair reduction rate.
2. The patient's satisfaction was divided into not satisfied, satisfied and very satisfied.

Patients were given an ice pack to cool the face immediately following the procedure. We advised them to use sunscreen and to protect themselves from sunlight. In the case of erythema, topical hydrocortisone skin cream 1% was prescribed. Patients were examined for any side effects likes: erythema, perifollicular edema, and hyperpigmentation.

The data were analyzed by version 22 IBM SPSS (Statistical Package for the Social Sciences). Pearson's chi-squared test was used to compare the hair reduction rate with other

variables. A P-Value of less than 0.05 was considered a statistically significant difference.

## RESULTS

Out of 81 ladies with hirsutism, 19 patients were excluded because they were not fulfilled the inclusion criteria. The remaining 62 patients were enrolled in the current study. The age was ranged from 18 to 51 years with a mean of 32.02 years  $\pm$  7.939. The energy (fluence) was between 18-34 J/cm<sup>2</sup> with a mean of 25 J/cm<sup>2</sup>  $\pm$  3.126.

There were 36 females (58.1%) with Fitzpatrick skin type 3, 13 (21 %) type 4, 11 (17.7%) type 2, and only 2 (3.2%) type 5. The excellent hair reduction rate was found mostly in type 2 (n = 5 (45.5 %)). No statistically significant difference was found between the type of the skin and hair reduction rate P-Value = 0.355 Table 2.

The most common site affected by hirsutism in our patients was "upper lip, chin, and sides of the face" (n = 23, 37.2%), while the least was upper lip 3 (4.8%). The highest good hair reduction rate (n = 11, 64.8%) was achieved in the chin and sides of the face. Also, there was no statistical significance between the site involved and hair reduction rate P-Value = 0.502 Table 3.

Ladies with PCOD comprises 56.5% (n= 35), while without PCOD 43.5% (n= 27). The majority of good hair reduction rate (n = 27, 77.1%) in patients with PCOD. While, excellent hair reduction rate (n = 15, 55.6%) was found mainly in ladies without PCOD. Also, no moderate response was found in patients without PCOD. There was a high statistical significant difference between treatment response and subjects with PCOD P-Value = 0.000 Table 4.

Excellent hair reduction rate found in subjects with very satisfied about the IPL treatment (n = 14 87.5%), good hair reduction rate was found mainly in ladies who had satisfied by IPL treatment (n = 37, 84.1%), and all patients who had not satisfied carried moderate response. A high statistically significant difference found between patient satisfaction and hair reduction P-Value = 0.000 Table 5.

Transient erythema occurred in 45 (72.6%) patients and resolved completely 1-2 hours following the treatment session. Perifollicular edema was found in around a quarter of our patients with and only 2 subjects with pigmentation Table 6.

Figure 1 showed one of our patients who had treated with IPL. A: before treatment, and B: following the completion of treatment.

## DISCUSSION

Hirsutism causes cosmetic and psychological problems. Depending on the ethnicity and the definition of hirsutism, the incidence of hirsutism varies from 5 to 10% of the females [8].

**Table 1.** The hair reduction rate according to the age groups in 62 patients treated with IPL.\*

| Age group   | Hair reduction [Number (%)] |           |           | Total    |
|-------------|-----------------------------|-----------|-----------|----------|
|             | Moderate                    | Good      | Excellent |          |
| 18-40 years | 6 (10.9)                    | 35 (63.6) | 14 (25.5) | 55(88.7) |
| >40 years   | 1 (14.3)                    | 4 (57.1)  | 2 (28.6)  | 7(11.3)  |
| Total       | 7 (11.3)                    | 39 (62.9) | 16 (25.8) | 62(100)  |

\* P-Value = 0.938.

**Table 2.** The hair reduction rate according to the Fitzpatrick skin type in 62 patients treated with IPL.\*

| Skin type | Hair reduction [Number (%)] |           |           | Total    |
|-----------|-----------------------------|-----------|-----------|----------|
|           | Moderate                    | Good      | Excellent |          |
| 2         | 1 (9)                       | 5 (45.5)  | 5 (45.5)  | 11(17.7) |
| 3         | 3 (8.3)                     | 24 (66.7) | 9 (25)    | 36(58.1) |
| 4         | 2 (15.4)                    | 9 (69.2)  | 2 (15.4)  | 13(21)   |
| 5         | 1 (50)                      | 1 (50)    | 0         | 2(3.2)   |

\* P-Value = 0.355.

**Table 3.** The hair reduction rate according to the site in 62 patients treated with IPL.\*

| Site                                   | Hair reduction [Number (%)] |           |           | Total    |
|--|-----------------------------|-----------|-----------|----------|
|  | Moderate                    | Good      | Excellent |          |
| Upper lip, chin, and sides of the face | 4(17.4)                     | 12 (52.2) | 7 (30.4)  | 23(37.2) |
| Upper lip and chin                     | 0                           | 14 (73.7) | 5 (26.3)  | 19(30.6) |
| Chin and sides of the face             | 3(17.6)                     | 11 (64.8) | 3 (17.6)  | 17(27.4) |
| Upper lip                              | 0                           | 2 (66.7)  | 1 (33.3)  | 3(4.8)   |
| Total                                  | 7(11.3)                     | 39 (62.9) | 16 (25.8) | 62(100)  |

\* P-Value = 0.502.

**Table 4.** The hair reduction rate according to the history of PCOD in 62 patients treated with IPL.\*

| PCOD  | Hair reduction [Number (%)] |           |           | Total    |
|-------|-----------------------------|-----------|-----------|----------|
|       | Moderate                    | Good      | Excellent |          |
| Yes   | 7 (20)                      | 27 (77.1) | 1 (2.9)   | 35(56.5) |
| No    | 0                           | 12 (44.4) | 15 (55.6) | 27(43.5) |
| Total | 7 (11.3)                    | 39 (62.9) | 16 (25.8) | 62(100)  |

\* P-Value = 0.000.

**Table 5.** The hair reduction rate according to patient satisfaction in 62 patients treated with IPL.\*

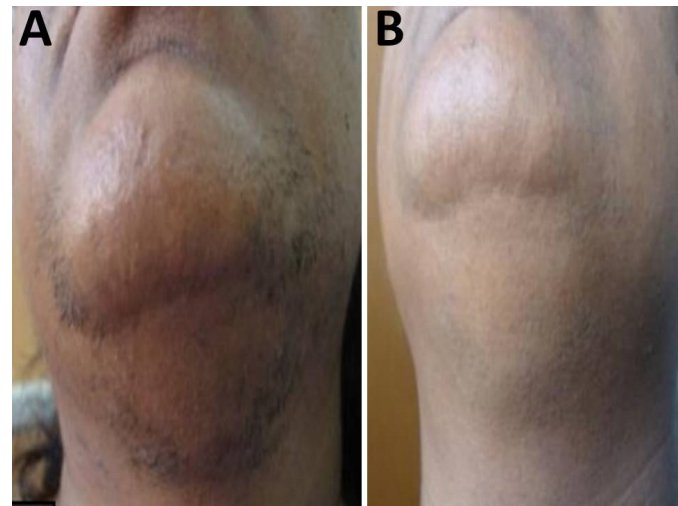
| Patient satisfaction | Hair reduction [Number (%)] |           |           | Total    |
|----------------------|-----------------------------|-----------|-----------|----------|
|                      | Moderate                    | Good      | Excellent |          |
| Not satisfied        | 2 (100)                     | 0         | 0         | 2(3.2)   |
| Satisfied            | 5 (11.4)                    | 37 (84.1) | 2 (4.5)   | 44(71)   |
| Very satisfied       | 0                           | 2 (12.5)  | 14 (87.5) | 16(25.8) |
| Total                | 7 (11.3)                    | 39 (62.9) | 16 (25.8) | 62(100)  |

\* P-Value = 0.000.

**Table 6.** The Side effects in the 62 patients treated with IPL

| Side effects         | Number of the patients | %    |
|----------------------|------------------------|------|
| Transient erythema   | 45                     | 72.6 |
| Perifollicular edema | 15                     | 24.2 |
| Pigmentation         | 2                      | 3.2  |

But it is so higher in Iraqi ladies where the facial hirsutism affects 26.8% of them [13].



**Figure 1.** One of our patients treated with IPL. A: Before treatment. B: Six months after treatment.

The response to IPL treatment for facial hirsutism varies from 10 to 88.66% among various researchers [1, 6, 11, 12, 14–21]. The current study showed that 62.9% had good and 25.8% excellent hair reduction rate. The difference in these ratios might be attributed to the difference in the skin type and site, the number of sessions, definitions of the satisfactory results, short or long term follow-up, fluence of the IPL, type of IPL machine, and whether there is a history of PCOD or not.

IPL devices have 2 benefits include lower price than laser and have filters that enable the application of the light on the larger surface area than in laser. However, they need more treatment sessions [10]. Many prior studies used IPL for the treatment of hirsutism with various number of sessions (1-13) [6, 11, 14, 18–21]. The current study used 6 sessions. Kumari et al [18] found that 10 sessions carry significant hair reduction rates than 6 and 4 sessions (69.5% in cases with 10, 16.1% cases with 6, and 16.6% cases with 4 sessions). Also, Puri study [21] found that response to IPL is affected by the number of sessions applied to the affected area (10% for 2, 48% for 4, and 70% for patients with 8 sessions).

Certain previous studies investigated various factors that affect the IPL treatment response. Sadick et al study revealed that the hair reduction rate was not affected by the type of skin, the color of the hair, site of the lesion, and the number of treatment sessions [6]. Kumari et al showed that there was no statistically significant difference between age groups and IPL response (p=0.66), also not a statistically significant difference between marital status and IPL response (p=0.99) [18]. Khodaeyani et al found no statistically significant difference between the IPL response and body site [19]. Taylor et al study showed that there was no statistical difference between the IPL treatment response and patients with a history of PCOD [16]. The current study showed that IPL treatment was not statistically significant difference with the age of the patient, facial anatomical location, and skin type, while the study found a highly significant difference in relation to the patient with a history of PCOD and patient satisfaction.

It is obvious that the skin types differ from geographical region to others. The present study revealed that the majority of patients with skin type 3 (58.1%). Also, most of

the patients of the Khodaeyani et al were of skin type 3 [20]. While in Subha study most of the patients were skin type 4 (50%) and 5 (40%) because Indians subjects have a darker color than Iraqi and Iranian people [14].

Patient satisfaction about IPL treatment is a subjective assessment of the treatment response. There is no universal scale system for patient satisfaction among dermatologists. Therefore, there are many scores used by researchers, for example, Kumari et al used this grading visual scale analogue [Excellent (>80% reduction in hair density), Good (>50% reduction in hair density), Fair (>30% reduction in hair density)] [18]. Of course, satisfaction varies from one person to another. However, our study found that 71% of patients expressed satisfied, and 25.8% were very satisfied which is nearly similar to the study of Subha et al [14].

In our study, there was a difference in the percentage of patients with PCOD (56.5%) and those without PCOD (43.5%) which is nearly similar to the results in R.Subha et al study [14]. The present study showed a highly statistical significant difference between the IPL treatment response and patients with history of PCOD.

Ismail from Jeddah, Saudi Arabia compared between long-

pulsed Nd Yag laser and IPL on 2 sides of the axilla in same patient of the 39 hirsute women with 6 sessions for all subjects, he found that there was a significant decrease in hair counts (P-Value = 0.01) between laser (79.4%) and IPL side (54.4). This explains that Nd-Yag laser is more effective than IPL in dark-skinned ladies [10].

The present study revealed that 72.6%, 24.2%, and 3.2% of the ladies had transient erythema, perifollicular edema, and pigmentation, respectively. No serious adverse effects were reported in our subjects, which may be due to that most females have skin type 3 with dark hair considered as the best patients for the IPL option.

The limitations of the study were no control group, no comparison of the results according to the number of sessions, and no long term follow-up of the treated females with IPL. Anyhow, the IPL achieved good and excellent hair removal in 88.7% of patients. In addition, few side effects were reported and resolved completely within a short time. Therefore, we highly recommend the use of IPL in hirsute ladies.

#### CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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