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A Study on Clinical Evaluation and Efficacy of Ipl in Hirsutism

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ABSTRACT

Background: Hirsutism, characterized by excessive hair growth in women in areas where hair is typically minimal or absent, poses significant cosmetic and psychological challenges. The condition is often associated with polycystic ovary syndrome (PCOS), adrenal gland disorders, and certain medications. Intense Pulsed Light (IPL) therapy has emerged as a modern alternative for treating hirsutism. The objective of the study to evaluate the clinical efficacy of intense pulsed light therapy in the management of hirsutism

Methods: This single-group interventional study was conducted at the Department of Dermatology, Venereology, and Leprosy, BTGH, affiliated with Mahadevappa Rampure Medical College, Kalaburagi, from August 2022 to January 2024. Fifty clinically diagnosed hirsutism patients aged 18-45 years were enrolled. Informed consent was obtained, and participants underwent a detailed medical history review, clinical examination, and hormonal assays. The severity was assessed using the modified Ferriman-Gallwey (mFG) score, and Fitzpatrick skin type was determined. IPL treatment parameters included a 640 nm cut-off filter, fluence of 20 J/cm², and a pulse duration of 3 msover six sessions spaced 4 weeks apart.

Results: The study found that 70% of participants had discrete hirsutism (mFG score 8-16) and 30% had moderate hirsutism (mFG score 17-25). PCOS was reported in 32% of participants, and 12% had lipid abnormalities. The mean initial hair count was 19.3 ± 4.4, with a mean HRE of 60.1% ± 10.2%. Satisfaction levels post-treatment were "Satisfied" in 46%, "Very Satisfied" in 38%, and "Not Satisfied" in 16% of participants. Side effects were minimal, reported by 6% of participants.

Conclusions: IPL therapy was effective in reducing hair count in patients with hirsutism, with the majority of participants expressing satisfaction with the treatment. The therapy was well-tolerated with minimal side effects, making it a viable option for managing hirsutism, particularly for individuals seeking long-term results. Further studies could explore the combination of IPL with other modalities to enhance treatment outcomes.

Keywords: Hirsutism, Intense Pulsed Light, PCOS, Hair Removal, Ferriman-Gallwey Score

I. INTRODUCTION:

Hirsutism, a condition characterized by excessive hair growth in women in areas where hair is typically minimal or absent, such as the face, chest, and back, poses significant cosmetic and psychological challenges. This condition results from an increased level of androgens or heightened skin sensitivity to these hormones. The primary underlying causes include polycystic ovary syndrome (PCOS), adrenal gland disorders, and certain medications. Clinically, hirsutism is often associated with symptoms like irregular menstrual cycles, acne, and alopecia.

Despite the availability of various treatment modalities, including hormonal therapy and mechanical hair removal methods,[1] many women seek more permanent solutions. Traditional treatments such as electrolysis, though effective, are often painful and time-consuming. Hair removal methods, such as plucking, threading, and creams, are often painful and provide only

temporary relief. The repetitive nature of these treatments, combined with their potential for causing skin irritation and folliculitis, adds to the emotional distress experienced by women with hirsutism. Consequently, there is a pressing need for more effective, long-lasting, and less invasive treatment options.[1-2]

IPL therapy stands out due to its versatility and efficacy. IPL systems use a flash lamp to generate high-energy pulses of light across a broad spectrum (400-1200 nm). These pulses are filtered to produce specific wavelengths that target chromophores like melanin in hair and haemoglobin in blood vessels. IPL's wide range of wavelengths allows it to treat various conditions by applying different filters. When the IPL light penetrates the skin, it is absorbed by melanin concentrated in the hair shaft and follicle, generating heat that destroys the hair-producing papilla. The heat also affects darker capillaries supplying blood to the follicle, enhancing the treatment's efficacy.[3-4]

IPL therapy for hair removal is popular due to its ability to selectively damage hair, its time efficiency, lower cost, and fewer side effects compared to other hair removal methods. Recent studies have focused on optimizing IPL parameters, such as wavelength and pulse duration, to maximize hair reduction while minimizing skin damage. Additionally, there is growing interest in combining IPL with other treatment modalities, such as topical medications that reduce androgen levels locally, to enhance overall treatment outcomes.[4-5] Therefore, this study aims to determine the prevalence of hirsutism among women of reproductive age (18-45 years) and to evaluate the efficacy of IPL laser treatment among those with hirsutism.

II. METHODOLOGY

The study was conducted at the Department of Dermatology, Venereology, and Leprosy, Basaweshwar Teaching and General Hospital, affiliated with Mahadevappa Rampure Medical College, Kalaburagi. The study period was from 1st August 2022 to 31st January 2024, totalling 18 months. All clinically diagnosed patients with hirsutism belonging to the reproductive age group (18 – 45 years).

Informed consent was obtained from all participants in their vernacular language before enrolment. Upon enrolment, each eligible participant underwent a detailed medical history review focusing on hirsutism symptoms and relevant health conditions, followed by a clinical examination conducted by a dermatologist to confirm the diagnosis of hirsutism. The patients were evaluated for clinical signs of acne, androgenic alopecia, and acanthosis nigricans.

Participants underwent a detailed medical history review and physical examination to assess for symptoms of PCOS. Hormonal assays were performed to measure serum levels of testosterone, luteinizing hormone (LH), follicle-stimulating hormone (FSH), and dehydroepiandrosterone sulphate (DHEA-S). Ultrasound was done to evaluate the presence of polycystic ovaries.The diagnosis was confirmed using the Rotterdam Criteria, which requires at least two of the following: oligo/anovulation, clinical and/or biochemical signs of hyperandrogenism, and polycystic ovaries.

Lipid profile and thyroid profile were taken. A diagnosis of diabetes was confirmed with fasting glucose levels ≥126 mg/d. A comprehensive lipid profile, including total cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and triglycerides, was obtained from fasting blood samples.

The severity of hirsutism was assessed using the modified Ferriman-Gallwey (mFG) score. The scoring criteria are as follows: Normal (less than 8), Mild (8-16), Moderate (17-25), and Severe (more than 25).Fitzpatrick skin type was determined to guide treatment and assess potential skin reactions, with classifications ranging from Type I (very fair) to Type VI (very dark).

Before the procedure, patients were informed about the duration of treatment, potential adverse effects, and post-treatment care. Treatment parameters, including pulse duration and fluence, were set according to the manufacturer's guidelines. A 1 cm^2 grid was used to count the number of hairs at baseline and follow-up intervals. Hair in the treatment area was shaved on the day of the procedure, and a cooling gel was applied beforehand. A 640 nm cut-off filter was used, with an initial fluence of 20 J/cm^2 and a pulse duration of 3 ms. Treatment consisted of 6 sessions spaced 4 weeks apart. Digital photographs were taken prior to each treatment session. Following the procedure, patients were advised to avoid sun exposure and were prescribed sunscreen. Throughout the study, participants refrained from certain hair removal methods. Follow-up assessments at 4–6-week intervals monitored treatment efficacy and safety.

Hair removal efficiency was determined by calculating the percentage reduction in the number of hairs present at each visit relative to the baseline count. All patients were requested to rate their satisfaction level following the procedure as either

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"Not Satisfied," "Satisfied," or "Very Satisfied." Data analysis was done. Categorical data were summarized using frequencies and proportions, while continuous data were presented as meanand standard deviation.

III. RESULTS

Table 1. Distribution of age among the study participants (N=50)

Age (in years)	n	%
15-25	19	38.0
26-35	15	30.0
36-45	14	28.0
45-50	2	4.0
Total	**50**	**100.0**

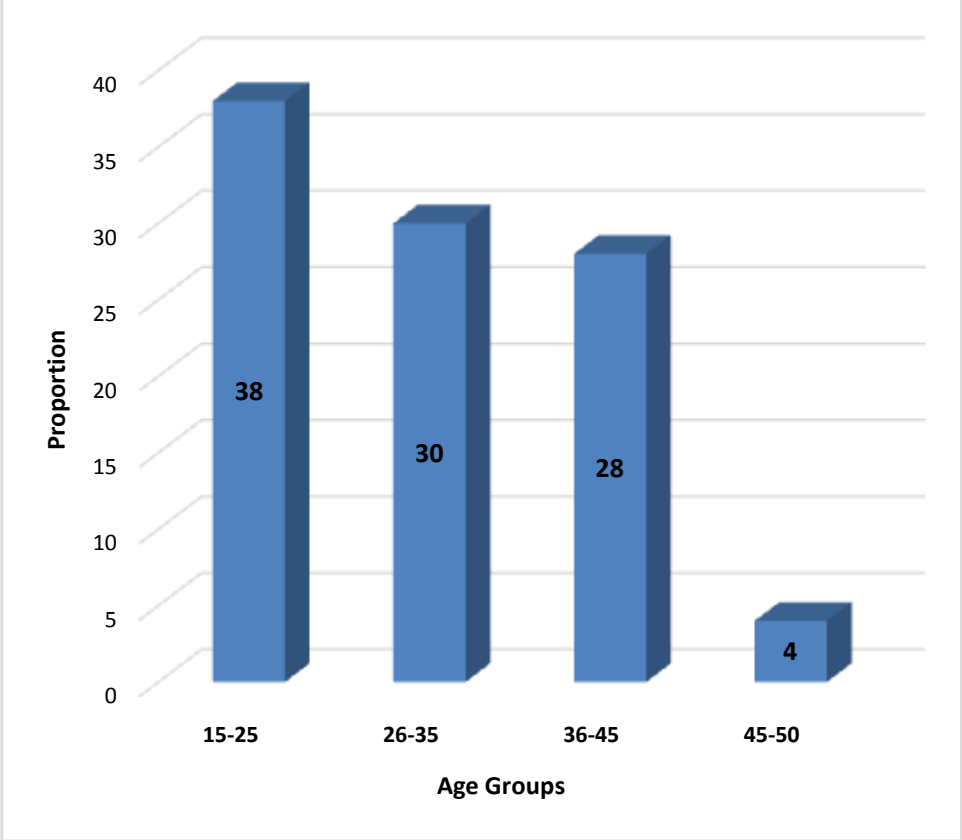

Figure 1. Distribution of age among the study participants

Table 1 depicts the age distribution among the study participants. Of total, 38% (n=19) of the study participants belonged to 15-25 years of age group, 30% (n=15) belonged to 26-35 years, 28% (n=14) belonged to 36-45 years and 4% (n=2) of the study participants belonged to 45-50 years of age group.

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Table 2. Distribution of PCOS among the study participants (N=50)

PCOS	n	%
Yes	16	32.0
No	34	68.0
Total	**50**	**100.0**

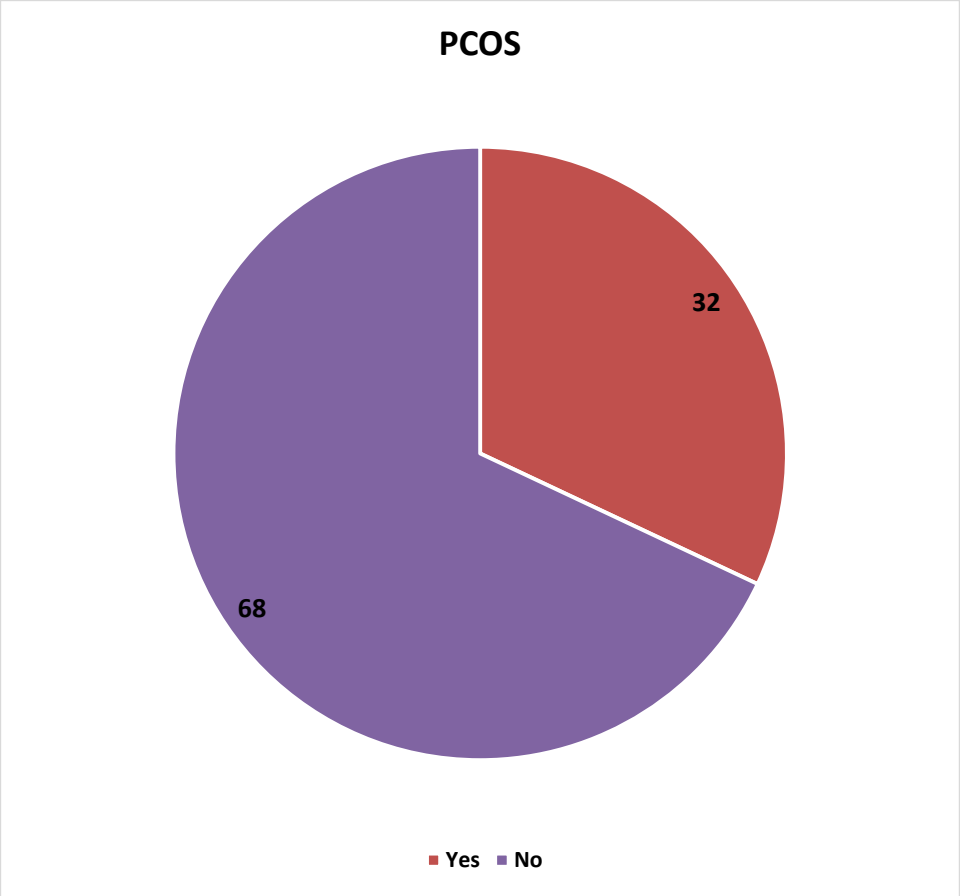

Figure 2. Distribution of PCOS among the study participants

In our study, PCOS was reported by 68% (n=34) of the study participants.

Table 3. Distribution of Ferriman Gallway Scoring(Abraham's classification) among the study participants (N=50)

Ferriman Gallway Scoring	n	%
Discrete (8-16)	35	70.0
Moderate (17-25)	15	30.0
Total	**50**	**100.0**

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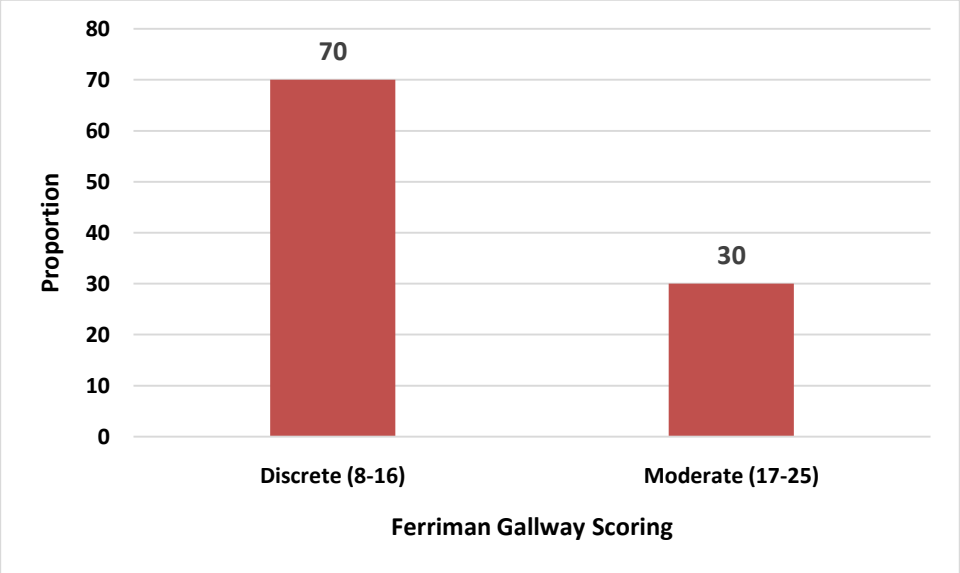

Figure 3. Distribution of Ferriman Gallway Scoring(Abraham's classification) among the study participants

According to Ferriman Gallway Scoring (Abraham's classification), 70% (n=35) of the study participants had discrete (8-16) scoring and 30% (n=15) had moderate (17-25) scoring.

Table 4. Distribution of satisfaction level among the study participants (N=50)

Satisfaction level	n	%
Not satisfied	8	16.0
Satisfied	23	46.0
Very satisfied	19	38.0
Total	**50**	**100.0**

Figure 4. Distribution of satisfaction level among the study participants

Of total, 46% (n=23) of the study participants were satisfied, 38% (n=19) of them were very satisfied, however, 16% (n=8) of the study participants reported unsatisfaction.

IV. DISCUSSION

This study aimed to evaluate the efficacy of Intense Pulsed Light treatment in patients with hirsutism and to investigate the prevalence of hirsutism among women of reproductive age. Fifty participants were enrolled at the Department of Dermatology, Venereology, and Leprosy, Basaweshwar Teaching and General Hospital, affiliated with MahadevappaRampure Medical College, Kalaburagi between 1st August 2022 to 31st January 2024.

Fifty participants aged 15-50 years were enrolled in the study. The majority (38%) were in the 15-25 age group. Similar age distributions were observed in previous studies by Chinjitha D T, Mahajan V K et al., and Subha R et al.[70,73,74]

In our study, the age of onset for hirsutism was predominantly between 16 and 25 years, accounting for 52% of cases, indicating that hirsutism commonly begins in adolescence and early adulthood, aligning with hormonal changes during these periods. This finding is consistent with the other studies by Wankhade V H et al., who identified a mean age of onset at 21±4.2 years, and ChhabraSet al., who observed a slightly higher mean age of 24.18 ± 5.61 years.[6-7] Together, these results highlight a trend where hirsutism frequently arises in young women, likely linked to increased androgen levels associated with puberty and the development of conditions such as PCOS.

The prevalence of menstrual irregularities among hirsutism patients varied across studies, suggesting potential differences in study populations, or methodological approaches. Our study reported the highest prevalence at 50%, notably higher than the 40% found in Chhabra et al. and the 38% in AnsarinH et al.[7-8] Sharma D et al. reported the lowest prevalence at 28%, and Zargar AH et al. reported a prevalence of 48%, closely aligning with our findings.[9-10]

In our study, 32% of participants had PCOS which is comparable with Wankhade VH et al. (32%) and Zargar A S et al. (37.3%).[7-8-9]However, Shubha R et al. (55%) and Chhabra S et al. (70%) reported markedly higher prevalence.[6-7]The higher prevalence observed in some studies may reflect a more comprehensive approach to diagnosing PCOS or a population with a greater incidence of the condition.

In our study, 14% of participants had hypothyroidism. This is comparable to the findings of Chinjitha D T et al. (17.5%.).[7]However, it is notably higher than the prevalence reported by Sharma D et al. (8%), Wankhade V H et al. (8%), and Chhabra S et al. (7.5%).[75,76,79]Study population characteristics, diagnostic criteria used, sample size or underlying iodine status can be the potential factors leading to this variability.

Our study observed a prevalence of 2% for Cushing syndrome, contrasting with the absence of cases reported by Sharma D et al., Mahajan V K et al., Sharma N L et al., and Zargar A H.[6-7-8] Interestingly, Chhabra S et al. reported a prevalence of 2.7%, aligning more closely with our findings.Our study reported a prevalence of 2% for Congenital adrenal hyperplasia, aligning with the findings of Chinjitha DT et al. (2%) and Zargar A S et al. (1.4%). In contrast, Vankhade VH et al. (4%)and Chhabra S et al. (7.5%) reported higher prevalence. [6-7]

In our study, 12% of participants had lipid abnormalities, which is higher compared to the 6% reported by Wankhade VH et al.[7]

In our study, 10% of participants had infertility, whereas Mahajan VK et al. reported no cases[8].

The Ferriman-Gallwey (FG) scoring system is used to assess hirsutism. Our study revealed that 70% of participants exhibited mild hirsutism, while 30% had moderate hirsutism. These findings are somewhat comparable to those of Sharma D et al., who reported 80% with mild and 20% with moderate hirsutism. However, our results contrast with the higher prevalence of both mild and moderate hirsutism observed in Wankhade et al. and Chhabra S et al., who also reported a significant proportion of women with severe hirsutism.[7-8-9-10]

In our study, the mean hair count was 19.3 (SD 4.4), and the mean hair removal efficiency (HRE) was 60.1% (SD= 10.2%). Comparatively, Subha S et al. reported mean HRE values of 72.7% (SD = 6.8), 59.8% (SD = 10.5), and 60.6% (SD = 10.2) across FST 3, FST 4, FST 5 respectively. The variation in mean HRE across studies may reflect differences in treatment protocols, skin types, or measurement methods. Our findings align more closely with the lower efficiency values reported by Subha S et al., suggesting a potentially similar response to hair removal treatments within our sample.[11-12]

Our study (30%)andSubha S et al. (65%), reported a higher prevalence of involvement of the chin and sides.Naheed A et al. highlighted that the chin was predominantly affected with severe involvement, while the upper lip had the highest proportion of mild cases.

In our study, 16% of participants were not satisfied, 46% were satisfied, and 38% were very satisfied. In comparison, Subha S et al. reported lower dissatisfaction (5%), higher satisfaction (70%), and lower very satisfaction (25%). Naheed A et al. found similar dissatisfaction levels (16%) but a higher percentage of very satisfied participants (57%) compared to our study. These differences in satisfaction levels may reflect variations in treatment outcomes, expectations, or assessment methods across studies.

V. CONCLUSION

The study results indicate that IPL treatment achieved a significant reduction in hair growth among participants, with a notable mean hair removal efficiency. Most individuals reported satisfaction with the treatment, with a substantial portion being very satisfied. Although there were minimal side effects reported, IPL treatment was generally well-tolerated and effective, demonstrating its potential as a viable option for managing hirsutism. Overall, this study underscores the complexity of hirsutism and highlights the importance of a comprehensive diagnostic approach, individualized treatment strategies, and ongoing evaluation to optimize patient outcomes. Future research should focus on refining treatment modalities and exploring the impact of demographic and clinical factors on hirsutism management.

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Declarations
Funding: None
Conflict of interest: None
declared Ethical approval: The study was approved by the Institutional Ethics Committee

PICTURES

Case 1 – Before

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Case 1- After(4 Sittings of IPL)

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Case 2- Before

Case 2- After(5 Sittings of IPL)

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