

CLINICO-TRICHOSCOPIC EVALUATION OF HIRSUTISM TREATED WITH INTENSE PULSED LIGHT IN A TERTIARY CARE HOSPITAL IN EASTERN INDIA

DAVIS T CHINJITHA^{1*}, CHOWDHURY JOYEETA², DAS SUCHIBRATA¹, ACHAR ARUN¹, ROY K ALOK¹

¹Department of Dermatology Venereology and Leprosy, NRS Medical College, Kolkata, West Bengal, India. ²Department of Dermatology Venereology and Leprosy, MRCP(SCE) Dermatology, Diamond Harbour Medical College, Diamond Harbour, West Bengal, India.

*Corresponding author: Davis T Chinjitha; Email: chinjutdavis@gmail.com

Received: 20 January 2023, Revised and Accepted: 23 March 2023

ABSTRACT

Objective: The objective of this study is to determine the effectiveness of Intense Pulsed Light in treating hirsutism after three sittings, as evaluated through clinical and trichoscopic assessments, in patients attending a tertiary care hospital in Eastern India.

Methods: This was a Descriptive Longitudinal study conducted at the Dermatology Outpatient Department (OPD), Government Medical College, Kolkata, from March 2019 to February 2020. The study included 40 cases of Dermatology OPD attendees who complained of hirsutism. Trichoscopy was used to evaluate treatment response. Data were analyzed using Medcalc.

Results: Seventy percent had functional while 30% had organic hirsutism; 65% patients had PCOD and 27.5% had idiopathic hirsutism. All the patients had significant improvement with intense pulsed light with regard to terminal-vellus hair ratio and Terminal hair density observed with trichoscopy irrespective of their medical treatment. The mean modified visual analog score was 6.75 ± 1.1209 . According to the modified visual analog score, 57.5% had good reduction while the rest had a moderate reduction.

Conclusions: The majority had functional hirsutism. Polycystic ovarian disease and idiopathic hirsutism are the most common causes of hirsutism. Intense pulsed light is an effective and safe method of hair removal, regardless of medical treatment, and trichoscopy can be used to evaluate treatment response.

Keywords: Hirsutism, Intense pulsed light, Modified Ferriman-Gallwey scoring, Trichoscopy.

© 2023 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2023v16i8.47379>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>

INTRODUCTION

Hirsutism is a cosmetically disfiguring condition that can significantly reduce the quality of life [1]. The cost of medical treatments and procedures is high, and results may not always meet patient expectations. The current cosmetic methods of hair removal include shaving, waxing, plucking, electrolysis, depilatories, and intense pulsed light and Laser [2]. Among these methods, Intense pulsed light (500–1200 nm) and Laser hair removal are the most effective. Long-pulsed ruby (694 nm), long-pulsed Alexandrite (755 nm), Diode (800–980 nm), and long-pulsed Nd: YAG (1064 nm) are the commercially available laser devices for hair removal most widely studied [3].

However, there are only few studies on trichoscopic evaluation of hirsutism treated with lasers/Intense Pulsed Light in India; none in West Bengal. Hence this study aims to evaluate the effectiveness of Intense pulsed light in hirsutism using trichoscopy among the population of Eastern India.

The objective of the study is to evaluate the etiological factors of Hirsutism and to find out the effectiveness of Intense pulsed light in Hirsutism after 3 sittings of Intense pulsed Light (Clinical and trichoscopical evaluation) using trichoscopy in a tertiary care hospital in Eastern India.

METHODS

This was an institution-based descriptive study conducted at the Dermatology Outpatient Department (OPD) of a government Medical College in Kolkata from March 2019 to February 2020. Ethical and scientific committee clearance was obtained for the study. Forty cases were taken as a study sample from the study population of Dermatology

OPD attendees who complained of hirsutism with an age equal to/more than 18 years and with brown or black terminal hair. The patients with active cutaneous inflammation or infection, active sunburn, keloidal tendency, active vitiligo, history of recurrent herpes simplex, and papulosquamous lesions at targeted areas were excluded from the study.

Modified Ferriman-Gallwey (mFG) scoring was used to assess the severity of Hirsutism. Clinical images were taken using a digital camera, and trichoscopic evaluations were performed using a Dermoscope "Dermalite 3" (with magnifications of $\times 25$ and $\times 60$) before each sitting of Intense Pulsed Light. Modified visual analog score was also used as a tool to assess hair reduction perceived by the patient, scored from 1 to 10 based on the patient's response (Score 1–3 - mild reduction, score 4–6 - moderate reduction, Score 7–10 - good reduction). The Intense Pulsed Light (SHR mode) Alma Laser device was used on 650–950 nm with a rectangular spot size of 5 cm², fluence 3–5 j/cm² (total energy 5–10 kilojoule), and pulse frequency of 3 s.

Data were analyzed using Medcalc, and a paired t-test was used as a test of statistical significance. A $p < 0.05$ was considered statistically significant.

RESULTS

In our study, the mean age was 25.95 years (SD \pm 9.0212) with a range from 18 to 54 years. Majority of the patients, i.e., 82.5% of the sample belonged to the age range of 18–30 years. The duration at presentation ranged from 0.42 to 39 years (mean \pm SD = 6.15 ± 7.4147); the median duration was 4 years. Hypothyroidism (17.5%), diabetes (5%), and hypertension (5%) were the comorbidities found in the study sample. Twenty-two people (55%) who underwent laser treatment were also on

other medications such as combined OCP/Spironolactone/Metformin. Thirty percent had a family history. The mean BMI was 24.832 ± 3.1564 .

Modified Ferriman–Gallwey score

The Mean Modified Ferriman–Gallwey scoring (mFG) was 13.325 ± 6.318 .

Seventy percent had functional Hirsutism (mFG 9–14), while 30% had organic (mFG >15).

Etiological inference

65% had polycystic ovarian disease (PCOD) and 27.5% had idiopathic hirsutism (IH) (Graph 1).

Therapeutic profile using trichoscopy

Terminal vellus hair ratio and Terminal hair density were evaluated in each sitting using trichoscopy. Mean values of the Terminal vellus hair ratio show a decreasing trend after Intense pulsed light sessions with each session (Table 1).

There was a significant reduction in Terminal vellus hair ratio from baseline (i.e., before the 1st sitting) to the follow-up visit (6 weeks after the 3rd visit) with Intense pulsed light ($p=0.010$). With the first sitting of Intense pulsed light, there was a significant reduction in Terminal vellus hair ratio, and each sitting contributed to a significant reduction ($p<0.05$) (Table 2).

Mean terminal hair density shows a decreasing trend with each sitting of laser (Table 3).

There was a significant reduction in terminal hair density with each sitting. The first sitting showed a significant reduction in terminal hair density. There was a drastic reduction in terminal hair density from baseline to the follow-up visit after three sittings of intense pulsed light (Table 4 and Graph 2).

Medical therapy

Twenty-two were on medical therapy, and eighteen were not on any medical therapy while undergoing Intense pulsed light.

There was a significant overall reduction in terminal hair density and terminal hair vellus hair ratio in both groups, those who received medical therapy and those who did not. There was no significant difference in mean terminal hair density between the two groups during the follow-up visit, as evidenced by the comparable mean THD4 values (Tables 5-7). This indicates that intense pulsed light is effective regardless of medical therapy.

Modified visual analog score

The mean modified visual analog score value was 6.75 ± 1.1209 ; 57.5% had good reduction (score 7–10) and the rest had a moderate reduction (score 4–6).

Grading of efficacy as per serial photography

Thirty percent had excellent improvement; 55% had good and 15% had fair improvement as per serial photography (Graph 3) (Figs. 1-3).

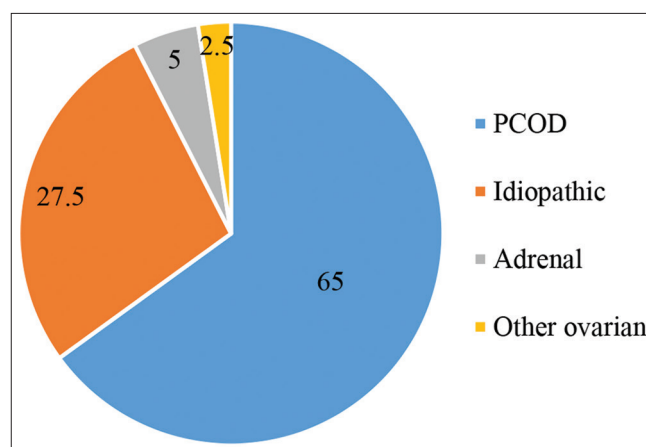
Side effect profile

Two had side effects; one had erythema. Pain and edema and the other one had paradoxical hypertrichosis.

DISCUSSION

Hirsutism is a common benign cosmetically disfiguring condition that may be the presenting feature of hormonal and other systemic conditions that needs proper aetiological diagnosis and appropriate treatment [1].

The study, which is an institutional-based descriptive longitudinal study, attempted to study the clinical, investigational, trichoscopic, and therapeutic profile of Hirsutism patients treated with intense pulsed



Graph 1: Etiological distribution

Table 1: Mean of Terminal vellus hair ratio (T Number of Terminal hair, V Number of vellus hair)

Terminal vellus hair ratio before each sitting	Mean	Standard deviation
T1/V1	0.8687	1.7132
T2/V2	0.3735	0.3769
T3/V3	0.19	0.1207
T4/V4	0.1358	0.09495

Table 2: Paired difference between T1/V1 versus T4/V4 (T Number of Terminal hair, V Number of vellus hair)

Paired t-test	Paired differences			
	Mean	SD	p-value	Significance
Pair 1 T1/V1-T4/V4	0.7329250	1.7157950	0.010	Significant

Table 3: Mean values of terminal hair density in each sitting (THD Terminal hair density)

Terminal hair density	Mean	Standard deviation
THD1	0.6368	0.3511
THD2	0.43	0.2029
THD3	0.369	0.2356
THD4	0.299	0.2283

Table 4: Paired difference between THD (Terminal hair density) baseline and follow up visit after 3 sittings of Intense pulsed light

Paired t-test	Mean	SD	p-value	Significance
Pair 1 THD1-THD4	0.3377500	0.3080916	0.000	Significant

light in the eastern population who attended dermatology OPD in a tertiary care hospital in Eastern India.

The mean age of patients was found to be 25.95 years ($SD \pm 9.0212$) with a range from 18 to 54 years, whereas the mean age of patients (years) in the studies by Chhabra *et al.* [4], Sharma *et al.* [5], and Zargar *et al.* [6] were 24.18 ± 5.61 , 23.8 ± 6.66 , and 26.1 ± 9.5 , respectively. The majority of patients in the sample belonged to the age group of 18–30 years, comprising 82.5% of the sample. The median duration was 4 years. Hypothyroidism was present in 17.5% of the sample, while diabetes (5%) and hypertension (5%) were the other comorbidities found in the

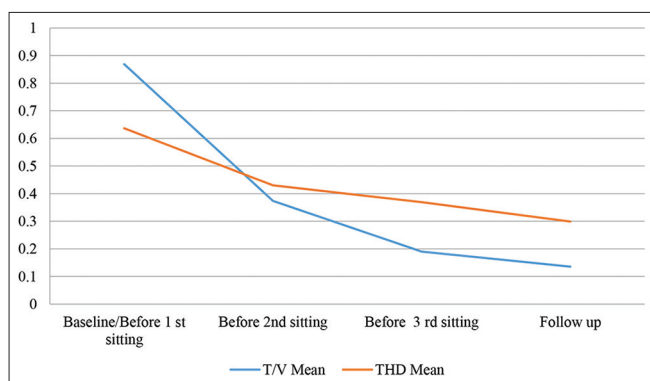
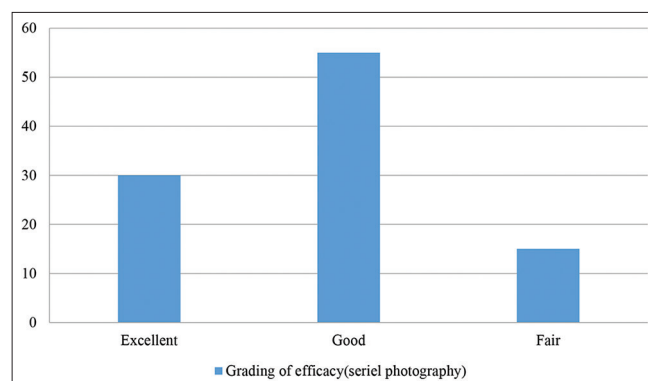
Table 5: Paired differences in Terminal hair vellus hair ratio with each sitting and paired differences in terminal hair density (THD) with each sitting in those who were also on medical therapy

Paired T-test		Paired differences			
		Mean	SD	p-value	Significance
Pair 1	T1/V1-T2/V2	0.7427273	1.8577422	0.075	Significant
Pair 2	T2/V2-T3/V3	0.212727	0.4336064	0.033	Significant
Pair 3	T3/V3-T4/V4	0.0772273	0.0931568	0.001	Significant
Pair 4	T1/V1-T4/V4	1.0312273	2.2708253	0.045	Significant
Pair 5	THD1-THD2	0.2031818	0.3150720	0.006	Significant
Pair 6	THD2-THD3	0.0781818	0.1349298	0.013	Significant
Pair 7	THD3-THD4	0.0581818	0.1718149	0.127	Not Significant
Pair 8	THD1-THD4	0.3395455	0.3442380	0.000	Significant

Table 6: Paired differences in terminal hair vellus hair ratio with each sitting and paired differences in THD with each sitting in those who were not on medical therapy

Paired t-test		Paired differences			
		Mean	SD	p-value	Significance
Pair 1	T1/V1-T2/V2	0.1927222	0.2935218	0.013	Significant
Pair 2	T2/V2-T3/V3	0.1496667	0.2537843	0.023	Significant
Pair 3	T3/V3-T4/V4	0.0259444	0.1091639	0.327	Significant
Pair 4	T1/V1-T4/V4	0.3683333	0.3576237	0.000	Significant
Pair 5	THD1-THD2	0.2111111	0.2461202	0.002	Significant
Pair 6	THD2-THD3	0.0400000	0.2465766	0.501	Significant
Pair 7	THD3-THD4	0.0844444	0.2331932	0.143	Not Significant
Pair 8	THD1-THD4	0.3355556	0.2671466	0.000	Significant

THD: Terminal hair density

**Graph 2: Effectiveness of intense pulsed light shown by reduction in mean values of terminal hair density and Terminal and vellus hair ratio (T/V ratio mean) with each sitting of intense pulsed light****Graph 3: Grading of efficacy using serial photography**

study. Twenty-two patients (55%) who had undergone laser treatment were also on other medications such as combined OCP/spironolactone/Metformin.

In this study, functional hirsutism (mFG 9–14) constitutes 70%, and organic hirsutism (mFG >15) constitutes 30%. In the study by Wankhade *et al.* [7], forty-one (82%) patients had mild hirsutism (18 were of IH), seven (14%) patients had moderate hirsutism (2 were of IH), and two (4%) patients had severe hirsutism (both of which were of Congenital adrenal Hyperplasia/CAH). These observations were similar to Sharma *et al.* [5], (mild in 80% and moderate in 20%), and Ansarin *et al.* [8], (mild hirsutism in 65%, moderate in 32.5%, and severe in 2.5%). The mean BMI was 24.832 ± 3.1564 . Obese patients constituted 37.5% of the study. PCOD (65%) was the most common cause of hirsutism in this study, whereas IH was the commonest cause in studies by Sharma *et al.* [5], Ansarin *et al.* [8], Carmina [9], and Wankhade *et al.* [7]. This difference can possibly be attributed to the large number of PCOD referral cases from the gynecology and endocrinology departments. Nevertheless, it

may also be due to the increase in the prevalence of PCOD among the general population due to lifestyle changes. This needs to be confirmed with further large population-based studies.

Mean of Terminal hair vellus hair ratio T1/V1(baseline) was 0.8687 ± 1.7132 and T4/V4(at the follow-up) was 0.1358 ± 0.09495 . Mean terminal hair density THD1(baseline) was 0.6368 ± 0.3511 and THD4 (at the follow-up) was 0.299 ± 0.2283 . The current study shows that Intense pulsed light is effective and safe in treating hirsutism. There is a significant reduction in Terminal hair density and terminal vellus hair ratio after first sitting itself. With each successive sitting, a significant reduction was observed; overall, there was excellent response. Intense pulsed light is effective irrespective of medical therapy. The mean Modified visual analog score value is 6.75 ± 1.1209 . According to modified visual analog score (based on patient satisfaction), 57.5% had good reduction and the rest had a moderate reduction. 85% of patients who had undergone laser showed excellent to good improvement as per serial photography. Only 5% had side effects; that also only mild side effects such as erythema, pain, edema in 1 patient and paradoxical hypertrichosis in another patient. White hairs were observed to be resistant. In Goh [10] study,

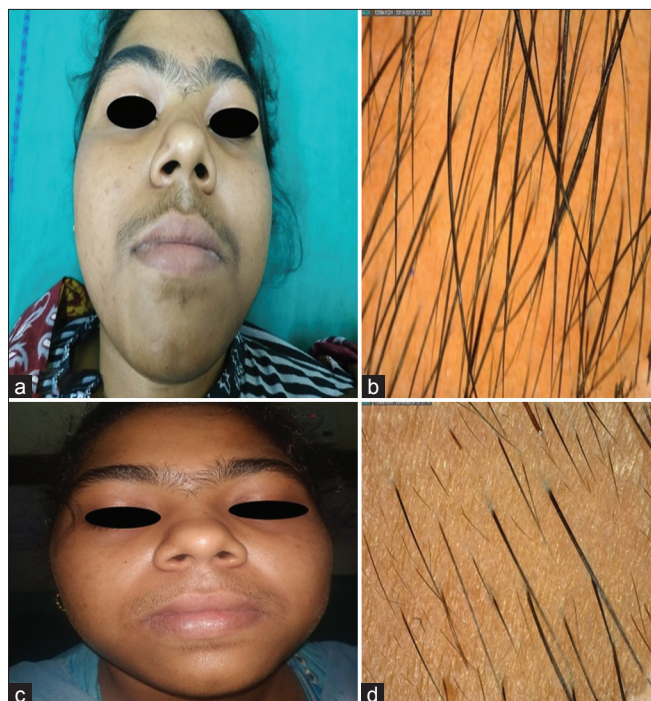


Fig. 1: (a) Patient(P1) Baseline, (b) Patient(P1) Baseline trichoscopy image, (c) Patient(P1) after final sitting, (d) Patient(P1) trichoscopy after final sitting

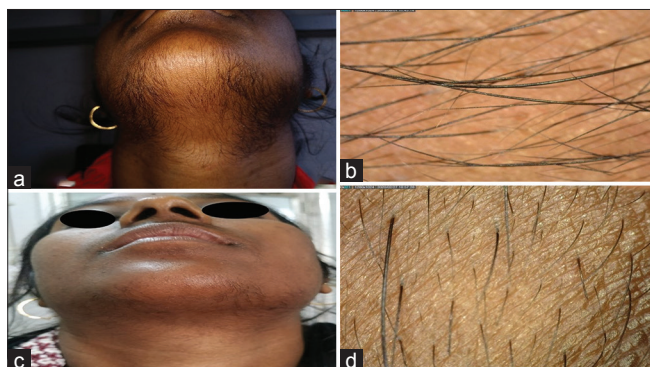


Fig. 2: (a) Patient(P2) Baseline, (b) Patient(P2) Baseline trichoscopy image, (c) Patient(P2) after final sitting, (d) Patient(P2) trichoscopy after final sitting



Fig. 3: (a) Patient(P3) Baseline, (b) Patient(P3) Baseline trichoscopy image, (c) Patient (P3) after final sitting, (d) Patient(P3) trichoscopy after final sitting

Table 7: Comparing mean THD4 in both groups (THD4 Terminal hair density in follow up)

Comparing 2 means	Mean THD4	SD
On medication	0.236	0.230
Without medication	0.375	0.238

p=0.0689, Accepting the null hypothesis

64% and 73% noticed hair reduction <20% after 6 weeks on IPL and Nd: YAG treated side, respectively. Post-inflammatory pigmentation and blistering occurred in some volunteers on the IPL-treated sides whereas this was not seen on any Nd: YAG-treated side. El Bedewi [11] showed there was a significant hair reduction of about 80% with no side effects and minimal complications with IPL. As per Mohanan *et al.* [12] study, among 12 patients, for a maximum of 6 IPL sessions, the mean hair removal efficacy was 69.6%; 83% were satisfied with the procedure; 66% had excellent results; 16% had good results. No permanent adverse effects were seen. It was observed in the study by Puri [13] that the percentage of hair reduction after four sessions of treatment was maximum (64%) in the diode laser group, followed by 62% hair reduction in the Nd: YAG laser group and 48% hair reduction in the IPL group. The percentage of hair reduction after eight sessions of treatment was maximum (92%) in the diode laser group, followed by 90% hair reduction in the Nd: YAG group and 70% hair reduction in the IPL group.

Limitations of our study were small sample size, single-center study, hospital bias, limited number of sittings and subject bias.

As trichoscopy has been found to be a very effective and proven tool in treatment assessment; the given study can be extrapolated with a larger sample size and various novel treatment modalities in hirsutism.

CONCLUSIONS

The majority had functional hirsutism. PCOD and IH are the most important causes of hirsutism in our study. Intense pulsed light is a very effective and safe method of hair removal irrespective of medical treatment and trichoscopy helps in evaluating the treatment response.

ETHICAL APPROVAL

Both scientific and ethical clearance have been obtained for the study.

CONSENT

Written informed consent was obtained from all patients for publication of the study along with images.

ACKNOWLEDGEMENT

Nil.

AUTHORS CONTRIBUTION

All authors have made substantial contributions in all stages of the study, including (1) the conception or design of the study, or the acquisition, analysis, and interpretation of data; (2) drafting the article or revising it critically for important intellectual content; (3) approving the final version of the manuscript; and (4) agreeing to be accountable for all aspects of the work, ensuring that questions related to accuracy or any part of the work are properly investigated and resolved.

CONFLICT OF INTERESTS

Nil.

AUTHORS FUNDING

Nil.

REFERENCES

1. Elghblawi E. Idiopathic hirsutism: Excessive bodily & facial hair in women. *Br J Nurs* 2008;17:192-7. doi: 10.12968/bjon.2008.17.3.28556. PMID: 18335429
2. Bhat YJ, Bashir S, Nabi N, Hassan I. Laser treatment in hirsutism: An update. *Dermatol Pract Concept* 2020;10:e2020013. doi: 10.5826/dpc.1002a13. PMID: 32318397; PMCID: PMC7154401
3. Freinkel RK, Freinkel N. Hair growth and alopecia in hypothyroidism. *Arch Dermatol* 1972;106:349-52. doi: 10.1001/archderm.1972.01620030019003. PMID: 5089085
4. Chhabra S, Gautam RK, Kulshreshtha B, Prasad A, Sharma N. Hirsutism: A clinico-investigative study. *Int J Trichology* 2012;4:246-50. doi: 10.4103/0974-7753.111212. PMID: 23833334; PMCID: PMC3699939
5. Sharma D, Shanker V, Tegta G, Gupta M, Verma GK. Clinico-investigative profile of patients of hirsutism in a tertiary level institution. *Int J Trichology* 2012;4:69-74. doi: 10.4103/0974-7753.96918. PMID: 22837521; PMCID: PMC3401776
6. Zargar AH, Wani AI, Masoodi SR, Laway BA, Bashir MI, Salahuddin M. Epidemiologic and aetiologic aspects of hirsutism in Kashmiri women in the Indian subcontinent. *Fertil Steril* 2002;77:674-8. doi: 10.1016/s0015-0282(01)03202-7. PMID: 12009329
7. Wankhade VH, Shah VH, Tomar SS, Singh RP. Clinical and investigative study of hirsutism. *J Clin Diagn Res* 2019;13:WC01-4. doi: 10.7860/jcdr/2019/41723.12804. PMID: 31355046; PMCID: PMC6631408
8. Ansarin H, Aziz-Jalali MH, Rasi A, Soltani-Arabshahi R. Clinical presentation and etiologic factors of hirsutism in premenopausal Iranian women. *Arch Iran Med* 2007;10:7-13. PMID: 17198415
9. Carmina E. Prevalence of idiopathic hirsutism. *Eur J Endocrinol* 1998;139:421-3. doi: 10.1530/eje.0.1390421. PMID: 9792227
10. Goh CL. Comparative study on a single treatment response to long pulse Nd: YAG lasers and intense pulse light therapy for hair removal on skin Type IV to VI--is longer wavelengths lasers preferred over shorter wavelengths lights for assisted hair removal. *J Dermatolog Treat* 2003;14:243-7.
11. El Bedewi AF. Hair removal with intense pulsed light. *Lasers Med Sci* 2004;19:48-51.
12. Mohanan S, Basheerahmed P, Priyavathani R, Nellainayagam G. New intense pulse light device with square pulse technology for hirsutism in Indian patients - A pilot study. *J Cosmet Laser Ther* 2012;14:14-7.
13. Puri N. Comparative study of diode laser versus neodymium-yttrium aluminum: Garnet laser versus intense pulsed light for the treatment of hirsutism. *J Cutan Aesthet Surg* 2015;8:97-101.