Journal of Cardiovascular Disease Research

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

Original Research Article

APPLICATION OF LASER TREATMENT IN DERMATOLOGICAL CLINICAL PRACTICE –A HOSPITAL BASED STUDY.

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Abstract

Introduction: Laser treatment is often seen as a hallmark of modern technology that may use as an alternative treatment modality in various skin disorders. Various factors related to patient and technology which could result in variable, unpredictable complications or poor responses to laser therapy in spite of ensuring appropriate indications and adequate parameters of laser use. Hence the present study was undertaken to assess the awareness, attitude and practice in application of lasers in dermatology among patients attending dermatology OPD.

Methods & material: A Hospital based study was undertaken during January 2022 among 120 patients who attended OPD in Department of Dermatology, Prathima Institute of Medical sciences, Karimnagar.

Results: About 56 (46.7%) were heard of lasers application for skin disorders. Majority 36 (64.3%) of patients were aware of various skin conditions where lasers were applied. No post-operative morbidity was observed in 104 (86.7%) of the patients, whereas about 16 (13.3%) has reported some or other kind of morbidities.

Conclusion: The present study demonstrates that the average knowledge among patients, but some knowledge gaps on certain specific aspects still remained which needs to be addressed on various aspects of laser application. About 13.3% of patients experienced side- effects following laser therapy. Most of the patients were unaware about the advantages of laser treatments and its side effects and hence it is important to conduct more awareness programmes to the general public about the applications and benefits of lasers in dermatological conditions

Keywords: Lasers, Awareness, Attitude, Side effects, Skin disorders

Introduction

Laser treatments are often seen as a hallmark of modern technology and play an important role in treating many conditions that affect the skin, hair, and nails. In recent years, advanced laser technology has progressed rapidly and its applications in medicine have been promoted in different fields such as dermatology, dentistry, ophthalmology, and surgery.[1] With the advent and development of modern lasers, we are now able to target many of these conditions and provide a viable safe treatment option for patients. Later, advances in laser technology resulting in development of new laser systems with much better therapeutic results and low risk of adverse effects.

Indian skin ranges from type IV to VI on the Fitzpatrick skin type scale and is more pigmented in comparison to the Caucasian or Oriental skin types owing to presence of greater amounts of epidermal melanin and larger melanosomes which makes it more vulnerable to post inflammatory hyperpigmentation following laser treatment.[2]There are various factors related to patient and technology which could result in variable, unpredictable complications or poor responses to laser therapy in spite of ensuring appropriate indications and adequate parameters of laser use. Patient dependable variables include the skin type, the type of lesion, hormonal status (particularly in female patients undergoing laser hair removal), inadequate or improper sunscreen application and recent tanning, while Operator-dependent variables include faulty parameters and poor technique like the hand piece not being perpendicular to the skin, placing the probe too close or too far from the skin while operating the laser, and not using adequate protection for operating personnel and patients.

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Laser has disadvantages like relatively high cost of laser unit, specialized training and education on operations of laser, different lasers for various procedures, inability of erbium family of lasers to get rid of metallic and cast-porcelain defective restorations, disease transmission in immunocompromised patients by laser generated aerosols harmful to eyes. It is very important to have thorough knowledge of several aspects of lasers such as – laser physics, various delivery systems, different wavelengths available and range of application of each wavelength, accurate clinical technique, laser safety, possible side-effects, and sterilization and disinfection protocol. An important component for success of laser therapy depends on the Dermatologists judgement in aligning the patient's wishes with the therapeutic and surgical limitations. Laser therapy has become an integral part of therapeutic alternatives in dermatology. Nevertheless, there are only few studies done on role of lasers in everyday practice of dermatological clinics. Also there is a need to investigate the evolution of patient's awareness, experiences regarding side effects and responses after laser therapy to refine the art of patients preparation and there by improve the patients- doctor relationship. Ultimately, understanding patient attitudes and preferences for treatment attributes can lead to greater treatment satisfaction, treatment adherence and compliance, and better long-term outcomes.[3] With this background, the current study was undertaken to assess the awareness, attitude and practice in application of lasers therapy for skin conditions amongst patients attending dermatology OPD clinic.

Material and methods

A Hospital based study was undertaken during January 2022 among 120 patients who attended OPD clinic in Dermatology department of Prathima Institute of Medical sciences, Karimnagar. The ethical clearance was obtained from the institutional ethics committee of the Institute. The purpose of the study was explained and written and signed Informed consent was obtained from all the participants. Convenient sampling method was carried out throughout the survey. A semi-structured questionnaire consisting of the socio-demographic characteristics, awareness regarding lasers, attitude towards lasers, indication of lasers for skin conditions, side-effects of treatment and regarding precaution during treatment were administered to 120 patients attending OPD clinic. Socio-demographic characteristics include information regarding the patients age, sex, educational status, occupation and socio-economic status were included in the questionnaire. Socio-economic status was calculated using modified Kuppuswamy's classification. Patients of all ages, both sexes those who gave consent and were willing to participate in the study were included. Those who are critically ill and not willing to participate were excluded from the study. Information questions had multiple choices and participants had to select from the options. Questionnaire was done by both patients undergoing laser treatment and follow up sessions of laser therapy. All patients underwent treatment after obtaining a detailed personal history (skin type, clinical manifestations, health conditions, previous medications, and life-style) were noted in detail with help of proforma. Information regarding post –operative morbidity was also collected. Data was entered into an excel spread sheet and statistical measures obtained were mean values and percentages.

Results

The socio-demographic characteristics of the respondents are depicted in table 1. In the present study, the majority 56(46.7%) were between the age group of 20-30 years. Among the study participants56 (46.7%) were male and 64(53.3 %) were female. About 36 (30%) of the study sample are residing in rural areas, while 84 (70%) were from urban areas. Most of them 46(38.3%) cases were graduates, 24(20 %) cases were having intermediate 24(20%) while 6 (5%) were illiterate. Regarding occupational status, the majority58 (48.3%) of them were job holders followed by students 24(20%) and housewives constituting 20 (16.7%) respectively followed by others such as construction workers/ daily wages10 (8.3%) and farmers/ carpenters 8(6.7%). As per Kuppuswamy's socioeconomic status scale, majority, 54 (45%) were belonging to upper middle class. About 24 (20%) of male patients were smokers. Very few 6 (5%) were reported to have history of medication/allergies in present study.

Table 1: Socio-demographic and lifestyle characteristics of respondents

Variables	Number	Number	Percentage
Age in years	<20	10	8.3
	20-30	56	46.7
	31-40	34	28.3
	>40	20	16.7
Sex	Male	56	46.7
	Female	64	53.3
Residence	Rural	36	30
	Urban	84	70
Religion	Hindu	92	76.7
	Muslim	12	10
	Christian	16	13.3
	Illiterate	06	5

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Education	Primary school	10	8.3
	Secondary school	14	11.7
	Intermediate	24	20
	Graduate	46	38.3
	Postgraduate	20	16.7
Occupation	Job	58	48.3
	Students	24	20
	Construction workers/Daily wages	10	8.3
	Farmer/Carpenter	08	6.7
	Housewives	20	16.7
Socio-economic status	Upper	18	15
	Upper middle	54	45
	Lower middle	28	23.3
	Upper lower	14	11.7
	Lower	6	5
History of any medication (Isotretinoin) / Allergies	Yes	6	5
	No	114	95
History of smoking	Yes	24	20
	No	96	80
Total		120	100

Table 2 shows the awareness levels of respondents towards laser applications. About 56 (46.7%) Were heard of lasers application for skin conditions. Majority 36 (64.3%) of patients were aware of various skin conditions where lasers were applied. Regarding the skin conditions in which lasers are used the maximum 24 (42.9%) of patients were aware for unwanted hairs, followed by tattoo removal 15(26.8%). Only a few 18 (32.1%) were known that lasers are applied for Pigmentary and vascular lesions 12 (21.4%). Our finding also found that various patient factors to be considered for laser application by follow up patients than the new patient, most commonly important factors are type of skin 28 (50%), hair type & colour 24 (42.9%). The respondents in the study has given multiple response for benefits of lasers applications, pain less and blood less procedure 15(26.8%) was considered as the most common benefit followed by minimal side -effects 12 (21.4%%). About 42 (75%) were aware of side-effects of lasers. It was observed that majority 24 (42.9%) of patients were aware of that laser therapy requires many repeated sessions and 18(32.1%) efficacy of treatment varies from person to person. About 24 (42.9%) were aware of pre and post treatment precautions for laser therapy. Around 34 (60.7%) patients were aware of personal protective equipment required while undergoing laser therapy.

Table 2: Knowledge assessment of respondents in relation to laser applications

Variables		**Number**	**Percent**
Aware of lasers	Yes	56	46.7
	No	64	53.3
Total		120	100
Aware of conditions which lasers are applicable (n=56)	Yes	36	64.3
	No	20	35.7
Conditions in which lasers are used (n= 36) (Multiple responses)	Unwanted hair	24	42.9
	Tattoo removal	15	26.8
	Birth mark scars	4	7.1
	Pigmented skin disorders	18	32.1
	Vascular lesions	12	21.4
	Skin resurfacing conditions	8	14.3
	Type of skin	28	50
	Depth of skin involvement	12	21.4
	Degree of sun tan	16	28.6

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Aware of Patients factors to be considered (n=56) (Multiple responses)	Hair type & colour	24	42.9
	Hair growth cycle	1	1.8
	Hormonal involvement	4	7.1
	Don't know	14	25
Benefits of laser therapy (n=56) (Multiple responses)	Painless and blood less surgery	15	26.8
	Procedure takes less time	6	10.7
	OPD procedure	4	7.1
	Minimal side effects	12	21.4
	Permanent/mostly permanent	6	10.7
	Pigment removal	6	10.7
	Quick healing process	4	7.1
	Relatively safe procedure	12	21.4
	Don't know	34	60.7
Aware of side effects of lasers (n=56)	Yes	42	75
	No	14	25
If yes, side effects of lasers (n= 42) (Multiple responses)	Swelling	16	38
	Redness	8	19
	Blistering	4	9.5
	Crusting	4	9.5
	Bleeding	8	19
	Infection	5	11.9
	Pain	10	23.8
	Scarring	2	4.8
	Changes in skin colour	16	38
Aware of laser therapy requires many sessions for complete treatment (n=56)	Yes	24	42.9
	No	32	57.1
Efficacy of laser treatment varies from person to person (n=56)	Yes	18	32.1
	No	38	67.9
Aware treatment may be failed to respond in some patients (n=56)	Yes	10	17.9
	No	46	82.1
Aware of patch test is necessary before commencing laser treatment (n=56)	Yes	12	21.4
	No	44	78.6
Aware of pre- post treatment precautions for laser therapy (n=56)	Yes	24	42.9
	No	32	57.1
Any protection required while undergoing laser therapy (n=56)	Yes	34	60.7
	No	22	39.3

Table 3 shows the attitude of patients towards lasers application in dermatology. Majority 76 (63.3%) of them have a positive attitude towards that procedure is worthwhile. A total of 98(81.7%) have a favorable attitude for undergoing repeated sessions for laser therapy Regarding pregnancy, 36(30%) agreed that lasers therapy should be avoided during pregnancy. A maximum 84(70%) of patients were having a positive attitude and belief that laser has fewer side effects. The majority64 (53.3%) of them were in a favorable attitude that modern lasers are more effective than traditional methods (waxing, threading). A total 106 (88.3%) were having favorable attitude of protection required (eye goggles) while undergoing laser therapy. About 64 (53.3%) agreed to recommend other community members to use lasers.

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Table 3: Attitude of respondents towards laser applications

Variables		Number	Percent
Are you in favour that procedure is worth while	Yes	76	63.3
	No	44	36.7
Are you in favour of undergoing repeated sessions for laser therapy	Yes	98	81.7
	No	22	18.3
Laser should not be used during pregnancy	Yes	84	70
	No	36	30
Modern lasers are more effective than the traditional methods (waxing, threading)	Yes	64	53.3
	No	56	46.7
Lasers has fewer side effects	Yes	84	70
	No	36	30
In favor of using protective measures (eye goggles) while undergoing laser therapy	Yes	106	88.3
	No	14	11.7
Recommend other community members to use lasers	Yes	64	53.3
	No	56	46.7
Total		120	100

Table 4 reveals the source of information of patients regarding lasers in dermatology. In present study we obtained multiple responses, majority 42 (35%) of them obtained information through Dermatologists followed by internet 34(28.3%) and only few obtained from books 10(8.3%) and relatives, neighbours and friends 2(1.7%). About 64 (53.3%) of them have no source of information on lasers applications.

Table 4: Source of information regarding Laser therapy

Variables	Number	Percentage
Doctors	42	35
Internet	34	28.3
Television	8	6.7
Relatives/neighbours	2	1.7
Books/ Newspaper	10	8.3
Don’t know	64	53.3

Figure 1 represents the distribution of patients in relation to application of lasers in dermatology. It was observed that majority 14 (11.7%) of them underwent lasers therapy for Pigmentary disorders (melasma), facial melanosis 12(10 %) and Scar treatment 9(7.5%). About 10 (8.3%) patients preferred lasers for laser hair removal. Only few patients 3(2.5%) preferred lasers for tattooing.

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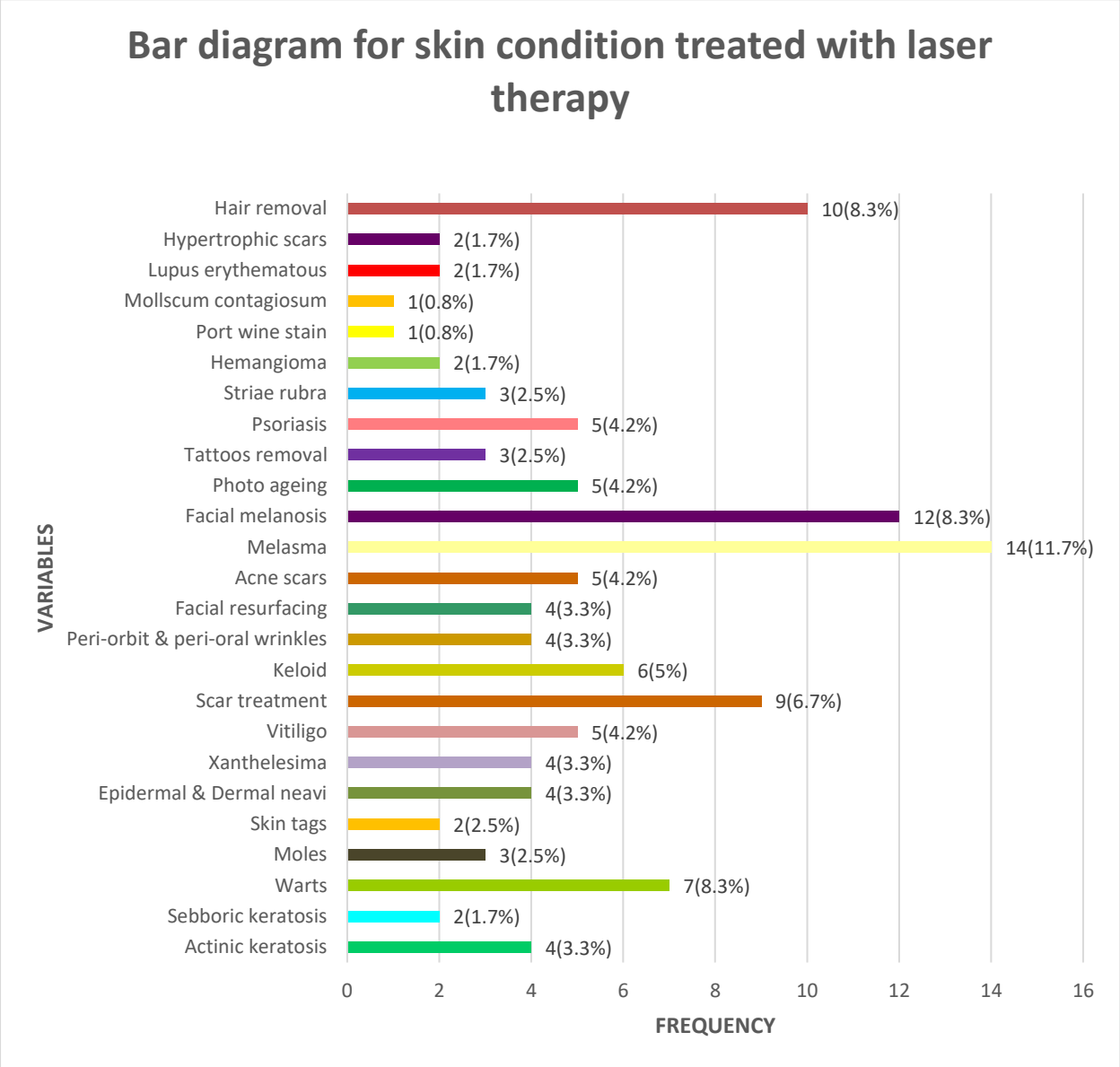

Table 5 presents the various side effects and pre-operative and post-operative precautions taken by patients during their laser therapy. No post-operative morbidity was observed in 104 (86.7%) of the patients, whereas about 16 (13.3%) has reported some or other kind of morbidities. Pigmentary changes like hyperpigmentation 10 (62.5%) &swelling 8 (50%) were the commonest side effect, followed by erythema (redness) 6 (37.5%) which disappeared after treatment. Other side effects were stinging sensation (25%) and delayed hypopigmentation were reported by 3 (18.8%) patients. None of the patient reported infection, hypertrophic scarring or ectropion side-effect in the present study. Regarding precautions taken before and after laser therapy, majority 104(86.7%) of patients had undergone counselling before any laser therapy for skin conditions. Enquiring on precaution taken before laser therapy, about 106 (88.3%) of patients avoided infected area from treatment, 68 (56.7%) of patients avoided skin tanning and followed by usage of medication like emollients, moisturizing creams &dietary Supplements like vitamin C by 48(40%) of patients. Only few 12(10%) patients followed abstinence from smoking. Almost 106 (88.3%) of patients utilized goggles to prevent eye injury during laser therapy. While 32 (26.7%) were not followed any precaution before laser therapy Regarding precautions taken to reduce side effects of laser therapy, majority 64 (53%) of patients were infiltrative used topical anaesthesia to reduce pain, about 28 (23.3%) of participants use ice packs as cooling procedure particularly after laser hair removal, while18 (15%) applied like petroleum jelly. Around 34 (28.3%) patients were able to avoid exposure to mid-day sun by using personal protective measures like protective clothing and by applying sunscreen lotions 24 (20%) to prevent side-effects following laser therapy.

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Table 5: Experienced side effects and pre-operative & post-operative precautions towards laser treatment

Variables		Number	Percent
Experienced any side effects during laser therapy	Yes	16	13.3
	No	104	86.7
Side-effects developed Following laser therapy (n=16) (Immediate complications)	Pain during procedure	4	25
	Erythema (Redness)	6	37.5
	Stinging sensation	4	25
	Swelling	8	50
	Bruising	2	12.5
	Blistering	1	18.8
	Scarring	1	18.8
	Crusting	1	6.3
	Allergic reactions	2	12.5
	Post-inflammatory hyperpigmentation	10	62.5
Delayed complications (Multiple responses)	Infections(bacterial/viral/fungal)	0	6.3
	Delayed hypopigmentation	3	18.8
	Persistent erythema	2	12.5
	Prolonged healing	2	12.5
	Hypertrophic scarring	0	0
	Ectropion	0	0
Undergone any counselling before laser therapy	Yes	104	86.7
	No	16	13.3
Total		120	100
Precaution taken before laser therapy (Multiple responses)	Avoiding infected area from treatment	106	88.3
	Usage of medication like emollients, moisturizing creams, & dietary supplement (vitamin C) interfering with treatment	48	40
	Avoided skin tanning	68	56.7
	Abstinence from smoking	12	10
	Avoid excessive sweating	10	8.3
	Avoid physical exercise	10	8.3
	Use of goggles during laser therapy	116	96.7
	Not taken any precautions	32	26.7
Precautions taken to reduce side effects of laser therapy (Multiple responses)	Local infiltrative/ topical anesthesia to reduce pain	64	53.3
	Use of ice pack	28	23.3
	Apply petroleum jelly	18	15
	Avoid picking any scab	42	35
	Avoid exposure to mid-day sun by use of protective clothing	34	28.3
	Apply sunscreen lotion	24	20
	Not taken any precautions	42	35

Discussion

As an alternative treatment modality in various skin disorders, lasers may help to increase patient compliance and reduce potential risk for skin cancer, but its convenience is limited by high cost and accessibility. Various Studies have shown that the most important factor in the outcome of laser therapy is not technical success of the laser surgery but the patient perception of the outcome. Many recent studies address the postoperative morbidity such as erythema, crusting, swelling and infections following laser surgery. The subjective experience of a patient after laser procedure in turn influenced by a number of factors, including the patient's expectation, motivation, perception and fears. Therefore the present study was undertaken to assess the patient's awareness, their attitude and practical application of lasers for dermatological conditions.

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The current study revealed that about 36 (64.3%) of patients are aware of skin conditions for laser application. The maximum 24 (42.9%) of patients were aware of laser applications for unwanted hairs, tattoo removal 15(26.8%) followed by pigmented skin disorders 18(32.1%). Only a few were aware of skin resurfacing conditions 8(14.3%) and Birth mark scars 4 (7.1%). Patients in the present study were aware of factors that contribute to variable outcomes in laser therapy are skin type 28 (50%), degree of sun tan 16 (28.6%), hair type and color 24 (42.9%), hair regrowth cycle 1 (1.8%) and hormonal influences 4(7.1%). An ideal patient for conventional laser hair removal is one who has, light skin, thick dark terminal hairs and should have normal hormonal status.[4] While around 14 (25%) were not aware of patient factors considered in laser therapy. During laser hair removal the patient selection should not be compromised as these can decrease response to treatment. Dark skin types necessitate that sufficient caution is taken for the safe application of a laser hair removal by any wavelength. Safety of patients with type 5-6 skin is a challenge for laser hair removal due to high density of competing chromophore in the epidermis of skin .[5]Terminal hairs are considered suited for laser hair reduction as they absorb laser energy more. These responses may be poor when vellus or thin hair are treated due to relatively less chromophore in them, which is true for upper lip where chromophore in thin hairs are less for laser wavelength absorption.[6]

Regarding pigmentation of hair, considerable variations in treatment results are often seen among patients with dark hair.[5] Though permanent hair loss is not expected in all individuals, but considerable lessening of hair density and thickness is seen.[6]White and gray hairs have no melanin and are not known to respond to lasers. Hair in early anagen phase is most susceptible to laser treatment. After a session of laser hair reduction, re-growth of hair may be delayed up to 6 or 8 weeks; subsequent sessions after very brief intervals are associated with poor outcome. Therefore an interval of 1-2 months between sessions is optimum and this depends on the body location. It was observed that majority 24 (42.9%) of patients were aware of that laser therapy requires many repeated sessions and 18 (32.1%) efficacy of treatment varies from person to person. Several underlying medical and hormonal conditions such as Polycystic Ovarian Syndrome, thyroid dysfunctions, adrenal hyperplasia & hyperprolactinemia which strongly influence the laser hair removal outcome from androgen-sensitive areas. Patients with untreated hormonal diseases can have variable-to-poor responses to laser hair removal and require more number of sessions than patients with normal hormone levels. In the present study, it was found that maximum number of patients aware of the advantages of laser therapy, and the most common advantage was a painless and blood less procedure 15(26.8%) and followed by lasers has minimal side effects 12 (21.4%). About 42 (75%) were aware about risks associated with methods, consisting of hypersensitivity, Burns and pigmentation.

Now- a-days, lasers are incorporated into daily practice. Health education and counselling given at every subsequent laser therapy visit in skin OPD of medical college is most important for patients as it is the main source of knowledge that every patient relies on and their understanding of the subject depends on information provided by their institution. All patients were also instructed to avoid sun exposure and to apply broad- spectrum sunscreen during and after the treatment. Other possible factors which lead to incomplete or poor response following laser hair removal procedure include doing laser treatment on epilated or waxed treatment areas; not shaving the treatment area properly; or doing laser treatment on a freshly bleached hair.[7]

Regarding the attitude of respondents towards laser therapy, the majority 84 (70%) of the respondents agreed that the laser process should be avoided during pregnancy. Since there is an increase in the levels of prolactin Hyperprolactinemia state has a melanocyte stimulating effect. All light therapies are ineffective for hair reduction in case of hyperprolactinemia due to pregnancy. Many patients 98(81.7%) were in favor of undergoing repeated sessions for certain skin conditions. Prior the treatment, skin should not be tanned, damaged, or show any signs of infection Test spots are performed 2 weeks before the full treatment. Immediately after the treatment, the area should exhibit follicular edema and erythema which is the normal response to laser heating of the follicle. To avoid post inflammatory changes in darker skin types, topical steroid is often used for 5 days. Complete removal can take from three to ten sessions spaced 1 month apart, depending on the hair, treatment area and the patient's skin type. Sun protection is critical both before and after laser application in dermatology.[8]Demand for laser hair removal has exponentially raised during the last decade. Traditional methods of hair removal such as threading, plucking and waxing have largely been replaced by interventions using laser and light sources as the latter methods are substantially superior in achieving long term hair reduction. Similar finding was found in present study. Laser hair removal is said to be permanent when there is a stable decrease in the number of terminal hairs for a period longer than the complete hair growth cycle at a given site after treatment.[9]Majority 106(88.3%) were having favorable attitude of protection required (eye goggles& closing of mouth with gauze or mouth piece) while undergoing laser therapy.

Ocular protection is of outmost importance when operating a laser device. Any person that may possibly be exposed to optic radiation must wear appropriate protective eyewear, including the laser operator, support staff, patients, and visitors. Protective eyewear is chosen based on the wavelengths of light emitted by the laser.[10]Lasers may also be a hazard to oral health. Dental enamel, in particular, is vulnerable to ultraviolet and infrared light.

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Avoiding oral injury can be achieved by keeping the mouth closed or by covering it with a moistened gauze or a protective mouthpiece. [11] Majority 64(53.3%) were in favour of recommending other community members to use lasers in present study. In a study conducted by Vasanop Vachiramon found that all patients completing the study would recommend LHR for patients with unwanted hair with the mean recommendation score of 91.5.[12]

We obtained multiple responses in the context of source of information about dermatological laser surgeries among the patients. It has been observed that dermatologists played the major role in creating awareness among the participants as 42(35%) of patients accepted it as their principle source of information. The knowledge received from the internet was about 34(28.3%) and particularly students followed by television 8 (6.7%). Only 2(1.7 %) of the patients obtained information from friend, relatives and peers. About 64(53.3%) of patients have no source of information regarding laser applications in dermatology. A study done by Doheyan et al found that 38% had gained information from television[13]whereas Adejeji et al found that 49.8% had received their information from television, [14] and Ahmed et al found that 88% had received their information from Internet. We found that 34% of respondents had come to know about these procedures from medical textbooks.[15]

Numerous studies have shown that the most important factor in the outcome of laser treatment is not the technical skills of dermatologist but the patient's perception of the outcome. Patients experience after any procedure is in turn influenced by number of factors, including patients expectation, motivation, pre perception and fear. Proper patient selection essential as with any cosmetic procedure. During initial consultation the dermatologist should ascertain the patient expectation of treatment and the circumstances leading to the decision to have cosmetic laser therapy. Enquired about complete medical and surgical history including recent use of isotretinoin and skin to be treated should be thoroughly examined for scarring, dyschromia, and skin type should be carefully noted. Most importantly, patients have realistic expectations and sound reasons for deciding to undergo the cosmetic laser surgical procedures. The study findings showed that the Pigmentary disorders melasma 14 (11.7%), Facial melanosis 12(10%), scar treatment 8 (6.7%). While only 10 (8.3%) underwent laser hair removal. Only few 3(2.5%) preferred lasers for tattoo removal.

The complications associated with Laser therapies could be immediate or, it might take some time to occur, which depends on various factors. It was observed in the present study that about 16 (13.3%) patients reported complications following laser procedures for various skin conditions. It was found that the most common presenting minor complications following laser therapy was hyperpigmentation 10 (8.3%) followed by swelling 8 (50%) and erythema 6 (37.5%). But these minor complications although frequent, are usually of minimal consequence. Hyper-pigmentation (darkening) or erythema (redness) over the treatment area is common in colored skin and causes anxiety to patients. However these are temporary effects. Most serious complications reported in the study were delayed hypopigmentation 3 (18.8%) and prolonged healing 2 (12.5%) and persistent erythema 2 (12.5%). In a study done by Juhee Park et al found that there were no significant adverse effects, such as hypopigmentation, crusting, infection, long-standing erythema, scarring, or blistering. However, some patients complained of a stinging sensation during the laser treatment, and of transient erythema after treatment. One patient complained of hyperpigmentation on the KP lesions after treatment. With time, however, hyper pigmented lesions improved without any procedures.[16]In another study conducted by Jeffrey. S. Dover et al reported that long term complications were also assessed. Six patients (25%) had some pigment irregularity while 4 (17%) felt that their skin was more sensitive to topical preparations than before the procedure. Two patients (8%) felt that their skin was more easily traumatized than before LSR. One (4%) had persistent hypopigmentation. No patients (8%) reported ectropion, scarring or infection. Two patients (8%) felt that their skin tone and appearance had continued to improve between 1 and 2 year after Laser Skin Resurfacing, [17]A study conducted by R Steven Nisticò, found regarding relevant side effects, such as blisters, crusts, atrophy, and scars, were absent in all conditions; many patients showed typical FPDL-induced side effects like swelling and purpura, which disappeared three to ten days after treatment. Five patients reported long-lasting purpura (30 days). No patient reported infection, hypertrophic scarring or ectropion side-effect in the present study. It has been observed in the present study that around 104 (86.7%) of patients have undergone counselling before laser therapy.

Detailed counselling with respect to the treatment, desire effects, possible postoperative complication should be discussed in detail with the patient. In dark skinned patients as seen in south India, pigmentation is a possible complication, which may last for several weeks should be emphasized in the counselling sessions. In addition Brochures are provided to patients to study and seek relevant information. Proper postoperative care is important to avoid complications. Most of the complications can be prevented by the health care provider, while others can be treated with minimal medications. In the current study about48 (40 %) of patients practicing application of certain medications as the aftercare of the procedure. Alongside managing these complications, pre-treatment and post-treatment care must be precisely followed for effective results. The management therapy includes the use of corticosteroids, topical analgesics, selective antiviral agents, emollients, moisturizing creams, and lotions as the aftercare of the procedure and some other agents depending on the type of complication observed in a patient. Hence, there is a broad scope for laser hair removal advancements to avoid complications and achieve the best

ISSN:0975-3583,0976-2833 VOL14,ISSUE05,2023

results. Further on enquiring about other pre-treatment practices are about 68(56.7%) avoided skin tanning. While only 12(10%) were followed abstinence from smoking. Patients should be discouraged from smoking before and after surgery to reduce the risk of delayed wound healing. Almost 116 (96.7%) all patients followed the use of goggles to prevent eye injury during the laser therapy. Patient should understand that there is a post-operative healing phase with erythema, and crusting that lasts for 1-2 weeks. Precautions should be taken to reduce side effects of laser therapy. In the present study it was observed that, after laser therapy application, most 64 (53.3%) of the patients have received local infiltrative/topical anesthesia once or repeated times to reduce pain, followed by application of ice pack 28 (23.3%) and petroleum jelly 18 (15%) and avoided picking any scabs 42(35%). Other precautionary measures are to avoid exposure to mid-day sun by use of protective clothing 34(28.3%) followed by application of sunscreen lotion 24 (20%). A study conducted by R Steven Nisticò on Nonconventional Use of Flash-Lamp Pulsed-Dye Laser for certain skin disorders found that most of the lesions were treated without anesthesia. Its use has been limited as the procedure itself was not so painful and also because local anesthesia could cause oedema and hinder the "visual feedback processing" during treatment. An effective cooling device was always used during each laser session for improving comfort. Patients were instructed to avoid sun and cosmetics during the immediate post procedural periods and to apply cool gauzes, emollient creams, and sunscreens until complete recovery. Daily application of cool wraps was useful to prevent the appearance of vesicles and blisters. An antibiotic ointment, gentamicin 0.1%, was also requested to be applied to the target areas for 7 days after each laser session for avoiding potential cutaneous super infections.[18]

Adverse effects of laser therapy include hyperpigmentation or hypopigmentation, more often present in dark- skinned patients. Due to possibility of developing post inflammatory hyperpigmentation when a higher epidermal melanin content is present, it is strongly recommended to avoid treating tanned patients or pre-treat with bleaching agents acting on pre- melanin synthesis (tretinoin), melanin synthesis (hydroquinone, arbutin, vitamin C), or post- melanin synthesis (alpha hydroxyl acid).[8]About the problems associated with use of lasers are ocular (corneal burns, keratoconjunctivitis, and cataracts) or cutaneous (hyperpigmentation, achromia, atrophic or hypertrophic scars, scabs, epidermal bubbles, herpes, psoriasis, or eczema). The main precautions to take are wearing glasses and gloves, a laser room that meets safety standards, avoiding sun exposition, isotretinoin, and beta-carotene, avoiding in pregnant women, cleaning the skin thoroughly before session, and applying a healing cream and sun protection after it.[19]In the present study, the patients were not practicing pretreatment precautions32 (26.7%) and post –operative precautions 42 (35%) due their negligence and forgetful nature followed by unavoidable circumstances. A few reported due to less exposure. Hence there is an urgent need for early detection of complication and rapid institution of appropriate therapy is extremely important. Delay in treatment can have serious deleterious consequences including permanent scarring and dyspigmentation. Avoidance of undue sun exposure and use of broad-spectrum sunscreen is mandatory.

Conclusions

The present study demonstrates that the average knowledge among patients, yet differences on knowledge of certain aspects of laser applications exist. Dermatologists, internet and television were important source of information about lasers. About 13.3% of patient experienced side- effects following laser therapy. Within the limitations of the study, it is evident that knowledge of lasers and treatments and pre& post- operative precautions were not practiced by majority of the patients. Hence patients need to be counselled properly about these aspects of laser therapy as in all aesthetic treatment, proper counselling and case selection are important. As patients are unaware about the advantages of laser treatments and its benefits, it's important to conduct more awareness programmes to the general public about the applications and benefits of lasers in dermatological conditions. This study conclude that the dermatological practitioners should educate about the advantages of laser treatments to every patient and reduce the fear towards laser treatment.

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