

The qualification and training of laser/intense pulse light hair removal operators within South Africa

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Abstract

Background: Lasers and intense pulse light (IPL) sources are powerful devices that can cause skin burns, pigmentary changes, and scarring if used incorrectly. Adequate training is essential, and regulations are required to limit complications.

Aims: The purpose was to investigate the qualifications and training obtained by laser hair removal operators in South Africa.

Methods: Questionnaires were distributed and information gathered from owners/managers of laser clinics, suppliers of laser devices in South Africa, individuals in the workplace performing laser hair removal procedures, and accredited tertiary institutions.

Results: A majority of clinic owners/managers (94.45%) felt that more emphasis should be placed on laser hair removal training at a tertiary level, and 66.67% out-source additional training provided by the manufacturer of laser devices. Based on the survey to manufacturers, 50% did not require any formal qualification as a minimum requirement, while 33.33% indicated laser hair removal training is incorporated at a NQF level 4 (National/Senior Certificate). The majority of individuals (68.89%) received training from tertiary institutions; however, they did not receive any practical training, and 60.87% felt the amount of training was insufficient. According to the survey sent to tertiary institutions in South Africa, only 27.78% offer laser hair removal training, and of these, 20% offer no practical training and 50% indicated that no practical examination is provided.

Conclusions: There is a clear lack of training in laser hair removal in South Africa. The industry should have standard requirements in terms of minimum practical and theoretical hours with regards to the therapy.

KEYWORDS

intense pulse light, laser complications, laser hair removal, training

1 | INTRODUCTION

For many years, temporary methods such as tweezing, waxing, chemical depilatories, threading, and shaving have been used to remove unwanted body hairs. The development and invention of

various light-based devices have made it possible for unwanted hairs to be permanently removed. Light-based hair removal technologies are grounded on high-intensity, coherent, monochromatic, collimated lasers or high-intensity, incoherent, polychromatic and noncollimated-pulsed light (intense pulsed light, IPL). Light energy is absorbed by specific targets called chromophores in the skin such as

melanin, water, hemoglobin, collagen, and tattoo ink. In the case of laser hair removal or IPL, the chromophore is hair melanin. Emitted light is absorbed by the hair shaft, whereby light energy is converted into intense heat energy that destroys the hair follicle and its bulb, preventing a new hair from forming.¹

The theory of selectively targeting chromophores is referred to as selective photothermolysis. The chromophore is selected, while sparing the surrounding tissue from damage.¹ Tissue exposure to the laser should be short enough to damage the target without heat spreading to the surrounding tissues, a process known as the thermal relaxation time (TRT). If the pulse duration (or pulse width, which is the exposure time of the selected energy delivered to the target) is longer than the TRT, heat will dissipate from the chromophore, thus injuring the surrounding tissue.² The epidermal layer of the skin contains melanin which absorbs the same wavelengths used for hair removal. In darker-skinned individuals, the greater epidermal melanin content competes with the hair follicle for light absorption, increasing the risk of thermal blisters and hyperpigmentation.³ For the purposes of this paper, the term "laser hair removal treatments" is used to describe hair removal that makes use of both laser and IPL devices.

There are various light-based treatment devices on the market, namely ruby lasers, alexandrite lasers, diode lasers, neodymium-doped yttrium aluminum garnet (Nd:YAG) lasers, and IPL.⁴ Lasers are classified from Class 1 through to Class 4, according to the potential harm that the laser beam can inflict. Class 4 lasers are usually used for medical and therapeutic treatments such as laser hair removal. Class 4 lasers must be used with extreme caution and care, and this is why adequate training and protocols are necessary. Proper patient selection, informed consent, preoperative preparation, laser and light source selection, and understanding of the principles of laser/IPL safety are the keys to the success of laser hair removal treatments. An understanding of the hair anatomy, physiology and growth, together with a comprehensive knowledge of laser-tissue interaction within the context of choosing optimal laser settings for effective laser hair reduction should also be acquired before using lasers for hair removal.⁵

The Radiation Health Committee (RHC) Working Group surveyed registered health practitioners and nonmedical practitioners in Australia, collecting data on accidents/incidents caused by the use of lasers and IPL devices from 15 November 2012 to 13 December 2012 (The 2012 Survey).⁶ Medical practitioners indicated that over a 12-month period, 62 cases of delayed or missed diagnosis of skin cancer occurred because a pigmented lesion was incorrectly treated with an IPL or laser device. Of the 62 cases, there were 22 cases where diagnosis of a melanoma was delayed or missed. The responses also revealed 416 injuries, of which 268 were severe and included permanent pigmentary changes, burns, blistering, and scarring, and more than half of these were related to improper training. There was also one case of eye injury.⁵ Suitable training and a registered qualification are fundamental in understanding the effects and risks of IPL and lasers on various skin types, as well as the condition being treated to ensure proper

treatment management. According to Jalian *et al*, there were 174 reported cases related to injury caused by cutaneous laser procedures from 1985 to 2012 in the United States.⁶ There was a peak occurrence in 2010, with laser hair removal being the most common litigated procedure. Laser hair removal resulting in litigation was at 36.2%, followed by rejuvenation laser treatments (24.7%) and vascular laser treatments (8%).⁷

The use of high powered laser and light devices is risky and can lead to serious complications. Therefore, sufficient regulations are required to limit complications. In the United Kingdom (UK), healthcare professionals using lasers and intense light sources (which include IPL and light-emitting diodes, LED) in facilities providing treatment of "disease, disorder or injury" are required to register with the Care Quality Commission (CQC). Facilities in England providing only nonsurgical cosmetic interventions, healthcare professionals, and nonhealthcare professional operators are now generally exempt from this. Having said that, certain areas in England namely, London boroughs, Nottingham and some Essex boroughs, a licensing scheme exists for establishments that provide laser and 8 intense light source (ILS) treatments.⁸ The Care Standards Act 2000 includes standards for various providers and includes the "Prescribed Techniques and Prescribed Technologies" ("P" standard) for laser and ILS treatments. Although The Care Standards Act 2000, enacted in 2002, was repealed in England by regulations which came into force in October 2010, the provisions of the "P" standards still apply in Northern Ireland and Wales and are enforced by the Regulation and Quality Improvement Authority (RQIA) and by the Health Inspectorate Wales (HIW).^{9,10} The Healthcare Improvement Scotland (HIS) formally registers independent clinics in Scotland where services are provided by medical practitioners', registered nurses, midwives, and dental care professionals. HIS does not regulate nonmedical professionals.¹¹

In the United States of America (USA), Arizona was the first state that required mandatory training hours to legally perform light-based treatments for hair removal. An esthetician or a cosmetologist who wishes to perform cosmetic laser procedures and procedures using IPL devices needs to complete 40 hours didactic training, as well as 24 hours of practical training under direct supervision of a health professional or a laser technician who has a minimum of 100 hours of practical experience per procedure. Confirmation of completion of the training must be given by the health professional or laser technician.¹² In Texas, in order to receive a Laser Technician certificate, applicants must have at least 24 hours of training in safety, laser physics, skin typing, skin reactions, treatment protocols, burns, eye protection, emergencies, and post-treatment protocols as well as at least 100 laser hair removal practical procedures under the direct supervision of a senior laser hair removal technician or a certified laser hair removal professional.¹³ In the state of Florida, applicants are required to complete a 320-hour combined epilator, laser- and light-based training course, and pass the International Board of Electrologist Certification (IBEC) electrology, laser and IPL examination. Direct

supervision is required and is the responsibility of a physician properly trained in laser hair removal.¹⁴

In Australia, Tasmania, Queensland, and Western Australia, Class 3B and Class 4 laser operators are regulated.⁶ The remaining states have not yet established a regulatory framework for the operation and use of IPL and laser devices. In Queensland, nonmedical professionals are required to be licensed in order to use a laser device, but not in the case of IPL devices. In Tasmania, a licence is required by nonmedical professionals to operate both laser and IPL devices. Operators must also be under direct supervision of a registered medical practitioner. In Western Australia, users of both laser and IPL devices need to be licenced, and the use of laser devices must be operated under direct supervision.⁶

In South Africa, one of the concerns regarding laser hair removal is who can perform these procedures and what training and qualifications are required to enable individuals to perform them. Currently, there is no legislation regarding the supply and purchase of laser devices, which means anyone with a sufficient amount of money can purchase a laser device, even with poor or no formal qualification. Most suppliers offer nonaccredited or informal training of 2-4 days. If accredited training was offered by the suppliers, the duration of the training should be at least 100 hours (practical and theory) according to the South African Association of Health and Skincare Professionals (SAAHSP).¹⁵ The lack of any form of regulation and qualification regarding cosmetic laser and IPL treatments, including hair removal, is problematic. The increased growth in the health and skincare industry offering laser hair removal, without any educational requirements, poses a serious risk to the public. In addition to this, these types of treatments are offered not just at "medical spas" or laser clinics, but also at day salons, hotels, resorts, and even people's residences.

2 | MATERIALS AND METHODS

2.1 | Research design

The purpose of the study was to investigate the qualification and training of laser hair removal operators within South Africa. The University of Johannesburg, Faculty of Health Sciences Research Ethics Committee (clearance number REC-01-138-2016), approved this study. Data collection occurred during July 2017 to November 2017.

2.2 | Population and sampling

Four separate electronic survey questionnaires were distributed. In total, 196 electronic questionnaires were distributed. Questionnaires were distributed to clinic owners/managers in South Africa that offer laser/IPL hair removal therapy to acquire information on the impact of existing training obtained by operators ($n = 60$). The second questionnaire was aimed at manufacturers that supply

laser/IPL hair removal devices in South Africa to acquire information on the theoretical and practical training hours offered, as well as the content allocated to perform laser/IPL hair removal therapy ($n = 12$). The third questionnaire was aimed at individuals currently in the workplace practising laser/IPL hair removal to acquire information about their qualification and the type of training received ($n = 83$). Lastly, the fourth questionnaire was aimed specifically at accredited tertiary institutions within South Africa, to acquire information about the theoretical and practical training hours in laser/IPL hair removal, as well as the allocated content and their opinion on the current regulations surrounding laser/IPL hair removal therapy in South Africa ($n = 41$).

2.3 | Inclusion criteria

The sampling inclusion criteria were accredited tertiary institutions that provide laser/IPL hair removal training listed on the Comité International d'Esthétique et de Cosmétologie (CIDESCO) and SAAHSP website. Clinics that offer laser/IPL hair removal services listed on the open source websites of South Africa Business Directory, Business South Africa, and the Directory of South Africa Cosmetics and Skin Care. Companies that supply laser/IPL devices in South Africa were obtained from the laser hair removal forum website. For hair removal operators, there were no exclusions based on qualification/s and employment period. This population comprised of individuals/therapists operating laser/IPL hair removal devices of any gender, age, and ethnicity, who at the time of the conduction of the study were working as laser/IPL hair therapists/operators within South Africa.

2.4 | Study procedure

The surveys used in this study were created and administrated using an online platform, Survey Monkey. The survey questionnaire comprised mainly of closed-ended questions designed to gather information regarding qualifications, laser/IPL hair removal training, and opinions of current legislation and regulation of laser/IPL hair removal operators.

2.5 | Data analysis and interpretation

Data were analyzed using descriptive techniques using visual representations of data, data reduction and by cross tabulating the variables.

2.6 | Ethical considerations

Participation was anonymous as results were sent without any respondent identifying information. Participation in the study was on a

voluntary basis, and participants were informed that they were free to withdraw from the study before submitting the survey without concern of retribution. Participants were unable to withdraw their consent after submitting the questionnaire as their results could not be identified nor linked to any one individual. Participants gave their consent to participate in the study by ticking a checkbox, and completing and submitting the survey through Survey Monkey.

3 | RESULTS

3.1 | Owners/Managers of hair removal clinics

A total number of 60 electronic questionnaires were sent to owners/managers of hair removal clinics in South Africa ($n = 60$), of which 39 (65%) responses were received. Of the 39 responses, there were 36 (92.30%) completed questionnaires and three (7.69%) partially completed questionnaires. Table 1 summarizes the main outcomes of the survey.

Respondents were asked whether qualified therapists from tertiary institutions were adequately trained to perform laser/IPL hair removal therapy, to which 66.66% agreed and 33.34% disagreed. In contradiction, 94.45% of respondents felt that more emphasis should be placed on training at tertiary educational institutions. The bulk of clinic owners/managers (86.11%) indicated additional training had to be provided and that the majority of this training was

provided for by suppliers/manufacturers (66.67%) of the devices in South Africa, clinic owners (36.11%), and senior therapists (36.11%), all of which are informal and noncredited training. However, 8.33% indicated no additional training was needed. Respondents were allowed to have more than one answer to the above question, as individuals may receive training through multiple avenues. When asked about the duration of additional training provided before operators were deemed competent, 50% of respondents indicated training was 7 days and less, while 19.44% indicated 1-4 weeks, and 22.22% more than a month. However, 8.33% felt that operators were adequately trained.

3.2 | Suppliers of devices in South Africa

Twelve electronic questionnaires were sent to suppliers of laser/IPL hair removal devices in South Africa ($n = 12$). Of the 12 survey responses, there were eight (66.66%) completed questionnaires, and four (33.33%) partially completed questionnaires. Table 2 summarizes the main outcomes of the device suppliers' survey.

When questioned on practical training provided on hair removal, 44.44% of respondents indicated that 1-10 hours was spent, while 33.33% spent 16-20 hours, and 22.22% spent more than 26 hours. Respondents also indicated that case studies were included in their training, which allows for in-depth, multi-faceted explorations of complex issues in real-life settings. The number of case studies ranged from 1 to 5 (22.22%), 6 to 10 (55.56%), and 16 to 20 (22.22%). A wide range of devices were used during practical training and included, IPL (90%); diode lasers (80%); Nd:YAG lasers (80%); alexandrite lasers (40%); pulse dye lasers (30%); and ruby lasers (10%). Respondents were allowed to have more than one answer if they used multiple devices in their training. During practical training, 90% of suppliers included the face as their focus area, and 100% indicated they included the body. Suppliers were questioned on practical examination pass rates, and 12.50% of respondents indicated an examination pass mark of 75%, while 62.50% indicated their pass mark was 80% and above. A quarter (25%) of suppliers indicated there was no practical examination in order to establish the level of competency.

When questioned on theoretical training provided, all suppliers (100%) indicated they delivered 1-10 hours of theoretical training. Suppliers were asked which theoretical content was covered in this training, and all respondents (100%) covered the following: laser physics; mechanism of action; laser/IPL safety; skin biology; light therapy in practice; parameters that affect results; side effects and risks; and contraindications. Radiation-tissue interaction, hair biology, and legal issues were covered by 87.50% of respondents, and 75% covered the theoretical content of comparing laser/IPL hair removal with other removal techniques. When suppliers were asked whether they offered an examination related to the learnt theory and the corresponding pass marks, 25% revealed a pass mark of 75%; 62.50% indicated a pass mark of 80% and above; and 12.50% indicated that they provided no theoretical examination.

TABLE 1 Owners/manager survey results

Questions surveyed	Clinic owners/managers response (%)
"Laser hair removal operators from tertiary institutions who have worked for your clinic are adequately trained to perform laser hair removal therapy"	33.33% strongly agreed 33.33% agreed 27.78% disagreed 5.56% strongly disagreed
"There should be more emphasis on laser hair removal training by tertiary education facilities"	66.67% strongly agreed 27.78% agreed 5.56% disagreed
"Does the clinic provide additional training?"	86.11% indicated yes 13.89% indicated no
"Who performs the additional laser hair removal training?" (More than one answer was allowed)	36.11% senior therapists 36.11% clinic owners 66.67% laser manufacturers 8.33% no additional training was needed
"What is the duration of additional training?"	8.33% indicated 1-24 h 25% indicated 1-3 d 16.67% indicated 4-7 d 19.44% indicated 1-4 wk 22.22% indicated more than a month 8.33% indicated no additional training was needed

TABLE 2 Laser/IPL hair removal device suppliers survey results

Questions surveyed	Device suppliers' response (%)
"What is the duration of practical training in laser hair removal?"	22.22% indicated 1-5 h 22.22% indicated 6-10 h 33.33% indicated more 16-20 h 22.22% indicated more than 26 h
"Number of case studies included in practical training"	22.22% indicated 1-5 cases 55.56% indicated 6-10 cases 22.22% indicated 16-20 cases
"Types of laser hair removal devices used practically in laser hair removal training provided"	90% indicated IPL 80% indicated diode lasers 80% indicated Nd:YAG lasers 40% indicated alexandrite lasers 30% indicated pulse dye lasers 10% indicated ruby lasers
"Focus area of the volunteers included in practical training"	90% indicated the face 100% indicated the body
"What is the duration of theoretical training in laser hair removal?"	22.22% indicated 1-5 h 77.78% indicated 6-10 h
"Theoretical content covered in laser hair removal training"	100% indicated contraindications 100% indicated side effects and risks 100% indicated laser parameters that affect results 87.5% indicated legal issues 87.5% indicated hair biology 100% indicated light therapy in practice 100% indicated skin biology 100% indicated laser safety 87.5% indicated radiation-tissue interaction 75% indicated comparisons with other removal techniques 100% indicated mechanism of action 100% indicated laser physics
"What is the theoretical examination pass mark included in the laser hair removal training?"	25% indicated a pass mark of 75% 62.50% indicated a pass mark of 80% and above 12.50% indicated no theoretical examination was provided
"What is the practical examination pass mark included in the laser hair removal training?"	12.50% indicated a pass mark of 75% 62.50% indicated a pass mark of 80% and above 25% indicated no practical examination was provided
"At what National Qualification Framework (NQF) level incorporates laser hair removal training?"	33.33% indicated NQF 4 level 16.67% indicated NQF level 10 50% indicated none

Respondents were asked which National Qualification Framework (NQF) level incorporated laser/IPL hair removal training. NQF is the set of guidelines and principles which enables national recognition of acquired skills and knowledge, thereby ensuring an integrated system that encourages life-long learning.¹⁴ According to the feedback received, 50% of respondents do not require

individuals to have any prior NQF level to undergo laser/IPL hair removal training; while 33.33% of respondents incorporate it at a NQF level 4 (National/Senior Certificate), and 16.67% incorporated it at NQF level 10 (Doctoral degree).

3.3 | Hair removal operators

A total number of 83 electronic questionnaires were sent to hair removal operators (n = 83), of which 51 (61.45%) replies were received. There were 49 (96.07%) complete questionnaires, and two (3.92%) partially completed questionnaires. Table 3 summarizes the main outcomes of the operator survey.

Respondents were asked to indicate their highest qualification and the institution where the qualification was obtained. The results showed that 4.08% of respondent's highest qualification was a High School Senior Certificate (NQF level 4); 18.37% indicated a 2-year Certificate in Skin Care Therapy (NQF level 5); 42.86%, indicated a 3-year college level Diploma in Skin Care Therapy (NQF level 5 or 6); 24.49% indicated a 3-year university Diploma in Skin Care Therapy (NQF level 6); and 10.20% obtained a fourth-year university Bachelor Degree in Skin Care Therapy (NQF level 7). These qualifications were obtained through private institutions (84.42%), Universities of Technologies (20%) and Technical Colleges (2.22%). Respondents were allowed to have more than one answer if they obtained a qualification through multiple institutions.

Hair removal operators were questioned from whom they received laser/IPL hair removal training from. It was found that a lecturer at the institution they qualified from trained 68.89% of respondents. This training could either be theoretical and/or practical training. There were 24.44% of respondents who received their training from manufacturers, while 33.33% indicated that they received training by the clinic owners or from a senior therapist. Respondents were allowed to have more than one answer if they received training through multiple sources. When asked how much theoretical training was received, 4.26% indicated they received no such training, while a minority of respondents indicated that their theoretical training was more than 30 minutes but less than an hour (2.13%). Some respondents received 1-10 hours theoretical training (55.32%), 21.28% received 11-20 hours, and 17.03% received more than 20 hours. When questioned on practical training, it was found that 36.17% did not receive any practical laser/IPL hair removal training by the institution they qualified from, whereas 17.02% indicated they received more than 26 hours. Just <47% of respondents (46.81%) indicated that they had received 25 hours and less.

Respondents were asked to indicate their number of years' experience performing laser/IPL hair removal therapy. The results indicated that 32.65% had <1 years' experience; 14.29% had 1-3 years' experience; 6.12% had 4-6 years' experience; 2.04% had 7-10 years' experience; 2.04% had more than 11 years' experience; and an alarming 42.86%, had no experience in performing laser/IPL hair therapy. When asked to respond to the statement, "The amount of training

TABLE 3 Laser/IPL hair removal operators' survey results

Questions surveyed	Laser hair removal operator response (%)
"What is your highest qualification?"	4.08% indicated a high school diploma 18.37% indicated 2-y college level diploma in skin care therapy 42.86% indicated 3-y college level diploma in skin care therapy 24.49% indicated three university diploma in skin care therapy 10.20% indicated 4-y university bachelor degree in skin care therapy
"Where did you obtain your qualification? (More than one answer was allowed)"	84.42% indicated from a Private institution 20% indicated from a University of Technology 2.22% indicated from a Technical College
"Where did you aquire your laser hair removal training from? (More than one answer was allowed)"	13.33% indicated from a senior therapist 20% indicated from the clinic owner 24.44% indicated from a laser manufacturer 68.89% indicated from lecturers at tertiary institutions
"What is the duration of practical training in laser hair removal by tertiary institutions?"	8.51 indicated <30 min 6.38% indicated more than 30 min less than hour 14.89 indicated 1-5 h 4.26% indicated 6-10 h 8.51% indicated 11-15 h 2.13% indicated 16-20 h 2.13% indicated 21-25 h 17.02% indicated more than 26 h 36.17% indicated no practical training was provided
"What is the duration of theoretical training in laser hair removal?"	2.13% indicated more than 30 min but <1 h 34.04% indicated 1-5 h 21.28% indicated more than 6-10 h 12.77% indicated 11-15 h 8.51% indicated 16-20 h 4.26% indicated 21-25 h 12.77% indicated more than 26 h 4.26% indicated no theory training was provided
"Types of laser devices used in practical training received"	12.24% indicated ruby lasers 14.29% indicated alexandrite lasers 22.45% indicated diode lasers 24.49% indicated Nd:YAG lasers 8.16% indicated pulsed dye lasers 51.02% indicated IPL 42.86% indicated no training
"How many years' experience do you have performing laser hair removal?"	32.65% indicated <1 y 14.29% indicated 1-3 y 6.12% indicated 4-6 y 2.04% indicated 7-10 y 2.04% indicated more than 11 y 42.86% indicated not having any experience in laser hair removal therapy
"The amount of training on laser hair removal from your tertiary institution was sufficient"	10.87% indicated they strongly agree 28.26% indicated they agree 32.61% indicated they disagree 28.26% indicated they strong disagree

on laser hair removal from your tertiary institution was sufficient," the results showed that 60.87% disagreed and strongly disagreed with the above statement, whereas 28.26% agreed and 10.87% strongly agreed to the above statement.

3.4 | Tertiary institutions

A total number of 41 electronic questionnaires were sent to accredited tertiary institutions that offer laser/IPL hair removal training in South Africa, of which 22 (53%) responses were received. Of these, there were 19 (86.36%) complete questionnaires and three (13.63%) partially completed questionnaires. Table 4 summarizes the main outcomes of the tertiary institution survey.

Institutions were asked whether they offered laser/IPL hair removal training. According to the results, a staggering 72.22% of the institutions indicated they do not offer such training. Of the 27.78% of tertiary institutions that offered laser/IPL hair removal training, 16.67% offered theoretical training of more than 30 minutes but <1 hour, 33.33% offered 6-10 hours theoretical training, and 50% offered 11-15 hours. The percentage distribution of the theoretical content provided by tertiary institutions was given. All of the respondents (100%) covered the following theoretical training: laser physics; mechanism of action; radiation-tissue interaction; safety; skin biology; light therapy in practice; hair biology; parameters that affect results; side effects and risks; and contraindications. Whereas 83.33% responded that comparisons with other removal techniques were included, and 66.67% of the respondents included legal issues in their theoretical training. Respondents were requested to reveal the pass mark for the theoretical training that was provided; 83.33% indicated a theoretical examination pass mark of 50%, while 16.67% indicated their pass mark at 70%.

With regards to practical training, the results showed that the duration allocated for practical training was as follows: 20% <30 minutes; 40% 1-10 hours; and 20% provided more than 26 hours. Twenty percent of these tertiary institutions provided no practical training on laser/IPL hair removal for the students. Practical examinations were included in some of the respondents' training. A pass mark of 50% was indicated by 33.33% of respondents, and a pass mark of 70% was indicated by 16.67%. Half (50%) of the respondents revealed there was no practical examination required to establish the level of competency.

Respondents were asked which NQF level incorporates their laser/IPL hair removal training. According to the feedback received, the majority (66.67%) of respondents incorporated laser/IPL hair removal at a NQF level 6 whereas, 16.67% of the respondents incorporated it at a NQF level 5, and 16.67% incorporated it at a NQF level 7. Respondents were asked whether they thought that the industry should have standard requirements in terms of minimum practical and theoretical hours with regards to laser/IPL hair removal therapy. All the respondents in this sample (100%) strongly agreed to the above statement. Respondents were further asked whether they

TABLE 4 Tertiary institutions survey results

Questions surveyed	Tertiary institution response (%)
"Does the institution offer laser hair removal training?"	27.78% indicated "yes" 72.22 indicated "no"
"What is the duration of theoretical training in laser hair removal?"	16.67% indicated more than 30 min but less than an hour 33.33% indicated 6-10 h 50% indicated 11-15 h
"Theoretical content covered in laser hair removal training"	100% indicated contraindications 100% indicated side effects and risks 100% indicated laser parameters that affect results 66.67% indicated legal issues 100% indicated hair biology 100% indicated light therapy in practice 100% indicated skin biology 100% indicated laser safety 100% indicated radiation-tissue interaction 83.33% comparisons with other removal techniques 100% indicated mechanism of action 100% indicated laser physics
"What is the theoretical examination pass mark included in the laser hair removal training?"	83.33% indicated a pass mark at 50% 16.67% indicated a pass mark of 70%
"What is the duration of practical training in laser hair removal?"	20% indicated <30 min 20% indicated 1-5 h 20% indicated 6-10 h 20% indicated more than 26 h 20% indicated no practical training was provided
"Type of laser hair removal devices used practically in laser hair removal training"	16.67% indicated alexandrite lasers 50% indicated diode lasers 16.67% indicated Nd:YAG lasers 33.33% indicated IPL 33.33% indicated no training
"The number of case studies included in the practical training"	50% indicated 1-5 cases 16.67% indicated 6-10 cases 33.33% indicated no practical training is provided
"Focus area/s included in practical training"	50% indicated the face 66.67% indicated the body 33.33% indicated no practical training is provided
"What is the practical examination pass mark included in the laser hair removal training?"	33.33% indicated a pass mark of 50% 16.67% indicated a pass mark of 70% 50% indicated no practical examination was provided
"At what National Qualification Framework (NQF) level incorporates laser hair removal training?"	16.67% indicated at a NQF 5 level 66.67% indicated at a NQF 6 level 16.67% indicated at a NQF 7 level
"The industry should have standard requirements in terms of minimum practical and theoretical hours with regards to laser hair removal therapy"	100% indicated they strongly agree
"The regulation of laser hair removal services by an established Regulatory Board would help to create unified standards that applies to all laser hair removal operators"	83.33% indicated they strongly agree 16.67% indicated they neither agree, nor disagree

thought that the regulation of laser/IPL hair removal services by an established Regulatory Board would help to create unified standards that apply to all laser/IPL hair removal operators. The majority of respondents (83.33%) strongly agreed, while 16.67% neither agreed nor disagreed to the above statement.

4 | DISCUSSION

Based on the information received, it is quite evident there appears to be a lack of training in industry before individuals enter

the workplace. The lack of training covers both theoretical as well as practical components needed to make use of these high-end devices. Currently, there are no industry standards with regards to laser practise in South Africa, and it is clear that institutions surveyed felt industry should have standards in terms of minimum practical and training requirements for laser hair removal therapy. As stated by SAAHSP, accredited training of laser hair removal should be at least 100 hours.¹⁵ The survey results of the tertiary institutions indicated that a majority have <11 hours in practical training and 100% having <16 hours in theoretical training; well below the recommendation by SAAHSP.

According to international standards, Arizona requires 40 hours of didactic training as well as 24 hours of hands-on use of lasers or IPL devices, Texas requires 24 hours in training and 100 practical procedures in laser hair removal, and Florida requires 320 hours training in epilator, laser- and light-based treatments.¹²⁻¹⁴ For the other countries and states where mandatory hours are not a prerequisite, there are at least regulatory boards governing the use of laser hair removal devices namely the Radiation Protection Unit, Department of Health and Human Services which is the regulatory body in Tasmania, the Radiological Council, Department of Health which is the regulatory body in Western Australia and the Radiation Health, Health Protection Unit, Queensland Health which is the regulatory board in Queensland, Australia.¹⁶⁻¹⁸ In South Africa, no statutory regulatory board exists for laser/IPL hair removal procedures. The need for regulation within South Africa was indicated in this study, and 83.33% of tertiary institutions surveyed strongly agreed that regulation of laser/IPL hair removal services by an established regulatory board would help to create unified standards.

In addition to mandatory hours and regulatory boards, most international standards require direct supervision of laser/IPL hair removal operators; but in South Africa, it is not a mandatory requirement. With this being said, if a physician was to supervise a task that a laser/IPL operator performs, it can be implied that the physician too should be capable of performing such tasks and have obtained the necessary training. Direct supervision would ensure that health and safety procedures are adhered to, correct protocols are followed, allow for the evaluation of technical skills of the delegate performing the laser/IPL hair removal procedure, as well as protecting the best interest and welfare of the clients.¹⁹ Direct supervision would be beneficial to those individuals that have no experience in laser/IPL hair removal therapy.

Based on the feedback given by laser/IPL hair removal operators in South Africa, results showed that 42.86% of such individuals currently in the workplace have no prior experience in laser hair removal, with 4% having no formal tertiary education training/ qualification in laser/IPL hair removal. This may indicate that laser clinics are employing unskilled, untrained, and unqualified individuals to perform procedures such as laser/IPL hair removal. Allowing inexperienced operators to perform these procedures could result in injury to clients, thus leading to traumatic experiences for both parties involved. According to the American Board of Laser Surgery (2016), the vast majority of clients are unaware of the potential risks and

complications associated with laser- and light-based procedures.²⁰ There is an imminent need for a higher awareness in the medical community and the public in general regarding complications pertaining to the improper training and use of these devices.²⁰

Of the 51 hair removal operators surveyed in this study, 34.04% received only 1-5 hours of theoretical training. More concerning is the fact that a majority of these operators indicated no practical training was provided by their tertiary institution, and if practical training was provided, half of the institutions surveyed indicated they do not provide a practical examination; therefore, no level of competency is measured before these individuals enter the industry. This could increase the risk of damaging the profession. If tertiary institutions are providing insufficient practical and theoretical training, then informal training may be the only option. There are always risks of complication when performing laser/IPL hair removal; however, these risks are magnified when individuals are insufficiently trained and are required to perform these treatments which may lead to possible litigation.

Even though two-thirds of the clinic owners/managers surveyed felt that the hair removal operators who worked at their clinic were adequately trained, an overwhelming majority (94.45%) felt that more emphasis should be placed on laser/IPL hair removal training at a tertiary level. Based on the findings, clinic owners/managers are seeking additional training from various training sources, one specifically being from suppliers of laser/IPL hair removal devices (66.67%) in South Africa. These types of training are informal, and there is no standard to measure the level of competency. In some cases, it is the primary source of training as the survey results have shown that the majority of the hair removal operators has not received any practical training from their tertiary institution. Unfortunately, it is commonly thought and accepted by some operators performing laser- and light-based procedures that a 4-hour "sale rep" training or a "weekend" course in laser/IPL is all that is necessary to begin treating patients; however, this training is insufficient when delivering efficacious and safe procedures.²⁰

The suppliers of laser/IPL hair removal devices that participated in this study provided theoretical examination (87.50%) as well as practical examination (75%). Although some suppliers expressed a desire to determine the level of knowledge and practical skills gained through the training provided, passing these examinations has no recognition in industry and does not provide any form of formal accreditation. It would be difficult to monitor and achieve consistent training standards, which can become problematic when training is being offered by unregistered and unaccredited training providers.

Information obtained from suppliers of laser/IPL hair removal devices indicated that half (50%) of these suppliers did not require any form of formal qualification as a minimum requirement to be trained on these procedures and devices; therefore, anyone without a specific NQF level can be trained to use these devices. In addition to this, 33.33% indicated laser/IPL hair removal training is incorporated at a NQF level 4 (National/Senior Certificate). According to the South Africa Qualification Authority,²¹ NQF is a comprehensive system approved by the Minister for the classification, registration, publication, and articulation of quality-assured national qualifications.

NQF is the set guidelines and principles by recording the learner's achievement. This enables national recognition of acquired skills and knowledge, thereby ensuring an integrated system that encourages life-long learning.²¹ Understanding the physiological process of laser/IPL treatments, as well as the science and physics behind the practical procedures, requires a higher order of thinking which involves analyzing, evaluating, problem solving, and critical thinking.

The majority of tertiary institutions (66.67%) surveyed incorporates laser/IPL hair removal training at a NQF level 6. Such NQF is also seen when obtaining laser/IPL removal hair training from short courses that are made available in the UK namely, the Confederation of International Beauty Therapy and Cosmetology (CIBTAC) which offers a National Vocation Qualification (NVQ) level 4 (NQF 6) laser and light qualification to laser/IPL operators.²² This qualification is suitable for nurses, doctors, and some other allied healthcare professionals, as well as skincare therapists with an entry requirement as a Beauty NVQ level 3 (NQF 5) or similar.^{21,22} The Vocational Training Charitable Trust (VTCT) offers a level 4 (NQF 6) qualification in laser and IPL treatments. The prerequisite requirement includes a Beauty NVQ Level 3 (NQF 5) or equivalent.²²

The laser/IPL hair removal theoretical training should include the following components²³:

- Laser physics, mechanism of action, and radiation-tissue interactions.
- Comparisons with other removal techniques and characteristics of different types of equipment.
- Laser safety, side effects and risks; contraindications and serious considerations.
- Skin and hair biology.
- Light therapy in practice and cleanliness/infection control in a laser/IPL treatment.
- Legal issues and meaning of associated warning labels.

In addition to this, theoretical training should also include comprehensive administration procedure such as,²³

- record keeping, which involves a treatment register to record each time a laser/IPL is used;
- consent procedure, which provides information to a patient about the treatment being offered and management expectations. All laser hair/IPL operators should be responsible for ensuring that the patient has given valid consent before treatment begins.

Practical training should involve a minimum of 50 hours under direct supervision. Operators should practise on different Fitzpatrick skin types and on various areas of the body. All procedures should be signed off in a logbook, which serves as evidence that practical training has been completed. Once the 50 practical hours have been completed, a formal practical and theoretical examination should be done to measure the level of competence of the candidate. Manufacturers' wanting to add value to their training course can provide their teaching through an accredited tertiary institution, which provides practical

and theoretical examination. This will allow their course to be part of the credit system. Credits may be based on student workload, contact hours, and learning outcomes in higher education systems.²⁴ Upon this, formal examination can be done with the appropriate level of difficulty.

In conclusion, laser/IPL hair removal is fast becoming the leading therapy option for long-term results and the popularity of the treatment is on the rise. Laser/IPL hair removal is not risk-free, and side effects are associated with the treatment. Adequate training is essential to minimize adverse side effects. In many countries such as the USA, Australia, and the UK, this is dealt with by regulating the industry, with severe penalties for noncompliance. However, in South Africa the opposite exists. There is a clear lack of training in laser/IPL hair removal offered by accredited tertiary institutions, placing inexperienced and poorly trained operators into the workforce. There is no minimum qualification placed on individuals receiving laser/IPL hair removal training, and anyone with little or no qualification is allowed to perform laser/IPL hair removal treatments. Having inexperienced and poorly trained laser hair removal operators puts the public at risk of burns, scars, and pigmentary changes, and may taint the industry. There is an unmistakable need for the industry to be regulated, with mandatory training hours and standards to be set out for high at-risk procedures, such as laser/IPL hair removal.

CONFLICT OF INTEREST

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the manuscript.

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