http://doi.org/10.33279/jkcd.v14i04.775

Orginal Article

DENTAL PRACTITIONER'S AWARENESS, KNOWLEDGE, AND ATTITUDES TOWARDS THE USE OF LASER TECHNOLOGY IN ENDODONTIC DISINFECTION: A CROSS SECTIONAL STUDY

Fayyaz Alam[1], Kemia Gul[1], Fawad Ali Shah[2], Brekhna Yousafzai[1], Muhammad Zohaib[1], Faiz Ur Rahman[1]

[1]Department of Operative Dentistry & Endodontics, Saidu College of Dentistry, Saidu Sharif, Swat
[2]Department of Operative Dentistry & Endodontics, Khyber College of Dentistry, Peshawar

ABSTRACT

Objectives: *To determine dental practitioner's awareness, knowledge, and attitudes towards the use of laser technology in endodontic disinfection.*

Materials and Methods: *This descriptive cross-sectional study involved 159 dental practitioners recruited through non-probability convenience sampling. Participants provided written informed consent and completed an online questionnaire covering demographics, awareness, and practical use of laser technology in endodontics. Chi-square tests applied to assess awareness among different experience levels.*

Results: *Among the 159 participants, the mean age was 33.08 ± 8.83years, with a higher proportion of males (n=95, 59.7%). While most respondents recognized the benefits of laser technology in endodontics, practical application was limited, with only 4.4% reporting its use. Significant differences were observed between respondents with 1-4 years and 5-8 years of experience in their familiarity with laser technology and beliefs about its application and outcomes. Barriers to adoption included cost concerns and perceived training accessibility.*

Conclusion: *Although awareness of laser technology in endodontics is common among dental practitioners, its practical use is still limited. Overcoming obstacles like cost and access to training could promote wider adoption and potentially improve treatment outcomes in endodontic practice.*

Key words: *Dental practitioners, Laser, disinfection, endodontics*

Cite as: Alam F, Gul K, Shah FA, Yousafzai B, Zohaib M, Rahman FU. Dental practitioner's awareness, knowledge, and attitudes towards the use of laser technology in endodontic disinfection: A Cross Sectional Study. Journal of Khyber College of Dentistry Dec 2024, Vol. 14, No. 4. http://doi.org/10.33279/jkcd.v14i04.775

INTRODUCTION

Root canal treatment is a critical procedure in endodontics, aimed at eliminating infections from the root canal system and preventing reinfection of the tooth[1]. Traditional methods of root canal disinfection involve mechanical instrumentation combined with chemical irrigants[2]. However, achieving complete disinfection remains challenging due to the complex anatomy of the root canal system and the limitations of conventional techniques[1,3].

Laser technology has revolutionized multiple healthcare fields since its entrance, and dentistry is no exception[4]. The use of lasers in dentistry began to gain traction in the 1990s and has since been widely used in all dental specialties, especially endodontics. Endodontics is concerned with the biology

Correspondence:
Fayyaz Alam
Associate Professor
Department of Operative Dentistry & Endodontics, Saidu College of Dentistry, Saidu Sharif, Swat
Email: drfayyazbds@yahoo.com

Date Submitted: July 2024
Date Revised: August 2024
Date Accepted: November 2024

of the dental pulp and tissues surrounding the root of a tooth, which, if injured, can be saved by a root canal[5]. This specialty has seen a wide range of advancements, particularly those stemming from the precision and minimally invasive nature offered by laser technology[6].

When lasers are integrated into endodontic practice, the major focus is the disinfection of root canals, since mechanical instrumentation and chemical antiseptics have their limitations[7,8]. Lasers have been extensively shown to effectively reduce bacterial loads within the complex anatomy of the root canal system[9]. A chief draw of these devices is that their focused energy can be delivered in controlled, intermittent bursts that minimize thermal effects yet effectively reduce bacterial populations[10].

Despite the potential benefits, the adoption of laser technology in root canal treatment varies among dental practitioners[11,12]. Factors influencing its utilization include awareness of the technology, perceived effectiveness, cost considerations, and training opportunities. Understanding the current awareness and attitudes of dental practitioners towards laser-assisted root canal disinfection is essential for identifying barriers to implementation and promoting evidence-based practice.

Previous study found that while 94.3% of respondents considered laser training useful, many lacked full awareness of the specific techniques involved in laser use for endodontic disinfection. The Nd laser was identified as particularly effective in removing smear layers, with 81.8% of participants agreeing on its efficacy. Despite the potential of laser technology in enhancing endodontic treatment, its practical use remains limited due to knowledge gaps and barriers such as cost and access to adequate training[11].

This survey aims to assess the awareness, knowledge, and attitudes of dental practitioners regarding the role of laser technology in root canal disinfection. The findings can inform strategies to overcome these barriers, ultimately facilitating greater integration of laser technology in endodontic procedures and enhancing patient care. Given the increasing interest in innovative dental technologies, this study is crucial to better understand how awareness translates to practice and how dental practitioners can be supported in adopting new technologies effectively.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted on 159 dental practitioners using a non-probability convenience sampling technique. Approval was granted by the hospital ethical review board (ERB No, 64-ERB/024). Written informed consent was obtained from all participants as part of the initial online questionnaire. All participants were anonymized before data analysis, and their confidentiality was ensured throughout the study.

The inclusion criteria for participation were dental professionals with at least a BDS qualification, endodontists (FCPS in operative dentistry), trainees specializing in operative dentistry, both gender and any age, any level of experience, Pakistani nationals, and those working in either government or private institutions or as private practitioners. Exclusion criteria included dental technicians, dental students, and trainees of other dental specialties.

The sample size was calculated using OpenEpi with a 6% margin of error, a 95% confidence level, and an 81.8%[13] frequency of awareness of the efficacy of laser endodontics in removing smear layers. Participants were recruited through WhatsApp groups and by obtaining emails from their previous publications. The response rate for the survey was 71%.

The questionnaire gathers information on dental practitioners' demographics (age, gender, years of experience, and specialty) and their knowledge and use of laser technology in endodontics. The first part contains informed consent. The questionnaire includes questions about familiarity with different types of lasers, awareness of the benefits and limitations, and the latest research in laser endodontics. Practitioners are asked about their practical application of laser technology, confidence in using it, and how often they update their skills. It also covers discussions with patients about laser treatment, perceived barriers such as cost and training opportunities, and regulatory concerns. The questionnaire assesses formal training received, availability of training, and interest in further education. It explores patient satisfaction and observed healing rates in laser-treated cases. Responses of the questions were recorded using Likert scale. This questionnaire was taken from previous study of Parthasarathy et al[11].

Statistical analyses were carried out in Stata 14. Descriptive statistics were computed in the form of mean and SD for continuous data like age and categorical like gender, experience and awareness responses. Awareness was compared among level of experience using chi-square test. P<0.05 was set as a significant level.

RESULT

The mean age was 33.08 years (SD 8.83), comprising 59.7% males and 40.3% females. Participants had an average of 3.92 years of experience (SD 1.85) and were distributed across specialties: 26.4% endodontists, 25.8% general practitioners, 19.5% trainees, and 28.3% from other specialties. (Table 1)

Most respondents agreed on the need for familiarity with laser use in endodontic disinfection (58.49%), understanding laser types (49.69%), and awareness of its advantages (48.03%). However, fewer were knowledgeable about limitations (24.53%) or kept up with the latest research (40.88%). Only 4.4% had applied lasers in practice or felt confident using them, while 21.38% regularly updated their skills. Notably, 58.49% believed lasers improve treatment outcomes, and 63.5% emphasized the importance of continuing education. (Table 2)

A significant difference was found between respondents with 5-8 years and 1-4 years of experience in their familiarity with laser technology (p=0.033) and understanding of different laser types (p=0.015), with more experienced practitioners showing greater agreement. Those with 5-8 years of experience were also more informed about recent research (p=0.007), while those with 1-4 years expressed stronger beliefs in laser technology's practical application (p=0.015) and improved outcomes (p=0.008). Cost was a bigger barrier for the more experienced group (p=0.01), while less experienced practitioners found training more accessible (p=0.002). (Table 3)

DISCUSSION

The findings from the study provide valuable insights into the awareness and attitudes of dental practitioners regarding the use of laser technology in endodontic disinfection.

The demographic characteristics of the participants indicate a relatively young cohort with a mean age of 33.08 years. The gender distribution skewed towards males, with 59.7% being male participants. This gender distribution pattern is common in dentistry, where historically, there has been a higher representation of males[14,15]. The participants had an average of 3.92 years of experience, suggesting a mix of early-career and mid-career professionals. The distribution across specialties showed a significant proportion of participants being endodontists, followed by general dental practitioners and trainees. The diversity in specialties reflects the varied backgrounds and expertise of the participants.

The significant proportion of participants, 93 out of 159 (58.49%), indicating familiarity with the use of lasers in endodontic disinfection is an encouraging sign of the evolving landscape within the field of endodontics. This finding suggests a growing awareness among dental practitioners regarding the potential benefits of utilizing laser technology in enhancing disinfection protocols during root canal procedures. Moreover, the reference to a previous study reporting that 72.9% of respondents found photo-activated disinfection to be effective as a supplementary method in canal irrigation further underscores the expanding interest in alternative disinfection techniques among dental professionals. This suggests a broader shift towards exploring and incorporating advanced methods beyond conventional approaches in endodontic practice[11]. Additionally, the mention of Samiei et al.'s research highlighting the efficacy of photodynamic therapy in reducing Enterococcus faecalis adds further weight to the argument for the adoption of innovative disinfection strategies[16]. E. faecalis is notoriously known for its resilience within root canal systems, making its effective eradication a crucial aspect of successful endodontic treatment[17].

Table 1: Distribution of age, gender, experience , and specialty of the participants

Characteristic	N = 159
Age (years), mean ±SD	33.08 ± 8.83
Gender	n (%)
Female	64 (40.25)
Male	95 (59.75)
Experience, mean ±SD	3.92±1.85
Specialty	n (%)
Endodontist	42 (26.42)
General dental practitioner	41 (25.79)
Trainee	31 (19.50)
Trainee	45 (28.30)

*Mean ± SD; n (%)

Differences between studies on laser use in endodontic disinfection arise from factors such as sample size, geographic location, access to training, and the focus on either knowledge or practical application. These variations affect practitioners' familiarity and adoption rates across different regions and study periods.

The results indicate a notable consensus among respondents on the importance of familiarity with laser technology in endodontic disinfection, understanding different types of lasers, and recognizing the advantages of laser technology[11]. However, there appears to be a gap in knowledge regarding the limitations and contraindications of laser use, as well as staying updated with the latest research and developments. The low percentage of respondents who reported having applied laser technology in their practice, feeling confident in selecting appropriate settings, and regularly updating their skills suggests a potential need for further training and education in this area. Despite these gaps, a significant portion of respondents expressed confidence in the positive im-

Table 2: Awareness LASER in endodontic disinfection among dental practitioners (n=159)

Questions	Agree	Disagree	Neutral	Strongly Agree	Strongly Disagree
Familiarity with laser use in endodontic disinfection is needed	93 (58.49)	27 (16.98)	23 (14.47)	7 (4.40)	9 (5.66)
I understand the different types of lasers (e.g., diode, Nd:YAG, Er:YAG) used in endodontics	79 (49.69)	27 (16.98)	37 (23.27)	7 (4.40)	9 (5.66)
I am aware of the advantages of using laser technology for root canal disinfection	73 (48.03)	48 (31.58)	14 (9.21)	8 (5.26)	9 (5.92)
I know the limitations and contraindications of laser use in endodontics	39 (24.53)	55 (34.59)	53 (33.33)	5 (3.14)	7 (4.40)
I am informed about the latest research and developments in laser technology for endodontics	65 (40.88)	62 (38.99)	23 (14.47)	-	9 (5.66)
I have applied laser technology in endodontic disinfection in my practice	7 (4.40)	70 (44.03)	40 (25.16)	-	42 (26.42)
I feel confident in selecting appropriate laser settings for different endodontic cases	7 (4.40)	88 (55.35)	43 (27.04)	-	21 (13.21)
I regularly update my knowledge and skills regarding laser-assisted endodontic treatments	34 (21.38)	57 (35.85)	49 (30.82)	-	19 (11.95)
I discuss the benefits and potential risks of laser endodontic treatment with my patients	22 (13.84)	67 (42.14)	37 (23.27)	7 (4.40)	26 (16.35)
I believe that laser technology significantly improves the outcomes of endodontic treatments	93 (58.49)	-	28 (17.61)	24 (15.09)	14 (8.81)
Cost is a significant barrier to the adoption of laser technology in my practice	79 (49.69)	-	25 (15.72)	46 (28.93)	9 (5.66)
Lack of training opportunities limits my use of lasers in endodontics	100 (62.8)	9 (5.66)	30 (18.87)	20 (12.6)	-
Patient acceptance and awareness affect my decision to use laser technology	86 (54.09)	12 (7.55)	46 (28.93)	15 (9.43)	-
Regulatory and safety concerns influence my use of laser in endodontic procedures	80 (50.31)	21 (13.21)	51 (32.08)	7 (4.40)	-
I have received formal training in using laser technology for endodontics	37 (23.27)	65 (40.88)	28 (17.61)	8 (5.03)	21 (13.21)
Training in laser technology is readily available and accessible	48 (30.19)	52 (32.70)	43 (27.04)	-	16 (10.06)
Continuing education in laser endodontics is important for my practice	101 (63.5)	-	37 (23.27)	21 (13.21)	-
I am interested in attending workshops or seminars on laser technology in endodontics	96 (60.38)	9 (5.66)	16 (10.06)	31 (19.50)	7 (4.40)
Patients report higher satisfaction with laser-assisted endodontic treatments	65 (40.88)	28 (17.61)	66 (41.51)	-	-
I have observed improved healing rates in laser-treated endodontic cases	43 (27.04)	21 (13.21)	86 (54.09)	9 (5.66)	-

Table 3: Comparison of awareness about use of LASER in endodontic disinfection among level of experience

Questions	5-8 year experience		
	Agree	Disagree	Neutral
I am familiar with the use of laser technology in endodontic disinfection.	65 (65.66)	13 (13.13)	12 (12.12)
I understand the different types of lasers (e.g., diode, Nd:YAG, Er:YAG) used in endodontics.	57 (57.58)	11 (11.11)	19 (19.19)
I am aware of the advantages of using laser technology for root canal disinfection.	44 (47.31)	31 (33.33)	9 (9.68)
I know the limitations and contraindications of laser use in endodontics.	25 (25.25)	33 (33.33)	33 (33.33)
I am informed about the latest research and developments in laser technology for endodontics.	50 (50.51)	34 (34.34)	12 (12.12)
I have applied laser technology in endodontic disinfection in my practice.	1 (1.01)	49 (49.49)	21 (21.21)
I feel confident in selecting appropriate laser settings for different endodontic cases.	1 (1.01)	58 (58.59)	28 (28.28)
I regularly update my knowledge and skills regarding laser-assisted endodontic treatments.	26 (26.26)	34 (34.34)	29 (29.29)
I discuss the benefits and potential risks of laser endodontic treatment with my patients.	12 (12.12)	41 (41.41)	24 (24.24)
I believe that laser technology significantly improves the outcomes of endodontic treatments.	61 (61.62)	12 (12.12)	0 (0)
Cost is a significant barrier to the adoption of laser technology in my practice.	58 (58.59)	11 (11.11)	0 (0)
Lack of training opportunities limits my use of lasers in endodontics.	58 (58.59)	8 (8.08)	18 (18.18)
Patient acceptance and awareness affect my decision to use laser technology.	51 (51.52)	9 (9.09)	27 (27.27)
Regulatory and safety concerns influence my use of laser in endodontic procedures.	49 (49.49)	12 (12.12)	32 (32.32)
I have received formal training in using laser technology for endodontics.	25 (25.25)	40 (40.40)	16 (16.16)
Training in laser technology is readily available and accessible.	37 (37.37)	35 (35.35)	17 (17.17)
Continuing education in laser endodontics is important for my practice.	66 (66.67)	15 (15.15)	0 (0)
I am interested in attending workshops or seminars on laser technology in endodontics.	60 (60.61)	4 (4.04)	7 (7.07)
Patients report higher satisfaction with laser-assisted endodontic treatments.	45 (45.45)	14 (14.14)	40 (40.40)

Table 3: Comparison of awareness about use of LASER in endodontic disinfection among level of experience

Strongly Agree	Strongly Disagree	1-4 year experience					p-value*
		Agree	Disagree	Neutral	Strongly Agree	Strongly Disagree	
6 (6.06)	3 (3.03)	28 (46.67)	14 (23.33)	11 (18.33)	1 (1.67)	6 (10.00)	0.033
6 (6.06)	6 (6.06)	22 (36.67)	16 (26.67)	18 (30.00)	1 (1.67)	3 (5.00)	0.015
6 (6.45)	3 (3.23)	29 (49.15)	17 (28.81)	5 (8.47)	2 (3.39)	6 (10.17)	0.5
3 (3.03)	5 (5.05)	14 (23.33)	22 (36.67)	20 (33.33)	2 (3.33)	2 (3.33)	>0.9
0 (0)	3 (3.03)	15 (25.00)	28 (46.67)	11 (18.33)	0 (0)	6 (10.00)	0.007
0 (0)	28 (28.28)	6 (10.00)	21 (35.00)	19 (31.67)	0 (0)	14 (23.33)	0.015
0 (0)	12 (12.12)	6 (10.00)	30 (50.00)	15 (25.00)	0 (0)	9 (15.00)	0.058
0 (0)	10 (10.10)	8 (13.33)	23 (38.33)	20 (33.33)	0 (0)	9 (15.00)	0.3
6 (6.06)	16 (16.16)	10 (16.67)	26 (43.33)	13 (21.67)	1 (1.67)	10 (16.67)	0.7
20 (20.20)	6 (6.06)	32 (53.33)	16 (26.67)	0 (0)	4 (6.67)	8 (13.33)	0.008
27 (27.27)	3 (3.03)	21 (35.00)	14 (23.33)	0 (0)	19 (31.67)	6 (10.00)	0.01
15 (15.15)	0 (0)	42 (70.00)	1 (1.67)	12 (20.00)	5 (8.33)	0 (0)	0.2
12 (12.12)	0 (0)	35 (58.33)	3 (5.00)	19 (31.67)	3 (5.00)	0 (0)	0.4
6 (6.06)	0 (0)	31 (51.67)	9 (15.00)	19 (31.67)	1 (1.67)	0 (0)	0.6
6 (6.06)	12 (12.12)	12 (20.00)	25 (41.67)	12 (20.00)	2 (3.33)	9 (15.00)	0.8
10 (10.10)	0 (0)	11 (18.33)	17 (28.33)	26 (43.33)	6 (10.00)	0 (0)	0.002
18 (18.18)	0 (0)	35 (58.33)	22 (36.67)	0 (0)	3 (5.00)	0 (0)	0.002
22 (22.22)	6 (6.06)	36 (60.00)	5 (8.33)	9 (15.00)	9 (15.00)	1 (1.67)	0.2
0 (0)	0 (0)	20 (33.33	-	-	-	-	-

pact of laser technology on treatment outcomes and recognized the importance of continuing education in laser endodontics.

Only 4.4% participants used laser technology in endodontic disinfection. the low percentage of participants using laser technology in endodontic disinfection in our study conducted in Pakistan likely stems from a combination of cost constraints, limited access to training and education, infrastructure challenges, regulatory hurdles, concerns about efficacy, and prevailing awareness and attitudes. Addressing these barriers will be crucial in promoting the wider adoption of laser technology and enhancing its utilization in endodontic practice in Pakistan[18].

The comparison of awareness among respondents with different levels of experience revealed interesting insights. Respondents with 5-8 years of experience demonstrated a higher agreement in familiarity with laser technology, understanding different types of lasers, and being informed about the latest research compared to those with 1-4 years of experience. However, respondents with 1-4 years of experience were more likely to report having applied laser technology in their practice and believe in its significant improvement of treatment outcomes. The differences in perceptions regarding barriers to the adoption of laser technology highlight the varying challenges faced by practitioners at different stages of their careers. Previous study also showed the experience has significant with awareness of Laser[19].

LIMITATIONS

One limitation of this study is the use of non-probability convenience sampling, which may not fully represent the broader population of dental practitioners. Additionally, the self-reported nature of the questionnaire could introduce response bias, as participants might overestimate their knowledge or application of laser technology. The study's reliance on WhatsApp groups and emails for participant recruitment may have limited the diversity of respondents, particularly those less active in such digital platforms. Furthermore, the study focused only on Pakistani nationals, potentially limiting the generalizability of the findings to other regions. Lastly, the use of a pre-existing questionnaire may not have fully captured all relevant aspects of laser technology use in endodontics.

CONCLUSION

Based on our study findings we can conclude that most are aware of the benefits of laser technology in endodontics, yet practical application remained limited, with only a small percentage reporting actual use in their practice. Interestingly, those with 5-8 years of experience showed greater familiarity and optimism towards lasers compared to their less-experienced peers. Cost and training accessibility were noted barriers. Addressing these challenges through targeted education could enhance the adoption of laser technology in endodontic practice, potentially improving treatment outcomes.

REFERENCES

1. Wong J, Manoil D, Näsman P, Belibasakis GN, Neelakantan P. Microbiological aspects of root canal infections and disinfection strategies: an update review on the current knowledge and challenges. Front Oral Health. 2021;2:672887.
2. Li Y, Wang Z, Bao P, Meng T, Liu M, Li H, et al. Cleaning and disinfecting oval-shaped root canals: ex vivo evaluation of three rotary instrumentation systems with passive ultrasonic irrigation. Med. 2023;59(5):962.
3. Versiani M, Martins J, Ordinola-Zapata R. Anatomical complexities affecting root canal preparation: a narrative review. Austral Dent J. 2023;68:S5-S23.
4. Pagano S, Lombardo G, Orso M, Abraha I, Capobianco B, Cianetti S. Lasers to prevent dental caries: a systematic review. BMJ open. 2020;10(10):e038638.
5. Dixit S, Gupta P, Rajput R, Dhingra A, Singh A, Grover S. Laser-A new vision in Conservative Dentistry and Endodontics. J Advan Zool. 2024;45(2):21-34.
6. Ismail HH, Obeid M, Hassanien E. Efficiency of diode laser in control of post-endodontic pain: a randomized controlled trial. Clin Oral Invest. 2023;27(6):2797-804.
7. Camargo SCC. The antibacterial effects of lasers in endodontics. Roots. 2012;1:6-21.
8. Alfirdous RA, Garcia IM, Balhaddad AA, Collares FM, Martinho FC, Melo MAS. Advancing photodynamic therapy for endodontic disinfection with nanoparticles: present evidence and upcoming approaches. Appl Sci. 2021;11(11):4759.
9. Sin JHM, Walsh LJ, Figueredo CM, George R. Evaluation of effectiveness of photosensitizers used in laser endodontics disinfection: A systematic review. Translat Biophot. 2021;3(1):e202000007.
10. Mathew J, Emil J, Paulaian B, John B, Raja J, Mathew J. Viability and antibacterial efficacy of four root canal disinfection techniques evaluated using confocal laser scanning microscopy. J Conser Dent Endod.

2014;17(5):444-8.

11. Parthasarathy P, Antony SDP. Awareness and knowledge of dentists about laser technique used in endodontic disinfection. J Pharmaceut Sci Res. 2017;9(4):476.
12. Ganapathi A, Jeevanandan G. Awareness of laser dentistry among dentists in Chennai-a survey. Drug Invention Today. 2019;11(12):31-8.
13. Parthasarathy P, Antony SDP. Awareness and knowledge of dentists about laser technique used in endodontic disinfection. J Pharma Sci Res. 2017;9(4):476.
14. Alqahtani AS, Alqhtani NR, Gufran K, Aljulayfi IS, Alateek AM, Alotni SI, et al. Analysis of trends in demographic distribution of dental workforce in the Kingdom of Saudi Arabia. J Healthcare Eng. 2022;2022(1):5321628.
15. Tahir S, Bashir A, Khan J. Factors that hinder female dentists in pursuing their career. Biomed. 2014;30(3):34-9.
16. Samiei M, Shahi S, Abdollahi AA, Eskandarinezhad M, Negahdari R, Pakseresht Z. The antibacterial efficacy of photo-activated disinfection, chlorhexidine and sodium hypochlorite in infected root canals: an in vitro study. Iranian Endod J.2016;11(3):179.
17. Alghamdi F, Shakir M. The influence of Enterococcus faecalis as a dental root canal pathogen on endodontic treatment: A systematic review. Cureus. 2020;12(3).
18. Izhar F, Nazir MA, Majeed A, Almas K. A study of dentists about their knowledge and practice of dentine hypersensitivity. Eur J Dent. 2019;13(04):540-6.
19. Al Zahrani TA, AlTulihe SB, Alabdullateef KS, Alanazi OS, Almutairi NM, Ansari SH. Knowledge and practices of dental professionals towards lasers in riyadh city: a survey-based study. Pharmacoph. 2021;12(3-2021):77-86.

CONFLICT OF INTEREST
Authors declare no conflict of interest.
GRANT SUPPORT AND FINANCIAL DISCLOSURE
None declared.

AUTHORS' CONTRIBUTION

The following authors have made substantial contributions to the manuscript as under:

Conception or Design:	FA, KG, FAS, BY, MZ, FUR
Acquisition, Analysis or Interpretation of Data:	FA, KG, FAS, BY, MZ, FUR
Manuscript Writing & Approval:	FA, KG, FAS, BY, MZ, FUR

All the authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.