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Original Article

A Survey-Based Study on Dentists' Knowledge and Practices Regarding Lasers in Riyadh City

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ABSTRACT

Since Planck tested the technology for the first time in 1900, the use of lasers in the medical field has been around for more than a century. Since then, there has been no turning back, as these developments have been used in many areas of health. The present study aimed to survey dentists' knowledge and practice regarding lasers in Riyadh city. The current study used a closed-ended questionnaire and is cross-sectional. Since the dental professionals of Riyadh city are the study's objective, any dentists who could be interested in participating were asked to fill out the questionnaire. When the replies were compared by designation, it was found that 55% of advisors thought that not employing anesthesia was one of the key justifications for utilizing lasers (P-value = 0.007), 47% of general practitioners were dissatisfied given their degree of expertise (P-value = 0.023), and laser use rose with designations (P-value = 0.008). There were no noteworthy comparisons found in the remaining questions. Dental professionals' general understanding of laser usage was found to be lacking.

Keywords: Dental professionals, Knowledge, Lasers, Dentistry, Practices

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Introduction

Since Planck tested the technology for the first time in 1900, the use of lasers in the medical field has been around for more than a century. Since then, there has been no turning back, as these developments have been used in many areas of health. These include tumor ablation, benign prostate hyperplasia therapy, and removing kidney stones in the 1960s [1, 2].

The growing use of lasers in dentistry is changing the discipline, with the major benefits going to dental specialties including pediatrics, endodontics, implantology, periodontics, and restorative dentistry [3]. There have been several studies carried out throughout the globe to find out how dentists feel about the use of lasers and their degree of understanding. In response to questions about the usage of different kinds of lasers, Indian dentists demonstrated a sufficient level of understanding and endorsed their application in several dental processes. There was a notable disparity in the degree of awareness between dentists with little and a lot of experience, though, and several of these research participants felt that further training was generally necessary [4, 5]. However, Iranian dentists' attitudes were found to be divided, with a greater preference for traditional methods over laser technology [6].

A few further tests were carried out to evaluate the dental professionals' understanding of particular dental methods. According to one of these studies, dental professionals had a worse attitude about the use of lasers in endodontics, despite being fully informed of their use. The effectiveness of utilizing lasers to

disinfect root canals by laser photodynamic therapy has recently been established [7, 8]. Finally, the effectiveness of dental lasers in detecting cavities has been confirmed by Brazilian dentists. Even though only highly qualified dentists may use these techniques, their level of readiness seems to be on the rise [9].

Study hypotheses

Dentists in Riyadh are not well-versed in dental lasers and have little encounter with them.

Aims of the study

- To contrast the results based on work experience and professional designation;
- To ascertain the present dental laser usage practices of Riyadh dentists;
- To ascertain the dentists' understanding of the various types and applications of dental lasers;
- To evaluate the factors related to the absence of laser usage in dentistry.

Materials and Methods

Study design

The present study is a cross-sectional one, that applied a close-ended questionnaire.

Questionnaire design

The researchers constructed the questionnaire online by Google Forms. The questionnaire started with questions about demographics, such as gender, educational level, professional designation, etc. Moreover, about the knowledge level of dental lasers questions were asked, that included various kinds of lasers and their clinical uses, factors influencing using or not using lasers in dental procedures, etc.

Research sample

The target of this study is the dental professionals of Riyadh city; hence, all dentists with the tendency to participate were required to complete the questionnaire. In total, 500 Riyadh dentists were aimed to be involved in the present research. The survey was mainly sent by online communication such as social media.

Validity and reliability of the questionnaire

The research experts, which included a few faculty members of REU received the questionnaire to confirm its validity. Considering the reliability, a pilot study was performed using 20 online questionnaires completed haphazardly by university students. Cronbach's coefficient alpha in the Statistical Package for Social Sciences (SPSS) version 19 was used to test the reliability.

Statistical analysis

After collection, the data was transferred to SPSS version 19 from Google Sheets, where inferential as well as descriptive statistics were carried out. With the significance value kept under 0.05, comparisons were made between the groups.

Results and Discussion

The online survey was completed by 344 people in total. When the participants were grouped according to their gender, it was found that 38% (n = 130) were female and 62% (n = 214) were male **(Figure 1)**. Furthermore, according to their categorization, 68% (n = 233) of the participants are general practitioners, 29% (n = 100) are specialists, and 3% (n = 10) are advisors **(Figure 2)**. Furthermore, when the participants were categorized by experience level, it was found that 78% (n = 266) had one to three years of experience, 16% (n = 54) had four to six years, 5% (n = 16) had seven to ten years, and 2% (n = 13) had over a decade **(Figure 3)**. Gender comparisons are displayed in **Table 1**, specialization comparisons are shown in **Table 2**, and job experience is compared in **Table 3**.

Validity and reliability of the questionnaire

Before distributing our questionnaire to the research participants, we made a few small adjustments, according to the REU specialists. Regarding reliability, we used SPSS to calculate Cronbach's coefficient alpha, and the result was 0.80, which is sufficient to proceed with data collecting after the pilot research.

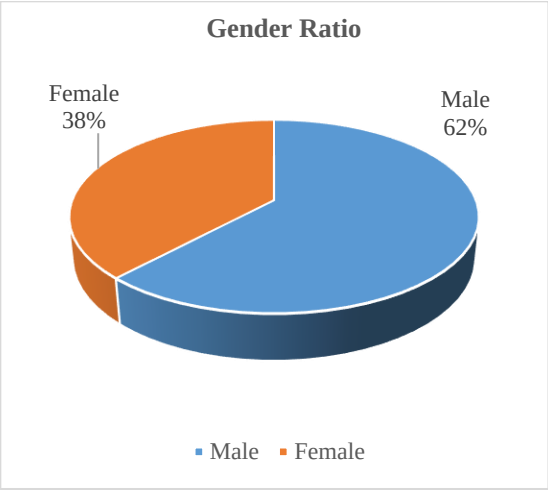

Figure 1. Gender distribution of study participants

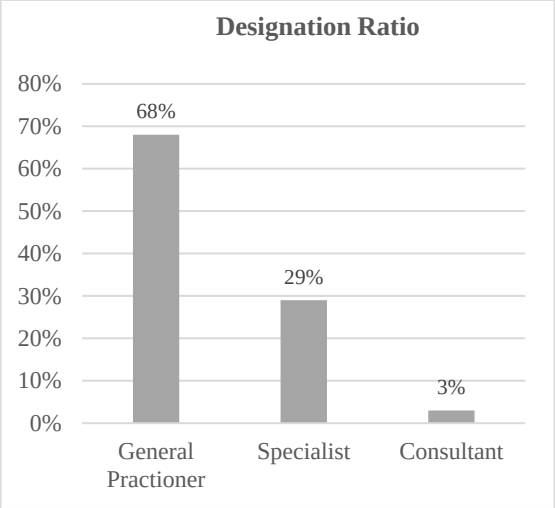

Figure 2. Distribution of study participants based on their designation

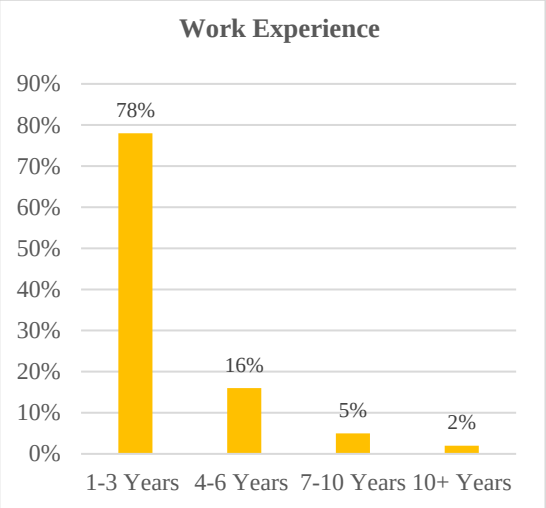

Figure 3. Distribution of study participants based on work experience

Table 1. Gender-based comparison of research participants

Item	Male	Female	P-value
How much do you estimate you are aware of dental lasers in general? (Highly Unsatisfactory/Unsatisfactory/Neutral/Satisfactory/Highly satisfactory)	17% 41% 32% 7% 3%	11% 76% 27% 7% 2%	0.217
Does your dentist's practice use dental lasers? (Never Used/Occasionally Used\Very commonly used)	80% 14% 6%	82% 15% 3%	0.337
Have you had the necessary instruction to utilize dental lasers? (Yes)	15%	5%	0.009
Do you know how the various kinds of lasers work? (Highly unaware/Unaware/Neutral/Aware/Highly aware)	15% 43% 30% 11% 1%	11% 54% 26% 7% 2%	0.200
What kind of laser is suitable for soft tissues? (GAALAS (Diode)\Excimer/Ruby/Argon/HO: YAG)	40% 17% 16% 17% 10%	45% 7% 16% 15% 16%	0.048
Which type of laser is suitable for use on hard tissues? (GAALAS (Diode)\Excimer/Erbium/Argon/Nd: YAG)	34% 18% 6% 20% 22%	29% 19% 6% 26% 20%	0.764
Compared to handpieces, lasers can eliminate cavities more effectively and conservatively (strongly Disagree/Disagree/Neutral/Agree/Strongly agree)	10% 12% 20% 53% 5%	3% 12% 18% 64% 3%	0.104
When it comes to endodontic irrigation, lasers are superior to traditional techniques (Strongly disagree/ Disagree/Neutral/Agree/Strongly agree)	12% 60% 15% 11% 2%	4% 65% 21% 9% 1%	0.061
What is the primary reason to use lasers in dentistry? (Minimally Invasive/Not harmful for surrounding tissues/No anesthesia needed)	56% 23% 21%	46% 21% 33%	0.053

What is the reason not to use lasers in dentistry? (Not enough information/Procedure is time-consuming/Expensive)	29% 9% 62%	16% 8% 76%	0.020
Do you want to learn how to use dental lasers properly? (Definitely, Yes/Maybe/Definitely, No)	47% 51% 2%	49% 49% 2%	0.893

Table 2. Comparison of research participants based on their specialty

Item	General practitioner	Specialist	Consultant	P-value
How well-versed in dental lasers do you think you are in general? (Highly unsatisfactory/Unsatisfactory/Neutral/Satisfactory/Highly satisfactory)	15% 47% 30% 6% 2%	17% 42% 29% 9% 3%	0% 30% 50% 0% 2%	0.023
Have you been incorporating dental lasers into your practice? (Never Used/Occasionally Used/Very commonly used)	86% 10% 4%	70% 25% 5%	80% 20% 0%	0.008
Have you undergone proper training to use dental lasers? (Yes)	9%	18%	10%	0.068
Do you know how the various kinds of lasers work? (Highly Unaware/Unaware/Neutral/Aware/Highly aware)	14% 49% 28% 8% 1%	13% 43% 27% 13% 4%	10% 30% 50% 10% 0%	0.520
Which type of laser is suitable for soft tissues? (GAALAS (Diode)\Excimer/Ruby/Argon/HO: YAG)	45% 13% 15% 15% 14%	35% 15% 20% 19% 11%	60% 0% 10% 30% 0%	0.372
Which type of laser is suitable for hard tissues? (GAALAS (Diode)\Excimer/Erbium/Argon/Nd:YAG)	34% 15% 6% 21% 24%	28% 25% 7% 24% 16%	30% 20% 0% 50% 0%	0.104
Lasers are more effective and conservative than handpieces in removing caries (Strongly disagree/ Disagree/Neutral/Agree/Strongly agree)	8% 11% 18% 59% 4%	7% 14% 25% 49% 5%	0% 10% 0% 90% 0%	0.351
When it comes to endodontic irrigation, lasers are superior to traditional techniques. (Strongly disagree/ Disagree/Neutral/Agree/Strongly agree)	10% 63% 18% 9% 1%	8% 61% 17% 11% 3%	10% 40% 20% 30% 0%	0.474
What is the primary reason to use lasers in dentistry? (Minimally invasive/Not harmful for surrounding tissues/No anesthesia needed)	53% 20% 27%	55% 27% 18%	0% 45% 55%	0.007
What is the reason not to use lasers in dentistry? (Not enough information/Procedure is time consuming/Expensive)	23% 7% 70%	27% 12% 61%	10% 10% 80%	0.322
Do you want to learn how to use dental lasers properly? (Definitely, Yes/Maybe/Definitely, No)	52% 47% 1%	40% 58% 2%	40% 50% 10%	0.135

Table 3. Comparison of research participants based on their years of experience

Item	1-3 Years	4-6 Years	7-10 Years	10+ Years	P-value
How would you assess your overall knowledge of dental lasers? (Highly unsatisfactory/Unsatisfactory/Neutral/Satisfactory/Highly satisfactory)	18% 49% 26% 5% 2%	4% 39% 46% 9% 2%	13% 19% 26% 31% 13%	0% 0% 56% 14% 30%	0.000
Have you been incorporating dental lasers into your practice? (Never Used/Occasionally used/Very commonly used)	88% 9% 3%	60% 34% 6%	56% 25% 19%	30% 70% 0%	0.000
Have you undergone adequate training to use dental lasers? (Yes)	8%	19%	38%	33%	0.000
Are you familiar with the functions of various types of lasers? (Highly Unaware/Unaware/Neutral/Aware/Highly aware)	15% 52% 25% 7% 1%	8% 38% 40% 12% 4%	6% 18% 36% 30% 6%	0% 0% 43% 43% 14%	0.000
Which type of laser is suitable for soft tissue use? (GAALAS (Diode)/Excimer/Ruby/Argon/HO: YAG)	45% 13% 15% 17% 13%	33% 21% 23% 15% 8%	36% 0% 21% 7% 36%	29% 0% 4% 58% 14%	0.014
Which type of laser is suitable for use on hard tissues? (GAALAS (Diode)/Excimer/Erbium/Argon/Nd: YAG)	36% 16% 5% 21% 23%	25% 25% 6% 28% 16%	0% 29% 21% 43% 7%	0% 33% 33% 17% 17%	0.003
Compared to handpieces, lasers can eliminate cavities more effectively and conservatively (Strongly Disagree/Disagree/Neutral/Agree/Strongly agree)	8% 11% 18% 59% 4%	7% 19% 22% 48% 4%	6% 12% 31% 44% 6%	0% 0% 15% 70% 15%	0.712
When it comes to endodontic irrigation, lasers are superior to traditional techniques (Strongly Disagree/Disagree/Neutral/Agree/Strongly agree)	8% 67% 16% 7% 1%	9% 52% 20% 19% 0%	25% 25% 25% 13% 12%	0% 17% 17% 66% 0%	0.000
What is the primary reason to use lasers in dentistry? (Minimally Invasive/Not harmful for surrounding tissues/No anesthesia needed)	52% 21% 27%	56% 26% 18%	40% 33% 27%	43% 29% 29%	0.723
What is the reason not to use lasers in dentistry? (Not enough information/Procedure is time-consuming/Expensive)	23% 5% 72%	26% 22% 52%	31% 13% 56%	14% 29% 57%	0.001
Do you want to learn how to use dental lasers properly? (Definitely, Yes/Maybe/Definitely, No)	49% 50% 1%	41% 56% 3%	63% 32% 5%	33% 67% 0%	0.426

The goal of the current study was to ascertain how well-versed in laser technology dentists in Riyadh City were. The research population was separated based on employment experience, designation, and gender. When asked if they had received the appropriate training to utilize dental lasers (P-value = 0.009), what kind of laser was utilized for soft tissues (P-value = 0.048), and why they did not use lasers in dentistry (P-

value = 0.020), statistically significant variations were seen between the sexes. Overall, there is no correlation between gender and laser use and understanding because none of the other responses were statistically significant. Al-Jobair [10] published similar results, finding no statistically significant correlation between gender and knowledge of lasers.

Additionally, 12% of research participants stated that they have undergone dental laser training. 21% of Indian dentists had been given training in laser therapy, according to research by Yadav *et al*. [11]. According to another study conducted in Iran, just 3% of dentists were trained to utilize dental lasers [12].

Following a comparison of the replies by designation, it was found that 55% of advisors thought that not applying anesthesia was one of the key justifications for utilizing lasers (P-value = 0.007), 47% of general practitioners were dissatisfied with their range of knowledge (P-value = 0.023), and laser use rose with designations (P-value = 0.008). No meaningful comparison was found for the remaining questions.

Lastly, when asked to rate their range of understanding (P-value = 0.000), their present utilization of dental lasers (P-value = 0.000), getting adequate training (P-value = 0.000), being knowledgeable of the various lasers (P-value = 0.000), lasers for soft tissues (P-value = 0.014), lasers for hard tissues (P-value = 0.003), lasers being utilized for endodontic treatments (P-value = 0.000), and reasons for not utilizing (P-value = 0.001), the work experience revealed a few significant variations. Dentists with more and less job experience gave different answers.

There is a requirement to improve the sample size of this research; that is the restriction also.

Conclusion

- It was discovered that dentists' general level of laser utilization expertise was below average.
- The dentists' gender had no impact on their degree of expertise.
- The degree of expertise was likewise unrelated to the work designation.
- The degree of laser usage expertise was higher among dentists with modest work experience.

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Conflict of Interest: None

Financial Support: None

Ethics Statement: None

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