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Endo and perio disease among dental practitioners in western region: Knowledge and awareness assessment, observational study

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ABSTRACT

Background: When it comes to the diagnosis & prognosis of the teeth involved, endodontic and periodontal diseases provide problems to the dental practitioner. This work was performed to assess knowledge and awareness about Endo-Perio lesion among dental practitioners in western region**.** *Methods:* This observational research was conducted in the Saudi Arabia from November 2021 to August 2022. The paper group included 623 aged above 18 years. The outcomes of this study will be analysed using the SPSS program using a pre-tested questionnaire. *Results:* This research consisted of 623 participants. 49.2% aged between 21- 25 ages and 45.4% between 26- 30 years old. Males made up 34.3% of the sample and 45.7% were females 55.1% of the participants in our study were familiar with Simon et al classifications of endo-perio lesions. Actinomycetemcomitans was cited by 53% of respondents as the most common bacterium linked to endo-perio lesions, followed by *T. denticola*, 16.8% *S. mutans*, and 14% *S. aureus*. The majority of responders (50%) identified the apical foramen as most direct pathways of communication between pulp and periodontal tissue. *Conclusion:* In summary, the research showed that Saudi Arabian dental practitioner has a medium degree of endo & perio lesions understanding. Organizing regular training and seminars sessions for dental practitioner working in hospitals and private clinics to strengthen their skills in the detection and management of endo & perio lesion may provide more fruitful outcomes.

Keywords: Endodontic-periodontic lesion, EPL, Root canal treatment.

1. INTRODUCTION

Periodontal tissues and tooth pulp have a strong connection. Hertwig's epithelium rooted sheet divides the pulp from the dental-papilla and the PDL from the dental follicle (Guo et al., 2018). In regions lacking cementum, exposing D- tubules may act as a conduit for communications between both the PDL and the pulp. Dentinal tubule exposure can result from birth

abnormalities, pathological conditions, periodontal conditions, or surgical operations. Cementumdentinal connection to the pulp: ridiculer dentin tubules (Rotstein & Simon, 2006).

They provide difficulties for the doctor in terms of the prognosis and diagnosis of the affected teeth. Assembly the right-diagnosis is crucial for determining the best course of therapy. The Simring & Goldberg made the initial discovery of the connection between periodontium and pulp (Blázquez et al., 2019). It has long been understood that the primary cause of combined EPL is the close relationship between the endodontic system and the periodontium. The transfer of infectious components from the pulp to the periodontium and vice versa is facilitated by a number of mechanisms. These contributed to the emergence of EPL along with the presence of mixed anaerobic bacteria (Zehnder et al., 2002). According to Seltzer et al., (1963) interradicular periodontal tissues may become inflamed as a result of pulpal inflammation. It is possible for bacteria and their poisonous by-products to move from the pulp to the periodontal ligament and vice versa when there are patent accessory canals, which might lead to an inflammatory reaction in the tissues involved. Despite the fact that treating endo & perio lesions requires a multidisciplinary approach, the periodontal component of the treatment plan is frequently overlooked for a variety of reasons, rendering endodontic treatments ineffective on its own. Thus, the goal of this case series is to present endodontic and periodontal patients that had an endodontic procedure followed by regenerative or restorative periodontal therapy, with a maximum 12-month follow-up (Raveendran et al., 2020).

The pulpal and periodontal tissues appear to have a tight hypothetical interaction, according to several investigations. Understanding how these two transmit diseases has evolved into a necessary routine for making the right and accurate diagnosis (Alshawwa et al., 2020; Siddiqui et al., 2022). According to surveys, many students are not aware of the bacterial organisms that cause endo-perio lesions to become infected. The order in which various lesions should be treated is likewise unclear (Sambandhan et al., 2020). Studies have shown that practitioners who continue their education at an institution have a higher degree of endo-perio lesions understanding and awareness than practitioners who work in public hospitals and private clinics. Compared to specialized dentists, general dentists had lower awareness and knowledge levels (Çirakoglu & Karayürek, 2020). Clinically serious endo-perio illness is challenging to identify and effectively treat. One of the various ways this illness can appear, making diagnosis more difficult, is the absence of carious teeth (Patel et al., 2017). Due to the lack of any research on this topic in Saudi Arabia, the current study aims to measure and analyze dentists' knowledge, awareness, and management of Endo-Perio lesions. This research's primary objective is to gauge Saudi Arabian dental practitioners' awareness and knowledge of endo & perio diseases.

2. MATERIALS AND METHODS

Study design

Between November 2021 and August 2022, observational research using survey questionnaire was accomplished in KSA. The study's respondents consisted of Saudi dental practitioners practicing in either the government or private sectors. Dental practitioners authorized with the Saudi Ministry of Health were included in this study.

Sample size

The sample-size was estimated using the Rao-soft calculator with a confidence-level of 95%, the maximum acceptable error is 0.05 and the calculated minimum sample size was 384. Data collection was in the form of the participants' responses to the questions.

Inclusion criteria and Exclusion criteria are as follows

This study was included all dental student, dental intern and general practitioners who live in Saudi Arabia and fully completed survey. This study was excluded the dental practitioners who did agree to participate in our study.

Method for data collection and instrument

A self-administered, anonymous English questionnaire was provided. Participants completed two parts, the first of which contained characteristics such as age, gender, specialization, and registration with the Saudi Ministry of Health. In the second portion, participants were questioned about categorization, examination techniques, and prognosis, distinctive characteristics of endo-perio diseases and several treatment modalities, most frequent bacteria, and risks, as well as channel of communications and entry to the pulp.

Data management and analysis

The data will be verified by hand, then coded and entered into a personal computer. Data was analyzed by the Statistical Package for Social Sciences (IBM, SPSS version 27). Descriptive statistics (i.e., frequency, percentage, mean and standard deviation) was calculated. P-values less than 0.05 will be considered statistically significant.

3. RESULTS

In table (1) the sample consisted of 623 participants. 49.2% aged between 21- 25 years old and 45.4% between 26- 30 years old. 34.3% of sample was males and 45.7% were females. 39% of participants were general dentist, 37.4% were dental intern and 23.5% dental students.

Table 1 Participants' socio-demographic parameters

Parameter		No	Percent
Age	18-20	1	.2
	21 –25 years old	306	49.2
	26 –30 years old	221	35.4
	31 – 35 years old	63	10.2
	36 –40 years old	26	4.2
	41 – 50 years old	19	3.1
Gender	Male	214	34.3
	Female	409	65.7
Specialty	Dental student	146	23.5
	Dental intern	233	37.4
	General dentist	243	39

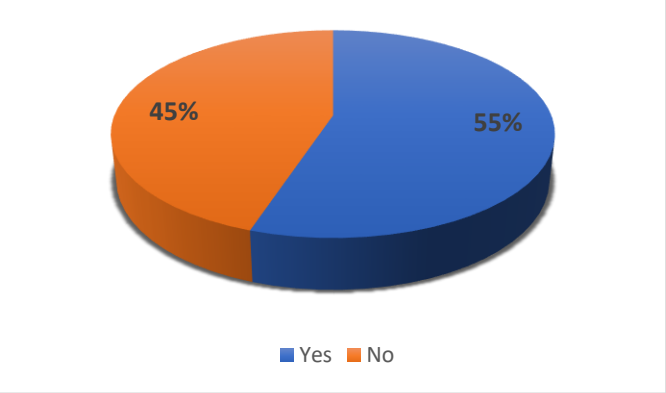

Figure 1 Knowledge of participants about the Simon et al., classification of endo-perio lesions.

As mentioned in (Figure 1), 55.1% were aware of Simon et al., (1972) endo-perio lesions categorization. 53% identified Actino-mycetem-comitans as the most-common bacteria associated with endo-perio lesion, 17.6% *T. denticola*, and 16.8% *S. mutans*, and 14% *S. aureus*. In terms of risk factors, 58.4% of the sample we looked at revealed faulty restorations, 57.3% vertical root fracture, 52% dental caries, 66.4% plaque and calculus, 25.5% malocclusion, and 23.6% high heat during endodontic therapy (Figure 2). 32.9% of participants believed that the prognosis of real mixed lesions was frequently in doubt, 55.5% reported a dismal or questionable prognosis, and only 11.6% reported a positive prognosis, as shown in table (2). A pical for a men, lateral-canals, dentinal-tubules and dental caries were recognized as the most direct routes of communication between pulp and periodontal tissue by 50%, 39.8%, 7.7%, and 2.5% of respondents, respectively. A vitality test, radiograph, and percussion test were the three most popular examination techniques for diagnosing primary endodontic lesions, respectively, according to 75.5%, 14.5%, and 10% of respondents. Bone loss and deep pocket depth were the most common features of primary periodontal lesions, followed by caries

(3.8%), root perforation (1.9%), and bone loss (94.3%). Additionally, 87.8% of respondents to table (2) reported that exposed dentinal tubules may allow bacterial products and toxins to enter the pulp, and 87.8% reported that host defence mechanisms were thought to alter the extent of periodontal deterioration (Table 2).

Table 2 Participants' awareness and understanding of Endo & Perio diseases

Parameter		**Percent**
Are you familiar with the endo-perio lesions classification proposed by Simon et al., (1972)	No	44.9
	Yes	55.1
Which bacteria are most frequently related to endo-perio lesions	S.aureus	14.0
	S. mutans	16.8
	T. denticola	17.4
	Actinomycetemcomitans	53.2
Pathway of communication between periodontal tissue and pulp that is the most direct	Dental caries	2.5
	Dentinal tubules	7.7
	Lateral canals	39.8
	Apical foramen	50.0
What is the prognosis of a true combined lesion most of the time	Good	11.6
	Poor and hopeless	32.9
	Questionable	55.5
Predisposing risk factors leading to an endo-perio lesion	Excessive heat during endodontic therapy	23.6
	Malocclusion	25.5
	Dental caries	52.0
	Defective Restorations	58.4
	Vertical root fracture	57.3
	Plaque and Calculus	66.4
The most used type of evaluation for identifying a primary endodontic lesion?	Percussion test	10.0
	Radiograph	14.5
	Vitality test	75.5
The majority of primary periodontal lesion features	Root perforation	1.9
	Caries	3.8
	Bone loss and deep pocket depth	94.3
A factor influencing the extent of periodontal damage is the host defensive mechanism.	No	11.5
	Yes	88.5
Exposure of the dentinal tubules allows bacterial byproducts and toxins to enter the pulp	No	12.2
	Yes	87.8

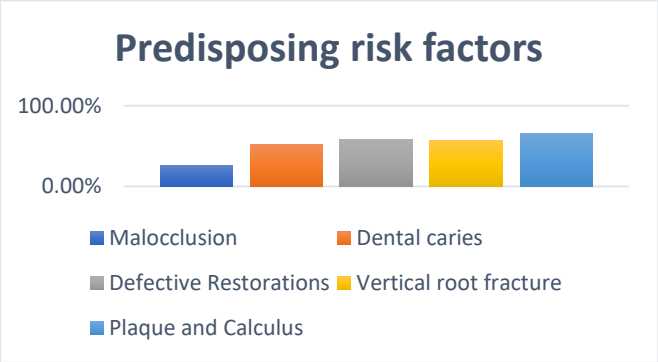

Figure 2 Knowledge of participants about the Predisposing risk factors leading to an endo-perio lesion

As shown in table (3), Primary endo secondary perio lesion was reported to have been treated. As 76.5% reported endodontic therapy followed by periodontal therapy, 16.8% root canal treatment alone, and 5.8% periodontal therapy followed by endodontic therapy. Treatment for primary perio secondary endo lesions was reported as endodontic therapy followed by periodontal therapy in 43.7% of cases, followed by periodontal therapy and endodontic therapy in 50% of cases, periodontal therapy alone in 4.3% of cases, and root canal therapy alone in 2.0% of cases. Treatment of combined lesions was reported to be carried out in 34.4% of cases by concurrent endodontic and periodontal therapy, in 55.2% of cases by endodontic therapy and periodontal therapy, and in 10.4% of cases by periodontal therapy and endodontic therapy.

Table 3 Participants' awareness and understanding of Endo & Perio treatment

The primary perio secondary endo lesion treatment	Root canal treatment alone	2.0
	Periodontal therapy alone	4.3
	Endodontic therapy followed by Periodontal therapy	43.7
	Periodontal therapy followed by Endodontic therapy	50.0
The primary endo secondary perio lesion treatment	Periodontal therapy alone	0.9
	Periodontal therapy followed by Endodontic therapy	5.8
	Root canal treatment alone	16.8
	Endodontic therapy followed by Periodontal therapy	76.5
Combination lesions treatment	Periodontal therapy followed by Endodontic therapy	10.4
	Both Endodontic and Periodontal therapies simultaneously	34.4
	Endodontic therapy followed by Periodontal therapy	55.2

According to table (4); knowledge of Simon et al., (1972) classification of endo-perio lesions was significantly associated with specialty of participant (P= 0.05) but not with age or gender.

Table 4 Relationship between participant sociodemographic characteristics and specialty knowledge of Simon et al., (1972) classification of endo-perio lesions.

Parameter		**Know Simon et al., (1972) classification of endo-perio lesions**		**Total (N=623)**	**P value**
		Yes	No		
Age	18-20	0	2	2	0.468
		0.0%	0.7%	0.4%	
	21 - 25 years old	226	192	415	
		55.0%	53.4%	53.7%	
	26 - 30 years old	175	142	320	
		42.5%	40.2%	43.4%	
	31 – 35 years old	15	13	27	
		2.9%	3.6%	4.2%	
	36 - 40 years old	6	4	11	
		1.4%	1.1%	1.4%	
	41 - 50 years old	0	4	5	
		0.0%	0.8%	0.6%	
Gender	Female	203	150	353	0.129
		48.7%	42.1%	45.7%	
	Male	216	204	421	
		53.3%	55.9%	55.3%	
Specialty	Dental student	20	10	26	0.015
		6.3%	2.8%	1.6%	
	Dental intern	173	115	290	
		39.2%	32.7%	38.4%	

Comparing knowledge level to demographic characteristics was significantly associated with specialty of participant (P= 0.05) but not with gender table (5).

Table 5 Comparing knowledge level to demographic characteristics *P-values were determined using the Chi-square-test; p values of 0.05 were used to indicate statistical-significance.

Parameter		**Knowledge (+)**	**Knowledge (-)**	**Percent**	**P value**
Age	18-20	0	1	.2	0.002
	21 – 25 years old	135	171	49.2	
	26 – 30 years old	112	99	35.4	
	31 – 35 years old	29	34	10.2	
	36– 40 years old	15	11	4.2	
	41 – 50 years old	14	5	3.1	
Gender	Male	122	92	34.3	0.532
	Female	198	211	65.7	
Specialty	Dental student	43	103	23.5	0.017
	Dental intern	136	97	37.4	
	General dentist	129	114	39	

4. DISCUSSION

Because general dental practitioners manage the majority of the population, his understanding and awareness of Endo & perio disorders and their therapy are critical (Al-Zarea, 2013). Also because etiology and path physiology of pulp it is and apical periodontitis are well understood, general dental practitioners should work to achieve the best possible success rate in the field of endodontic. Although trauma, root resorptions, perforations, fractures, and dental anomalies all contribute to the development and progression of such diseases, viral & bacterial infection are the main causes of disease in the pulp & apical periodontium (Al-Fouzan, 2014). The care of endo & perio disease represents the most common difficulties in therapeutic practice today. The simultaneous occurrence of pulpal diseases and inflammatory-periodontal-diseases may make it more difficult to plan for diagnosis and treatment and may affect the sequence of care to be given (Raja Sunitha et al., 2008).

Out of 225 participants in the survey conducted in 2020, 97 (43.11%) of the doctors were aware of the risk factors and the illness criteria for endo & perio disease. Specialist dentists employed by the university have a higher rate (60.6%). For medical professionals working in a private clinic & dentists employed by a public hospital, respectively, the rates are significantly lower 41 % & 33%. Following recent publications and strong departmental communication are both factors in the university's greater than average concentration of dental specialists 68 (Khandelwal et al., 2020). In our survey, 55.5% of participants believe that the prognosis of real mixed lesion is doubtful most of the time, 32.9% believe it is bad or hopeless, and just 11.6% believe it is favourable. Only periodontal treatment is necessary for primary-periodontal diseases. Effective treatments involve surgical periodontics after etiologic treatment, which involves removing any triggers or supporters of epithelial down growth (Carrotte, 2004; Miao et al., 2015).

In our paper, 53.2% of participants identified Actinomycetemcomitans as the most-common bacteria associated with endo-perio lesion, 16.8% *T. denticola*, and 17.4% *S. mutans*, and 14% *S. aureus*. Most characteristics feature of primary periodontal lesion were identified as bone loss and deep pocket depth by 94.3%, caries by 3.8% and root perforation 1.9%. Regarding risk factors, 66.4% plaque and calculus, 58.4% of our studied sample reported defective restorations, 57.3% vertical root fracture, 52% dental caries, 26.6% malocclusion, and 25.5% reported excessive heat during endodontic therapy. A recent study found that 43.11% of dental practitioners were aware of risk factors and illness definitions for EPL (Çirakoglu & Karayürek, 2020).

In this paper, the treatment of primary perio secondary endo lesion was reported as 43.7% reported endodontic therapy followed by Periodontal therapy, 50% periodontal therapy followed by endodontic therapy, 4.3% periodontal therapy alone and 2% root canal treatment alone. The primary endo secondary perio lesion was reported to be managed as 76.5% reported endodontic therapy followed by periodontal therapy, 16.8% root canal treatment alone, and 5.8% periodontal therapy followed by endodontic therapy. In our investigation, participants' knowledge of Simon et al categorizations of endo-perio lesions were strongly linked with their specialization (P= 0.05), but not with their age or gender. In accordance with a previous paper, endo-dontists and perio-dontists are more knowledgeable and aware than dentists in other specialities. When demographic data were taken into consideration, it was discovered that there was no significant correlation between gender and awareness level, but that there was a substantial difference with regard to marital status. As a result, single people knew more about endo-perio and were more mindful of it than married people (Çirakoglu & Karayürek, 2020).

5. CONCLUSION

This study discovered that Saudi-Arabian dental practitioners have a medium of endo & perio diseases awareness and understanding. With the increase in expertise among dentists who treat these lesions, holding recurring seminars and training sessions for dentists working in public hospitals and private clinics to improve their knowledge level endo-perio diseases diagnosis and therapy may yield more favourable outcomes. It's likely that dental practitioner who is schooled in specializations will learn about Endo & perio lesion throughout their specialized training, which might save time and effort when determining the likely-hood of forthcoming Endo & perio lesion. The main limitation of this study is the lack of previous literature to compare with our results.

Ethical approval

Taif University Researchers supporting Project number (TURSP-2020/256) Taif University, Taif, Saudi Arabia.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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Conflict of interest

The authors declare that there is no conflict of interests

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