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Evaluation of Attitudes of General Dentists and Dental Specialists in Periodontal Examination and Oral Hygiene Practices: A Cross-Sectional Survey-Based Study

Genel Diş Hekimleri ve Uzman Diş Hekimlerinin Periodontal Muayene ve Oral Hijyen Uygulamalarındaki Tutumlarının Değerlendirilmesi: Kesitsel Anket Esaslı Bir Çalışma

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ABSTRACT Objective: Examination and diagnosis of periodontal diseases are of the utmost importance in a dentist's approach to their patients. Likewise, oral hygiene practices are vital to lower the prevalence of periodontal diseases. This study aims to evaluate the knowledge and attitudes of Turkish general dentists and dental specialists in the examination and diagnosis methods of periodontal diseases and oral hygiene instructions (OHI) practices. **Material and Methods:** A total of 326 dentists participated in the study. A questionnaire consisting of 31 questions shared by the "Google Forms" application was administered to physicians. Sociodemographic information such as gender, years of experience, specialty, institution/organization of practice, number of patients seen daily, and examination time allocated to patients were recorded. The remainder of the questionnaire consisted of dentists' attitudes and behaviors towards periodontal examination, frequency of periodontal probe use, and OHI. **Results:** The percentage of dentists who performed periodontal examination was 76.40% (n=249) while the percentage of dentists using periodontal probes during periodontal examination was 51.50% (n=168). The percentage of dentists who provided OHI to their patients was 62.90% (n=205). Dentists with more than 20 years of experience (85%) performed the most frequent periodontal examinations. Dentists with more than 20 years of professional experience provide their patients the most amount of OHI. **Conclusion:** It was observed that both the general dentists and dental specialists with more experience, and less patient load, working in non-governmental clinics presented better knowledge and attitudes toward periodontal treatment and care to their patients.

Keywords: Practice patterns of dentists; oral hygiene; referral and consultation; oral health

ÖZET Amaç: Periodontal hastalıkların muayenesi ve teşhisi, bir diş hekiminin hastalarına yaklaşımında son derece önemlidir. Aynı şekilde, oral hijyen uygulamaları da periodontal hastalıkların prevalansını azaltmak için hayati önem taşımaktadır. Bu çalışma, Türk diş hekimlerinin periodontal hastalıkların muayene ve teşhis metodları ile oral hijyen eğitimi uygulamaları konusundaki bilgi ve tutumlarını değerlendirmeyi amaçlamaktadır. **Gereç ve Yöntemler:** Çalışmaya toplam 326 diş hekimisi katılmıştır. Hekimlere "Google Forms" uygulaması ile paylaşılan 31 sorudan oluşan bir anket uygulandı. Cinsiyet, deneyim yılı, uzmanlık alanı, çalıştığı kurum/kuruluş, günlük bakılan hasta sayısı ve hastalara ayrılan muayene süresi gibi sosyodemografik bilgiler kaydedildi. Anketin geri kalanı diş hekimlerinin periodontal muayeneye yönelik tutum ve davranışları, periodontal sonda kullanım sıklığı ve ağız hijyeni talimatlarından [oral hygiene instructions (OHI)] oluşmuştur. **Bulgular:** Periodontal muayene yapan diş hekimlerinin oranı %76,40 (n=249) iken periodontal muayene sırasında periodontal sond kullanan diş hekimlerinin oranı %51,50 (n=168) idi. Hastalarına OHI sağlayan diş hekimlerinin oranı %62,90'dır (n=205). En sık periodontal muayeneyi 20 yıldan fazla deneyime sahip diş hekimleri (%85) gerçekleştirmiştir. Mesleki deneyimi 20 yıldan fazla olan diş hekimleri hastalarına en fazla oral hijyen eğitimi sağlamaktadır. **Sonuç:** Özel kliniklerde çalışan daha deneyimli ve daha az hasta yüküne sahip uzman diş hekimleri ve genel diş hekimlerinin hastalarına periodontal tedavi ve bakım konusunda daha iyi bilgi ve tutum sergiledikleri görülmüştür.

Anahtar Kelimeler: Diş hekimlerinin uygulama paternleri; ağız hijyeni; sevk ve konsültasyon; ağız sağlığı

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Periodontal diseases are chronic inflammatory conditions characterized by the destruction of the periodontium.¹ Failure to ensure oral hygiene routine has been recognized as a major risk for the development of periodontal diseases. It was found that poor oral hygiene can significantly increase the risk of periodontitis by 2 to 5 times.² Oral hygiene routines are defined as practices that aim to prevent periodontal diseases by regular removal of microbial dental biofilm, which stands as the primary causative factor for periodontal diseases.³

Given that oral hygiene is conducted with adequate thoroughness and at appropriate intervals, toothbrushing, along with interdental mechanical cleansing, can effectively manage microbial dental biofilm. Hence, promoting awareness about periodontitis prevention and fostering better oral health habits are the key to the prevention and management of periodontitis.⁴ The objective of oral hygiene instructions (OHI) is to foster the knowledge and attitudes necessary for cultivating behavioral patterns that contribute to enhanced oral health.⁵ OHI, which includes tooth-brushing exercise, is needed as a preventive measure to reduce the prevalence of dental caries and periodontal diseases.⁶ Amongst the variety of manual toothbrushing techniques, the most appropriate technique for every patient's needs should be suggested and introduced to the patient by the dentist.⁷ In various studies, it was observed that OHIs had positive effects on different indicators of oral health and have increased oral health knowledge, attitude, and behavior.⁸⁻¹⁰

Dentists play a vital role in the improvement of oral hygiene as well as in the diagnosis and treatment of periodontal diseases.¹¹ A thorough periodontal examination is a critically important data-collection activity that is necessary to arrive at a diagnosis and develop a treatment plan.¹² Early diagnosis of periodontal diseases is critical, and periodontal assessment is recommended as part of any comprehensive dental examination.¹³ Periodontal examination by using a periodontal probe must become routine to diagnose all patients with periodontal diseases as early as possible and to monitor oral hygiene improvements.¹⁴

Periodontal treatment procedures strive to reduce the inflammatory response, primarily through the eradication of bacterial deposits.¹⁵ The goals of periodontal therapy are to preserve the natural dentition, periodontium, and peri-implant tissues; and to maintain and improve periodontal and peri-implant health, comfort, esthetics, and function.¹⁶ If the dentist detects that periodontal diseases is present and is unwilling or unable to accurately diagnose and/or treat the type or extent of the disease, the dentist must offer the patient the opportunity to be evaluated by a periodontist who can complete the examination and diagnostic process.¹⁷

There has been valuable research conducted before this study evaluating the behavior of dentists in limited regions of Türkiye with smaller groups of participants such as the studies of Ercan et al. and Özçelebi and Ünsal.^{11,18}

Considering the insufficient data in the literature on Turkish dentists' and dental specialists' approaches to periodontal conditions this study aimed to evaluate general dentists' and all dental specialists' knowledge and attitudes of Turkish general dentists and dental specialists in the examination and diagnosis methods of periodontal diseases and OHI practices, shedding light on the possible misguided clinical practice in dental practice in Türkiye.

MATERIAL AND METHODS

Research Ethics approval for this project was obtained from the Okan University Science, Social, and Non-Interventional Health Sciences Research Ethics Committee with date/number November 16, 2022/160. A survey questionnaire form consisting of 31 questions and prepared using the "Google Forms" (Google, USA) application was administered to dentists online between October 2022 and March 2023. The questionnaire was conducted in Turkish. No identity information was requested from the physicians for the reliability of the results. The sample size was calculated with G*Power 3 as 326 participants (Pi percentile- incidence 21%, confidence interval 95%, margin of error 0.038%). All participants provided informed consent prior to participation in the study. This study was performed in line with the principles of the Declaration of Helsinki.

TABLE 1: Section B of the questionnaire.

| Serial Number | Questionnaire | Serial Number | Questionnaire |
|---------------|---|---------------|---|
| 1. | Do you perform a periodontal examination at the initial/general examination of each patient? a) Yes b) No | 4. | Do you recommend toothbrushes to your patients? a) Yes b) No |
| 1a. | Which diagnostic methods do you use in periodontal examination? (You can select more than one option.) a) Intraoral examination b) Clinical periodontal indexes c) Panoramic radiography d) Periapical radiography e) Tomographies | 4a. | Which feature(s) do you pay attention to in the toothbrush you recommend? (You can choose more than one option.) a) Round bristle tips b) The frequency of bristles c) The softness of the bristles d) The length of the toothbrush handle e) Ergonomic structure of the toothbrush f) The brand of the toothbrush g) An electric toothbrush |
| 1b. | Do you use periodontal probes for clinical periodontal measurements? a) Yes b) No | 5. | Do you recommend dentifrices to your patients? a) Yes b) No |
| 2. | Do you provide oral hygiene instructions to each patient? a) Yes b) No | 5a. | What/what do you pay attention to when recommending toothpaste? (You can choose more than one option.) a) Antiplaque feature b) Whitening feature c) Antisensitivity feature d) Fluoride content e) Lack of fluoride f) The brand of the dentifrice g) The taste and smell of the dentifrice |
| 2a. | When do you provide oral hygiene education to your patients? (You can choose more than one option.) a) After first examination b) After first dental procedure c) Before scaling d) After scaling e) The appointment after scaling if the oral hygiene is not adequate f) Control appointment after treatment | 5. | Do you recommend dentifrices to your patients? a) Yes b) No |
| 2b. | How much time do you allocate to each patients oral hygiene instructions? a) Less than 1 minute b) 1-5 mins c) 5-10 mins d) 10-30 mins | 5a. | What do you pay attention to when recommending toothpaste? (You can choose more than one option.) a) Antiplaque feature b) Whitening feature c) Antisensitivity feature d) Fluoride content e) Lack of fluoride f) The brand of the dentifrice g) The taste and smell of the dentifrice |
| 2c. | Which motivational tools do you use in oral hygiene education? (You can choose more than one option.) a) Dental models b) Brochures c) Verbal expression d) Practical expression e) Video demonstration | 6. | Which product(s) do you recommend to your patients for interdental care in addition to toothbrushes? (You can choose more than one option.) a) Dental floss b) Interdental brushes c) Toothpick d) Floss Pick e) None |
| 3. | Do you recommend a specific toothbrushing technique to your patients? a) Yes b) No | | Do you recommend mouthwashes to your patients? a) Yes b) No |
| 3a. | Which toothbrushing technique do you recommend to your patients? a) Bass Technique b) Modified Bass Technique c) Modified Stillman Technique d) Charters Technique e) Roll Technique | | For which clinical indications do you recommend mouthwash? (You can select more than one option.) a) Patients who have undergone scaling and root planing b) Only for patients who have undergone surgical operations c) Patients with systemic diseases who have undergone surgical operation d) Patients with halitosis e) To every patient |
| 3b. | Do you check that your patient understands brushing correctly? a) Yes b) No | 9. | What are your mouthwash recommendations for daily use? a) I recommend chlorhexidine mouthwashes. b) I recommend mouthwashes containing essential oils. c) I recommend mouthwashes that contain essential oils but not alcohol d) I recommend salt water. e) I do not recommend mouthwashes for daily use. |
| 3c. | How do you check that your patient understands brushing? (You can choose more than one option.) a) By asking the patient to demonstrate on the model b) By asking the patient to repeat verbally c) By asking the patient to show it in the mirror with his own brush d) In the control session with plaque staining agents e) By measuring the plaque index in the control session and comparing it with the baseline | | |

The dentists who participated were asked about their clinical periodontal practice. The questionnaire consisted of three sections: sections A, B, and C. In the questionnaire form, sociodemographic and professional information such as gender, province of practice, years of experience, specialty, institution/organization of practice, number of patients seen in a day, and examination time allocated to patients were recorded accordingly in section A. Section B of the questionnaire consisted of 19 questions recording attitudes about periodontal examination and oral hygiene education and tools (Table 1). Section C of the questionnaire consisted of 5 questions recording information about success criteria in periodontal treatment, and attitudes towards referral to periodontology specialists.

STATISTICAL METHOD

Descriptive statistics of the data obtained in the study were calculated and presented as frequency (n) and percentage (%). The relationship between various demographic information and frequency distributions according to the answers given to the questions was evaluated by Pearson chi-square and Fisher Freeman Halton analyses, computed to assess the relationships between the ratings of the study group, taking into account the ratio of expected values less than 5 to observed values. p values less than 0.05 were considered significant. Survey data were analyzed using the SPSS 21 (IBM, USA) package program for data analysis. Analyses of variance were used to compare the average responses of providers according to gender, province of practice, years of experience, specialty, institution/organization of practice, number of patients seen in a day, and examination time allocated to patients.

RESULTS

The study population consisted of 326 dentists which included 130 male (39.90%) and 196 female (60.10%) dentists. 55.50% of the participants were general dentists (n=181) and 16.90% (n=55) of the participants were periodontists. The remaining participants, constituting 27.60% (n=90) of the total, were dental specialists with various other areas of expertise. Table 2 displays the sociodemographic data of the participants of the current study.

TABLE 2: Sociodemographic and professional data of the participants.

| Variable | Frequency | n | % |
|---------------------|----------------------------------|-----|-------|
| Sex | Male | 130 | 39.90 |
| | Female | 196 | 60.10 |
| Years of experience | 0-5 years | 84 | 25.80 |
| | 5-10 years | 58 | 17.80 |
| | 10-20 years | 71 | 21.80 |
| | >20 years | 113 | 34.70 |
| Specialty | General dentistry | 181 | 55.50 |
| | Prosthodontics | 16 | 4.90 |
| | Restorative dentistry | 9 | 2.80 |
| | Oral and maxillofacial radiology | 7 | 2.10 |
| | Periodontics | 55 | 16.90 |
| | Oral and maxillofacial surgery | 12 | 3.70 |
| | Pediatric dentistry | 20 | 6.10 |
| | Orthodontics | 14 | 4.30 |
| | Endodontics | 12 | 3.70 |
| Workplace | Private dental offices | 195 | 59.80 |
| | Oral health centers | 48 | 14.70 |
| | Government dental hospitals | 4 | 1.20 |
| | Governmental university clinics | 38 | 11.70 |
| | Private university clinics | 41 | 12.60 |
| Patients per day | 0-5 patients | 71 | 21.80 |
| | 5-10 patients | 111 | 34.00 |
| | 10-15 patients | 64 | 19.60 |
| | >15 patients | 80 | 24.50 |
| Total | | 326 | 100 |

A substantial 76.4% (n=249) performed routine periodontal examinations, with 68.8% (n=224) employing periodontal probes during these assessments. Additionally, 62.9% (n=205) of the surveyed dentists consistently provided OHI to their patients. Furthermore, 76.4% (n=249) of the general dentists recommended specific toothbrushing techniques. Notably, 70.3% (n=229) ensured patients' comprehension of OHI. Product recommendations were also prevalent, with 84% (n=273) advising on toothbrush choices and 62.9% (n=205) offering toothpaste suggestions. In addition, 59.8% (n=194) of dentists advocated for the use of mouthwashes in their patients' oral care regimens. The highest percentage of toothbrushing techniques recommended was the modified Bass technique (55.5%) with the Roll technique following as the second most recommended toothbrushing technique (24.7%).

It was noted that dentists with over 20 years of professional experience exhibited a significantly higher rate of performing periodontal examinations on their patients, with an 85% compliance rate ($p<0.05$). Moreover, this same group of experienced dentists also demonstrated an inclination toward providing extensive OHI, with 77% ($n=87$) actively engaging in this practice ($p<0.05$). Furthermore, it was evident that the dentists with the highest level of professional experience were the primary proponents of recommending specific toothbrushing methods to their patients (Table 3).

Periodontists exhibited the highest degree of commitment to periodontal care, with 100% routinely conducting periodontal examinations. When periodontists were excluded from the specialist categories, no significant differences were detected among other dental specialists regarding the frequency of periodontal examinations. Additionally, periodontists demonstrated the significantly highest amount of dedication to patient education, with 92.7% consistently providing OHI. Excluding periodontists from the analysis, orthodontists (78.6%) and pedodontists (80%) emerged as the specialists most inclined to offer oral hygiene guidance, whereas oral and maxillofacial surgeons (25%) and endodontists (25%) were found to be less engaged in this aspect of patient care. Furthermore, periodontists stood out for their approach to recommending oral care products, with 96.4% advising on toothbrush selection and 98.2% suggesting specific toothbrushing methods. In contrast, endodontists (33.3%) recom-

mended specific toothbrushing methods less frequently than their peers. Among other specialists, endodontists (58.3%) and prosthodontists (68.8%) were less likely to recommend toothbrushes. Pedodontists, on the other hand, demonstrated a strong inclination to recommend toothpaste (90%) to their patients.

General dentists emerged as prominent advocates for mouthwash use, with 66.3% actively recommending it to their patients, while pedodontists displayed a lower inclination in this regard, with only 25% endorsing mouthwash usage (Table 4).

In oral health centers, our observations revealed a notably lower prevalence of periodontal examinations, utilization of periodontal probes, provision of OHI, and recommendations for toothbrushes compared to other workplaces within our study group. Furthermore, our findings revealed that OHI was provided at significantly higher rates in private dental offices (69.2%) and private university clinics (68.3%) compared to other workplace settings. Within private dental offices, recommendations for toothbrushes (88.7%) and toothbrushing techniques (86.7%) were notably more prevalent than in other workplaces (Table 5).

Dentists who attended more than 15 patients per day demonstrated the lowest rates of conducting periodontal examinations, employing periodontal probes, providing OHI, and recommending toothbrushing techniques, in contrast to their counterparts with fewer daily patient encounters. In the context of toothbrushing recommendations, it was notable that

TABLE 3: Questionnaire results grouped by years of professional experience.

| Years of professional experience | | 0-5 years | | 5-10 years | | 10-20 years | | >20 years | |
|--|-----|------------------|--------|-----------------|--------|------------------|--------|-----------------|--------|
| | | n | % | n | % | n | % | n | % |
| Performing periodontal examination | Yes | 62 ^{ab} | 73.8% | 38 ^b | 65.5% | 53 ^{ab} | 74.6% | 96 ^a | 85% |
| | No | 22 ^{ab} | 26.2% | 20 ^b | 34.5% | 18 ^{ab} | 25.4% | 17 ^a | 15% |
| Providing oral hygiene instructions | Yes | 48 ^a | 57.10% | 33 ^a | 56.90% | 37 ^a | 52.10% | 87 ^b | 77.00% |
| | No | 36 ^a | 42.90% | 25 ^a | 43.10% | 34 ^a | 47.90% | 26 ^b | 23.00% |
| Toothbrush recommendation | Yes | 65 ^{ab} | 77.4% | 38 ^b | 65.5% | 48 ^b | 67.6% | 98 ^a | 86.7% |
| | No | 19 ^{ab} | 22.6% | 20 ^b | 34.5% | 23 ^b | 32.4% | 15 ^a | 13.3% |
| Toothbrushing technique recommendation | Yes | 65 ^{ab} | 77.4% | 38 ^b | 65.5% | 48 ^b | 67.6% | 98 ^a | 86.7% |
| | No | 19 ^{ab} | 22.6% | 20 ^b | 34.5% | 23 ^b | 32.4% | 15 ^a | 13.3% |

a, b: Different letters given for each question (variable) indicate a statistically significant difference between the column ratios of the responses by years of professional experience ($p<0.05$).

TABLE 4: Questionnaire results grouped by specialization in dentistry.

| Specialty | General dentistry | | Prosthodontics | | Restorative dentistry | | Oral and maxillofacial radiology | | Periodontics | | Oral and maxillofacial surgery | | Pedodontics | | Orthodontics | | Endodontics | |
|--|---------------------|-------|------------------|-------|-----------------------|-------|----------------------------------|-------|--------------------|-------|--------------------------------|-------|-------------------|-----|-------------------|-------|-------------------|-------|
| | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % | n | % |
| Performing periodontal examinations | 133 ^a | 73.5% | 10 ^a | 62.5% | 8 ^{ab} | 88.9% | 6 ^{ab} | 85.7% | 5 ^b | 100% | 6 ^a | 50% | 13 ^a | 65% | 11 ^a | 78.6% | 7 ^a | 58.3% |
| | No | 26.5% | 6 ^a | 37.5% | 1 ^{ab} | 11.1% | 1 ^{ab} | 14.3% | 0 ^b | 0% | 6 ^a | 50% | 7 ^a | 35% | 3 ^a | 21.4% | 5 ^a | 41.7% |
| Providing oral hygiene instructions | 107 ^a | 59.1% | 6 ^a | 37.5% | 6 ^{ab} | 66.7% | 2 ^a | 28.6% | 51 ^a | 92.7% | 3 ^a | 25% | 16 ^{ab} | 80% | 11 ^{ab} | 78.6% | 3 ^a | 25% |
| | No | 40.9% | 10 ^a | 62.5% | 3 ^{ab} | 33.3% | 5 ^a | 71.4% | 4 ^b | 7.3% | 9 ^a | 75% | 4 ^{ab} | 20% | 3 ^{ab} | 21.4% | 9 ^a | 75% |
| Toothbrushing technique recommendation | 142 ^a | 78.5% | 8 ^{ab} | 50% | 7 ^{abc} | 77.8% | 3 ^{ab} | 42.9% | 54 ^c | 98.2% | 6 ^{ab} | 50% | 13 ^{ab} | 65% | 12 ^{abc} | 85.7% | 4 ^b | 33.3% |
| | No | 21.5% | 8 ^{ab} | 50% | 2 ^{abc} | 22.2% | 4 ^{ab} | 57.1% | 1 ^c | 1.8% | 6 ^{ab} | 50% | 7 ^{ab} | 35% | 2 ^{abc} | 14.3% | 8 ^b | 66.7% |
| Toothbrush recommendation | 151 ^{abc} | 83.4% | 11 ^c | 68.8% | 6 ^{abc} | 66.7% | 6 ^{abc} | 85.7% | 53 ^b | 96.4% | 10 ^{abc} | 83.3% | 18 ^{abc} | 90% | 11 ^{abc} | 78.6% | 7 ^{bc} | 58.3% |
| | No | 16.6% | 5 ^a | 31.3% | 3 ^{abc} | 33.3% | 1 ^{abc} | 14.3% | 2 ^b | 3.6% | 2 ^{abc} | 16.7% | 2 ^{abc} | 10% | 3 ^{abc} | 21.4% | 5 ^{bc} | 41.7% |
| Toothpaste recommendation | 117 ^{abcd} | 64.6% | 6 ^{cd} | 37.5% | 7 ^{abcd} | 77.8% | 5 ^{abcd} | 71.4% | 36 ^{abcd} | 65.5% | 3 ^{cd} | 25% | 18 ^a | 90% | 7 ^{abcd} | 50% | 6 ^{abcd} | 50% |
| | No | 35.4% | 10 ^{cd} | 62.5% | 2 ^{abcd} | 22.2% | 2 ^{abcd} | 28.6% | 19 ^{abcd} | 34.5% | 9 ^{cd} | 75% | 2 ^a | 10% | 7 ^{abcd} | 50% | 6 ^{abcd} | 50% |
| Mouthwash recommendation | 120 ^a | 66.3% | 10 ^{ab} | 62.5% | 4 ^{ab} | 44.4% | 5 ^{ab} | 71.4% | 33 ^{ab} | 60% | 7 ^{ab} | 58.3% | 5 ^a | 25% | 6 ^{ab} | 42.9% | 5 ^{ab} | 41.7% |
| | No | 33.7% | 6 ^{ab} | 37.5% | 5 ^{ab} | 55.6% | 2 ^{ab} | 28.6% | 22 ^{ab} | 40% | 5 ^{ab} | 41.7% | 15 ^b | 75% | 8 ^{ab} | 57.1% | 7 ^{ab} | 58.3% |

a, b, c, d: Different letters given for each question (variable) indicate a statistically significant difference between the column ratios of the responses by dental specialty (p<0.05).

dentists who attended to more than 15 patients per day suggested toothbrushes less than their counterparts seeing 5-10 patients per day (Table 6).

It was observed that of the participants 99.6% utilized intraoral examinations and 93.2% employed panoramic radiographs as their primary diagnostic methods. In contrast, clinical periodontal indexes (45%), periapical radiographs (44.2%), and tomographies (17.3%) were less frequently employed for diagnostic purposes (Figure 1). Our findings indicated that the majority of dentists routinely provided OHI to their patients following their initial intraoral examinations or scaling procedures (Figure 2). Notably, the verbal lecture technique emerged as the most commonly employed motivational tool among dentists (Figure 3). Moreover, our study revealed that a significant proportion of dentists, 90.3% (n=294), opted to refer their patients to periodontists on various occasions. The instances prompting such referrals predominantly included severe periodontal diseases (85.5%) and the need for periodontal surgery (88.4%) (Table 7).

DISCUSSION

Motivating and supporting patients in their efforts to maintain good oral hygiene practices is a fundamental step of periodontal treatment.¹⁹ It's important for healthcare providers to educate patients about the significance of optimal oral hygiene and to provide guidance on proper oral hygiene techniques.²⁰ The proper diagnosis, effective treatment plan, and determined risk factors of periodontal diseases play a pivotal role in achieving successful outcomes in periodontal treatment and preventing disease progression.²¹ It is important to consider that in other nations, where general dentists might delegate non-surgical treatment to dental hygienists, the perspectives of general dentists and periodontists could vary. This study aims to evaluate the knowledge and attitudes of Turkish general dentists and dental specialists in the examination and diagnosis methods of periodontal

TABLE 5: Questionnaire results grouped by workplace.

| Workplace | | Private dental offices | | Oral health centers | | Governmental dental hospitals | | Governmental university clinics | | Private university clinics | |
|--|-----|------------------------|-------|---------------------|-------|-------------------------------|------|---------------------------------|-------|----------------------------|-------|
| | | n | % | n | % | n | % | n | % | n | % |
| Performing periodontal examinations | Yes | 161 ^a | 82.6% | 21 ^b | 43.8% | 2 ^{ab} | 50% | 32 ^a | 84.2% | 33 ^a | 80.5% |
| | No | 34 ^a | 17.4% | 27 ^b | 56.3% | 2 ^{ab} | 50% | 6 ^a | 15.8% | 8 ^a | 19.5% |
| Use of periodontal probes | Yes | 111 ^a | 56.9% | 7 ^b | 14.6% | 0 ^{ab} | 0% | 26 ^a | 68.4% | 24 ^a | 58.5% |
| | No | 84 ^a | 43.1% | 41 ^b | 85.4% | 4 ^{ab} | 100% | 12 ^a | 31.6% | 17 ^a | 41.5% |
| Providing oral hygiene instructions | Yes | 135 ^a | 69.2% | 18 ^b | 37.5% | 1 ^{ab} | 25% | 23 ^{ab} | 60.5% | 28 ^a | 68.3% |
| | No | 60 ^a | 30.8% | 30 ^b | 62.5% | 3 ^{ab} | 75% | 15 ^{ab} | 39.5% | 13 ^a | 31.7% |
| Toothbrush recommendation | Yes | 173 ^a | 88.7% | 31 ^b | 64.6% | 3 ^{ab} | 75% | 31 ^{ab} | 81.6% | 35 ^{ab} | 85.4% |
| | No | 22 ^a | 11.3% | 17 ^b | 35.4% | 1 ^{ab} | 25% | 7 ^{ab} | 18.4% | 6 ^{ab} | 14.6% |
| Toothbrushing technique recommendation | Yes | 169 ^a | 86.7% | 24 ^b | 50% | 1 ^b | 25% | 26 ^{ab} | 68.4% | 29 ^{ab} | 70.7% |
| | No | 26 ^a | 13.3% | 24 ^b | 50% | 3 ^b | 75% | 12 ^{ab} | 31.6% | 12 ^{ab} | 29.3% |

a, b: Different letters given for each question (variable) indicate a statistically significant difference between the column ratios of the responses by workplace ($p < 0.05$).

TABLE 6: Questionnaire results grouped by patients per day.

| Patients per day | | 0-5 patients | | 5-10 patients | | 10-15 patients | | >15 patients | |
|--|-----|------------------|--------|------------------|--------|------------------|--------|-----------------|--------|
| | | n | % | n | % | n | % | n | % |
| Performing periodontal examination | Yes | 59 ^a | 83.1% | 90 ^a | 81.1% | 49 ^a | 76.6% | 51 ^b | 63.7% |
| | No | 12 ^a | 16.9% | 21 ^a | 18.9% | 15 ^a | 23.4% | 29 ^b | 36.3% |
| Use of periodontal probes | Yes | 44 ^a | 62% | 66 ^a | 59.5% | 33 ^a | 51.6% | 25 ^b | 31.3% |
| | No | 27 ^a | 38% | 45 ^a | 40.5% | 31 ^a | 48.4% | 55 ^b | 68.8% |
| Providing oral hygiene instructions | Yes | 52 ^a | 73.2% | 75 ^a | 67.6% | 43 ^a | 67.2% | 35 ^b | 43.8% |
| | No | 19 ^a | 26.8% | 36 ^a | 32.4% | 21 ^a | 32.8% | 45 ^b | 56.3% |
| Toothbrush recommendation | Yes | 60 ^{ab} | 84.50% | 100 ^b | 90.10% | 53 ^{ab} | 82.80% | 60 ^a | 75.00% |
| | No | 11 ^{ab} | 15.50% | 11 ^b | 9.90% | 11 ^{ab} | 17.20% | 20 ^a | 25.00% |
| Toothbrushing technique recommendation | Yes | 59 ^a | 83.1% | 89 ^a | 80.2% | 53 ^a | 82.8% | 48 ^b | 60% |
| | No | 12 ^a | 16.9% | 22 ^a | 19.8% | 11 ^a | 17.2% | 32 ^b | 40% |

a, b: Different letters given for each question (variable) indicate a statistically significant difference between the column ratios of the responses by patients per day ($p < 0.05$).

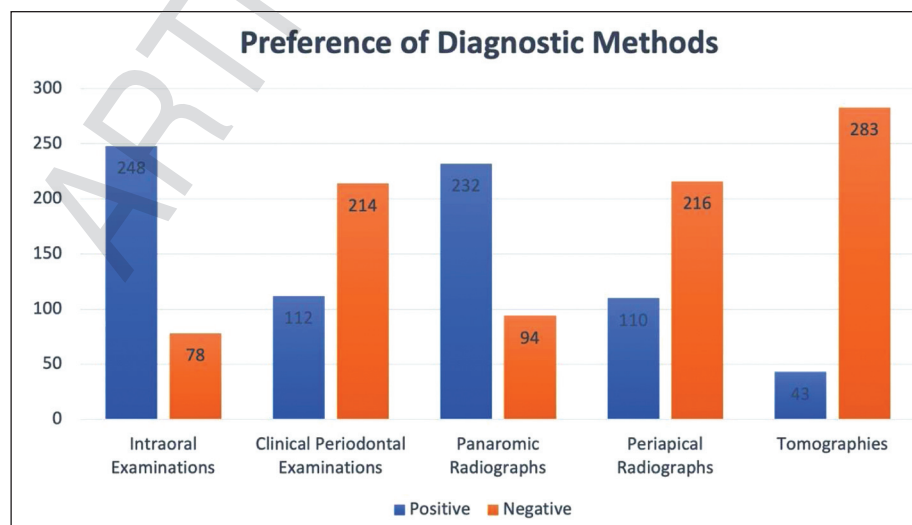


FIGURE 1: Preference of diagnostic methods of participants.

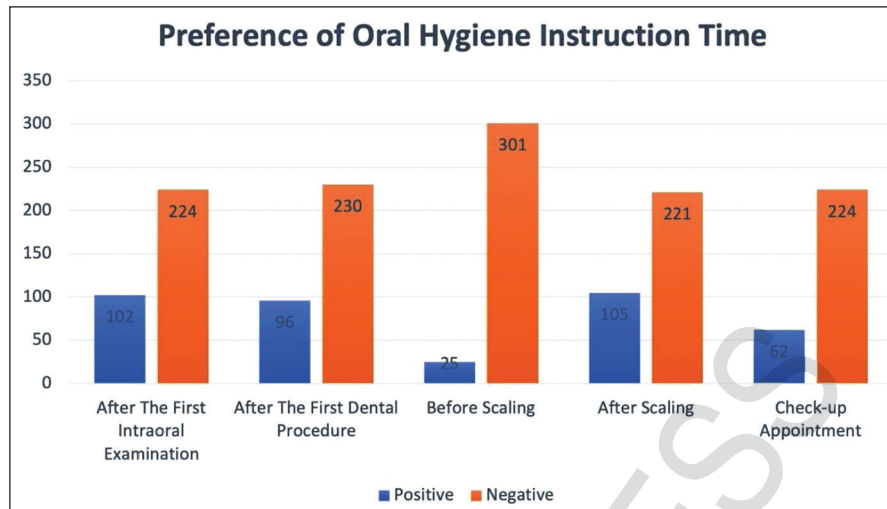


FIGURE 2: Preference time of oral hygiene instruction time by participants.

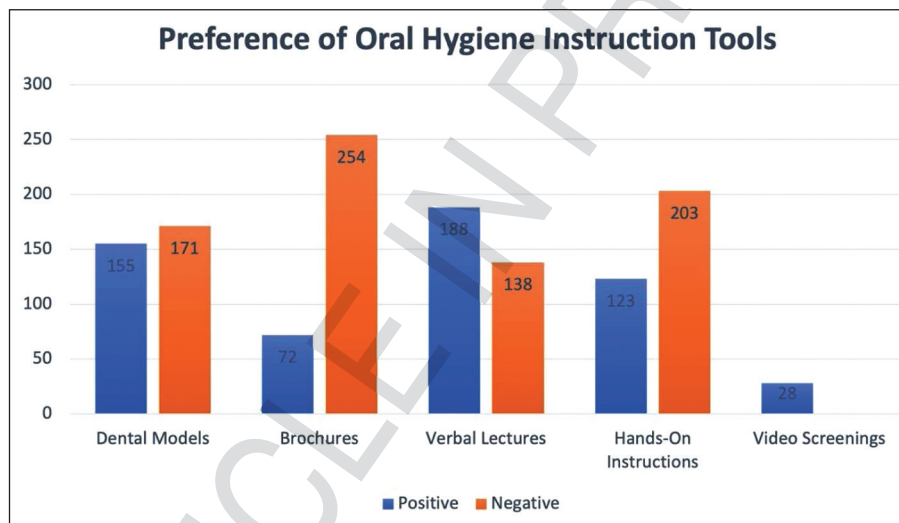


FIGURE 3: Preference of oral hygiene instruction tools by the participants.

TABLE 7: Distribution of dentists' referral reasons to periodontists.

| Referral to periodontists | Preference | n | Total |
|---|------------|-----|-------|
| Scaling and root planing | Positive | 146 | |
| | Negative | 180 | |
| Patients with systemic diseases | Positive | 34 | |
| | Negative | 292 | |
| Patients with severe periodontal diseases | Positive | 213 | 326 |
| | Negative | 113 | |
| Emergency periodontal treatment | Positive | 142 | |
| | Negative | 184 | |
| Lack of oral hygiene | Positive | 55 | |
| | Negative | 271 | |
| Periodontal surgery | Positive | 220 | |
| | Negative | 106 | |

diseases and OHI practices as it reports on the degree of knowledge of dentists assessing physicians' attitudes and behaviors towards periodontal examination, success criteria after periodontal treatment, and questions measuring whether physicians performed periodontal treatment and their tendency to refer their patients to periodontists.

Acknowledging that success in periodontal treatment is highly dependent upon the ability and willingness of the patient to maintain adequate oral hygiene, the study revealed that 62.88% of dentists in the study group provided OHI to their patients.²²

Özçelebi and Ünsal's study of general dentists found that 97.7% of physicians provided OHI to their patients.¹¹ In Darby's investigation on general dentists it was revealed that 96.7% of the participants offered general advice regarding oral hygiene to their patients.²³ On the contrary, previous research has documented increased instances of OHI being offered by dental professionals which could be attributed to the fact this research included both general dentists and dental specialists working in diverse settings across Türkiye, who are likely to have limited time and a higher amounts of patients to care for. Periodontists were notably more diligent in offering OHI aligning with expectations given their specialized focus on periodontal care. Another result is that the dentists who attended the most patients per day provided the lowest percentage of OHIs to their patients. Furthermore, 77% of dentists with more than 20 years of professional experience provided OHIs to their patients substantially more than all the other less experienced groups. In contrast, Ercan et al.'s investigation revealed a negative correlation between the increased professional experience of general dentists and a decline in patient motivation toward oral hygiene. The oral hygiene motivation rate was high in the first 10 years of clinical practice (60.3%) and lessened as the professional experience increased.¹⁸ Another potential rationale for the reduced levels of OHI provided by dentists detected could be attributed to the inclusion of both general dentists and dental specialists prioritizing their respective specialized procedures over general oral hygiene practices, which contrasts with earlier studies that primarily focused on general dentists.

In the current survey, 84% of participants recommended toothbrushes to their patients and gave the highest percentage (79.1%) of importance to the softness of the toothbrush bristles when making a toothbrush recommendation in contrast to the research by Gotjamanos et al. where it was seen that 47% of the participants made a toothbrush recommendation to their patients.²⁴ In previously mentioned research, it was revealed that 98.5% of the participants regularly provided instructions on proper brushing techniques as opposed to 76.4% in our results highlighting the potential gap in this critical aspect of OHIs.²³ Re-

garding toothpaste recommendations, our data showed that 62.9% of dentists recommended specific toothpaste, with pedodontists (90%) significantly outperforming other specialty groups in this regard. In Garyga et al.'s research, it was documented that 88.6% of general dentists and 81% of dental specialists did recommend toothpaste to their patients.²⁵ Amorim Junior et al. reported that 90% of pediatric dentists recommended fluoride toothpaste in pediatric patients after the first tooth eruption, and 92.8% recommended it after selective removal of carious tissue.²⁶ The uniformity in the existing body of evidence highlights the importance that pedodontists assign to the careful choice of toothpaste while pointing out that other dental specialists may not necessarily share the same perspectives or prioritize this aspect, given that oral hygiene is not among their specialties' specific focus areas.

Despite the well-established significance of periodontal treatment in maintaining oral health, reports suggest that the diagnosis and treatment of periodontal diseases might not be given the level of importance they deserve by dentists.²³ According to the survey results, it was uncovered that 76.4% of dentists conducted periodontal examinations for all of their patients which is consistent with previous literature, where 74.85% of dentists similarly conducted periodontal examinations at the first examination of their patients possibly revealing a pattern among Turkish dentists.¹¹ Similarly, another study revealed that 79.7% of general dentists reported screening all new patients for periodontal disease.²³ Previously, international studies have presented varying patterns. The study by Ghiabi and Weerasinghe reported a notably higher percentage, with 94.8% of 272 dentists performing periodontal examinations at the first general examination.²⁷ Conversely, the study conducted by Tugnait et al. found that substantially fewer dentists (56%) screened all their new patients using basic periodontal examinations.²⁸ The reason for the variance in these findings might be explained by the inclusion of different dental professionals and the differences in the resources available in each study group such as available time to allocate to each patient.

Periodontists emerged as the dental specialists who consistently performed higher numbers of peri-

odontal examinations aligning with expectations given their specialized focus on periodontal care. Extensively, it became evident that dentists with over two decades of experience were the ones conducting the most extensive number of periodontal examinations in contrast to their less experienced colleagues. This observation might suggest that experienced dentists, acknowledging the critical role of periodontal health, have begun to prioritize and pay greater attention to periodontal tissues. Furthermore, it was revealed that dentists working in oral health centers performed fewer periodontal examinations compared to their counterparts in private dental practices, as well as in both government and private university clinics. The observed finding may correlate with the considerable patient load and the constrained time allocation per patient encountered in oral health centers.

The accurate assessment and measurement of periodontal pockets is of fundamental importance for the diagnosis of periodontal diseases. To date, the periodontal probe is the only instrument that is both reliable and convenient for pocket examinations.²⁹ While recognizing the pivotal role of the periodontal probe in precise periodontal examinations, our survey revealed a usage rate of 68.8% for periodontal probes within our study group. International studies reveal a diverse landscape in the utilization of periodontal probes. For instance, the research by Ercan et al. reported that only 45.08% of 173 participants used periodontal probes during periodontal examinations.¹⁸ Similarly, 43.3% of 272 participants used periodontal probes during the initial examination in other research.²⁷ In contrast, the study of Meers et al., found that a substantial 92% of dentists employed periodontal probes during periodontal examinations.³⁰ Similarly, previous studies revealed that less than 40% of the participants recorded the community periodontal index of treatment needs or performed full-mouth probing.²³ The higher rate of probe usage in our study in comparison to most of the previously mentioned studies might be explained by our study including responses not only from general dentists but also from dental specialists who might give more importance to periodontal health. Additionally, it was apparent that periodontists relied more extensively on

periodontal probes, a practice intrinsic to their specialty due to the need for precise probing depth measurements and other periodontal assessments. Interestingly, there was no significant difference detected in the use of periodontal probes between dentists with varying years of experience despite the dentists with more than 20 years of experience conducting a higher number of periodontal examinations compared to their less experienced colleagues. This suggests that, regrettably, increased professional experience alone may not necessarily translate into greater adoption of ideal practices such as using periodontal probes for clinical measurements. Our research has highlighted an interesting dichotomy: while dentists in our sample conducted periodontal examinations with greater frequency, they tended to utilize periodontal probes less frequently, indicating a preference for visual inspection and radiographs as primary examination techniques in Turkish dental care services.

General dentists and dental specialists must be well-informed about the importance of making timely and appropriate referrals to periodontists when necessary, as recent studies have provided evidence that this referral process might be compromised in many instances.^{31,32} The study pointed out that instances prompting such referrals predominantly included severe periodontal disease (85.5%) and the need for periodontal surgery (88.4%). Comparatively, various studies conducted also addressed referrals to periodontists. The findings of the research of Pawar et al. indicated that 62.5% of patients were referred for scaling and root planing, while 71.9% were referred for periodontal surgeries.³³ Additionally, in the research conducted by Bennett et al. it was observed that in thirty days, 84% of the 160 participants referred their patients to periodontists.³⁴ To follow, in the study by Gilbert et al., it was observed that 40% of general dentists referred their patients to periodontists for non-surgical periodontal therapy while 68% of general dentists referred their patients to periodontists for surgical periodontal therapy.³⁵ Observing the lower amount of referrals recorded for patients in need of periodontal surgeries in international studies, it may be interpreted that dentists in Türkiye are less eager to conduct periodontal surg-

eries based on higher percentages of referrals. In line with our results, it was observed in the research conducted by Lee et al. that 43% of dentists referred their patients to periodontists for non-surgical therapy which might show Turkish dentists conduct non-surgical periodontal therapy as rarely as they conduct surgical periodontal therapy.³²

This research is subject to certain limitations. One limitation faced was the challenge of obtaining comprehensive and finely detailed unique responses to our research inquiries when relying on predefined survey answer choices. Finally, it's important to acknowledge the limitations, including both the possibility of measurement error and the potential for response bias among participants, especially given the self-reported online nature of the survey. While "Google Forms" offers basic analytics, it lacks advanced analytical tools necessary for complex research projects. The lack of advanced survey features can limit the survey design's depth and sophistication.

CONCLUSION

In conclusion, the study findings revealed noteworthy attitudes regarding oral health practices among dental professionals. Those with extensive experience in the field exhibited a higher tendency to provide comprehensive OHIs, conduct more frequent periodontal examinations, and recommend more toothbrushing techniques. Conversely, dentists daily attending the highest numbers of patients demonstrated a lower inclination to provide OHIs, perform periodontal examinations, and utilize periodontal probes, unlike those with a smaller patient load. Notably, comparisons between private dental offices and oral health centers highlighted a significant disparity, with oral health centers consistently showing lower rates in periodontal examinations, using periodontal probes, OHIs, and both toothbrush and toothbrushing tech-

nique recommendations compared to private offices. These findings highlight the critical necessity of establishing and implementing thorough training programs focused on oral hygiene practices and periodontal examination techniques across a range of dental specializations. Such training is especially essential in oral health centers, where diverse dental professionals interact with patients. By equipping general dentists with the necessary skills and knowledge, we can enhance the overall quality of care provided to patients and promote better oral health outcomes.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

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