JOURNAL OF DENTAL HEALTH & ORAL RESEARCH

e-ISSN 3050-9432

Journal of Dental Health and Oral Research

ATHENAEUM SCIENTIFIC PUBLISHERS

Research Article

Knowledge and Clinical Practices of Dentists in Türkiye Regarding Peri-Implantitis: A Cross-Sectional Study

Fatih Karaaslan[1], **Melis Acar**[2*]

[1]Associate Professor, Uşak University, Faculty of Dentistry, Department of Periodontology, 64200, Uşak, Türkiye

[2]Research Assistant, Uşak University, Faculty of Dentistry, Department of Periodontology, 64200, Uşak, Türkiye

***Correspondence author:** Melis Acar, Research Assistant, Uşak University, Faculty of Dentistry, Department of Periodontology, 64200, Uşak, Türkiye; E-mail: melis.acar@usak.edu.tr

Citation: Karaaslan F, et al. Knowledge and Clinical Practices of Dentists in Türkiye Regarding Peri-Implantitis: A Cross-Sectional Study. J Dental Health Oral Res. 2026;7(1):1-13.

https://doi.org/10.46889/JDHOR.2026.7121

Received Date: 07-02-2026

Accepted Date: 25-02-2026

Published Date: 04-03-2026

Abstract

Background: Peri-implant mucositis and peri-implantitis constitute the leading biological complications affecting long-term implant success. Despite the growing number of implants placed in Türkiye, evidence regarding dentists' knowledge and clinical practices on peri-implant diseases remains limited. This study evaluated dentists' knowledge, diagnostic approaches and treatment preferences related to peri-implantitis.

Methods: A nationwide cross-sectional online survey was administered between May-August 2025. The questionnaire included demographic characteristics and domains assessing knowledge, diagnostic criteria, risk-factor perception, treatment modalities and follow-up routines. Associations were examined using Chi-square/Fisher's exact tests with effect sizes reported as Cramér's V.

Results: A total of 460 dentists participated (52% female). Knowledge levels differed significantly across specialties (χ^2=197.1, p<0.001, V=0.46), with oral and maxillofacial surgeons (100%) and periodontists (93%) demonstrating the highest awareness, whereas general dentists (41%) and prosthodontists (33%) showed the lowest. Poor oral hygiene was the most frequently cited risk factor across all groups. Antibiotic prescribing was widespread, titanium curettes were commonly preferred for mechanical debridement and xenografts were the most frequently used regenerative materials. Most clinicians recommended three-month recall intervals. Patient reluctance was reported as the major barrier to treatment and current therapies were predominantly rated as moderately effective.

Conclusion: Marked variability exists in dentists' knowledge and peri-implantitis management practices in Türkiye, particularly among general practitioners and prosthodontists. Standardized diagnostic protocols and structured continuing professional education programs are needed to enhance clinical decision-making and improve long-term implant outcomes.

Keywords: Dental Implants; Peri-Implantitis; Dentist; Knowledge; Attitudes; Clinical Practice

Introduction

Dental implants have become a widely accepted and predictable treatment option for the rehabilitation of partially and fully edentulous patients [1]. However, the increased use of implants has been accompanied by a rise in biological complications, particularly peri-implant mucositis and peri-implantitis. Peri-implant mucositis is defined as a reversible inflammatory process confined to the peri-implant soft tissues, whereas peri-implantitis is characterized by inflammation combined with progressive marginal bone loss and clinical signs such as bleeding and/or suppuration on probing [2]. Epidemiological evidence highlights the global significance of these conditions. Peri-implant mucositis is estimated to affect nearly half of implant patients, whereas peri-implantitis occurs in approximately one-fifth of individuals and up to 9% of implants [3,4]. These diseases represent major

contributors to implant failure and impose considerable clinical and economic burdens by increasing the need for retreatment, maintenance and long-term follow-up care [4]. Although several non-surgical and surgical treatment modalities-such as mechanical debridement, antiseptics or antibiotics, laser- or light-based therapies, resective surgery, regenerative procedures and implantoplasty have been proposed, no universally accepted or standardized treatment protocol currently exists [2,5]. Consequently, early diagnosis, modification of risk factors and structured supportive care remain essential components in managing peri-implant diseases [2,6].

Multiple patient, implant and operator-related factors have been associated with the development of peri-implant diseases. Poor plaque control, a history of periodontitis, smoking, systemic conditions, prosthetic misfit and inadequate surgical placement are among the most consistently reported contributors [7]. Despite this evidence, international survey studies reveal considerable variability in clinicians' awareness of risk factors, diagnostic criteria and treatment preferences, highlighting a lack of standardization in daily practice [8,9]. In Türkiye, dental implant therapy has become increasingly common; however, limited data exist regarding dentists' knowledge, perceptions and clinical behavior related to peri-implant diseases. Understanding these parameters is crucial for identifying gaps in professional training, guiding continuing education programs and enhancing the quality of implant maintenance and disease prevention nationwide.

Therefore, the present study aimed to assess the knowledge, attitudes and clinical approaches of dentists in Türkiye regarding peri-implantitis, identify current deficiencies across different professional groups and provide an evidence-based foundation for future educational initiatives and guideline development efforts.

Materials and Methods

Study Design and Ethical Approval

This cross-sectional, web-based survey study was conducted between May and August 2025 to assess dentists' knowledge, attitudes and clinical practices regarding peri-implant diseases in Türkiye. The study was designed and reported in accordance with the STROBE guidelines for observational research. Ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Uşak University (Approval No: 676-676-24). Participation was voluntary, informed consent was obtained electronically prior to survey access and all responses were collected anonymously.

Sampling Strategy and Participants

Considering the nationwide distribution of dentists and the feasibility of digital recruitment, a non-probability convenience sampling method was employed. The survey link was disseminated through professional dental associations, institutional e-mail lists, specialty societies and social media platforms commonly used by dentists.

Inclusion criteria:
a) Licensed dentists actively practicing in Türkiye
b) Providing informed consent
c) Completing all mandatory items of the questionnaire

Exclusion criteria:
a) Duplicate entries detected using IP/time-stamp comparison
b) Intern or pre-graduate dental students
c) Responses showing internal inconsistencies or completion times <2 minutes (speed-response elimination)
A total of 512 submissions were received; after applying exclusion criteria, 460 valid responses were included in the final analysis (validation rate: 89.8%). This sample size exceeded the minimum requirement indicated by power analysis, ensuring sufficient statistical precision.

Sample Size Estimation

Sample size estimation was initially performed using G*Power 3.1 for Chi-square tests of independence. Assuming a medium effect size (Cramér's V = 0.30), $\alpha = 0.05$, power $(1 - \beta) = 0.80$ and degrees of freedom based on the number of response categories, the minimum required sample size was calculated as n = 88.

In addition, taking into account that the number of actively practicing dentists in Türkiye is approximately 40,000, a finite-population sample size calculation for a single proportion with a 95% confidence level (z = 1.96), maximum variability (p = 0.50) and a margin of error of 5% (d = 0.05) yields a required sample size of approximately n ≈ 380-381. The achieved sample size in the present study (n = 460) therefore exceeds both the power-based and population-based requirements, providing sufficient statistical power and acceptable precision for subgroup analyses by specialization, institution type, gender and years of experience.

Questionnaire Development and Validation

The questionnaire was developed based on previously published studies investigating peri-implant disease awareness and clinical practices [2-4,10-12]. It consisted of two main sections:

1. *Demographic and Professional Characteristics*
    - Gender
    - Age
    - Years of clinical experience
    - Area of specialization (e.g., oral surgery, periodontology, prosthodontics, general dentistry)
    - Institution type (public dental hospital, private clinic, university)
    - Experience in implant surgery
2. *Knowledge, Attitudes and Practices (KAP) Domains*
    - Item 1: Distinguishing peri-implant mucositis from peri-implantitis
    - Item 2: Estimated prevalence of peri-implantitis
    - Item 3: Perceived primary risk factors
    - Item 4: Antibiotic prescription habits
    - Item 5: Preferred mechanical debridement instruments
    - Item 6: Biomaterials used in regenerative surgery
    - Item 7: Recommended follow-up intervals
    - Item 8: Reasons for reluctance to perform peri-implantitis treatment
    - Item 9: Perceived effectiveness of current treatment modalities

All items were multiple-choice and aligned with comparable KAP surveys reported in the literature.

Content Validity

Two independent periodontology specialists evaluated the relevance, clarity and representativeness of the items. The content validity indices were:

I-CVI = 0.87-1.00

S-CVI/Ave = 0.93

indicating excellent content validity.

Pilot Testing

A pilot test was conducted with 20 dentists to assess clarity, readability and survey flow. Minor modifications were made and pilot responses were excluded from the final dataset.

Data Integrity and Quality Assurance

To minimize bias and ensure the validity of the findings, the following protocols were applied:

Response Validation: Although all survey items were set as mandatory in the online interface to ensure completeness, certain questions allowed for "No opinion" or "I prefer not to say" options to maintain response accuracy. These instances, along with any technical non-responses, were treated as "Missing at Random" (MAR) and handled via pairwise deletion in Chi-square/Fisher's exact tests. Consequently, the total number of respondents (n) may vary slightly across specific item analyses.

Speed Screening: A minimum threshold of two minutes (120 seconds) was established for survey completion; submissions falling below this duration were discarded to eliminate "speed-response" bias.

Deduplication: Potential duplicate entries were identified and removed by cross-referencing unique identifiers, including IP addresses and timestamps.

Inconsistency Check: Responses demonstrating internal contradictions (e.g., conflicting answers between related diagnostic criteria and clinical scenarios) were excluded during the preliminary data cleaning phase.

Final Sample: Out of 512 initial submissions, 460 were deemed valid for the final analysis, representing a validation rate of 89.8%. No statistical imputation was performed, ensuring that only original, verified data were used for statistical testing.

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics version 29.0. Descriptive statistics (frequencies, percentages) were used to summarize demographic and survey variables. Associations between categorical variables (gender, specialization, institution, years of experience) and peri-implantitis-related responses were assessed using the Pearson Chi-square test. Fisher's exact test was applied when ≥20% of expected cell counts were <5. Effect sizes for significant associations were calculated using Cramér's V All tests were two-tailed with $p < 0.05$ considered statistically significant. No imputation was performed; incomplete responses were excluded based on predefined criteria.

Results

A total of 460 dentists participated in the study (48% male, 52% female). Demographic characteristics including years in practice, specialization, institution type and implant-related experience are presented in Table 1.

Characteristic	n (%)
Gender	
Male	220 (48)
Female	240 (52)
Years in Profession	
0-5 years	260 (57)
6-10 years	140 (30)
11-15 years	55 (12)
16-20 years	5 (1.1)
Specialization	
Oral and Maxillofacial Surgeon	95 (21)
Periodontolog	145 (32)
Prosthodontics	30 (6.5)
General Dentist	185 (40)
Other Specialization	5 (1.1)
Institution of Employment	
Public Dental Hospital	80 (17)
Private Clinic	230 (50)
University	150 (33)
Implant Dentistry Experience	
0-5 years	300 (66)
6-10 years	125 (27)
11-20 years	30 (6.6)

Table 1: Demographic characteristics of the participants.

Gender-Based Comparisons

Recognition of the distinction between peri-implant mucositis and peri-implantitis was similar across genders (male: 68%; female: 69%; $p = 0.700$). Most respondents in both groups reported diagnosing peri-implantitis in 0-25% of their implant patients

(p = 0.400). Poor oral hygiene was the most frequently cited risk factor in both genders; however, females emphasized smoking more often than males, although the difference did not reach statistical significance (p = 0.069). Antibiotic prescription rates were relatively high in both groups (male: 52%; female: 64%). Titanium curettes were the most preferred mechanical debridement instruments (male: 77%; female: 62%). Xenografts represented the most commonly selected biomaterials across genders.

A three-month recall interval was the most frequently recommended follow-up schedule and patient reluctance was consistently reported as the primary barrier to performing peri-implantitis treatment. Both males and females predominantly rated current treatment modalities as moderately effective. Detailed gender-based findings are presented in Table 2.

		Gender									
Items	**Response**	**Male**			**Female**						
		n	**%**	**%C**	**n**	**%**	**%C**	**χ^2**	**df**	**p-value**	**Cramér's V**
	Yes	150	47.1	68	165	47.1	69				
Item 1	No	40	32.3	18	30	67.7	12	4.28	2	0.118	0.096
	No idea	30	25	14	45	75	19				
Item 2	0-25 %	185	50	84	185	50	77	3.15	1	0.076	0.083
	26-50%	35	39	16	55	61	23				
	Poor oral	175	52	81.33	160	48	68.33				
	hygiene										
Item 3								26.99	2	1.37E-06	0.245
	Periodontitis	20	66.7	9.33	10	33.3	4.33				
	history										
	Smoking	20	23.6	9.33	65	76.4	28.33				
Item 4	Yes	115	43.4	52	150	56.6	64	5.77	1	0.016	0.113
	No	105	55.3	48	85	44.7	36				
	Plastic curette	50	41.6	23	70	58.4	29.5				
Item 5	Titanium curette	170	54	77	145	46	62	24.85	2	0.000004	0.234
	Ultrasonic scaler	0	0	0	20	100	8.5				
	None	35	41	15	50	59	21				
Item 6	Autogenous graft	65	54	30	55	46	23	3.5	2	0.174	0.087
	Xenograft	120	47	55	135	53	56				
	Every 3 months	155	50	62.5	155	50	69				
Item 7	Every 5 months	0	0	2.5	50	100	2	44.53	2	2.13×10^{-10}	0.303
	Every 6 months	60	48	35	65	52	29				
	Patient reluctance	110	52	50	100	48	45				

	Difficulty in implant surface detoxification	10	25	10	30	75	15				
	Lack of knowledge	35	44	40	45	56	20				
Item 8	Unpredictable outcomes	55	55	30	45	45	20	12.5	3	0.0058	0.171
	Slightly effective	40	50	18	40	50	17				
	Very effective	5	25	2.3	15	75	6.5				
Item 9	Not effective	5	20	2.3	20	80	8.7	14.48	3	0.0023	0.179
	Moderately effective	170	52	77	155	48	67				

Table 2: Distribution of peri-implantitis knowledge, attitudes and clinical practices according to gender.

Experience-Based Comparisons

No statistically significant differences were found across experience groups regarding fundamental knowledge of peri-implant diseases ($p = 0.500$). Across all professional experience categories (0-5, 6-10, 11-15 and 16-20 years), most dentists reported diagnosing peri-implantitis in 0-25% of their cases ($p > 0.900$). Poor oral hygiene remained the most frequently reported risk factor regardless of experience level, whereas smoking was more commonly cited by dentists with 6-10 years of experience ($p = 0.200$). A significant association was identified only for biomaterial selection: xenograft use was significantly higher in the 11-15 years group ($p = 0.048$, Cramér's V medium effect). Other clinical preferences including antibiotic prescribing, preferred debridement methods and follow-up intervals did not differ significantly across experience groups. Patient reluctance was the leading barrier in all categories. Full distributions are provided in Table 3.

		Profession Year															
		0-5 years			**6-10 years**			**11-15 years**			**16-20 years**						
Items	**Response**	**n**	**%**	**%C**	**n**	**%**	**%C**	**n**	**%**	**%C**	**n**	**%**	**%C**	**χ^2**	**df**	**p-value**	**Cramér's V**
	Yes	185	59	71	35	11	64	95	30	68	0	0	0				
Item 1	No	30	43	12	10	15	18	25	35	18	5	7	100	32.23	6	1.48×10^{-5}	0.187
	No idea	45	60	17	10	13	18	20	27	14	0	0	0				
Item 2	0-25 %	205	55	79	45	12	82	115	31	82	5	2	100	1.96	3	0.58	0.065
	26-50%	55	61	21	10	11	18	25	28	18	0	0	0				
Item 3	Poor oral hygiene	195	58	76	45	14	82	95	28	70	0	0	0	77.98	6	9.33×10^{-15}	0.294

	Periodontitis history	10	33.3	3.9	5	16.7	9.1	10	33.3	7.4	5	16.7	100				
	Smoking	50	59	20	5	6	9.1	30	35	22	0	2	0				
Item 4	Yes	145	55	57	35	13	64	80	30	57	5	2	100	4.51	3	0.211	0.1
	No	110	56	43	20	11	36	60	33	43	0	0	0				
	Plastic curette	65	55	25	15	2	27	40	33	30	0	0	0				
Item 5	Titanium curette	185	59	71	35	11	64	90	28	67	5	2	100	13.8	9	0.129	0.092
	Ultrasonic scaler	10	50	3.8	5	25	9.1	5	25	3.7	0	0	0				
Item 6	None	60	70	23	5	6	9.1	20	24	14	0	0	0	44.12	3	1.42×10^{-9}	0.343
	Autogenous graft	60	50	23	0	0	0	60	50	43	0	0	0				
	Xenograft	140	54	54	50	20	91	60	24	43	5	2	100				
Item 7	Every 3 months	170	54	69	30	11	60	105	33	75	5	2	100	19.16	6		0.148
	Every 5 months	0	0	0	0	0	0	5	100	3.6	0	0	0			0.00389	
	Every 6 months	75	60	31	20	16	40	30	24	21	0	0	0				
	Patient reluctance	125	60	51	35	16	64	50	24	40	0	0	0				
	Difficulty in implant Surface detoxification	30	75	12	5	12.5	9.1	5	12.5	4	0	0	0	64.71	9		0.224
Item 8	Lack of knowledge	40	50	16	15	19	27	20	25	16	5	6	100			1.64×10^{-10}	
	Unpredictable outcomes	50	50	20	0	0	0	50	50	40	0	0	0				
	Slightly effective	45	56	18	0	0	0	35	44	25	0	0	0				
	Very effective	15	75	6	5	25	9.1	0	0	0	0	0	0				
Item 9	Not effective	10	40	4	10	40	18	5	20	3.6	0	0	0	43.95	9		0.18
	Moderately effective	180	55	72	40	13	73	100	30	71	5	2	100			1.44×10^{-6}	

Table 3: Association between clinical responses and years of professional experience.

Specialization-Based Comparisons

Knowledge levels varied markedly among dental specialties, with a highly significant association ($p < 0.001$). Oral and maxillofacial surgeons demonstrated perfect awareness (100%), followed by periodontists (93%). In contrast, general practitioners (41%) and prosthodontists (33%) showed substantially lower diagnostic knowledge.

Across all specialties, poor oral hygiene remained the most commonly identified risk factor. Prosthodontists more frequently attributed peri-implant disease to smoking. Antibiotic prescription, titanium curette use, xenograft preference and the

recommendation of three-month recall intervals were common across specializations.

Patient reluctance was the most frequently reported barrier to initiating peri-implantitis treatment. All specialties predominantly considered currently available treatment modalities as moderately effective. A detailed breakdown is available in Table 4.

Items	Response	Specialization																		
		Surgeon			Other Specialization			Periodontist			Dentist			Prosthodontics						
		n	%	%C	n	%	%C	n	%	%C	n	%	%C	n	%	%C	χ^2	df	p-value	Cramér's V
Item 1	Yes	95	30	100	0	0	0	135	43	93	75	24	41	10	3	33	197.1	8	2.61×10^{-38}	0.463
	No	0	0	0	5	7.1	100	5	7.1	3.4	50	71.5	27	10	14.3	33				
	No idea	0	0	0	0	0	0	5	6.7	3.4	60	80	32	10	13.3	33				
Item 2	0-25 %	95	25.6	100	5	1.4	100	145	39	100	100	27	54	25	7	83	141.57	4	1.30×10^{-29}	0.555
	26-50%	0	0	0	0	0	0	0	0	0	85	94.4	46	5	5.6	17				
Item 3	Poor oral hygiene	85	25.4	89	5	1.5	100	120	36	83	115	34.1	66	10	3	33	55.93	8	2.91×10^{-9}	0.249
	Periodontitis history	0	0	0	0	0	0	5	17	3.4	20	66	11	5	17	17				
	Smoking	10	12	11	0	0	0	20	23	14	40	47	23	15	18	50				
Item 4	Yes	50	19	53	0	0	0	90	34	62	105	39.5	58	20	7.5	67	9.95	4	0.041	0.148
	No	45	24	47	5	3	100	55	29	38	75	39	42	10	5	33				
Item 5	Plastic curette	30	25	32	0	0	0	45	37.5	31	40	33.3	22	5	4.2	17	38.84	12	0.000112	0.155
	Titanium curette	60	19	63	5	1.6	100	100	31.7	69	125	39.8	69	25	7.9	83				
	Ultrasonic scaler	5	25	5.3	0	0	0	0	0	0	15	75	8.3	0	0	0				
Item 6	None	15	17.6	16	5	5.9	100	15	17.6	10	45	53	24	5	5.9	17	3	4	0.557	0.089
	Autogenous graft	30	25	32	0	0	0	40	33.3	28	45	37.5	24	5	4.2	17				
	Xenograft	50	19.6	53	0	0	0	90	35.3	62	95	37.3	51	20	7.8	67				
Item 7	Every 3 months	65	21	68	5	1.6	100	115	37.1	79	100	32.2	61	25	8.1	83	32.03	8	0.000092	0.191
	Every 5 months	0	0	0	0	0	0	5	100	3.4	0	0	0	0	0	0				
	Every 6 months	30	24	32	0	0	0	25	20	17	65	52	39	5	4	17				
Item 8	Patient reluctance	50	24	59	0	0	0	70	33	48	70	33	42	20	10	67	73.9	12	5.94×10^{-11}	0.239
	Difficulty in implant Surface detoxification	5	12.5	5.9	5	12.5	100	15	37.5	10	10	25	6.1	5	12.5	17				
	Lack of knowledge	10	13	12	0	0	0	25	31	17	45	56	27	0	0	0				

	Unpredictable outcomes	20	20	24	0	0	0	35	35	24	40	40	24	5	5	17				
Item 9	Slightly effective	20	25	21	0	0	0	30	37.5	21	30	37.5	17	0	0	0	29.77	12	0.003	0.148
	Very effective	0	0	0	0	0	0	10	50	6.9	10	50	5.7	0	0	0				
	Not effective	10	40	11	0	0	0	10	40	6.9	5	20	2.9	0	0	0				
	Moderately effective	65	20	68	5	1.5	100	95	29.3	66	130	40	74	30	9.2	100				

Table 4: Specialization-based comparison of knowledge, risk perception and clinical management behaviors related to peri-implant diseases.

Institution-Based Comparisons

Significant institutional variation was identified in diagnostic knowledge (p = 0.021). University-based dentists exhibited the highest level of awareness (90%), while practitioners in public dental hospitals showed the lowest (50%). University clinicians also more frequently reported diagnosing peri-implantitis in 0-25% of cases compared with public and private settings (p = 0.002). Despite these differences, perceptions of risk factors (with poor oral hygiene ranked highest), patterns of antibiotic prescribing, preference for titanium curettes and xenograft utilization were broadly similar across institutions. A three-month follow-up interval was consistently recommended and patient reluctance remained the predominant barrier. Institutional comparisons are presented in Table 5.

		Institution												
		Public			**Private**			**University**						
Items	**Response**	**n**	**%**	**%C**	**n**	**%**	**%C**	**n**	**%**	**%C**	**χ^2**	**df**	**p-value**	**Cramér's V**
	Yes	40	12.7	50	140	44.4	61	135	42.9	90				
Item 1	No	20	29	25	45	64	20	5	7	3.3	197.1	8	1.63×10^{-10}	0.237
	No idea	20	26.7	25	45	60	20	10	13.3	6.7				
Item 2	0-25 %	45	12	56	180	49	78	145	39	96.7	141.57	4	8.71×10^{-13}	0.347
	26-50%	35	39	44	50	55	22	5	6	3.3				
	Poor oral hygiene	40	12	53	170	50.7	76	125	37.3	83		8		
Item 3	Periodontitis history	15	50	20	10	33.3	4.4	5	16.7	3.3	55.93		4.06×10^{-7}	0.198
	Smoking	20	24	27	45	52	20	20	24	13				
Item 4	Yes	50	19	63	125	47	56	90	34	60	9.95	4	0.483	0.057
	No	30	16	38	100	52	44	60	32	40				
Item 5	Plastic curette	20	17	27	65	54	28	35	29	23	38.84	12	0.000156	0.158
	Titanium curette	45	14	60	160	51	70	110	35	73				
	Ultrasonic scaler	10	50	13	5	25	2.2	5	25	3.3				
	None	15	18	19	55	64	24	15	18	10				
		25	21	31	50	42	22	45	37	30	3	4	0.316	0.078

Item 6	Autogenous graft												
	Xenograft	40	16	50	125	49	54	90	35	60				
	Every 3 months	45	15	64	150	48	68	115	37	77	32.03			
												8	0.057	0.102
Item 7	Every 5 months	0	0	0	5	100	2.3	0	0	0				
	Every 6 months	25	20	36	65	52	30	35	28	23				
	Patient reluctance	35	17	47	95	45	46	80	38	53				
	Difficulty in implant Surface detoxification										73.9		0.0129	0.137
		5	12.5	6.7	15	37.5	7.3	20	50	13				
Item 8												12		
	Lack of knowledge	10	13	13	50	62	24	20	25	13				
	Unpredictable outcomes	25	25	33	45	45	22	30	30	20				
	Slightly effective	0	0	0	55	69	24	25	31	17				
	Very effective	5	25	6.7	10	50	4.4	5	25	3.3				
Item 9	Not effective	5	20	6.7	10	40	4.4	10	40	6.7	29.77	12	0.000428	0.165
	Moderately effective	65	20	87	150	46	67	110	34	73				

Table 5: Association between clinical responses and institution type.

Discussion

This study provides a current and comprehensive assessment of dentists' knowledge, attitudes and clinical approaches toward peri-implant mucositis and peri-implantitis in Türkiye. Given the continuous growth of implant therapy and the increasing burden of biological complications worldwide, understanding clinician-related factors remains crucial for improving peri-implant disease prevention and management [1-7]. The inclusion of dentists from diverse specialties and practice settings allowed the present study to capture a wide spectrum of clinical behaviors, thereby revealing critical gaps that parallel and in certain domains surpass-those documented in international research. Consistent with previous investigations from Türkiye, Saudi Arabia, Brazil and the United Kingdom, gender did not emerge as a significant determinant of diagnostic knowledge in the current study [8,10,13-15]. Although female dentists more frequently identified smoking as a major risk factors a pattern similarly reported in Middle Eastern and Asian cohorts [8,14,16]. This difference did not reach statistical significance. This finding indicates that, despite some variations in risk-factor emphasis, gender-based differences in risk perception remain generally limited.

Of particular concern, both male and female dentists displayed high rates of antibiotic prescribing, despite robust evidence questioning the effectiveness of systemic antibiotics as a primary treatment modality for peri-implantitis [18]. This mirrors trends identified in earlier studies and highlights a persistent gap between evidence-based recommendations and real-world clinical practice [11,13,17]. Collectively, these observations emphasize the need for enhanced antimicrobial stewardship strategies and structured continuing education programs targeting both general practitioners and specialists. The present findings indicate that years of clinical experience did not translate into higher levels of knowledge regarding peri-implant diseases, reinforcing previous evidence that professional seniority alone does not guarantee competency in peri-implant diagnosis or management [8,13,16]. Although dentists with 6-10 years of experience more frequently identified smoking as a major etiological factor and

those with 11-15 years of experience more commonly selected xenografts during regenerative procedures, these patterns reflect only minor variations rather than systematic improvements. The increased xenograft preference among more experienced clinicians aligns with reports suggesting that seasoned practitioners tend to adopt regenerative approaches supported by contemporary evidence [19]. Nevertheless, the overall absence of consistent, experience-related differences suggests that structured postgraduate education may exert a more meaningful influence on peri-implant proficiency than experiential learning accumulated in daily practice.

The most pronounced and clinically consequential disparities emerged across dental specialties. Oral and maxillofacial surgeons and periodontists demonstrated substantially higher diagnostic knowledge, whereas general dentists and prosthodontists showed markedly limited awareness-an observation consistent with studies from Türkiye, Saudi Arabia, Brazil and Iran [8,10,13,14,16]. The increased emphasis on smoking among prosthodontists, also reported in Italian and Brazilian cohorts, may reflect heightened sensitivity to prosthetic design-related risk factors [10,20]. However, this does not mitigate their generally low diagnostic accuracy or insufficient adherence to evidence-based treatment strategies.

Across specialties, titanium curettes and xenografts remained the most commonly selected clinical tools and biomaterials, mirroring trends described in international surveys [21]. However, the widespread use of these modalities despite the absence of robust, high-quality evidence supporting their superiority underscores the persistent heterogeneity and lack of standardized treatment protocols that have been repeatedly criticized in the literature [5,21,22]. Such variability highlights the need for clearer clinical guidelines, improved continuing education pathways and enhanced interdisciplinary collaboration to promote consistent, evidence-based peri-implantitis management.

Institutional differences observed in this study further highlight systemic gaps in peri-implant diagnostic knowledge and clinical decision-making. Dentists affiliated with university-based institutions demonstrated the highest levels of knowledge and more frequently reported diagnosing peri-implantitis, a trend plausibly attributed to structured follow-up protocols, multidisciplinary case discussions and routine exposure to contemporary academic practices. These findings mirror results from Türkiye, Saudi Arabia and Spain, where university settings consistently outperform public and private sectors in evidence-based implant maintenance [8,13,14,23]. In contrast, dentists working in public dental hospitals exhibited the lowest awareness, likely reflecting limited access to continuing professional development, high patient load constraints and reduced exposure to updated clinical guidelines. Despite these institutional differences in knowledge, treatment preferences such as reliance on titanium curettes, xenografts and three-month recall intervals remained broadly inconsistent across all settings. This suggests that institutional environment alone may not be sufficient to standardize peri-implantitis management and that individual training background and postgraduate education exert a more substantial influence on practice patterns.

Despite its strengths, several limitations of the present study warrant careful consideration. The cross-sectional design restricts causal inference and the use of self-reported data introduces the potential for recall bias and social desirability bias. Furthermore, the use of a web-based, non-probability convenience sampling method may have introduced a selection bias; the findings likely reflect the perspectives of clinicians who are more digitally active or technologically proficient, potentially underrepresenting older dentists or those with limited access to professional digital networks. Although the sample included 460 dentists from diverse specialties, practice settings and geo graphical regions, it still represents a portion of Türkiye's dental workforce. While the questionnaire was adapted from previously validated instruments comprehensive psychometric testing within the current sample was limited. However, the high content validity indices and the results of the pilot study mitigate concerns regarding the instrument's relevance. Finally, the study assessed clinicians' perceptions and reported behaviors rather than objective measures such as diagnostic accuracy, radiographic interpretation or treatment outcomes, limiting the ability to evaluate the real-world effectiveness of the reported clinical approaches.

Conclusion

This study demonstrates that dentists in Türkiye display heterogeneous and frequently insufficient levels of knowledge regarding peri-implant mucositis and peri-implantitis, with the most pronounced deficiencies observed among general practitioners and prosthodontists. Despite the growing prevalence of implant therapy, diagnostic confidence, awareness of modifiable and non-modifiable risk factors and adherence to evidence-based treatment practices remain inconsistent across specialties and institutional settings. The widespread overuse of antibiotics and the variability in regenerative material selection

further underscore the absence of standardized, guideline-driven therapeutic protocols. These findings highlight the urgent need for structured and continuous professional education initiatives particularly for non-specialist clinicians-to enhance diagnostic accuracy, rationalize treatment strategies and promote more consistent peri-implant care. Nationally endorsed clinical guidelines, well-defined referral pathways and updates to undergraduate and postgraduate curricula may help harmonize practice patterns and reduce preventable complications.

Future research should incorporate objective clinical assessments, multicenter recruitment and longitudinal follow-up to validate self-reported behaviors and better understand the real-world effectiveness of peri-implantitis management strategies. Integrating patient-reported outcomes and evaluating the long-term impact of educational interventions may further strengthen the evidence base and support the development of standardized clinical protocols.

Conflict of Interest
The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding Statement
This research did not receive any specific grant from funding agencies in the public, commercial or non-profit sectors.

Study Protocol
Prospective Register of Systematic Reviews - CRD42022359009

Acknowledgement
We would like to thank all the volunteers who participated in our survey.

Data Availability Statement
Not applicable.

Ethical Statement
Approval was obtained from the Uşak University Ethics Committee (Date: 15.05.2025, Decision No: 676-676-24).

Informed Consent Statement
Informed consent was taken for this study.

Authors' Contributions
Concept - FK; Design - FK; Supervision - FK; Data Collection and/or Processing - MA; Analysis and/or Interpretation - FK, MA; Writing - FK, MA.

References
1. Malmqvist S, Erdenborg J, Johannsen G, Johannsen A. Patients' experiences of dental implants, peri-implantitis and its treatment: A qualitative interview study. Int J Dent Hyg. 2024;22(3):530-9.
2. Heitz-Mayfield LJ. Peri-implant mucositis and peri-implantitis: Key features and differences. Br Dent J. 2024;236(10):791-4.
3. Berglundh T, Armitage G, Araujo MG, Avila-Ortiz G, Blanco J, Camargo PM, et al. Peri-implant diseases and conditions: Consensus report of Workgroup 4 of the 2017 World Workshop. J Clin Periodontol. 2018;45(Suppl 20):S286-91.
4. Apaza-Bedoya K, Galarraga-Vinueza ME, Correa BB, Schwarz F, Benfatti CAM, Bianchini MA. Prevalence, risk indicators and clinical characteristics of peri-implant mucositis and peri-implantitis: A multicenter cross-sectional study. J Periodontol. 2024;95(6):582-93.
5. Derks J, Ichioka Y, Dionigi C, Trullenque-Eriksson A, Berglundh J, Tomasi C, et al. Prevention and management of peri-implant diseases: A systematic review of outcome measures used in clinical studies in the last 10 years. J Clin Periodontol. 2023;50(Suppl 26):55-66.
6. Renvert S, Persson GR, Pirih FQ, Camargo PM. Peri-implant health, peri-implant mucositis and peri-implantitis: Case definitions and diagnostic considerations. J Clin Periodontol. 2018;45(Suppl 20):S278-85.

7. Darby I. Risk factors for periodontitis and peri-implantitis. Periodontol 2000. 2022;90(1):9-12.
8. Zakaria O, Tabassum A, Attia D, Alshehri T, Alanazi DA, Alshehri J, et al. Dental practitioners' knowledge and attitudes toward peri-implantitis: A cross-sectional study. Dent J (Basel). 2024;12(12):387.
9. Polymeri A, Marti KC, Aronovich S, Inglehart MR. Periodontists' and oral surgeons' peri-implantitis-related education, knowledge and attitudes: A national survey. J Dent Educ. 2024;88(9):1167-79.
10. de Paula LG, Vieira JL, dos Santos DRM, Mendes PHC, Abdo VL, Durães SVPB, et al. Knowledge and attitudes of implantology clinicians regarding peri-implantitis management. Int J Dent Hyg. 2024;22(4):825-32.
11. Tripathi R, Vasudevan S, Palle AR, Gedela RK, Punj A, Vaishnavi V. Awareness and management of peri-implantitis among private dental practitioners in Hyderabad: A cross-sectional study. J Indian Soc Periodontol. 2020;24(5):461-6.
12. Alqahtani AR, Gufran K, Alqahtani AM, Alazemi FN, Alzahrani KM. Knowledge of general dentists toward management of peri-implant diseases: A multicenter study. Open Dent J. 2021;15:123-9.
13. Yiğit U, Yüksel H, Torumtay Cin G, Kurt Ş. Evaluation of dentists' clinical approaches in implant applications and peri-implantitis cases. Curr Res Dent Sci. 2022;32(3):145-52.
14. Madi M, Tabassum A, Attia D, Al Muhaish L, Al Mutiri H, Alshehri T, et al. Knowledge and attitude of dental students regarding peri-implantitis. J Dent Educ. 2024;88(1):100-8.
15. Thomas S, Barrak F. Awareness of peri-implantitis among general dental practitioners in the UK: A questionnaire study. Br Dent J. 2024;236:1-5.
16. Kadkhodazadeh M, Hosseinpour S, Kermani ME, Amid R. Knowledge and attitude of Iranian dentists towards peri-implant diseases. J Adv Periodontol Implant Dent. 2018;9(1):12-7.
17. Rodrigues S, Kashid RV, Mitra D, Khobragade B, Surve N. Knowledge and practices regarding peri-implantitis among dental practitioners: A cross-sectional study. J Indian Dent Assoc. 2022;16(6):15-21.
18. Feres M, Martins R, Souza JGS, Bertolini M, Barão VA, Shibli JA. Effectiveness of antibiotics for peri-implantitis treatment: A scoping review. Clin Implant Dent Relat Res. 2023;25(4):767-81.
19. Polymeri A, Anssari-Moin D, van der Horst J, Wismeijer D, Laine ML, Loos BG. Surgical treatment of peri-implantitis defects with two different xenografts: A randomized clinical pilot study. Clin Oral Implants Res. 2020;31(11):1047-60.
20. Di Murro B, Pranno N, Raco A, Pistilli R, Pompa G, Papi P. Knowledge and attitude towards retrograde peri-implantitis among Italian implantologists. Int J Environ Res Public Health. 2020;17(22):8356.
21. Mordini L, Sun N, Chang N, De Guzman JP, Generali L, Consolo U. Peri-implantitis regenerative therapy: A review. Biology (Basel). 2021;10(8):773.
22. Togashi AY, Carmelo RA, Pereira NC. Level of knowledge of dentists about peri-implantitis diagnosis and treatment. Dent Press Implantol. 2014;8(1):45-52.
23. Terradellas-Luengo A, García-García M, Figueiredo R, Valmaseda-Castellón E, Sánchez-Torres A. Knowledge about peri-implant diseases among dental students in Spain: A cross-sectional study. J Clin Exp Dent. 2025;17(8):e967-74.

About the journal

ATHENAEUM SCIENTIFIC PUBLISHERS

Journal of Dental Health and Oral Research is an international, peer-reviewed, open-access journal published by Athenaeum Scientific Publishers. The journal publishes original research articles, case reports, editorials, reviews and commentaries relevant to its scope. It aims to disseminate high-quality scholarly work that contributes to research, clinical practice and academic knowledge in the field.

All submissions are evaluated through a structured peer-review process in accordance with established editorial and ethical standards. Manuscripts are submitted and processed through the journal's online submission system.

Manuscript submission: https://athenaeumpub.com/submit-manuscript/