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Patients' Chief Complaints Across Different Periodontal Diseases: A Cross-Sectional Study

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ABSTRACT

Aim: This study assesses the relationship between periodontal chief complaints and different periodontal diseases, including variations across periodontitis stages and grades.

Methods: A total of 309 patients were enrolled. Demographic data, smoking status, brushing frequency, diabetes, periodontal complaints, and clinical parameters were recorded. Periodontal diseases were categorized as Gingivitis, Gingival Inflammation on a Reduced Periodontium, and Periodontitis. Periodontitis was further classified based on its stages and grades according to clinical and radiographic findings. Associations between periodontal disease groups, periodontitis stages/grades, and chief complaints were analyzed.

Results: Significant differences in age, plaque index, probing depth, bleeding on probing, and gingival index were observed among the periodontal disease groups. Halitosis was most the common complaint in the Gingival Inflammation on a Reduced Periodontium (12.8%) and Gingivitis (9.6%) groups, while it was significantly less frequent in the Periodontitis group (3.4%, $p<0.001$). Gingival recession was significantly more reported in the Gingival Inflammation on a Reduced Periodontium (23.4%) and Periodontitis (15.1%) groups. A significant proportion of patients in Stage I, II, and III primarily reported dental calculus removal as their chief complaint, whereas gingival bleeding and mobility were significantly more common among Stage IV patients. No significant differences were found between periodontal chief complaints and the grades of periodontitis.

Conclusion: Patients' periodontal complaints varied across disease types and periodontitis stages but not grades. Understanding these complaints can improve patient cooperation and treatment adherence, ultimately enhancing outcomes.

Farklı Periodontal Hastalıklar Karşısında Hastaların Başlıca Şikayetleri: Kesitsel Bir Çalışma

Makale Bilgisi

Makale Geçmişi

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Periodontitis,
Azalmış periodonsiyum.

ÖZET

Amaç: Bu çalışma, periodontitis evreleri ve dereceleri arasındaki farklılıklar da dahil olmak üzere, periodontal başlıca şikayetler ile farklı periodontal hastalıklar arasındaki ilişkiyi değerlendirmektedir.

Yöntem: Toplam 309 hasta çalışmaya dahil edildi. Demografik veriler, sigara içme durumu, diş fırçalama sıklığı, diyabet, periodontal şikayetler ve klinik parametreler kaydedildi. Periodontal hastalıklar Gingivitis, Azalmış Periodonsiyumda Gingival İnflamasyon ve Periodontitis olarak kategorize edildi. Periodontitis ayrıca klinik ve radyografik bulgulara göre evrelerine ve derecelerine göre sınıflandırılmıştır. Periodontal hastalık grupları, periodontitis evreleri/dereceleri ve başlıca şikayetler arasındaki ilişkiler analiz edilmiştir.

Bulgular: Periodontal hastalık grupları arasında yaş, plak indeksi, sondalama derinliği, sondalamada kanama ve gingival indeks açısından anlamlı farklılıklar gözlendi. Ağız kokusu en sık Azalmış Periodonsiyumda Gingival Enflamasyon (%12,8) ve Gingivitis (%9,6) gruplarında görülürken, Periodontitis grubunda anlamlı olarak daha az görülmüştür (%3,4, $p<0,001$). Dişeti çekilmesi Azalmış Periodonsiyumda Gingival Enflamasyon (%23,4) ve Periodontitis (%15,1) gruplarında anlamlı olarak daha fazla bildirilmiştir. Evre I, II ve III' teki hastaların önemli bir kısmı diş taşı temizliğini başlıca şikayetleri olarak bildirirken, diş eti kanaması ve mobilite şikayetleri Evre IV hastaları arasında önemli ölçüde daha yaygındı. Periodontal başlıca şikayetler ile periodontitis dereceleri arasında anlamlı bir fark bulunmamıştır.

Sonuçlar: Hastaların periodontal şikayetleri hastalık tipleri ve periodontitis evreleri arasında farklılık göstermiş ancak dereceler arasında farklılık göstermemiştir. Bu şikayetlerin anlaşılması, hasta işbirliğini ve tedaviye uyumu artırabilir ve nihayetinde tedavi sonuçlarını iyileştirebilir.

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INTRODUCTION

Periodontal diseases are multifactorial, multi-microbial conditions that progressively damage the supporting structures of the teeth, including the cementum, gingiva, alveolar bone, and periodontal ligament.[1] Gingivitis is the mildest form of periodontal disease and it is characterized by gingival inflammation without the loss of periodontal attachment. While gingivitis is reversible with proper oral hygiene, its progression can lead to periodontitis.[2] In addition to its local effects, periodontitis is also known to be associated with various systemic conditions, including cardiovascular diseases, diabetes, respiratory diseases, and pregnancy complications. This association is thought to be mediated through several physiological pathways, particularly the systemic dissemination of proinflammatory cytokines such as IL-1β, TNF-α, and IL-6, which can contribute to systemic inflammation and disease progression.

Gingival inflammation on a reduced periodontium can be challenging due to structural and functional vulnerabilities from periodontal attachment loss. As first defined in the 2017 World Workshop on the Classification of Periodontal and Peri-Implant Diseases and Conditions, this condition often arises from a history of periodontal disease, restorative treatments such as crown lengthening, or gingival recessions that compromise the periodontium.[3] Unless specific preventive strategies—such as proper oral hygiene, a balanced diet, regular dental check-ups, and control of risk factors like smoking and systemic conditions—are implemented, patients remain at risk of further periodontal destruction.

Periodontitis represents a more advanced phase of periodontal disease, characterized by an inflammatory process that extends deeper into the periodontal tissues, resulting in irreversible destruction of periodontal attachment and alveolar bone. To enhance the understanding and clinical management of periodontitis, the 2018 classification system introduced a revised framework, integrating staging and grading criteria.[4] The staging system stratifies the disease based on its severity, extent, and complexity of management, derived from clinical, radiographic, and historical findings. In parallel, the grading system allows for the assessment of the disease's progression rate and its association with factors such as daily amount of smoking and HbA1c levels related to diabetes mellitus.[5] This comprehensive approach aims to individualize treatment planning and improve prognostic evaluations.

Both gingivitis and periodontitis are prevalent in communities and are considered to be preventable and treatable diseases. According to estimates, 46% of people over 30 are affected by periodontal diseases in the United States.[6] It is estimated that 10% of people worldwide suffer from severe periodontitis, and the prevalence rises with age. [7] Severe periodontal disease was ranked as the eleventh most common disease worldwide by the Global Burden of Disease Study (2016).[8]

Patients' chief complaints, or the primary reasons they seek dental care, play a critical role in clinical diagnosis and treatment planning.[9] These complaints often reflect the most noticeable or distressing symptoms experienced by the patient, such as bleeding gums, sensitivities, tooth mobility, bad breath, aesthetic concerns, or the discomfort caused by the presence of dental calculus.[10] Understanding these chief complaints within the context of different periodontal diseases offers valuable insights into patients' priorities and perceptions of oral health.[11] Specifically, examining the relationships between gingivitis, reduced periodontium with gingival inflammation, different stages and grades of periodontitis, and the chief complaints can aid clinicians in personalizing interventions and improving

patient communication, ultimately enhancing treatment outcomes.

Therefore, this cross-sectional study aims to examine the chief complaints of patients with periodontal diseases and explore how these diseases influence patient experiences and awareness, providing guidance for clinicians to address their concerns effectively.

MATERIALS AND METHODS

Study design and participants

The data for this study included 309 individuals who visited the Periodontology clinics for various treatment purposes. Participants were included in the study after reviewing and signing the written informed consent following the ethical principles of the Declaration of Helsinki. The research protocol was approved by the Ethics Committee of Necmettin Erbakan University Faculty of Dentistry Non-Drug and Non-Medical Device Research Ethics Committee (Protocol No: 2024/498).

The inclusion criteria for the study were as follows: being over 18 years of age, not being pregnant, having a diagnosis of gingivitis, gingivitis in reduced periodontium, or periodontitis, and not having any mental or physical illness that could prevent them from expressing their chief complaint. The exclusion criteria included having undergone dental scaling within the past six months and having a diagnosis of gingival health or gingival health on reduced periodontium. This criterion was applied to avoid potential bias due to ongoing healing or alveolar remodeling following recent treatment, which could affect both clinical parameters and patient-reported outcomes.

Demographic data, including periodontal chief complaints (pCC), sex, age, diabetes mellitus status, smoking, and daily brushing frequency, were collected and recorded for the patients included in the study. Age groups were classified as under 30 years, 30 to 45 years, and over 45 years. Smoking behaviours were classified as smokers and non-smokers. Brushing frequency was assessed as follows: 1) no brushing, 2) once a day, 3) twice a day, and 4) several times a week. Gingival bleeding, tooth mobility, gingival recession, halitosis, gingival pain, gingival enlargement, sensitivity, dental calculus cleaning, and dental staining were classified as pCC.

Clinical measurements

Clinical periodontal parameters have been measured by the same clinician (M.D.). To assess the reliability of the clinician's measurements, a cohort of ten volunteers, who were not involved in the study, received periodontal assessments. The examinations were subsequently repeated two days later. The clinician exhibited a measurement consistency surpassing 90% between the two assessments. Bleeding on probing (BOP), gingival index (GI), plaque index (PI), and probing depth (PD) were documented for each patient utilizing a Williams periodontal probe (Hu-Friedy, Chicago, IL).[12,13] Clinical periodontal parameters were assessed for the full mouth at six areas per tooth: mesio-lingual, mid-lingual, disto-lingual, disto-facial, mid-facial, and mesio-facial surfaces.

Classification of Periodontal Diseases

The calibrated expert clinician determined periodontal disease according to the most recent and widely accepted 2017 classification of periodontal diseases criteria based on radiographic and clinical examination.[3] Patients exhibiting no radiographic bone loss (RBL), no clinical attachment loss (CAL), PD less than 3 mm, and bleeding on probing at 10% or greater were diagnosed with gingivitis.

According to the 2017 Classification of Periodontal and Peri-Implant Diseases and Conditions, gingival inflammation on a reduced periodontium refers to the presence of bleeding on probing (BOP) in sites with shallow probing depths (≤3 mm), in patients with a history of

periodontitis but without signs of active disease progression. These individuals have previously experienced clinical attachment loss (CAL) and/or radiographic bone loss (RBL) as a result of periodontitis, yet currently present with a stable periodontal condition—characterized by probing pocket depths of ≤4 mm, minimal or no BOP, and no further attachment loss. When gingival inflammation is observed in these patients without concurrent deep pockets or ongoing destruction, the diagnosis is defined as "gingival inflammation in a reduced but stable periodontium.

Periodontitis diagnosis was established based on interdental CAL affecting at least two non-adjacent teeth or the presence of buccal CAL ≥ 3 mm with PD ≥ 4 mm at two or more teeth. The severity of periodontitis was categorized into stages and grades. Stage I included cases with a maximum interproximal CAL of 1–2 mm. Stage II was defined by an interproximal CAL of 3–4 mm, PD up to 5 mm, RBL confined to the coronal third (15–33%), and no history of tooth loss due to periodontal disease. Stage III involved an interdental CAL of ≥ 5 mm, RBL reaching to the middle third of the root, and tooth loss attributed to periodontitis. Stage IV was characterized by interdental CAL ≥ 5 mm, deep periodontal lesions, and RBL reaching the apical of the root.

The grade was evaluated based on indirect indicators of progression through RBL relative to age, as no direct evidence of progression was available at the 5-year follow-up. RBL was determined as the percentage of root length lost in the worst-affected tooth in the dentition. Patients were assigned Grade A if the bone loss percentage divided by age was below 0.25; Grade B if it ranged from 0.25 to 1.0; and Grade C if it exceeded 1.0. Subsequently, grade modifications were made based on HbA1c levels for individuals with diabetes and the daily smoking quantity for smokers.

Statistical Analysis

The sample size for this research was determined based on the primary outcome of differences between the groups (gingivitis, gingivitis on reduced periodontium, and periodontitis, subdivided into 3 and 4 subgroups) in terms of the patients' chief complaints. Using an effect size of d = 0.50 (medium effect), $\alpha = 0.05$, and a power of 80% (1 - β), the minimum sample size required for each group was determined to be 34, resulting in a total of 309 participants across all groups. The study data were analyzed using IBM SPSS v23. The associations between categorical variables were examined using the Pearson chi-square test and the Monte Carlo-corrected Fisher's Exact test. Multiple comparisons were assessed using the Bonferroni-corrected z test. Descriptive statistics for continuous variables were reported as mean ± standard deviation and median (range), while categorical variables were summarized using frequency (n) and percentage (%). A p-value below 0.05 was deemed statistically significant.

RESULTS

This study evaluated the clinical and demographic characteristics of 309 patients. The mean age of the participants was 42.41 ± 15.4 years, and 176 of the individuals (57%) were female. Three periodontal disease groups were evaluated in the study: Gingival Inflammation on a Reduced Periodontium, Gingivitis, and Periodontitis. Significant differences were identified among these groups in terms of age, mean PD, GI, PI, and the mean percentage of BOP. In the Gingival Inflammation on a Reduced Periodontium group, the mean age was 51.94 ± 11.43 years, PD was 2.39 mm, GI was 1.39, PI was 1.53, and BOP was 46.57%. For the Gingivitis group, these values were 25.82 ± 8.54 years, 2.11 mm, 1.21, 1.42, and 38.85%, respectively. In the Periodontitis group, the mean age was 47.6 ± 12.79 years, PD was 3.41 mm, GI was 1.8, PI was 2.18, and BOP was 65.52%.

When the stages of periodontitis were analyzed, the mean PD increased progressively from Stage I to Stage IV, measured as 2.82 ±

0.34 mm, 3.19 ± 0.37 mm, 3.55 ± 0.74 mm, and 4.11 ± 0.94 mm, respectively. For Stage I, the PI, GI, and BOP values were 2.12 ± 0.41, 1.7 ± 0.44, and 55.65 ± 27.16, respectively, with a statistically significant increase observed across the stages ($p < 0.05$). Similarly, when the grades of periodontitis were analyzed, the mean PD increased from Grade A to Grade C, with values of 3.07 ± 0.41 mm, 3.43 ± 0.67 mm, and 3.57 ± 0.96 mm, respectively. In addition, there was no differences were observed between grades for PI, GI, or BOP values ($p > 0.05$).

Table 1. Relationship Between Periodontal Disease Groups and Chief Complaints/Demographics

	Gingival Inflammation on a Reduced Periodontium (n=47)	Gingivitis (n=83)	Periodontitis (n=179)	Total (N=309)	Test Statistics	p
Age Groups. *n* (%)						
<30 years	0 (0)[a]	65 (78.3)[b]	16 (8.9)[a]	81 (26.2)	164.364	**< 0.001**[x]
30-45 years	16 (34)[a]	13 (15.7)[b]	59 (33)[a]	88 (28.5)		
>45 years	31 (66)[a]	5 (6)[b]	104 (58.1)[a]	140 (45.3)		
Gender. *n* (%)						
Female	23 (48.9)[a]	63 (75.9)[b]	90 (50.3)[a]	176 (57)	16.642	**< 0.001**[x]
Male	24 (51.1)[a]	20 (24.1)[b]	89 (49.7)[a]	133 (43)		
Brushing Frequency						
No brushing	0 (0)[ab]	0 (0)[b]	17 (9.5)[a]	17 (5.5)	78.275	**< 0.001**[y]
Once a day	25 (53.2)[a]	24 (28.9)[b]	72 (40.2)[ab]	121 (39.2)		
Twice a day	17 (36.2)[a]	56 (67.5)[b]	35 (19.6)[c]	108 (34.9)		
Several times a week	5 (10.6)[a]	3 (3.6)[a]	55 (30.7)[b]	63 (20.4)		
Diabetes Mellitus						
Yes	9 (19.2)[a]	2 (2.4)[b]	20 (11.2)[ab]	31 (10)	10.630	**0.004**[y]
No	38 (80.9)[a]	81 (97.6)[b]	159 (88.8)[ab]	278 (90)		
Smoking						
Yes	12 (25.5)[ab]	12 (14.5)[b]	55 (30.7)[a]	79 (25.6)	7.887	**0.019**[x]
No	35 (74.5)[ab]	71 (85.5)[b]	124 (69.3)[a]	230 (74.4)		
Chief Complaints						
Halitosis	6 (12.8)[a]	8 (9.6)[ab]	6 (3.4)[b]	20 (6.5)	61.216	**< 0.001**[y]
Gingival Pain	3 (6.4)	6 (7.2)	9 (5)	18 (5.8)		
Gingival Enlargement	1 (2.1)	4 (4.8)	5 (2.8)	10 (3.2)		
Gingival Recession	11 (23.4)[a]	0 (0)[b]	27 (15.1)[a]	38 (12.3)		
Gingival Bleeding	4 (8.5)	10 (12)	30 (16.8)	44 (14.2)		
Dental Scaling	20 (42.6)	40 (48.2)	66 (36.9)	126 (40.8)		
Sensitivity	1 (2.1)	5 (6)	15 (8.4)	21 (6.8)		
Mobility	1 (2.1)[ab]	0 (0)[b]	18 (10.1)[a]	19 (6.2)		
Dental Staining	0 (0)[a]	10 (12)[b]	3 (1.7)[a]	13 (4.2)		
Number of Teeth						
≤20 teeth	9 (19.2)[a]	2 (2.4)[b]	33 (18.4)[a]	44 (14.2)	13.020	**0.002**[x]
≥21 teeth	38 (80.9)[a]	81 (97.6)[b]	146 (81.6)[a]	265 (85.8)		

x Pearson chi-square, y Monte Carlo corrected Fisher Exact Test, n (%); a-c: There is no difference between groups with the same letter.

Table 1 presents the relationship between periodontal disease groups and demographic data, along with periodontal chief complaints. A significant association was detected between age groups, gender, brushing frequency, and disease groups ($p < 0.001$). The Gingivitis group consisted predominantly of younger patients and had a higher proportion of females. Daily brushing frequency was statistically higher in the Gingivitis and Gingival Inflammation on a Reduced Periodontium group, whereas the Periodontitis group had a greater proportion of patients who brushed infrequently or not at all. The prevalence of diabetes differed significantly across the disease groups ($p = 0.004$). Diabetes was most prevalent in the Gingival Inflammation on a Reduced Periodontium group, followed by the Periodontitis group, and was least common in the Gingivitis group. Smoking prevalence also varied significantly ($p = 0.019$), with a notably higher rate observed in the Periodontitis group compared to the Gingivitis group.

Table 2. Relationship Between Periodontal Chief Complaints and Demographics

	Halitosis (n=20)	Gingival Pain (n=18)	Gingival Enlargement (n=10)	Gingival Recession (n=38)	Gingival Bleeding (n=44)	Dental Scaling (n=126)	Sensitivity (n=21)	Mobility (n=19)	Dental Staining (n=13)	Total (N=309)	Test Statistics	p
Age Groups												
<30 years	4 (20)^{abcdefg}	5 (27.8)^{cfg}	6 (60)^{dg}	0 (0)^{c}	13 (29.5)^{abdefg}	36 (28.6)^{abdefg}	8 (38.1)^{abdefg}	0 (0)^{bcf}	9 (69.2)^{adeg}	81 (26.2)	60.809	**<0.001**^{x}
30-45 years	8 (40)	5 (27.8)	0 (0)	16 (42.1)	12 (27.3)	33 (26.2)	1 (4.8)	9 (47.4)	4 (30.8)	88 (28.5)		
>45 years	8 (40)^{ab}	8 (44.4)^{ab}	4 (40)^{ab}	22 (57.9)^{b}	19 (43.2)^{ab}	57 (45.2)^{ab}	12 (57.1)^{b}	10 (52.6)^{ab}	0 (0)^{a}	140 (45.3)		
Gender												
Female	9 (45)	13 (72.2)	6 (60)	23 (60.5)	24 (54.6)	68 (54)	13 (61.9)	10 (52.6)	10 (76.9)	176 (57)	6.065	0.652^{x}
Male	11 (55)	5 (27.8)	4 (40)	15 (39.5)	20 (45.5)	58 (46)	8 (38.1)	9 (47.4)	3 (23.1)	133 (43)		
Brushing Frequency												
No brushing	1 (5)	0 (0)	0 (0)	4 (10.5)	3 (6.8)	7 (5.6)	0 (0)	2 (10.5)	0 (0)	17 (5.5)	24.779	0.319^{x}
Once a day	10 (50)	4 (22.2)	2 (20)	15 (39.5)	20 (45.5)	46 (36.5)	13 (61.9)	6 (31.6)	5 (38.5)	121 (39.2)		
Twice a day	6 (30)	10 (55.6)	4 (40)	13 (34.2)	10 (22.7)	48 (38.1)	6 (28.6)	4 (21.1)	7 (53.8)	108 (34.9)		
Several times a week	3 (15)	4 (22.2)	4 (40)	6 (15.8)	11 (25)	25 (19.8)	2 (9.5)	7 (36.8)	1 (7.7)	63 (20.4)		
Diabetes Mellitus												
Yes	2 (10)	2 (11.1)	1 (10)	8 (21.1)	4 (9.1)	9 (7.1)	2 (9.5)	3 (15.8)	0 (0)	31 (10)	7.920	0.372^{x}
No	18 (90)	16 (88.9)	9 (90)	30 (79)	40 (90.9)	117 (92.9)	19 (90.5)	16 (84.2)	13 (100)	278 (90)		
Smoking												
Yes	7 (35)	2 (11.1)	4 (40)	7 (18.4)	10 (22.7)	28 (22.2)	11 (52.4)	5 (26.3)	5 (38.5)	79 (25.6)	14.317	0.062^{x}
No	13 (65)	16 (88.9)	6 (60)	31 (81.6)	34 (77.3)	98 (77.8)	10 (47.6)	14 (73.7)	8 (61.5)	230 (74.4)		

x Monte Carlo corrected Fisher Exact Test; n (%); a-g: There is no difference between groups with the same letter.

Table 3. Relationship Between Periodontitis Stages and Chief Complaints/Demographics

	Stage I (n=31)	Stage II (n=54)	Stage III (n=64)	Stage IV (n=30)	Total (N=179)	Test Statistics	p
Age Groups						14.133	**0.023**^{x}
<30 Age	5 (16.1)	3 (5.6)	8 (12.5)	0 (0)	16 (8.9)		
30-45 Age	11 (35.5)	18 (33.3)	25 (39.1)	5 (16.7)	59 (33)		
>45 Age	15 (48.4)^{a}	33 (61.1)^{ab}	31 (48.4)^{a}	25 (83.3)^{b}	104 (58.1)		
Gender						3.970	0.265^{y}
Female	11 (35.5)	30 (55.6)	35 (54.7)	14 (46.7)	90 (50.3)		
Male	20 (64.5)	24 (44.4)	29 (45.3)	16 (53.3)	89 (49.7)		
Brushing Frequency						16.758	**0.047**^{x}
No brushing	1 (3.2)	3 (5.6)	10 (15.6)	3 (10)	17 (9.5)		
Once a day	13 (41.9)	21 (38.9)	26 (40.6)	12 (40)	72 (40.2)		
Twice a day	9 (29)^{a}	10 (18.5)^{ab}	15 (23.4)^{ab}	1 (3.3)^{b}	35 (19.6)		
Several times a week	8 (25.8)	20 (37)	13 (20.3)	14 (46.7)	55 (30.7)		
Diabetes Mellitus						0.246	1.000^{x}
Yes	3 (9.7)	6 (11.1)	8 (12.5)	3 (10)	20 (11.2)		
No	28 (90.3)	48 (88.9)	56 (87.5)	27 (90)	159 (88.8)		
Smoking						4.869	0.182^{y}
Yes	12 (38.7)	11 (20.4)	20 (31.3)	12 (40)	55 (30.7)		
No	19 (61.3)	43 (79.6)	44 (68.8)	18 (60)	124 (69.3)		
Chief Complaints						38.998	**0.007**^{x}
Halitosis	1 (3.2)	2 (3.7)	0 (0)	3 (10)	6 (3.4)		
Gingival Pain	2 (6.5)	3 (5.6)	2 (3.1)	2 (6.7)	9 (5)		
Gingival Enlargement	1 (3.2)	0 (0)	2 (3.1)	2 (6.7)	5 (2.8)		
Gingival Recession	4 (12.9)	10 (18.5)	9 (14.1)	4 (13.3)	27 (15.1)		
Gingival Bleeding	5 (16.1)	6 (11.1)	13 (20.3)	6 (20)	30 (16.8)		
Dental Scaling	14 (45.2)^{a}	26 (48.1)^{a}	23 (35.9)^{ab}	3 (10)^{b}	66 (36.9)		
Sensitivity	1 (3.2)	6 (11.1)	4 (6.3)	4 (13.3)	15 (8.4)		
Mobility	1 (3.2)	1 (1.9)	10 (15.6)	6 (20)	18 (10.1)		
Dental Staining	2 (6.5)	0 (0)	1 (1.6)	0 (0)	3 (1.7)		
Grade						15.365	**0.018**^{y}
Grade A	9 (29)	10 (18.5)	8 (12.5)	3 (10)	30 (16.8)		
Grade B	12 (38.7)	36 (66.7)	34 (53.1)	13 (43.3)	95 (53.1)		
Grade C	10 (32.3)^{ab}	8 (14.8)^{b}	22 (34.4)^{ab}	14 (46.7)^{a}	54 (30.2)		
Number of Teeth						49.968	**<0.001**^{y}
≤20 teeth	4 (12.9)^{a}	7 (13)^{a}	3 (4.7)^{a}	19 (63.3)^{b}	33 (18.4)		
≥21 teeth	27 (87.1)^{a}	47 (87)^{a}	61 (95.3)^{a}	11 (36.7)^{b}	146 (81.6)		

x Monte Carlo corrected Fisher Exact Test, y Pearson chi-square, n (%), a-b: There is no difference between groups with the same letter.

Several periodontal chief complaints demonstrated significant variations among the periodontal disease groups. Halitosis was most common in the Gingival Inflammation on a Reduced Periodontium (12.8%) and Gingivitis (9.6%) groups, while it was significantly less

frequent in the Periodontitis group (3.4%, $p < 0.001$). Gingival recession was predominantly observed in the Gingival Inflammation on a Reduced Periodontium (23.4%) and Periodontitis (15.1%) groups, with no cases reported in the Gingivitis group. Similarly, mobility was most frequently observed in the Periodontitis group (10.1%) but was absent in the Gingivitis group. Dental staining was significantly more common in the Gingivitis group (12%) compared to other groups. Other complaints, including gingival pain, gingival enlargement, gingival bleeding, scaling needs, and sensitivity, showed no statistically significant differences between the periodontal disease groups. The relationship between periodontal chief complaints and demographic data is presented in Table 2, where significant differences were observed only for age groups ($p < 0.001$).

The associations between the stages (Table 3) and grades (Table 4) of periodontitis and both periodontal chief complaints and demographic variables were also analyzed. Among the periodontitis stages, only the need for dental scaling showed statistically significant differences ($p = 0.007$). Regarding periodontitis grades, significant differences were observed only for age groups, gender, and smoking habits ($p < 0.05$).

Table 4. Relationship Between Periodontitis Grades and Chief Complaints/Demographics

	Grade A (n=30)	Grade B (n=95)	Grade C (n=54)	Total (N=179)	Test Statistics	p
Age Groups (years)					18.660	**0.001**[x]
<30 Age	4 (13.3)	4 (4.2)	8 (14.8)	16 (8.9)		
30-45 Age	16 (53.3)[a]	23 (24.2)[b]	20 (37)[ab]	59 (33)		
>45 Age	10 (33.3)	68 (71.6)	26 (48.1)	104 (58.1)		
Gender					6.800	**0.033**[y]
Female	14 (46.7)[ab]	56 (58.9)[b]	20 (37)[a]	90 (50.3)		
Male	16 (53.3)[ab]	39 (41.1)[b]	34 (63)[a]	89 (49.7)		
Brushing Frequency					5.524	0.484[x]
No brushing	1 (3.3)	9 (9.5)	7 (13)	17 (9.5)		
Once a day	15 (50)	37 (38.9)	20 (37)	72 (40.2)		
Twice a day	8 (26.7)	19 (20)	8 (14.8)	35 (19.6)		
Several times a week	6 (20)	30 (31.6)	19 (35.2)	55 (30.7)		
Diabetes Mellitus					2.959	0.231[x]
Yes	1 (3.3)	14 (14.7)	5 (9.3)	20 (11.2)		
No	29 (96.7)	81 (85.3)	49 (90.7)	159 (88.8)		
Smoking					47.429	**<0.001**[x]
Yes	0 (0)[a]	18 (18.9)[a]	37 (68.5)[b]	55 (30.7)		
No	30 (100)[a]	77 (81.1)[a]	17 (31.5)[b]	124 (69.3)		
Chief Complaints					22.824	0.070[x]
Halitosis	2 (6.7)	1 (1.1)	3 (5.6)	6 (3.4)		
Gingival Pain	3 (10)	5 (5.3)	1 (1.9)	9 (5)		
Gingival Enlargement	1 (3.3)	1 (1.1)	3 (5.6)	5 (2.8)		
Gingival Recession	4 (13.3)	17 (17.9)	6 (11.1)	27 (15.1)		
Gingival Bleeding	7 (23.3)	12 (12.6)	11 (20.4)	30 (16.8)		
Dental Scaling	9 (30)	42 (44.2)	15 (27.8)	66 (36.9)		
Sensitivity	2 (6.7)	9 (9.5)	4 (7.4)	15 (8.4)		
Mobility	1 (3.3)	8 (8.4)	9 (16.7)	18 (10.1)		
Dental Staining	1 (3.3)	0 (0)	2 (3.7)	3 (1.7)		
Stages					15.365	0.018[y]
Stage I	9 (30)	12 (12.6)	10 (18.5)	31 (17.3)		
Stage II	10 (33.3)	36 (37.9)	8 (14.8)	54 (30.2)		
Stage III	8 (26.7)	34 (35.8)	22 (40.7)	64 (35.8)		
Stage IV	3 (10)	13 (13.7)	14 (25.9)	30 (16.8)		
Number of Teeth					0.215	0.898[y]
≤20 teeth	5 (16.7)	17 (17.9)	11 (20.4)	33 (18.4)		
≥21 teeth	25 (83.3)	78 (82.1)	43 (79.6)	146 (81.6)		

x Monte Carlo corrected Fisher Exact Test; y Pearson Chi-square; n (%); a-b: There is no difference between groups with the same letter.

DISCUSSION

Identifying the relationship between periodontal chief complaints and periodontal diseases can aid early diagnosis and improve both clinician and patient decision-making. Periodontitis often lacks noticeable symptoms like pain, leading to delayed recognition and complaints.[14] Understanding how specific complaints correspond to distinct periodontal disease stages or grades may enhance awareness and provide insights into the natural progression of these conditions. This study investigates the relationship between various periodontal diseases, including different stages and grades of periodontitis, and patients' chief complaints. Additionally, this research is the first in the literature to examine the association between chief complaints and both gingival inflammation on reduced periodontium and periodontitis grades according to the 2017 periodontal disease classification.

The number of studies examining periodontal chief complaints in the literature is relatively limited.[10] In a 2020 study by Abdulkareem et al., chief complaints were categorized into "true" and "others".[15] They reported that the proportion of periodontitis patients with true periodontal chief complaints was less than 25%. In a study conducted by Elhassan et al., the chief complaints of 121 patients with periodontal disease were recorded.[16] It was noted that 32% of the patients did not have a true chief complaint but were informed by another clinician that they had gingival disease. Additionally, 31% of the patients reported gingival bleeding as their chief complaint, while the third most common complaint was a request for dental calculus cleaning, reported by 9% of the patients. Although the findings of our study differ from these previous studies, they are consistent with the studies by Grover et al. [17] and Gürbüz et al.[11] Both studies identified the need for dental calculus cleaning as the most common periodontal chief complaint among periodontitis patients. Similarly, in our study, the need for dental calculus cleaning emerged as the most frequently reported chief complaint among all periodontal disease groups (40.8%). This finding may be associated with the low level of periodontal disease awareness among individuals in the Turkish population. Problems such as gingival bleeding might not be perceived as complaints by some patients and could instead be regarded as a physiological condition. Furthermore, the discomfort caused by dental calculus in the oral cavity and its unaesthetic appearance could also contribute to the prominence of this complaint.

In the study by Yeh et al., a relationship was found between patients' chief complaints at their first periodontal visit and their adherence to basic periodontal treatment.[9] The results indicated that patients with acute symptomatic or asymptomatic complaints were more motivated to start periodontal treatment compared to those with chronic symptomatic complaints. In the study conducted by Brunsvold et al. in 1999 on patients with periodontitis, it was reported that over 50% of patients were unaware they had periodontal disease, yet their chief complaints were referrals and preserving their teeth.[10] The same study identified gingival bleeding, a true symptom of periodontitis, as the third most common chief complaint, reported by 20.4% of periodontitis patients. Similarly, the prevalence of halitosis as a chief complaint was reported as 6.8%, which is highly comparable to the rate observed in our study (6.5%). In the present study, 16.8% of periodontitis patients reported gingival bleeding, 10.1% reported mobility, 5% reported gingival pain, and 15.1% reported gingival recession as their chief complaints. The infrequent reporting of pain in complaints may be attributed to the chronic nature and slow progress of most periodontal diseases.

The chief complaint of halitosis was statistically significantly more prevalent in the gingival inflammation on reduced periodontium group in our study. This could be attributed to the history of previous periodontitis, the higher prevalence of papillary loss, and the subsequent difficulty in maintaining optimal interdental oral hygiene.[18-20] Additionally, the fact that 66% of patients in this group were over 45 years old, along with an increase in prosthetic treatments such as crown lengthening, may explain the higher frequency of halitosis as a chief complaint compared to the other groups.

In the study conducted by Soundarajan et al., gingival bleeding was reported as the most frequently reported chief complaint (22.95%), which differs from other studies.[21] After classifying periodontitis into severe, moderate, and mild stages, they found a link between the severity of periodontitis and chief complaints. In patients with chronic symptomatic complaints, the rate of severe periodontitis was higher (44.67%), while in patients with acute symptomatic and asymptomatic complaints, this rate was lower. Furthermore, the types of complaints varied according to the severity of periodontitis; for instance, in patients with severe periodontitis, the most prevalant complaint was bleeding gingivas (24.68%).

Smoking was most prevalent in the periodontitis group (30.7%) compared to other periodontal disease groups. This finding highlights the potential impact of smoking on periodontal health, as it is known to exacerbate inflammation, promote tissue destruction, weaken immune responses, and reduce gingival blood flow—factors that collectively contribute to the progression of periodontal disease.[22] These observations underscore the importance of smoking cessation in the management and prevention of periodontal conditions. As periodontitis progresses from stage I to stage IV, clinical periodontal parameters worsen and patients' chief complaints change accordingly. Gürbüz et al. conducted a regression model revealing that complaints of mobility and gingival bleeding were approximately threefold more prevalent in Stage III periodontitis patients compared to those in Stage I/II, while mobility complaints in Stage IV patients increased up to thirteenfold compared to Stage I/II.[11] Our study revealed a comparable trend, with mobility complaints increasing at the same with the progression of disease stages. Mobility complaints were more common in Stage III (15.6%) and Stage IV (20%) patients than in Stage I (3.2%) and Stage II (1.9%) patients. Gingival bleeding was more often in Stage III (20.3%) and Stage IV (20%) than in Stage I (16.1%) and Stage II (11.1%) patients. This observation suggests that as periodontitis progresses to higher stages, gingival bleeding becomes more frequent, which may reflect an increase in the severity of periodontal inflammation and the extent of tissue damage.

The distribution of patints' chief complaints among different age groups reveals significant patterns in the motivations for seeking periodontal care ($p<0.001$). Consistent with the findings of Gürbüz et al.,[11] patients under 30 years old predominantly reported halitosis (20%) and dental staining (69.2%), indicating concerns tied to aesthetics and social interactions. Conversely, patients over 45 years old exhibited higher rates of gingival recession (57.9%), mobility (52.6%), and sensitivity (57.1%), reflecting age-related periodontal deterioration. In the present study, patients with stage I or II periodontitis were more likely to brush their teeth once or twice daily, suggesting better oral hygiene habits. In contrast, those with Stage III or IV periodontitis exhibited higher rates of inadequate brushing, including "no brushing" (25.6%) or brushing "several times a week" (67%). These findings align with the established understanding that insufficient oral hygiene is a critical factor influencing the developing stages of periodontal disease.[23]

The absence of a statistically significant associations between periodontitis grades and chief complaints in our study, suggests that patients' reported complaints may not directly correlate with the progression rate of the periodontitis.[24] These findings highlight the importance of examining the periodontal clinical parameters to accurately assess disease progression, rather than relying on patient-reported complaints.[22]

There are certain limitations to our study. The study's cross-sectional design, the absence of assessment regarding the history of periodontitis in the reduced periodontium group, the single-center nature of the research, and the nonhomogeneous distribution of patients across the stages and grades of periodontitis are notable limitations. The grading of periodontitis patients was calculated using indirect evidence rather than 5-year follow-up data, which constitutes a methodological limitation. Furthermore, another limitations of this study is that smoking status was categorized only as smoker or non-smoker in the statistical analysis. Although the number of cigarettes smoked per day was considered during the clinical grading of periodontitis, a more detailed stratification among smokers (e.g., light, moderate, heavy smokers) was not performed. This may have limited our ability to assess the dose-dependent effect of smoking on periodontal parameters. Moreover, the subjective nature of chief complaints and the lack of a standardized questionnaire to assess them may have introduced variability in patient-reported data. Future studies could benefit from employing validated patient-reported outcome measures to better assess the relationship between subjective symptoms and clinical periodontal parameters.

CONCLUSION

Knowing patients' chief complaints can help clinicians personalize interventions and improve patient communication. Implementing periodontal therapies aimed at addressing these complaints can strengthen cooperation with the patient by encouraging more regular attendance at check-ups, ultimately leading to improved treatment outcomes. A better understanding of the relationship between chief complaints and periodontal disease stages can guide clinicians in tailoring their approach to enhance patient satisfaction and treatment success. Future multicenter studies with larger, diverse populations and longitudinal designs are needed to better understand the effect of chief complaints on periodontal treatment adherence and outcomes.

Ethical Approval

Ethical approval was obtained from the Necmettin Erbakan University Faculty of Dentistry Non-Drug and Non-Medical Device Research Ethics Committee (Protocol No: 2024/498).

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Conflict of Interest

The authors deny any conflicts of interest related to this study.

Author Contributions

Design: OB, MD Data collection or access: OB,MD Analysis and comments: OB, FUY, ZTE Literature search: OB, ZTE, FUY, MD Writing: OB.

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