

Dentists' Attention to Periodontal Therapy in the Patients Treatment Planning to Dental Clinics of Isfahan City

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Abstract

Periodontal disease is among the most common oral conditions. However, due to the absence of patient complaints in most cases, dental clinicians often pay less attention to periodontal status. This study aimed to assess the dental clinicians' attention to periodontal therapy in the treatment planning of patients presenting to dental clinics of Isfahan city during 2016-2017. This cross-sectional study evaluated 251 patients presenting to dental clinics in Isfahan. The treatment plan suggested by dental clinicians for patients was recorded in a checklist. The suggested treatment plan concerning periodontal treatments was then compared with the actual patient needs to be determined by the community periodontal index of treatment needs (CPITN). Data were analyzed using SPSS version 24 via the chi-square test, Kruskal-Wallis test, and kappa coefficient at $P < 0.05$ level of significance. The treatment plans of 200 patients did not include any periodontal therapy; whereas, 28% of these patients required oral hygiene instruction, 51.5% required oral hygiene instruction and scaling and root planing (SRP), and 3.5% required oral hygiene instruction, SRP, and periodontal surgery. According to the results, dentists' attention to periodontal disease is low and the level of knowledge, attitude, and behavior of general dentists should be improved concerning periodontal disease.

Keywords: Periodontal disease, Community periodontal index of treatment needs, CPITN, Periodontal therapy

INTRODUCTION

Periodontal disease is a common inflammatory condition, which starts from gingivitis and progresses to periodontitis. Periodontal disease often occurs as the result of the activity of pathogenic microbiota and its effect on the innate and adaptive immune responses and subsequent development of inflammatory processes. Changes in the immune system negatively affect the tooth-supporting structures and can lead to attachment loss, bone loss, and eventual tooth loss [1-3]. Periodontal disease affects both males and females and its prevalence increases with age [4-6]. According to the World Health Organization statistics, about half the children and the majority of adults worldwide may experience variable levels of periodontal disease [4]. The incidence of periodontal disease is 96.30% in India [7], 62% in Georgia [8], less than 10% to 77% in Latin America [9], and 47% in the United States [10].

Screening for periodontal disease and proper and prompt treatment planning is highly important for several reasons. First, periodontal disease is among the main causes of tooth loss [11, 12]. Second, periodontal disease may be associated with some systemic disorders such as cardiovascular diseases, diabetes mellitus, osteoporosis, pulmonary diseases, systemic infections, premature birth, and cancers of the oral cavity, upper gastrointestinal tract, and the lungs [13-15].

Moreover, periodontal disease can negatively affect the quality of life [16, 17].

Several indexes are used in epidemiologic studies to assess the periodontal status of patients. The community periodontal index of treatment needs (CPITN) is among the most important indexes used to determine the periodontal treatment need of patients [18]. It was designed by Ainamo *et al.*, in 1982 upon request by the World Health Organization [19]. Different health organizations worldwide use CPITN to assess the periodontal status and the treatment needs of their respective communities [20]. However, CPITN is an index of

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treatment needs and cannot replace clinical indices such as clinical attachment level, since it cannot differentiate between different periodontal conditions [21].

During the recent decades, the CPITN has been frequently used for the assessment of periodontal status and the need for periodontal treatment in different communities. According to the CPITN, periodontal treatment need was 61% in an Indian subpopulation ≥ 15 years of age [22]. Zovko *et al.*, in Herzegovina evaluated the treatment needs of 20 to 49-year-olds and reported that 8% required oral hygiene instruction, 81.8% required prophylaxis and initial treatment, and 2.6% required professional treatment [23]. Hesari *et al.*, in Iran reported that only 1% of 35 to 45-year-olds had CPITN=0 [24]. Sanei *et al.*, evaluated 13 provinces of Iran and reported healthy periodontal status in only 14.5% of the population of adolescents. They showed that CPITN was significantly higher in boys, villagers, those with occasional toothbrushing, and large families [25].

Considering the high prevalence of periodontal problems reported in previous studies, it is imperative for dental clinicians to thoroughly evaluate the periodontal status of patients during dental visits [26]. However, despite the high prevalence and significance of periodontal disease, periodontal therapy is sometimes overlooked in the treatment planning of patients [27]. Thus, this study aimed to assess the dental clinicians' attention to periodontal therapy in the treatment planning of patients presenting to dental clinics of Isfahan city, Iran.

MATERIALS AND METHODS

This descriptive, cross-sectional study was carried out at the School of Dentistry, Isfahan University of Medical Sciences, in 2016. The target population comprised of patients presenting to dental clinics of Isfahan city in 2016.

The inclusion criteria were age ≥ 19 years, patients presenting to a general dentist, and both the patient and dental clinician's consent for participation in the study. Not answering the questions in the questionnaire and dental clinicians not consenting to the study were the exclusion criteria.

Patients were selected by cluster sampling. First, the list of dental clinics (both private and public) in 14 districts of Isfahan city was obtained and from each district, proportionate to the population of the respective district, one to three clinics were randomly chosen. Uncooperative clinics were excluded and replaced. In each selected clinic, patients were selected using convenience sampling. A total of 251 patients were enrolled as such. After briefing the patients about the objectives and methodology of the study, written informed consent was obtained from them and a checklist was used to collect information regarding age, sex, level of education, frequency of daily toothbrushing, history of previous dental treatments, and cigarette smoking. After routine dental examination of patients by the attending dentist

in the clinic, the treatment plan suggested by the dentist was recorded in a checklist.

Periodontal examination was performed using a periodontal probe (612 WHO) and a dental mirror on a dental chair under adequate lighting by an experienced dentist. The periodontal status of the patients and their periodontal treatment needs were determined using the CPITN according to **Table 1** [28].

Table 1. Community Periodontal Index of Treatment Needs

Periodontal status	CPITN score	TN code	TNs
Healthy	0	0	No periodontal TNs
Bleeding on probing	1	1	Oral hygiene improvement
Supragingival or subgingival calculus	2	2	Calculus removal and oral hygiene improvement
Pockets (4 or 5mm)	3	2	Calculus removal and oral hygiene improvement
Pockets (>6mm)	4	3	Complex periodontal care and oral hygiene improvement

A complete oral examination was carried out. Each jaw was divided into six sextants (one in the front and two in the back of each arch). Accordingly, the number of teeth in these sextants included 14-17, 13-23, 24-27, 34-37, 33-43, and 44-47. In each sextant, a minimum of two teeth had to be present with no indication for extraction. In the case of the presence of fewer than two teeth, the single tooth was included in the next sextant. Bleeding on probing was evaluated using a periodontal probe by applying a load of less than 25 g. After 20 seconds, the presence/absence of bleeding was recorded. Pocket depth was measured in six points around each tooth including the mesiobuccal, midbuccal, distobuccal, mesiolingual, midlingual, and distolingual and the maximum value was recorded. As shown in **Table 1**, the maximum score of each sextant was recorded. Next, the patients' checklists and the suggested treatment plans by dentists were evaluated and compared with the actual treatment needs to determine whether the treatment plan includes periodontal therapy or not. If periodontal therapy had been mentioned in the treatment plan, the agreement of the suggested treatment with the actual patient needs was evaluated. The collected data were analyzed using SPSS version 24 via the chi-square test, Kruskal-Wallis test, and kappa coefficient. The level of significance was set at $P < 0.05$.

RESULTS AND DISCUSSION

This study evaluated 251 patients presenting to active dental clinics in 14 municipal districts in Isfahan city. **Table 3** presents the demographic information of patients. According to the treatment plans suggested by the attending dentists of the clinics, 205 patients (81.7%) required restorative

treatments, 16 (6.4%) required orthodontic treatment, 83 (33.1%) required prosthetic treatment, 132 (52.6%) required endodontic treatment, 71 (28.3%) required surgical treatment and 51 (20.3%) required periodontal therapy.

According to the CPITN, of 251 patients, 34 (13.5%) had healthy gingiva. Of the remaining patients, 56 (22.3%) had bleeding on probing, 89 (35.5%) had supra-gingival or subgingival calculus, 53 (21.1%) had 4-5 mm deep pockets and 19 (7.6%) had ≥ 6 mm pocket depth. According to the CPITN, of 251 patients, 34 did not require any special care, 56 required oral hygiene instruction, 142 required oral hygiene instruction, and scaling and root planing (SRP), and 19 required oral hygiene instruction, SRP, and periodontal surgery.

Concerning the treatment plans suggested by dentists, dental clinicians did not suggest any periodontal treatment for 200 patients while among these 200 patients, 56 (28%) required oral hygiene instruction, 103 (51.5%) required oral hygiene instruction and SRP, and 7 (3.5%) required oral hygiene instruction, SRP and periodontal surgery. Also, 49 patients underwent SRP; out of which, 39 required oral hygiene instruction in addition to SRP, and 10 required oral hygiene instruction, SRP, and periodontal surgery. Of a total of 251 patients, 2 underwent periodontal surgery, who also required SRP according to the CPITN (**Table 2**).

Table 2. Frequency distribution of treatment plan based on CPITN

treatment plan		dentists' proposed treatment plan		
		No periodontal treatment	Calculus removal	Calculus removal and periodontal surgery
treatment needs according to CPIT	No periodontal TNs	34 (17%)	0 (0%)	0 (0%)
	oral hygiene education	56 (28%)	0 (0%)	0 (0%)
	oral hygiene education and Calculus removal	103 (51.5%)	39 (79.6%)	0 (0%)

oral hygiene education and Calculus removal and periodontal surgery	7 (3.5%)	10 (20.4%)	2 (100%)
total	200 (100%)	49 (100%)	2 (100%)

The Chi-square test revealed that the suggested periodontal treatment plan had a significant difference with the actual treatment needs of patients ($P < 0.001$). On the other hand, the kappa statistic revealed that the agreement between the suggested treatment plan and the need for periodontal treatment was not significant ($\text{kappa} = 0.024, P = 0.18$).

Table 3 presents the frequency distribution of gingival health status and the treatment needs of male and female patients. According to the chi-square test, the gingival health status and the treatment need were significantly different between males and females such that females had a more favorable gingival health status and fewer treatment needs. It should be noted that none of the female patients had ≥ 6 mm pocket depth and no female patient required periodontal surgery; whereas, 12.5% of males had ≥ 6 mm pocket depth, and 14% of males required periodontal surgery.

According to **Table 3**, patients with healthy gingiva had the lowest mean age (27.9 ± 4.7 years) while those with ≥ 6 mm pocket depth had the highest mean age (46.5 ± 8.9 years). One-way ANOVA revealed a significant association between the gingival health status and patients' age ($P < 0.001$). Patients with no periodontal treatment need had the lowest mean age (27.9 ± 4.7 years) while those requiring SRP and periodontal surgery had the highest mean age (44.8 ± 9.8 years). Accordingly, a significant association was noted between age and periodontal treatment needs of patients ($P < 0.001$).

As shown in **Table 3**, gingival health status and the treatment need had a significant association with cigarette smoking such that smoker patients had a lower level of gingival health; 39.1% of smoker patients had 4-5 mm pocket depth and 18.8% had ≥ 6 mm pocket depth. The prevalence of 4-5 mm and ≥ 6 mm pocket depth in non-smokers was 15.9% and 2.2%, respectively ($P < 0.001$). In terms of treatment needs, smoker patients had higher treatment needs such that 21.7% of them required periodontal surgery, while this rate was 2.2% in non-smokers ($P < 0.001$).

Table 3. Frequency distribution of periodontal status and patient's need for treatment by age, sex, and smoking

index	Status	sex		P-value	age		smoking		
		male	female		average	P-value	smoking	Not smoking	P-value
CPI	Healthy Periodontal Condition	7 (5.1%)	21 (18.3%)	<0.001	27.9 ± 4.7	<0.001	1 (1.4%)	33 (18.1%)	<0.001
	Bop	19 (14%)	28 (24.3%)		31.9 ± 11.1		0 (0%)	52 (28.6%)	
	Calculus	54 (39.7%)	33 (28.7%)		38.9 ± 11.6		28 (40.6%)	64 (35.2%)	

TN	Pocket with a depth of 4-5 mm	39 (28.7%)	33 (28.7%)	39.1±11.7		27 (39.1%)	29 (15.9%)	
	Pocket with depth of 6mm or more	17 (12.5%)	0 (0%)	46.5±8.9		13 (18.8%)	4 (2.2%)	
	No care need	7 (5.1%)	27 (23.5%)	27.9±4.7		1 (1.4%)	33 (18.1%)	
	Oral hygiene Education	23 (16.9%)	33 (28.7%)	31.5±9.7	<0.001	0 (0%)	56 (30.8%)	<0.001
	Oral hygiene Education and calculus removal	87 (64%)	55 (47.8%)	39.4±12		53 (76.8%)	89 (48.9%)	
	Oral hygiene Education, calculus removal, and periodontal surgery	19 (14%)	0 (0%)	44.8±9.8		15 (21.7%)	4 (2.2%)	

According to **Table 4**, patients with an elementary level of education had the lowest level of gingival health; 14.3% had 4-5 mm pocket depth and 57.1% had ≥6 mm pocket depth. The prevalence of 4-5 mm and ≥6 mm pocket depth in patients with high-school education was 39.4% and 24.8%, respectively. These values were 33.3% and 18.5% in patients with a university education, respectively. The linear by linear test revealed a significant difference in gingival health status according to the level of education of patients (P<0.05). As shown in **Table 4**, the treatment need was significantly different according to the level of education of patients such that 38.5% of those with elementary education required oral hygiene instruction, SRP, and periodontal surgery while this rate was 7.2% among patients with a high-school level of

education and 4.7% in those with university education (P<0.001).

As shown in **Table 4**, gingival health status and the treatment need were significantly different according to the frequency of toothbrushing by patients. Patients who did not brush their teeth had a lower level of gingival health such that 50% of patients who did not brush their teeth had ≥6 mm pocket depth. However, none of the patients who brushed their teeth twice daily had ≥6 mm pocket depth. In terms of treatment needs, those who did not brush their teeth had higher treatment needs such that 50% of them required periodontal surgery while this rate was 3% among those who brushed their teeth twice daily (P<0.001).

Table 4. Frequency distribution of periodontal status and patient's need for treatment by Level of Education and Brushing times

index	Status	Level of Education			P-value	Brushing times				P-value
		Elementary education	High school education	university education		No brushing	sometimes	once a day	twice a day	
CPI	Healthy Periodontal Condition	0 (0%)	5 (4.6%)	19 (14.1%)	<0.05	0 (0%)	0 (0%)	20 (16%)	14 (20.9%)	<0.001
	Bop	1 (14.3%)	17 (15.6%)	23 (17%)		0 (0%)	11 (20.8%)	21 (16.8%)	20 (29.9%)	
	Calculus	1 (14.3%)	17 (15.6%)	23 (17%)		1 (16.7%)	20 (37.7%)	55 (44%)	16 (23.9%)	
	Pocket with depth of 4-5 mm	1 (14.3%)	43 (39.4%)	45 (33.3%)		2 (33.3%)	14 (26.4%)	23 (18.4%)	17 (25.4%)	
	Pocket with depth of 6mm or more	4 (57.1%)	27 (24.8%)	25 (18.5%)		3 (50%)	8 (15.1%)	6 (4.8%)	0 (0%)	
	TN	No care need	0 (0%)	10 (9%)		24 (18.9%)	<0.001	0 (0%)	0 (0%)	
Oral hygiene Education	0 (0%)	24 (21.6%)	32 (25.2%)	0 (0%)	11 (20.8%)	25 (20%)		20 (29.9%)		
Oral hygiene Education and calculus removal	8 (61.5%)	69 (62.2%)	65 (51.2%)	3 (50%)	34 (64.2%)	74 (59.2%)		31 (46.3%)		
Oral hygiene Education, calculus removal, and periodontal surgery	5 (38.5%)	8 (7.2%)	6 (4.7%)	3 (50%)	8 (15.1%)	6 (4.8%)		2 (3%)		

Poor oral hygiene is the most common cause of periodontal disease [11]. As mentioned earlier, periodontal disease has a high prevalence worldwide. It has a prevalence of around 50% according to the World Health Organization [4]. On the

other hand, its prevalence has been reported to be 96.30% in India [7], 62% in Georgia [8], less than 10% to 77% in Latin America [9], and 47% in the United States. To the best of the authors' knowledge, there is no comprehensive study

regarding the prevalence of periodontal disease in Iran. However, some studies have shown that a considerable percentage of dental patients in Iran are not periodontally healthy [25-27]. Considering the high percentage of periodontal disease in patients and the significance of early detection and treatment of periodontal disease, this study assessed the dentists' attention to periodontal therapy in the treatment planning of patients presenting to dental clinics of Isfahan in 2016.

The present study evaluated 251 patients presenting to dental clinics of Isfahan; among which, periodontal treatment plans had been suggested for only 51 patients. No periodontal treatment plan had been suggested for the remaining 200 patients; whereas, 28% of the required oral hygiene instruction, 51.5% required oral hygiene instruction and SRP, and 3.5% required oral hygiene instruction, SRP, and periodontal surgery. In general, there was not a complete agreement between the actual periodontal treatment needs of patients and the suggested treatment plan by dentists. Our results also showed a significant difference in the periodontal status and treatment needs of patients based on their demographics. Males, older individuals, patients with a lower level of education, and smokers had poorer periodontal status and higher treatment needs, which was in agreement with the findings of other studies.

According to the CPITN, of 251 patients, 34 (13.5%) had healthy gingiva. Of the remaining patients, 56 (22.3%) had bleeding on probing, 89 (35.5%) had supra-gingival or subgingival calculus, 53 (21.1%) had 4-5 mm deep pockets and 19 (7.6%) had ≥ 6 mm pocket depth, which indicated the higher presence of calculus compared to other periodontal conditions. According to the CPITN, of 251 patients, 34 did not require any special care, 56 required oral hygiene instruction, 142 required oral hygiene instruction and SRP, and 19 required oral hygiene instruction, SRP and periodontal surgery, which highlights the greater need for oral hygiene instruction and SRP compared to complex treatment. Sekhon *et al.*, in their study in 2015 in India evaluated the CPITN and found a higher prevalence of periodontal disease in males, older individuals, and smokers, which was in agreement with our results [22].

Zovko *et al.*, in their study in 2014 in Herzegovina used the CPITN and showed a higher prevalence of periodontal disease in smokers and showed 8% of patients required oral hygiene instruction, 81.8% required prophylaxis and initial treatment, and 2.6% required complex periodontal treatment. Their findings were in accordance with ours. Similarly, in our study, the need for SRP and initial treatments were higher than the need for periodontal surgery. Also, cigarette smoking was associated with a higher prevalence of periodontal disease [18]. In the study conducted by Hesari *et al.*, in Iran in 2007, 1% of patients between 35 to 45 years had CPITN=0; accordingly, the majority of patients had unhealthy periodontal status while in our study, 13.5% had healthy periodontium. This difference in the results may be attributed

to the large sample size in the study by Hesari *et al.*, and the timing gap between the two studies. Hesari *et al.*, indicated a higher percentage of deep pockets in patients with a lower level of education, which was in line with our results [24].

In the study by Sanei *et al.*, conducted in 13 provinces of Iran in 2003, 14.5% of adults had healthy periodontium, 33.3% had bleeding on probing, 47.8% had calculus, 3.9% had shallow pockets and 0.5% had deep pockets. They showed that a lower frequency of tooth brushing was associated with higher bleeding on probing and calculus. Also, females had a healthier periodontium than males, which was in accordance with our findings. The presence of supra- and subgingival calculus had a high prevalence in the study by Sanei *et al.*, which was in agreement with our study. However, pockets with 4-5 mm depth had a higher frequency in our study. The difference in this respect between the two studies may be attributed to differences between the examiners and the load applied during probing [25]. Also, some other studies reported superior periodontal status in females, non-smokers, and patients with a higher level of education, which was in agreement with our results [29-31].

Periodontal therapy may be overlooked for several reasons; the most important of which is that in dental clinics, dental services are often provided to patients based on the patients' demands or chief complaint. Since dental caries and restorative treatments are the most common reasons for patients presenting to dental clinics, periodontal disease is often overlooked. Another reason is that patients often present to dental clinics with symptoms such as toothache and abscesses while periodontal disease is asymptomatic in the early stages. Thus, patients less commonly present to dentists due to periodontal disease. Sometimes dental clinicians suggest periodontal treatment to patients but due to the high cost of dental services and patients' reluctance to pursue them, the periodontal treatment plan is not often suggested. It should be noted that patients are not the only ones to blame for high CPITN and dentists not paying attention to periodontal disease also play a role in this respect. Thus, periodontal status should be thoroughly evaluated during a routine clinical dental examination.

Some reasons have been suggested for the incompatibility of patients' actual needs for periodontal therapy and the suggested treatment plan. Also, periodontal disease has a significant correlation with demographics, which highlights the role of knowledge and education in this respect [32]. Thus, the authorities should provide instructions regarding periodontal disease and its significance in oral and general health. Also, dental clinicians should pay more attention to periodontal disease. Attitude is a strong predictor of behavior. Thus, the attitude of patients, dental students, and dentists towards periodontal disease should be improved. Several models are available for behavioral change such as enhancing the level of knowledge and changing the common beliefs, which can change attitude and behavior [33]. motivation interview, targeting cognitions by the booklet, and mobile

motivational text messages can be used to enhance the level of knowledge and change the attitude of individuals towards the significance of periodontal disease and reinforce their positive beliefs in this respect [34].

The reasons behind the lack of attention of dentists to periodontal disease should be further studied to draw their attention to this topic. Furthermore, future studies are required to assess the efficacy of different techniques to change the attitude and behavior of dentists and patients.

CONCLUSION

Considering our results, significant differences existed in the periodontal health status and treatment needs of patients based on their demographics. Males, older individuals, those with a lower level of education, and smokers had poorer periodontal status and higher treatment needs. Also, dental clinicians' attention to periodontal disease was low and their level of knowledge, attitude, and behavior regarding periodontal disease should be improved.

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