

Impact of Interdental Aids Usage and Professional Oral Hygiene Instructions on the Periodontal Health Status of Iraqi Patients: Retrospective Cross-sectional Analysis

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Abstract

Background: It has been generally accepted that interdental aids have a positive effect on removing plaque, both supra- and subgingivally. **Objectives:** To evaluate the efficiency of interdental aid usage and oral hygiene instruction (OHI) given by the dentist or oral hygienist on the periodontal health status of patients with periodontal disease. **Materials and Methods:** The study was a retrospective, cross-sectional study that included the records of 2476 patients. The collected data included age, sex, chief complaint, smoking history, parafunctional habit, previously received OHI or not, and whether the patient used interdental aid(s) (IDA) or not. In addition, the diagnosis was carried out together with plaque index (PLI), gingival index (GI), and probing pocket depth (PPD). **Results:** The number of male patients was 1633 while the number of their female counterparts was 843. The majority of the patients (75%) did not use any type of IDA and both genders almost equally used these aids (25%). Among IDA users, dental floss was the most commonly used aid followed by toothpick. However, the use of these aids did not have any effect in reducing PPD. A significantly higher ($P < 0.05$) percentage of patients included in this study who had not previously received OHI was associated with different factors. Both PLI and GI were significantly lower in patients who had previously received OHI when compared to those who had not received any OHI. **Conclusion:** OHI given by professionals is integral in minimizing the severity of periodontal disease and maintaining good periodontal health status.

Keywords: Dental biofilm, interdental aids, oral hygiene, periodontal disease, retrospective study

INTRODUCTION

The healthy periodontium provides the support necessary to maintain the teeth in adequate function.^[1] It is well known that periodontal diseases are initiated and propagated by dental plaque. Epidemiological studies have demonstrated positive correlations between the severity of periodontal disease and the amount of dental plaque.^[2,3]

The measure of defense against periodontal diseases has always been daily meticulous mechanical plaque removal, supplemented by periodic professional mechanical tooth cleaning.^[4] Mechanical plaque control is an essential method not only to control plaque formation but also for healthy periodontium. It is also essential to maintain the health of professionally cleaned periodontal pockets by preventing dental plaque from establishing itself and

extending to previously treated pockets.^[5] Periodontal lesions are predominantly observed in the interproximal or interdental sites; it is these sites that are most frequently coated with plaque.^[6] Over the years, it has been generally accepted that interdental aids (IDAs) have a positive effect on removing plaque,^[7-10] both supra- and subgingivally. IDAs are good adjunctive to toothbrushing if properly used, otherwise, it may even cause trauma to the interdental area causing unnecessary damage to the interdental papilla. Furthermore, most of these

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aids require a high degree of manual dexterity, which is not even among all individuals in any population.^[11] In addition, there is a public misunderstanding between toothpicking and plaque control by toothpicks which generally reduce the efficiency of IDA.^[12] Oral hygiene instructions (OHI) given by the dentist or oral hygienist are crucial to achieving adequate plaque control by the patients.^[13] Generally, arbitrary OHI from non-reliable sources, without consulting a specialist or without previous knowledge, will not provide satisfactory results.^[14-16]

No previous data are available about the role of professional OHI on the level of oral hygiene of Iraqi patients. Thus, this study was carried out to evaluate the impact of previous OHI given by dental professionals on the periodontal health status in patients suffering from periodontal disease.

MATERIALS AND METHODS

Study design

The design of this retrospective cross-sectional study was aimed to collect data from patients' records accessed at multiple dental centers in the Baghdad Governorate from 2013 to 2018. Data collection was started after permission was granted to access these records from relevant health authorities.

Study population and data collection

Demographic information, medical, plaque index (PLI), gingival index (GI), and probing pocket depth (PPD) for whole surfaces and interdental areas were recorded for each patient. In addition, details of using or not using IDA and which type of IDA was used, dental history (DH)/whether the patient previously received OHI or not as well as the diagnosis.

Inclusion and exclusion criteria: All records were included except those for pregnant women, all patients with any systemic disease, and patients with physical abnormalities and handicaps.

After collecting the extracted data, the patients with periodontal disease were divided into patients with or without previous periodontal history, IDA and non-IDA users. These patients were further subdivided according to gender, smoking status, systemic disease, chief complaint, bruxism, and diagnosis. The effect of oral hygiene measures followed by the patients, whether instructed or not instructed, was determined by clinical parameters to evaluate the periodontal health status of each patient.

Statistical analysis

Histograms and pie charts were used for descriptive analysis to demonstrate percentages, mean PLI, mean GI, and mean PPD. For inferential statistics, the differences in percentages were estimated by using cross-tabulation and Chi-square whereas the differences of PLI and GI in the groups were calculated by Student *t* test using SPSS software (Version

25, IBM, New York City, NY, USA). Statistical difference was considered significant when $P < 0.05$.

RESULTS

Out of the 2834 records assessed for eligibility, a total of 2476 patients' records were included in the final analysis. The age range was from 21 to 74 years (average age 47.7 years). The data obtained from the records showed that the males represented the majority of patients 66% (1633), while the female patients represented 34% (843) of the sample [Figure 1A]. The percentage of males who did not have a previous visit to the dentist (41%) was significantly higher than those who had previous DH (25%). In contrast, no significant difference was obtained between the females with no previous DH (20%) and those with previous DH (14%) [Figure 1B].

For IDA use, the analysis showed that most of the patients who received or did not have previous OHI did not use any type of IDA (56%) [Figure 2A]. The frequency distribution of the IDA type used showed that the most commonly used aid was dental floss followed by toothpick. The percentages of other types of IDA usage were 25%, 14%, and 5% [Figure 2B]. The frequency distribution of IDA usage according to gender showed that the percentage of IDA usage in males and females ranged between 22% and

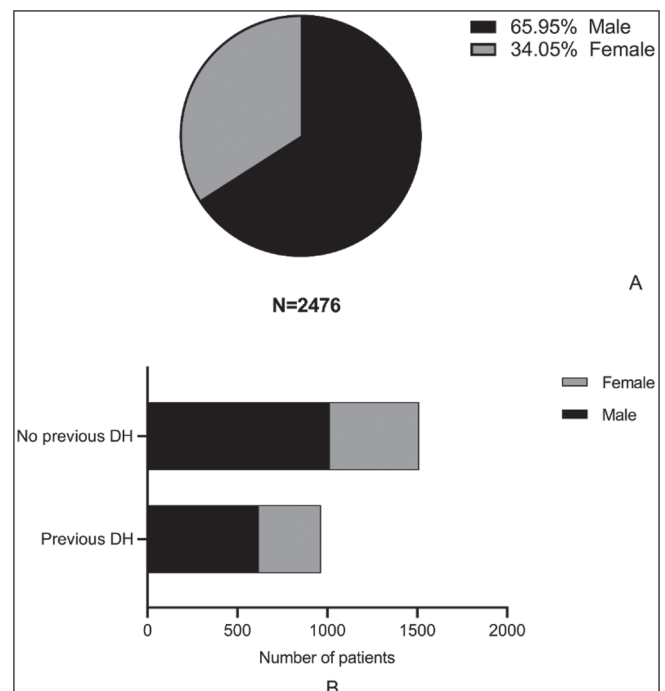


Figure 1: Distribution of gender according to previous DH. (A) Frequency distribution of the sample according to gender, the male represented 66% while the female accounted for 34% of the total records examined. (B) The percentage of males with no previous visit to the dentist was significantly higher than the percentage of males with previous DH. While the females did not show any significant difference between the two groups ($P < 0.05$)

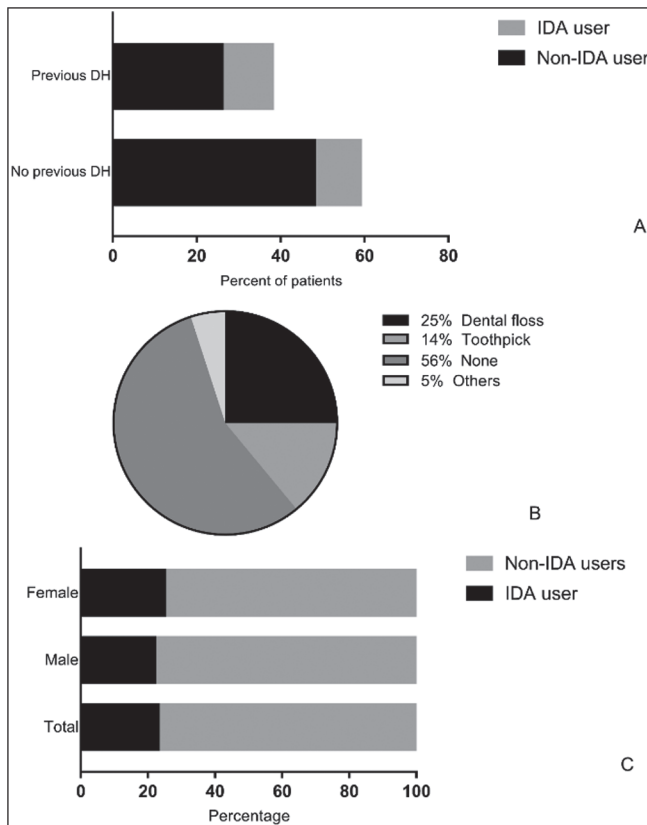


Figure 2: (A) Interdental aids (IDA) users represent the lowest percentage of the total number of patients (who had received or no previous DH). (B) Frequency distribution of IDA types used by the patients. (C) Percentage of IDA users and non-users (total, male, and female)

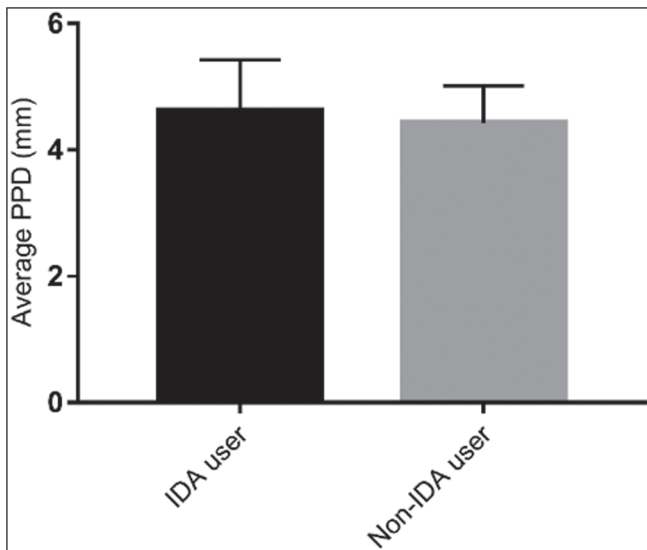


Figure 3: The use of interdental aids (IDA) did not affect PPD among patients with periodontitis

25% while the remaining patients (75%–78%) from both genders did not use any type of IDA [Figure 2C].

Furthermore, using IDA did not affect PPD which showed no significant difference with patients who did not use any type of IDA [Figure 3].

The association of different factors included in the current study with the patients' dental knowledge, whether they had received OHI or not, showed that there was no association between gender and systemic condition with the previous knowledge of oral hygiene measures. However, other parameters including the type of periodontal disease, parafunctional habits, chief complaints, and smoking status, showed significant association with previous OHI in which the majority of patients in these groups did not have previous instruction from professional personnel [Figure 4].

The patients who used different mechanical methods to clean their teeth were divided into two groups: either they had received or not previous OHI from their dentists. In general, the patients who had received OHI from previous dental visits showed significantly lower PLI and GI ($P < 0.05$) when compared to those patients who did not receive any OHI despite using different oral hygiene measures such as brushing and the use of IDA. However, there was no significant difference in proximal PLI and GI between the two groups [Figure 5].

DISCUSSION

Periodontal disease is an inflammatory condition that affects all populations worldwide with many undesirable consequences on different aspects of individuals and communities.^[17-19] Commitment to OHI is a crucial factor in the prevention of periodontal disease.^[20,21] Actually, repeated OHI may provide results that are comparable to that of professional plaque control.^[22] Previous literature has shown that a single instruction visit has a relatively short positive effect that may last for about 6 months only which requires further reinforcement of instructions.^[23,24] Generally, some patients gain knowledge about oral hygiene measures from the dentist and oral hygienist while others acquire this knowledge from other non-dental, less reliable sources.^[25,26] Nevertheless, OHI given by professionals yields better results than arbitrarily followed instructions as the trained personnel can adjust brushing technique, the use of correct IDA, and other related oral hygiene methods based on the individual needs of each patient.^[20,27-29] Thus, this study was conducted to evaluate the effect of IDA use and whether previously receiving OHI or not has any effect on the periodontal health status of Iraqi patients.

The results from the current study showed that females have more tendency to visit the dentist compared to males who showed more ignorance towards visiting dentists. Although the percentage of male patients was higher than that of their female counterparts, the percentage of IDA

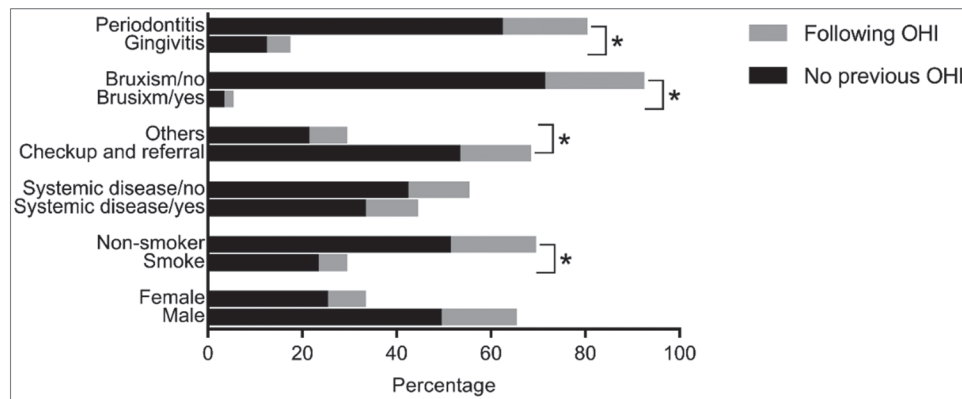


Figure 4: Association between different parameters and the patients that had received or not previous OHI (* $P < 0.05$)

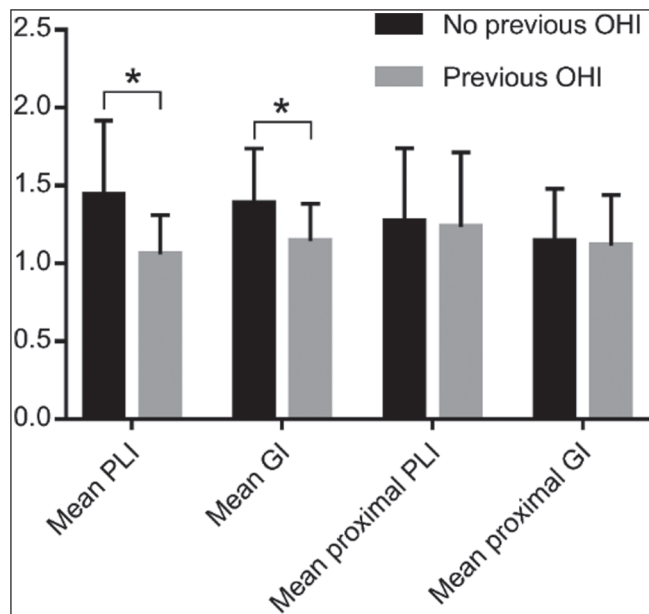


Figure 5: Patients who had previously received OHI from professional personnel showed significantly lower PLI and GI than the patients who had not received any previous instruction. However, no significant difference was recorded between interproximal PLI and GI in both groups (* $P < 0.05$)

users from both genders was equal. The results obtained from the majority of previous studies suggest that female patients are more restricted to OHI and the use of IDA.^[30-32] The inconsistency of the results of this study with previously reported findings could be due to differences in sample size or variations in the nature of communities where other studies were conducted. The use of different IDA types is an essential method to control the level of dental plaque in interdental areas.^[10,20,29] However, the results of this study revealed that the majority of the patients were not familiar with IDA or their use whether they have had a previous DH or not. This could be either due to a lack of knowledge about the benefits of these aids or they were not properly prescribed by the dentist or lack of compliance by the patients. A previous study conducted by Sharma

and Singh^[16] showed that about 80% out of 329 patients examined lack knowledge about interdental cleaning methods. In addition, lesser frequency of IDA use was associated with patients who rarely visit the dentist.^[33] This finding indicates a major defect in the oral hygiene regimen followed by the patients. Another interesting finding that is related to the use of IDA showed that PPD did not show any significant difference between IDA users and non-IDA users. Lower prevalence of periodontitis in association with flossing and use of interdental aids was suggested by Cepeda *et al.*^[33]; however, the authors did not indicate a causal relation between IDA and severity of periodontitis due to the cross-sectional nature of their study. Another possible reason for the lack of IDA effect on PPD is that established periodontal pockets, especially deep ones, have independent microflora. Controlling supragingival dental plaque will only be effective after cleaning these pockets thereby preventing the advancement of the plaque layer into the subgingival area.^[5]

The number of patients who attended the clinics for the first time and did not receive previous OHI was significantly higher than those who received professional instruction in association with factors included in this study such as periodontal disease, bruxism, chief complaint, and smoking status. For periodontitis patients, this finding was logical with the nature of the periodontal disease, which if not treated or prevented at early phases, will potentially progress into a more destructive form of periodontitis^[20,23] that potentially encourages patients to seek periodontal treatment. This is also reflected by the higher number of patients with periodontitis when compared to their counterparts who are affected with gingivitis only. Unawareness and lack of knowledge about periodontal disease is a global issue that was indicated by previous studies worldwide.^[34-36] The results of the current work support the finding of these studies in which the referred patients who attended the clinic were higher than the patients who attended the clinic for frank periodontal problems. The majority of referred patients did not receive OHI in comparison to those who received

OHI. Nonsmoker patients were significantly higher in number than smokers which is in agreement with general unawareness of the latter about the adverse effect of smoking on oral hygiene.^[37] A lower number of patients suffering from bruxism than patients with no bruxism could be attributed to the stressful lifestyle associated with bruxism which potentially interferes with their visit to the dentist and compliance to the given OHI.^[38,39]

Data from the current study showed no significant difference in proximal PLI and GI between IDA users and non-IDA users whether they have had a previous DH or not. The efficiency of IDA is highly dependent on the manual dexterity of the patient in addition to the correct indication for each type according to the different factors such as the shape of the interdental papilla and the space between the teeth.^[29,40,41] In addition, the results from previous systematic review suggest that the use of toothpicks did not visibly affect PLI and GI.^[42] Despite that, the overall PLI and GI showed a significant difference between the patients who had previously visited dentists and those who did not have any OHI. Professionally provided OHI has a positive effect on reducing plaque scores and the degree of gingival inflammation,^[20-23,43-45] which supports the findings of this study.

Using previously collected data represents the major limitation of the current study which is a common problem associated with retrospective studies. It is important to conduct other cross-sectional studies to evaluate the effect of OHI given in clinical settings on the oral hygiene level of the Iraqi population.

CONCLUSIONS

Based on the results of this study, it can be concluded that previous professional OHI had a positive impact on reducing plaque accumulation and gingival inflammation. In addition, there is a general defect in using different types of IDA and the awareness of their advantage in the community. Educational programs for the community need to be carried out by health institutes to highlight the importance of raising good oral hygiene standards for the lifestyle and well-being of the community people.

Ethical Approval

Not Applicable.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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