

Original article

# Periodontal Diseases Awareness and Knowledge Among Secondary School Teachers

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## ABSTRACT

**Background and objectives.** To determine level of knowledge related to etiology, risk factors, most common signs of periodontal diseases, knowledge related to oral hygiene practices, and relation between knowledge and oral hygiene practices among participants. **Methods.** 244 questionnaire answered by secondary school teachers consisted of a demographic data, and questions concerned knowledge regarding the causes of periodontal disease, its risk factors, and the most common signs of periodontal disease as well as the knowledge of periodontal diseases outcome and oral hygiene practice-related questions. **Results.** Above half (54.5%) of respondents exhibited good knowledge on periodontal diseases etiology, predisposing factors and most common signs of periodontal diseases, (40.2%) of participants have positive awareness toward periodontal disease outcome, and (82.80%) of respondents have adequate behavior toward oral hygiene maintenance. **Conclusions.** Despite the participants have good knowledge on etiology of periodontal diseases and adequate behavior toward oral hygiene maintenance, they have deficient knowledge on hereditary, mouth breathing, stress, and obesity as predisposing factors of periodontal diseases and they have misbelief that removing the calculus accumulated on the teeth surfaces weaken the teeth.

**Keywords:** Knowledge, Periodontal Diseases, School Teachers, Questionnaire Study.

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## INTRODUCTION

Periodontal diseases (PD) including gingivitis and periodontitis are the most common diseases after dental caries in oral cavity of human. Gingivitis is a most common reversible periodontal disease, which manifests as redness, gum swelling, and bleeding during tooth-brushing and flossing. Gingivitis if not treated may progress into periodontitis with destruction of periodontal ligament and alveolar bone [1].

Periodontal disease is associated with poor oral hygiene and many risk factors, including older age, male sex, socioeconomic status, smoking, obesity, stress, some psychiatric disorders, genetics, and some

systemic diseases. PD leading eventually to tooth loss as the condition progresses to its most severe stages. There is growing evidence that PD is associated with an increased risk of systemic disease, including diabetes, cardiovascular disease (CVD), and even the adverse effects of coronavirus disease 2019 (COVID-19) [2,3].

Dental plaque control and demonstration of risk factors are important components in periodontal diseases prevention [4]. Effective treatments for periodontal diseases are available and care can be provided early in the natural history of the disease that can eliminate or reduce its negative impact. Prevention of periodontal disease typically consists of

patient-performed control of the dental biofilm, professional interventions and control of risk factors. Several strategies have evolved affecting treatment, control, and prevention of periodontal disease based on the concept that primary prevention is the responsibility of the individual and secondary/tertiary prevention is in the domain of the oral health professional, e.g., in-office health education, professionally administered chemotherapeutic applications and advanced cleaning procedures like scaling and root planing [5].

Poor awareness of periodontal diseases and their outcomes has been reported as the most frequent reason for periodontal treatment failure on a community basis [6].

Periodontal health is essential to the overall health and well-being of patients. However, control of the etiologic agent and host inflammatory responses vital to maintaining health relies upon patient self-care and lifestyle behaviors [7]. So the behavior management is essential as a part of both prevention and therapy of periodontal diseases [3].

School is where students spend about six hours of their day. Therefore, the school is considered one of the most important preventive oral health systems. Teachers' awareness of the importance and impact of periodontal disease, and their role in raising student awareness of this disease is one aspect of periodontal disease prevention (8). Teachers with appropriate knowledge and positive attitudes towards oral hygiene can always play an important role in student health education. The present study was conducted to assess periodontal disease knowledge and awareness.

## METHODS

This cross-sectional study was conducted among the public secondary school teachers in Tajoura City, Tripoli, Libya. The Ethical clearance for the study was obtained from Faculty of Dentistry, Tripoli University dated 7/12/2022 and then from Education Monitoring of Tajoura dated 12/12/2022, which in turn gave me permission to conduct the study on secondary school teachers within its scope before commencing the study. The participant teachers were explained about the objectives of the study and informed consent was obtained from each participant. The study was

conducted during the period December 2022 to March 2023.

300 questionnaires were given to the secondary school teachers and asked to select their preferred option of yes, no, and don't know.

A questionnaire was constructed using questions from a similar study conducted by Ewa Dolińska E et al in 2022 [9].

A written questionnaire including a demographic data section, which included age, gender, and educational level, and questions concerned knowledge regarding the causes of periodontal disease, its risk factors, the connection between periodontal disease and general health status, and the most common signs of periodontal disease as well as the knowledge of periodontal diseases outcome and oral hygiene practice-related questions.

The questionnaire was adapted and then translated into Arabic language to ensure better comprehension by the respondents. Informed consent of the participants were obtained before participation in the study.

### *Data management and statistical analysis*

The collected data were sorted, coded, then entered and analyzed using SPSS, version 25.0. The numbers and percentages have been used to express on Quantitative data. We would compare participants' knowledge of periodontal diseases and behavior toward oral hygiene maintenance using Spearman's correlation. Less than 0.05 of p value was considered statistically significant.

The scoring system was calculated from the 16 questions as follows: 8 questions test knowledge of periodontal diseases' aetiology and predisposing factors; 2 questions test knowledge of signs of periodontal diseases; 2 questions test awareness of periodontal diseases' outcomes; and 4 questions test behavior toward oral hygiene maintenance. A score of 1 was given for correct answers and 0 for incorrect or "I don't know" answers.

The total knowledge score was considered good if the score of the total knowledge was > 60%. The positive behavior (score 1) and negative behavior (score 0) for each statement were added together, and a sum score of behaviors was calculated for each participant.

After considering an adequate attitude (score 1) and an inadequate attitude (score 0) for each statement, a sum score of attitudes was calculated for each participant.

## RESULTS

### Demographic Characteristics of Participants

Of the 300 questionnaires distributed, 244 were completed, giving a response rate of 97.6%. 207 (84.8%) of whom were female, and 37 (15.2%) were male. According to age group, 127 participants (52%) were between the ages of 41 and 50 years old, over a quarter (27.5%) were between 31 and 40 years old, forty (16.4%) were older than 50 years old, and only ten participants were between the ages of 21 and 30 years old. According to educational qualification, more than two-thirds (68.9%) of participants studied for a university degree, fifty-one (20.9%) completed diploma education, and only a small fraction (10.2%) was postgraduate. Regarding the smoking of the studied group, the majority (97.1%) were nonsmokers, and only seven (2.9%) participants were smokers. A summary of participant descriptive statistics can be found in Table 1.

**Table 1. Sociodemographic and habits profile of participants (N=244).**

Variable		N	%
Gender	Male	37	15.2
	Female	207	84.8
Age	21- 30 year	10	4.1
	31- 40 year	67	27.5
	41-50 year	127	52.0
	51-60 year	40	16.4
Educational level	Diploma	51	20.9
	College	168	68.9
	High Degree	25	10.2
Smoking	Yes	7	2.9
	No	237	97.1

*The values were expressed as frequency, percentage.*

### Knowledge towards periodontal diseases etiology and predisposing factor

Table 2 illustrates that the majority (92.6%) of participants correctly identified that the bacteria accumulated on the surfaces of the teeth cause gum diseases, and that the majority (90.6%) of those were

knowledgeable that smoking contributes to the presence of periodontal disease. 85.2% of participants believed that diabetes contributes to the presence of periodontal disease, and over three-quarters (77.5%) of participants correctly agreed that periodontal disease affects their overall health. Above half of those surveyed (57.4%) believed that hereditary factors contribute to the presence of periodontal disease, and nearly half of participants (47.5%) correctly recognized that mouth breathing affects the presence of periodontal disease. Nearly one quarter (23.4%) indicated that stress affects the presence of periodontal disease, whereas (16.0%) of those cited said that obesity contributes to the presence of periodontal disease.

**Table 2: Frequency of various response to questions regarding knowledge towards periodontal diseases etiology and predisposing factors (N= 244.)**

Questions	Correct response	Incorrect response
	N (%)	N (%)
Do you think that the bacteria accumulated on the surfaces of the teeth cause gum diseases?	226 (92.6)	18 (7.40)
Do you think hereditary factors contribute to the presence of periodontal disease?	140 (57.4)	104 (42.6)
Do you think that smoking contributes to the presence of periodontal disease?	221 (90.6)	23 (9.40)
Do you think that mouth breathing affects the presence of periodontal disease?	116 (47.5)	128 (52.5)
Do you think that stress affects the presence of periodontal disease?	57 (23.4)	57 (76.6)
Do you think that diabetes contributes to the presence of periodontal disease?	208 (85.2)	36 (14.8)
Do you think that obesity contributes to the presence of periodontal disease?	39 (16.0)	205 (84.0)
Do you think that periodontal disease affects your overall health?	189 (77.5)	55 (22.5)

*The values were expressed as frequency, percentage.*

**Knowledge towards signs of periodontal diseases.**

The results, as shown in Table 3, showed that the majority of the patients (86.1%) knew that gum bleeding during brushing or biting on hard objects is a sign of early-stage gingivitis, and a greater proportion of participants (84.8%) reported that bad breath was most often caused by oral diseases.

**Table 3: Frequency of various response to questions regarding knowledge towards signs of periodontal diseases.**

Question	Correct response	Incorrect response
	N (%)	N (%)
Earlier stages of gingivitis may include bleeding gums when brushing teeth or biting on hard objects?	210 (86.1)	34 (13.9)
The bad breath most often caused by oral diseases?	207 (84.8)	37 (15.2)

*The values were expressed as frequency, percentage.*

**Behavior towards oral hygiene maintenance**

According to table 4, the majority of those who responded (86.1%) indicated that they clean their teeth with interdental cleaning devices, and the majority of those who responded (85.2%) believed that effective brushing removes plaque and maintains healthy teeth and periodontal tissue. Almost three-quarters (73.0%) of them reported using 2-3 times a toothbrush daily.

**Table 4: Frequency of various response to questions regarding behavior towards oral hygiene maintenance (N=244).**

Question	Correct response	Incorrect response
	N (%)	N (%)
Do you think that effective brushing removes plaque and maintains healthy teeth and periodontal tissue?	208 (85.2)	36 (14.8)
How many times a day do you brush your teeth?	178 (73.0)	66 (27.0)

Do you clean your teeth with interdental cleaning devices?	210 (86.1)	32 (13.9)
Do you use mouth washes?	116 (47.5)	128 (52.5)

*The values were expressed as frequency, percentage.*

**Awareness towards periodontal diseases outcome**

We found that the majority of participants (91.8%) were aware that when gum diseases are not treated, they can progressively cause tooth loss, and more than a third of those who responded (43%) indicated that removing calculus accumulated on the surfaces of the teeth doesn't weakens the teeth.

**Table 5. Frequency of various response to questions regarding behavior towards periodontal diseases outcome (N=244).**

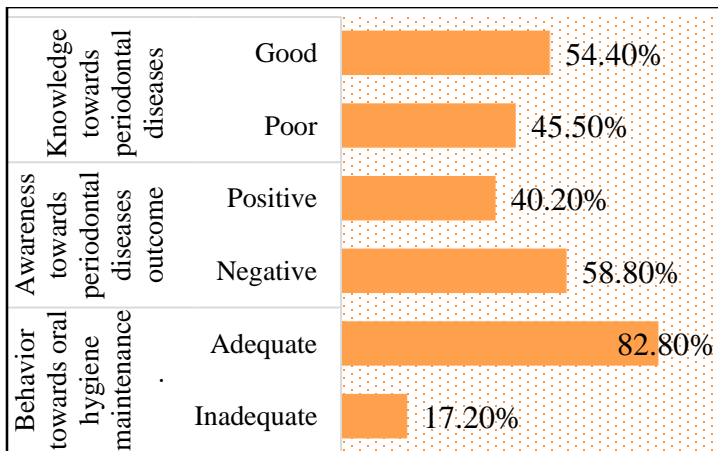
Question	Correct response	Incorrect response
	N (%)	N (%)
Does removing calculus accumulated on the surfaces of the teeth (tartar) weaken the teeth?	105 (43.0)	139 (57.0)
When gum diseases not treated, it can progressively cause tooth loss?	224 (91.8)	20 (8.2)

*The values were expressed as frequency, percentage.*

**Periodontal diseases knowledge, behavior towards oral hygiene maintenance, awareness towards periodontal diseases outcome scores of the participants**

Table 6 shows the participants' knowledge, behavior toward oral hygiene maintenance and awareness towards periodontal disease outcome scores: above half (54.5%) had good knowledge of aetiology, predisposing factors and signs of periodontal diseases. Participants have positive awareness toward periodontal disease outcome (40.2%), and (82.80%) of respondents have adequate behavior toward oral hygiene maintenance.





**Figure 1. Distribution of Periodontal diseases knowledge, behavior towards oral hygiene maintenance, awareness towards periodontal diseases outcome scores of the participants.**

**Table 6. Distribution of Periodontal diseases knowledge, behavior towards oral hygiene maintenance, awareness towards periodontal diseases outcome scores of the participants**

Variable		N	%
Knowledge towards periodontal diseases	Good	133	54.5
	Poor	111	45.5
Awareness towards periodontal diseases outcome	Positive	98	40.2
	Negative	146	59.8
Behavior towards oral hygiene maintenance.	Adequate	202	82.8
	Inadequate	42	17.2

*The values were expressed as frequency, percentage.*

**Correlation between periodontal diseases knowledge and Behavior Towards Oral Hygiene maintenance.**

Table 7 shows the Pearson correlation coefficients between periodontal disease knowledge and behavior towards oral hygiene maintenance, where the relationships were with correlation coefficient of (0.063) are aren't statistically significant at the level of significance

**Table 7. Correlation between periodontal diseases knowledge and behavior towards oral hygiene maintenance**

Variable	Correlation coefficient	P - value
Knowledge towards periodontal diseases - Behavior towards oral hygiene maintenance	0.063	0.326

*\*Pearson's correlation*

**DISCUSSION**

School teachers play an important role as positive stimulators for the overall development of their students. Teachers can increase student awareness of general and basic oral health and motivate students to follow good oral health practices [10]. For that reason, it is necessary to know whether the teachers have sufficient awareness and knowledge about periodontal disease.

Among 244 participants, above half (54.5%) of them exhibited good knowledge on periodontal diseases etiology, predisposing factors and most common signs of periodontal diseases, this may be explained by education level of the participants where more than two-thirds (68.9%) of participants studied for a university degree which is in line with Deinzer R et al study that demonstrate less educated participants (primary school) knew less than more highly educated subjects [11]. And the age of participants where (52%) between the ages of 41 and 50 years old, this was supported by data generated in Hayder R. and et al study which showed significantly higher levels of knowledge among individuals aged  $\geq 45$  years (12). Also in this study most of participants are female (84.8%), where in other studies conducted on both genders; the female school teachers have shown a better knowledge of oral health [13,14].

92.6% of participants knew that the bacteria accumulated on the surfaces of the teeth cause periodontal diseases. This is consistent with Selvaraj S et al study [15], (90.6%) of those were knowledgeable that smoking contributes to the presence of periodontal disease which is in accordance with the study conducted by Ayyad HA. et al in Benghazi City [16]. In contrast to the study done by Doli'nska E et al

[9] 85.2% of respondents believed that diabetes contributes to the presence of periodontal disease, and (77.5%) of participants also aware that periodontal disease affects their overall health which inconsistent with study conducted by G. Suragimath et al [17].

Gingival bleeding is the earliest sign of gingival diseases, and it is the most reliable indicator of the condition. In current study, the majority of the patients knew that gum bleeding and bad breath is the signs of periodontal diseases, which is similar to a study conducted by G. Suragimat et al [17].

In present study, we found knowledge deficits throughout risk factors for periodontitis such as hereditary factors (57.4%), mouth breathing (47.5%), stress (23.4%), and obesity (16.0%). These findings are similar to results of Dolin'ska et al study [9] and indicate a considerable need for oral health education of periodontitis predisposing factors in Libyan population.

Adequate plaque removal at home plays an important role in the prevention and treatment of periodontal disease. Using interdental cleaning aid is also very important in removing plaque from interproximal area [18]. The majority of respondent (85.2%) believed that effective brushing removes plaque and maintains healthy teeth and periodontal tissue, (73.0%) of them reported using 2-3 times a toothbrush daily, and (86.1%) of them indicated that they clean their teeth with interdental cleaning devices. adequate behavior towards oral hygiene maintenance may be due to the most participants are female. Lipsky et al reported that the men are more likely to ignore their oral health and have poorer oral hygiene habits than female [19]. Mouthwashes are important adjunctive to tooth brushing in controlling dental plaque. In this study only (47.5%) of participants using mouthwashes as plaque control which is inconsistent with a previous survey conducted in Iraq by Hayder et al [12] and in Poland by Dolin'ska et al [9].

Periodontal disease progression usually goes unnoticed by most patients, and they probably recognize it when reaches an advanced stage. We found that the majority of participants (91.8%) were aware that when gum diseases are not treated, they can progressively cause tooth loss, and (57%) indicated that removing calculus accumulated on the

surfaces of the teeth weakens the teeth which is a wrong decision require correction by oral health educational programs.

Also there aren't statistically significant correlation between periodontal disease knowledge and behavior towards oral hygiene maintenance, which is consistent with study on South Indian Population that demonstrate no positive linear correlation was seen among knowledge, attitude, and behavior towards oral health [15].

When analyzing the results of the presented experiment, the limitations of our survey should also be considered. The study group consisted of secondary school teachers. The knowledge of this group of participant cannot be compared to the entire Libyan population, including those with low level of education.

Also most of participant were female, so can't compare the knowledge between female and male group. So the future studies should include a wider range of population to include participants from different gender.

## CONCLUSION

Despite the participants have good knowledge on bacterial etiology of periodontal diseases, good knowledge of smoking and diabetic as contributing factor, good knowledge of most common signs of periodontal diseases and adequate behavior toward oral hygiene maintenance, they have deficient knowledge on hereditary factors, mouth breathing, stress, and obesity as predisposing factors of periodontal diseases and they have misbelief that removing the calculus accumulated on the teeth surfaces weaken the teeth. Theses indicate the need for further education on periodontal diseases among the teachers, which they can transfer it to the students. This will improve the oral and periodontal health among the students, who are the future generations of the nation.

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