Original Research Article

Awareness of Smokers about the Effects of Smoking on Periodontal and Oral Health in the Military Dental Hospital in Omdurman (Sudan) in 2018

Abstract:

Background: Smoking is considered as a risk factor for the initiation and progression of oral and periodontal diseases. **The aim** of this study was to assess the awareness of smokers about the effects of smoking on periodontal and oral health.

Methods: in this descriptive cross-sectional study, data was collected using designing questionnaire. Demographic data such as age, occupation and educational level were taken, then factors associated with smoking awareness, the effect of the number of cigarettes and the duration of smoking on oral periodontal health and the oral symptoms (complaints) associated with smoking. We followed a simple random method to select study participants at the Military Dental Hospital in Omdurman, Sudan. Data were analyzed by SPSS version 23 and the results were presented as frequencies and proportions in table and figures.

Results: A total number of 385 smoking males, with mean age of 27.8 were selected to participate in this study. The mean of cigarettes smoked per day was10 cigarettes and the mean of the duration since starting smoking was 8 years. The majority of smokers (85.5%) were not aware of the effect of the number of cigarettes on periodontal and oral health. Also, 93 % of them were not aware of the effects of the duration of smoking on oral and periodontal health. 63% of smokers complained of color change of oral mucosa, 35% about staining of the teeth, 19.2% of bad breath and 17% delay in wound healing.(with statistically significant difference) More than half (58.20%) of smokers were aware that

smoking can cause oral cancer and 76.10% indicated that smoking was cool. Most of the study participants (89.10 %) didn't receive adequate information about the risk of smoking on their health from their dentists and 88.60% of them didn't hear about Nicotine Replacement Therapy (NRTs).

Conclusion: the present study demonstrates that a high percentage of smokers were not aware of the harmful effects of smoking on oral and periodontal health.

Keywords: Awareness, Smoking, Periodontal, Oral health.

Abbreviations:

Cpd: Cigarettes per day

GDPs: General Dental Practitioners

NRT: Nicotine Replacement Therapy

US, FDA: The United States Food and Drug Administration

1-Introduction

Smoking has been known as a human habit for almost four centuries. Columbus was offered golden tobacco leaves when he came to America. The journey of tobacco to Spain through Columbus's crew, who carried tobacco plants and seeds with them and introduced its cultivation in Spain and from it to Mexico. Then tobacco was introduced into India by Portuguese traders and then spread rapidly into Malaysia, Japan, China and the world (1).Smoking may be considered serious health issue as epidemiological studies have shown that it may have a strong relationship to cancer and may cause physiological disturbances in the pulmonary, cardiovascular, and gastrointestinal systems. Smoking was also associated with various changes in the oral cavity which were related to staining or discoloration of teeth, delayed and impaired wound healing, dental caries, halitosis, Periodontal diseases and

attachment loss of the periodontal supporting tissues, bone loss, mobility of teeth, failure of dental implants and life-threatening disease such as oral cancer (2).

Dentists have been aware of the effects of tobacco on the soft and hard tissues of the oral cavity and the implications of this in clinical practice. In the past 20 years, there has been an increase in the awareness of the role of tobacco use in the prevalence and severity of periodontal diseases (3). Tobacco smoke might affect the function of the immune system. Many studies in vitro and in vivo have demonstrated so far that there is an immune-suppressive effect of tobacco smoke on T and B-lymphocytes (4). Tobacco, both in smoked and smokeless forms, is considered as a global epidemic, which is one of the most common causes of death all over the world. Smoked nicotine forms include cigarette or bidi, cigar, chillum, and hookah while smokeless forms are khaini, gutka, zard, gul, gudaku, and tuibur. (5) Smokers are classified into current smokers: those who have smoked ≥100 cigarettes in their lifetime. Former smokers: those who have smoked ≥100 cigarettes in their lifetime and do not currently smoke. Non-smokers: those who did not smoke ≥100 cigarettes in their lifetime and do not currently smoke (6). The cumulative smoking exposure was categorized as light-short-term (≤19 cigarettes per day cpd), and heavy-long-term (≥20 cpd) (7). It was observed that patients referred by their general dental practitioners (GDPs) to a restorative consultant clinic lacked awareness of the relationship between smoking and periodontal disease. It was perceived that GDPs might not be relaying this essential information to their patients in an effective way (8).

Although products for nicotine replacement therapy (NRT)such as gum, trans dermal patch, intranasal spray, inhaled and oral preparation have been available for over 20 years, they have been excluded until recently from insurance-based health service provision in many countries. They have therefore not been widely prescribed by doctors who help smokers wanting to quit (9). According to the US , FDA(United States Food

and Drug Administration) (NRT) are nicotine gum, rapid release gum ,nicotine lozenges ,nicotine patches, high does nicotine patch ,nicotine oral inhaler ,nicotine nasal spray, nicotine sub lingual tablet, electronic Cigarettes ,Combined therapy , Nicotine vaccines and Nicotine preload (10).

Periodontal diseases can affect the quality of life of patients by affecting the function and appearance of their dentition. Smoking is considered as one of the major risk factors for oral and periodontal disease. Accordingly, there is a need to demonstrate the awareness of smokers about the effect of smoking on oral and periodontal health.

2-Materials and Methods:

We conducted a descriptive cross-sectional study hospital based among smokers male in the Military dental hospital in Omdurman, Sudan. Verbal informed consents were taken from the patents. A designed pretesting and revised self administered questionnaires were used to collect data from study participants. We collected demographic data such as age, occupation and educational level, then the awareness of smokers about the effect of the number of cigarettes and the duration of smoking on oral and periodontal health, dentist consultation, oral symptoms (complaints) associated with smoking among smokers and the knowledge about nicotine replacement therapy. A simple random sampling technique was used to select study participants. The sample size was estimated based on this equation; $N= Z^2pq/n2$. Therefore, 385 participants were accessed to achieve a 95% confidence interval and a 5% margin of error. Data was analyzed by SPSS version 23 and the results were presented as frequencies and proportions in tables and figures. The difference between the two proportions was used for the oral symptoms (complaints) that were associated with smoking among smokers.

3-Results:

A total number of 385 participants were included in this study. The participants were male smokers with an age range extending from 18 to 70 years old and the mean of age for them was 27.8. Of the total smokers, 44, 4 % were students and 70.4% had a university level of education as seen in table 1. The findings of our study showed that the mean of cigarettes smoked was 10 cigarettes per day and the mean smoking duration was 8 years as seen in table2. In addition, 85.5% of smokers were not aware of the effect of the number of cigarettes that they had taken, and 93 % were not aware of the effect of smoking duration on periodontal and oral health as shown in table3. In this study 76.10 smokers smoked because they thought that it was cool to smoke as seen in table3. Our results showed that 58.8 % of smokers were aware of the effect of smoking on the etiology of oral cancer, but 89.10% of the smokers didn't talk with their dentist about the dangers of smoking and 88.60% of them didn't hear about nicotine replacement therapy as seen in table3. 63% of smokers complained from color change of oral mucosa (p-vale <0.01), 35% Staining of the teeth (p-vale <0.01), 19.2% bad breath (p-vale <0.01), 17% delay in wound healing (p-vale <0.01), 16% taste impairment (p-vale <0.01) and 10% other changes in the teeth, oral and periodontal tissue (p-vale <0.01) with statistically significant difference results as demonstrated in table4. The results showed that 89% of smokers did not hear about NRTs and 77% of smokers who heard about NRTs Said electronic cigarettes as seen in figure 1 and 2.

Table1: The smokers Age, occupation and education level

Age Range(years)	Mean ± (SD Years)
18-70	27.8286± 8.76259

Occupation	Frequency (385) Percent (%)
Students	(171) 44.40%
Un employ	(21) 5.50%
Employ	(114) 29.60
Business man	(79) 20.50%
Educational level	**Frequency (385) Percent (%)**
Un educated	(1) 0.30%
Primary school	(7) 1.80 %
High School	(102) 26.50%
University level	(270) 70.10%
Post graduate	(5) 1.30%

Table2: The mean of the numbers of cigarettes per day and the duration of smoking:

smoking	Mean ± SD
Numbers of cigarettes per day	10.7610± 6.52559
Duration of smoking	8.0312± 6.34134

Table 3: The awareness that number of cigarettes and duration of smoking affect the oral and periodontal health, smoking can cause oral cancer heard about NRT, cool to smoke

Awareness that number of cigarettes and duration of smoking affect the oral and periodontal health	**Frequency (385) Percent (%)**
Number of cigarettes	56 (14.5%)
Duration of smoking	27 (7 %)
Dentist consultation	**Frequency (385) Percent (%)**
Smokers did not consult the Dentist	(343) 89.1%
Smokers consult the Dentist	(42)10.9%
Smoking can cause oral cancer	**Frequency (385) Percent (%)**
Yes	(226) 58.8 %
No	(159) 41.2%
Heard about nicotine replacement therapy	**Frequency (385) Percent (%)**
Yes	(44)11.4%
No	(341) 88.60%
Cool to smoke	**Frequency (385) Percent (%)**
Yes	(293) 76.10%
No	(92) 23.9%
Received advice from dentists about the risk of smoking	**Frequency (385) Percent (%)**
Yes	(343) 89.1%
No	(42)10.9%

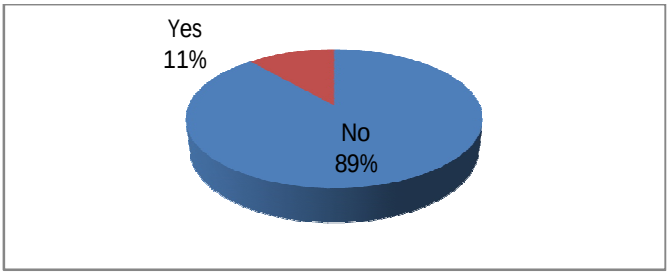
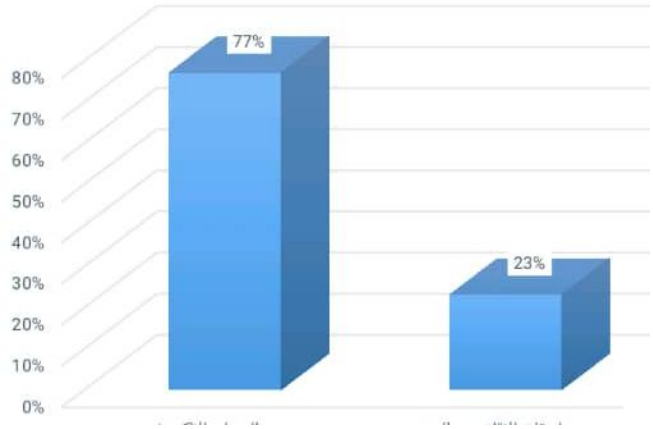


Figure 1: Smokers heard about Nicotine Replacement Therapy



Electronic cigarette smoking cessation stickers.

Figure 2: The knowledge about nicotine replacement therapy

Table 4: The oral symptoms (complaints) that associated with smoking among smoker:

The oral symptoms (complain)	% yes	% No	P- value
bad breath	19.2% (74)	80.8% (311)	< 0.001
Staining of teeth	35% (135)	65% (250)	< 0.001
Taste impairment	16% (62)	84% (323)	< 0.001
Delay in wound healing	17% (65)	83% (320)	< 0.001
change in color of oral mucosa	63% (243)	37% (142)	< 0.001
Other changes in the teeth. oral , and periodontal tissue	10% (38)	90% (347)	< 0.001

4-Discussion

Smoking is one of the major risk factors for oral and periodontal diseases which are associated with an increased rate of gingival and periodontal destruction. The findings of this study indicated that the mean age of smoker males was 27 years which is in agreement with a study done by singhal et al, who showed that the highest rate of smokers was among 25-50 years of age and people below 25 years of age were

influenced mainly by peer group and initiated smoking, while people in the age group of 25-50 years started smoking due to the stress (11). The majority of those who smoke were students, followed by employees, and businessmen or free workers. The lowest proportion was observed among unemployed people. A study conducted by Tin-Oo et al in Malaysia in 2013 supported our findings, where the majority of study participants who smoked were students (12).Another study done by Sutej et al showed that cigarette smokers decrease the periodontal health in the young population (13) Students usually were affected by their friend's opinions on smoking issues in addition to the amount of stress that they experienced during study and examinations. These factors were most likely considered as causes that push students to start the smoking habit. The effect of smoking depends on both dose and duration. Our findings indicated that the mean of the number of cigarettes smoked per day was high (10 cigarettes per day), and the mean of the duration since starting smoking was long (8 years). This high number of cigarettes and for a long duration was most likely because they wanted to have some sort of freedom and enjoyment. Our result is in accordance with Sutej et al who reported that more than half of smokers (55.3%) smoked 1-10 cigarettes per day (13). In our study, the majority of the study participants were not aware of the effect of the high number of cigarettes that they smoked. Approximately (93.5%) of the study participants were not aware of the effect of smoking duration on periodontal and oral health. This is in agreement with Singhal et al who reported that smokers had significantly less awareness of the adverse effects of smoking on their oral and periodontal health as compared with non-smokers (11). Another study done by Sepolia et al Concluded that there was a lack of awareness among smokers regarding the association between Smoking habits and periodontal diseases mainly periodontitis (14) .Our result is not in agreement with the study

conducted by Baklen et al who documented that a majority of smokers patients 84.5% showed awareness of the adverse effects of smoking on oral tissue (15).

We found that 80.8% of smokers did not complain of oral malodor, because they did not notice the smell or adapted to it.

In our study, more than half of our study participants complained of a change in the color of their oral mucosa followed by staining of teeth, bad breath, delay in wound healing, taste impairment and other changes in periodontal tissue with statistically significant difference. Unlike a study done by Puranik et al in India which reported proportion of alteration of taste was (78.4%) and delayed wound healing was (93%) among smokers patients (16).

In the present study More than half (58.20%) of smokers were aware that smoking can cause oral cancer, this finding is in agreement with More et al who found that 90% of patients recognized that smoking leads to oral cancer (17)

Smoking causes oral and periodontal diseases because cigarette nicotine affects both the innate and adaptive immune response. Also, smoke was shown to increase the production of numerous pro-inflammatory cytokines such as TNF-a, IL-1, IL-6, and IL-8 leading to gingival and periodontal tissue destruction and bone loss. Smoking also decreases the level of anti-inflammatory cytokines such as IL-10(13). Tobacco acts by reducing the flow of blood to gingival tissues, causing deprivation of oxygen supply and nutritional reach to the tissues. Make it more susceptible to bacterial infection (14).

Tobacco smoke decreases taste perception and causes oral mucosal tissue and gingival hyperkeratosis and Melanosis, which may lead to a change in the color of the oral mucosa to a gray-black color (14).

We found that the majority of study participants didn't ever consult a medical doctor or dentist about the danger of smoking. This result is in accordance with Baklen et al result which showed that only 32% of patients were informed about the side effects of smoking by their dentists (15). Our findings indicated that the majority of study participants didn't hear about nicotine replacement therapy (NRT).Those who have heard about the NRT were able to differentiate between them and said the electronic cigarette (77%) and smoking cessation stickers (23%). This result is similar to the study conducted by Tin- et al who found a high proportion of smokers who had no idea about NRT and with the study of Sachan et al in which the majority of smokers were un aware of tobacco cessation programs (20).

Nicotine replacement products contain pure nicotine with an aim to reduce the patient's inclination towards tobacco consumption and the physiological and psychomotor withdrawal symptoms. They increase nicotine levels in the blood stream, due to which the person will smoke fewer cigarettes, resulting in reduction in the consumption and toxicity to it (21).

5-Conclusion

Our findings indicated that smokers included in this study were not aware about the smoking effect on the oral and periodontal tissues. Most of them were aware that smoking can cause oral cancer. Smokers were not aware of the relation between the number of cigarettes, duration of smoking and oral disease. Majority of smokers had no idea of the nicotine replacement therapy.

Recommendation:

We recommend supporting students and young people to avoid smoking and raising the awareness of those who currently smoke to cease smoking. Also, increase awareness of the effects of smoking on oral and periodontal health.

We recommend using advertisement, audio-visual aids, and print media to show the benefits of smoking cessation for oral and systemic health.

Consent:

Verbal consent

Writing consent is not applicable

Ethical Approval:

I t is not applicable

Competing interests:

We declare that no competing interests exist

References:

1. Reddy KS, Gupta PC. Tobacco control in India. World Health Organization.2004.

2. Johnson NW, Bain CA. Tobacco Intervention: Tobacco and oral disease. BR DENT J. 2000; 189: 200-206.

3. Laxman VK, Annaji S, Tobacco use and its effects on the periodontium and periodontal therapy. J Contemp Dent Pract. 2008; 7(9): 097-107.

4. Geng Y, Savage SM, Razani BS, Sopori ML. Effects of nicotine on the immune response. Chronic nicotine treatment induces T cell energy. J immunol 1996; 156(7): 2384-90.

5. Sharma P, Murthy P, Shivhare P, Nicotine quantity and packaging disclosure in smoked and smokeless tobacco products in India. J Pharmacol. 2015; 47(4): 440-443.

6. Novak MJ, Novak KF. Smoking and periodontal disease. In: Newman M G, Takei H H, Klokkevold PR. Carranza's Clinical periodontology 10th edition. China. Elsevier. 2007: 251-252.

7. Rink M, Xylinas E, Margulis V, Cha EK, Ehdaie B, Raman JD, Chun FK, Matsumoto K, Lotan Y, Furberg H, Babjuk M, Pycha A, Wood CG, Karakiewicz PI,Fisch M, Scherr DS, Shariat SF. Impact of Smoking on Oncologic Outcomes of upper tract urothelial carcinoma after radical nephroureterectomy. European association of Urology. 2012: 06-029.

8. Lung ZHS, Kelleher MGD, Porter RWJ, Gonzalez J, Lung RFH, Poor patient awareness of the relationship between smoking and periodontal diseases. British Dental Journal. 2005; 199: 731-737.

9. Molyneux A. ABC of smoking cessation Nicotine replacement therapy. BMJ. 2004; 328:454.

10- Rajkumari D, Diplina B, Shruti S, Suranjana H,Sreeparna D. Nicotinereplacement therapy A friend or foe .Journal of Family Medicine and Primary Care.2020 ;9(6):p 2615-2620.

11- Singhal D, Bansal A. Knowledge and awareness of dental patients regarding adverse effects of smoking on periodontal health. J Dent ProblSolut. 2016; 3(1): 024-027.

12-Tin-Oo MM, Aung TT, Saddki N, Aung TM. Awareness of the effects of smoking on oral health among dental patients at defense service general hospital, Myanmar. Int Medical Journal. 2013; 20(2): 1-3.

13-Sutej I, Bozic D, Peros K,Plancak D.Cigarette smoking and its consequences on periodontal health in teenagers : a cross – sectional study .Cent Eur J Public Health.2021:29(4):311-316.

14-Sepolia S, Verma P, Gulati S.Knowledge of smoking and periodontal diseases: Across- sectional study. Journal of Advanced Medical and dental Sciences Research. 2020; 8(11):229-233.

15- Baklen A, Yildirim B, Mimaroglu M, Yavuz M B.The impact of smoking on oral health and patient assessment of tobacco cessation support from Turkish dentists.Tobacco Induced Diseases.2021;19(49).

16-Puranik AK, Mishra P, Kumar S, Dhodapkar SV. Dental patients' knowledge and awareness regarding effects of smoking on oral health among smokers and nonsmokers: A Comparative Study. J Orofac Res. 2013; 3(2): 77-80.

17- More AB, Rodrigues A, Sadhu B J.Effects of smoking on oral health: Awareness among dental patients and their attitude towards its cessation. Indian Journal of Dental Research.2021; 32(1):23-26.

18-Arnoson Y, Shoenfeld Y, Amital H. Effects of tobacco smoke on immunity, inflammation and autoimmunity. Journal of Autoimmunity. 2010; 3(34): 258-265

19-Bashiru BO, Udo UA, Cigarette smoking and awareness of oral health problems of tobacco use among students at the university of Port Harcourt, South-South Nigeria. World J Dent. 2014; 5(4): 209-212.

20- Sachan V,AmaranathbbJ,Gupta S,Das N,Sjngh AK,Pallavi K.Awareness among smokers relayed to adverse effects of tobacco smoking on periodontal health and the challenges faced to quit the habit: a cross sectional survey .Eur.Chem.Bull.2023,12(1):1988-1995.

21- Gupta R, Bharat A,Dhiman U, Sharma A.Nictine replacement therapy: A smoking cessation aid..An overview.Int J Oral Health Dent .2019; 5:69-75