

Original article

# Attitude of Medical Technology Students at University of Zawia Toward Smoking on Their Oral Health Care

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## ABSTRACT

The use of tobacco has been linked to the etiology and increase severity of adverse effects on oral health, ranged from the discoloration that happened for tooth to the periodontal disease like gingivitis and periodontitis. This study was conducted within the faculty of medical technology in Zawia, and the number of student who participated in the study was 73 students were selected to get their answers to the questions raised and excluded some of them for not giving them appropriate answers. This was comparative study whereby the oral status of smoker and non-smoker was compared, it involves just males setting adolescent and adults volunteers aged 18-30 were recruited. Current smokers were in turn interviewed about their duration of smoking and appropriate number of cigarette they smoked per day and non-smoker were interviewed on the same question that asked to the smokers which was about the oral health status. Among 60 respondents were 32 smokers and 28 non-smokers. Halitosis was diagnosed in 22 subjects. 15 (46.875%) of whom were smoker. 7 (25%) of never smokers and have halitosis. And about gingivitis, our study shows that 15 smokers appear to have gums with a good color and appearance compared to 16 non-smokers gums appear rosy, 13 smokers appear gums in red compared to 9 non-smokers have redness in the gums. Gingivitis may develop in advanced stages to include plaque buildup below the gum line, affecting the tooth bone and supporting tissues which are called periodontitis, about this section we noticed that 6 smokers said that they lost their teeth compared to 9 non-smokers. Been to find that the majority of members of the study they have good oral hygiene, and thus the number of people with oral diseases was limited, also smoking was no significant effect on the development of disease of the mouth.

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## INTRODUCTION

In 2015, there were over 930 million smokers globally, an increase from 870 million in 1999 [1]. Currently, approximately one in three adults, or about 1.2 billion people, use tobacco worldwide. This number is projected to exceed 1.6 billion by 2025 [2]. Each day, between 82,000 and 99,000 young individuals begin smoking. Tobacco-related diseases claim around 3 million lives annually, with projections suggesting this figure could rise to 10 million over the next 30 to 40 years [3]. Throughout the 20th century, tobacco caused the deaths of 100 million people [4]. Tobacco is expected to be responsible for 50% more deaths than HIV/AIDS in 2015 and for 10% of all global deaths. It is estimated that tobacco kills up to half of its users. For instance, in Libya, tobacco contributes to over 3,500 deaths each year [5]. It is undeniable that tobacco use is one of the leading preventable causes of disease worldwide. The negative consequences of tobacco include lung cancer, heart disease, and respiratory issues, as well as significant effects on oral

health, such as periodontal tissue damage, necrotizing periodontal disease, gingival recession, and various pre-malignant oral lesions. Tobacco use is also a key risk factor for aggressive periodontitis, which often affects younger individuals, and for oral cancer, the incidence and mortality rates of which have been rising among young men. Smoking adversely affects oral tissues by impacting taste perception, causing tooth discoloration, palatal keratosis, melanosis, oral candidiasis, halitosis, and dental caries [6]. There is a well-established link between smoking and poor oral hygiene; smokers tend to accumulate more plaque and calculus, experience more oral health issues, and are less likely to visit the dentist compared to non-smokers [7].

Nicotine and tar, primary components of cigarettes, lead to teeth discoloration with yellow and brown stains emerging, alongside tar residues adhering to dental crevices [8]. Tobacco staining affects teeth, dentures, and dental restorations, manifesting as brown to blackish stains notably concentrated around the tooth base [9]. Halitosis (bad breath) and taste impairment are prevalent in smokers, with smoking identified as an external factor contributing to oral halitosis [10]. Smoker's melanosis, a harmless oral mucosa pigmentation, primarily appears on the lower front gums and between teeth, displaying brown patches, prevalent in around one-third of smokers [11].

Smoking diminishes gum blood flow and nutrient provision, including essential vitamin C, fostering gum disease, bone degradation, and tooth loss due to bacterial plaque buildup. Reduced saliva production from smoking hampers mouth cleansing and decay prevention. Smokers exhibit higher rates of tooth decay and loss compared to non-smokers, possibly due to decreased saliva's protective effects against decay or increased root exposure from smoking-related periodontal disease [12,13].

The university student period is crucial for developing behavioral traits, and many students begin smoking during this time due to peer pressure. Given the observed rise in smoking among university students, this study aims to assess the prevalence of cigarette smoking and the awareness of oral health issues related to tobacco use across all departments of the Faculty of Medicine.

## METHODS

### *Study setting*

The study was conducted at the Faculty of Medical Technology in Al-Zawiya City, Libya. This faculty was established as a branch of medical sciences at Al-Zawiya University in the academic year 2001/2002. The research focused on male students from the Faculty of Medical Technology, encompassing all departments and including both smokers and non-smokers. A total of 240 male students were enrolled during the academic year 2020/2021, based on statistics obtained from the college registrar. A sample of 73 students completed questionnaires distributed within the faculty. However, 13 questionnaires were excluded due to incomplete responses, resulting in a final study sample of 60 valid questionnaires.

### *Data collection*

Data were collected by using a questionnaire that includes questions such as the age of the person and whether it is a smoker or not. The rest of the questions are related to oral health and some symptoms that may appear on the patient and be a sign of some oral diseases such as gingivitis, periodontitis and halitosis, staining of teeth, dental carries and oral mucosal lesions.

### *Data analysis*

The collected data were analyzed using SPSS, and post-hoc analyses were performed with a chi-square test. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

Which necessitates the study of some variables that may be the reason for the increase in this ratio, which has an impact on the high rate of healthy the mouth for some students? These variables, known as independent variables, include the following: The age of the students, Smoking, The period of smoking and number of cigarettes per day.

The majority of the students were in the 18-20 age range. More than half of the students (53.3%) were smokers. Most of the smokers (68.75%) had been smoking for 1-5 years, and more than half of them (56.2%) smoked more than one packet of cigarettes per day.

This information can be useful in understanding the smoking prevalence and patterns among the studied population of university students. The data can inform targeted interventions and educational programs to address the high smoking rates, particularly focusing on the younger age groups and heavy smokers.

**Table 1. Descriptive Statistics for The Independents Variables**

Independent Variables		No. of Cases	Percentage %	Mean	
Age	All Students			21.4	
	18 – 20	31	51.7%		
	21 – 25	23	38.3%		
	26 – 30	6	10%		
	Total	60	100%		
Smoking	All Students				
	Smokers	32	53.3%		
	Non-Smokers	28	46.7%		
	Total	60	100%		
Period of Smoking	Smokers	1 – 5	22	68.75%	4.6
		6 – 10	6	18.75 %	
		More than 10	4	12.50 %	
		Total	32	100%	
Number of cigarettes	Smokers	1 – 5	7	21.9%	
		6 – 10	7	21.9%	
		More than one packet	18	56.2%	
		Total	32	100%	

In table 2, among the 60 participants surveyed, 22 individuals (36.7%) disclosed experiencing bad breath, with 15 smokers (25.0%) and 7 non-smokers (11.7%) among them. Conversely, 38 participants (63.3%) reported no issues with bad breath, including 17 smokers (28.3%) and 21 non-smokers (35.0%). The data implies a potential link between smoking and bad breath, as a higher percentage of smokers (46.9%) acknowledged having bad breath compared to non-smokers (25.0%). In total, 53.3% of the participants were smokers, while 46.7% were non-smokers. The overall prevalence of bad breath among the participants was 36.7%. These results suggest a notably higher occurrence of bad breath among smokers than non-smokers, aligning with established knowledge regarding the adverse impact of smoking on oral health.

**Table 2. Cross tabulation for students based on Smoking Status and Bad Breath**

Bad breath		Smoking		Total
		Yes	No	
Yes	Count	15	7	22
	% of total	25.0%	11.7%	36.7%
No	Count	17	21	38
	% of total	28.3%	35.0%	63.3%

The data presented in table (3) suggests a potential association between smoking and experiencing pain in the mouth and teeth. Among the participants, 17 individuals (28.3%) reported experiencing pain in their mouth and teeth. Of these, 9 (15.0%) were smokers and 8 (13.3%) were non-smokers. On the other hand, 43 (71.7%) reported no pain in their mouth and teeth, of which 23 (38.3%) were smokers and 20 (33.3%) were non-smokers. A slightly higher proportion of smokers (9 out of 32, 28.1%) reported experiencing pain compared to non-smokers (8 out of 28, 28.6%). 53.3% of the participants were smokers, and 46.7% were non-smokers. Among the total participants, 28.3% reported experiencing pain in their mouth and teeth. These findings indicate that there is a slightly higher prevalence of mouth and teeth pain among the smoking population compared to non-smokers, although the difference is not statistically significant. This could be due to the known negative effects of smoking on oral health, such as gum disease, tooth loss, and increased sensitivity. However, the data also suggests that a substantial proportion of non-smokers (28.6%) reported experiencing oral pain, which may be attributed to other factors like poor oral hygiene, dental caries, or underlying medical conditions.

**Table 3. Cross tabulation for students experiencing pain in their mouth and teeth and their smoking status.**

Feel pain in your mouth and teeth		Smoking		Total
		Yes	No	
Yes	Count	9	8	17
	% of total	15.0%	13.3%	28.3%
No	Count	23	20	43
	% of total	38.3%	33.3%	71.7%

The data provided in table (4) indicates that among the participants surveyed, 14 individuals (23.3%) observed gingival (gum) recession, evenly split between 7 smokers (11.7%) and 7 non-smokers (11.7%). On the other hand, 46 participants (76.7%) did not report gingival recession, with 25 smokers (41.7%) and 21 non-smokers (35.0%) in this group. Regarding the link between smoking and gingival recession, the data indicates no significant difference in prevalence between smokers and non-smokers, as both groups had an equal percentage (11.7%) of individuals noting gingival recession. In terms of overall prevalence, 53.3% of participants were smokers, while 46.7% were non-smokers. Among all participants, 23.3% noticed gingival recession. These results highlight that gingival recession is a prevalent oral health concern, affecting a similar proportion of smokers and non-smokers in the surveyed population. This suggests that while smoking is a recognized risk factor for gum disease and recession, other factors like inadequate oral hygiene, dental injuries, or genetic predisposition may also contribute to the development of gingival recession.

**Table 4. Cross tabulation for students observing gingival recession and their smoking status.**

Do you notice Gingival recession		Smoking		Total
		Yes	No	
Yes	Count	7	7	14
	% of total	11.7%	11.7%	23.3%
No	Count	25	21	46
	% of total	41.7%	35.0%	76.7%

In table (5) The study includes 32 individuals, with 53.3% (32 individuals) identified as smokers and 46.7% (28 individuals) as non-smokers. In terms of gum color, the data shows that 51.7% of the participants have bluish gums, 36.7% have reddish gums, and 11.7% have pink gums. There appears to be a potential association between smoking and gum color, suggesting that gum color may lean towards being more reddish or bluish among smokers compared to non-smokers.

**Table 5. Cross tabulation for students with gum color changes and their smoking status.**

How color looks for your gums		Smoking		Total
		Yes	No	
Pink	Count	15	16	31
	% of total	25.0%	26.7%	51.7%
Reddish	Count	13	9	22
	% of total	21.7%	15.0%	36.7%
bluish	Count	4	3	7
	% of total	6.7%	5.0%	11.7%

The data presented in table 6, indicates that out of the total of 60 surveyed participants, 53.3% (32 individuals) are smokers and 46.7% (28 individuals) are non-smokers. Among the participants, 51.7% observed deposits on their teeth, with 30.0% of smokers and 21.7% of non-smokers noting this issue. On the other hand, 48.3% did not notice such deposits, with 23.3% of smokers and 25.0% of non-smokers indicating this. This information implies that a greater proportion of smokers in the study identified deposits on their teeth compared to non-smokers. The presence of these deposits could be influenced by multiple factors such as smoking habits, oral hygiene routines, and dietary choices.

**Table 6. Cross tabulation for students who observe deposits on their teeth and their smoking status.**

Notice deposits on your teeth		Smoking		Total
		Yes	No	
Yes	Count	18	13	31
	% of total	30.0%	21.7%	51.7%
No	Count	14	15	29
	% of total	23.3%	25.0%	48.3%

In table 7, among the 60 surveyed participants, 18.3% of them reported significant bleeding, with 10.0% of smokers and 8.3% of non-smokers encountering this problem. 45.0% reported occasional bleeding gums, with 21.7% of smokers and 23.3% of non-smokers mentioning this. 36.7% reported never experiencing bleeding gums, with 21.7% of smokers and 15.0% of non-smokers in this category. This data suggests that smokers tend to report bleeding gums more frequently compared to non-smokers. Bleeding gums may signal gum disease or other oral health problems, and smoking is a well-

known risk factor for such issues.

**Table 7. Cross tabulation for students experiencing gum bleeding and their smoking status.**

Does bleeding occur in your gums		Smoking		Total
		Yes	No	
Much	Count	6	5	11
	% of total	10.0%	8.3%	18.3%
Sometimes	Count	13	14	27
	% of total	21.7%	23.3%	45.0%
Never	Count	13	9	22
	% of total	21.7%	15.0%	36.7%

In table 8, the study includes, 25.0% of individuals reported having lost teeth, with 10.0% of smokers and 15.0% of non-smokers experiencing this. 75.0% of individuals reported not having lost teeth, with 43.3% of smokers and 31.7% of non-smokers falling into this category. This data suggests that a higher percentage of non-smokers in the study have not experienced tooth loss compared to smokers. Tooth loss can be influenced by various factors including oral hygiene, dental care, and lifestyle habits like smoking.

**Table 8. Cross tabulation for students who have never lost their teeth and their smoking status.**

Have you ever lost your teeth		Smoking		Total
		Yes	No	
Yes	Count	6	9	15
	% of total	10.0%	15.0%	25.0%
No	Count	26	19	45
	% of total	43.3%	31.7%	75.0%

In terms of oral hygiene practices (Table 9), 53.3% of individuals reported consistently maintaining mouth and teeth cleanliness, with 28.3% of smokers and 25.0% of non-smokers affirming this. Among the participants, 45.0% mentioned cleaning their mouth and teeth occasionally, with 23.3% of smokers and 21.7% of non-smokers falling into this group. Merely 1.7% of individuals admitted to never cleaning their mouth and teeth, with both smokers and non-smokers representing 1.7% and 0.0%, respectively. This information indicates that a slightly higher proportion of smokers in the study claimed to always keep their mouth and teeth clean compared to non-smokers. It is crucial to emphasize the significance of maintaining proper oral hygiene practices, such as regular cleaning, for overall oral health, regardless of smoking status.

**Table 9. Cross tabulation for students who maintain cleanliness of their mouth and teeth and their smoking status.**

Do you keep your mouth and teeth clean		Smoking		Total
		Yes	No	
Always	Count	17	15	32
	% of total	28.3%	25.0%	53.3%
Sometimes	Count	14	13	27
	% of total	23.3%	21.7%	45.0%
Never	Count	1	0	1
	% of total	1.7%	0.0%	1.7%

## DISCUSSION

Tobacco, known since ancient times and consumed in various forms, with smoking being the most prevalent, lacks recognized benefits and instead carries numerous detrimental health effects, standing as a significant risk factor that can lead to fatal outcomes [1,2]. This study was focused on young male adults aged 18-30 from the Faculty of Medical Technology, 73 students were selected for questioning, with some excluded due to inadequate responses. The majority of participants were under 25 years old, with half falling within the 18-20 age range. Out of the total 60 participants, 32 were smokers and 28 were non-smokers. Among the smokers, 22 had been smoking for less than 5 years, 6 for over 5 years, and only 4 for more than a decade, indicating relatively recent smoking experiences. While 7 smokers consumed fewer than 5 cigarettes daily, 7 smoked between 6 and 10 cigarettes, and 18 required more than a pack a day. Despite attempts to quit, most smokers in the study struggled with addiction and returned to tobacco use. Many participants had

visited dentists previously, likely for treatment or oral health check-ups, which is a positive practice. The majority exhibited pink tongues, although three smokers had a yellow coating compared to one non-smoker, while 9 smokers and 6 non-smokers had a white layer. No participants reported having a black and cracked tongue, with tobacco's impact on the tongue's surface attributed to its toxic elements that adhere to the tongue's walls, fostering bacterial and fungal growth manifesting as yellow and white coatings, exacerbated by neglecting tongue cleaning. Oral hygiene involves the routine practice of maintaining a clean mouth, free from diseases and issues like halitosis, through regular tooth brushing and interdental cleaning.

Consistent oral hygiene is crucial for preventing dental conditions, primarily tooth decay (cavities, dental caries), and gum diseases such as gingivitis and periodontitis [4]. A study revealed that 99% of participants prioritize dental cleanliness, with 31 smokers ensuring regular or occasional tooth brushing, while only one smoker neglects oral hygiene. This positive outcome may be attributed to the cultural and scientific interests of the students from the Faculty of Medical Technology, who prioritize dental care to avoid problems associated with poor oral hygiene and social embarrassment. Maintaining proper oral and dental hygiene helps reduce plaque accumulation, bad breath, tooth decay, and gum diseases. Effective oral hygiene also aids in removing tobacco residues around teeth, thereby decreasing the risks of smoking on oral and dental health. Halitosis, commonly known as bad breath, can be either hereditary or acquired. Poor oral hygiene and smoking are prevalent factors contributing to halitosis [10]. Previous research conducted aimed to investigate the association between smoking and bad breath, revealing that among smokers, bad breath mainly stems from the retention and subsequent exhalation of inhaled smoke in the lungs, with sulphur being a significant component in exhaled gases. The study highlighted that around 88% of tobacco users suffer from bad breath [10]. In the present study, 25% of smokers displayed malodorous breath, with 15 smokers experiencing bad breath compared to 7 non-smokers facing the same issue. While smoking does have an impact on mouth odor, the magnitude of this effect may not be as pronounced as indicated by this study, possibly due to all participants placing a high priority on oral hygiene practices, which help in mitigating bad breath. However, the study also suggests that the effect of smoking on mouth odor might not be as substantial as initially implied, potentially attributed to the diligent oral hygiene practices adopted by all participants.

Gingivitis arises from inadequate oral hygiene practices and smoking. Early symptoms of acute gingivitis include gum swelling, redness, and bleeding, particularly during teeth cleaning, which can progress to gum recession. Previous study has highlighted smoking's impact on plaque formation, significantly influencing gum health. Plaque buildup serves as a precursor to gingivitis. A less hygienic oral environment fosters the accumulation of harmful tobacco compounds, heightening bacterial activity and compromising immunity against gingivitis [14].

In this study, 15 smokers exhibited gums with a healthy color and appearance compared to 16 non-smokers with pink gums. 13 smokers displayed redness in their gums in contrast to 9 non-smokers. Swelling and bleeding in the gums were more prevalent among smokers than non-smokers, with 19 individuals from both groups experiencing gum bleeding. Both smokers and non-smokers showed signs of gum recession, with 7 participants from each group experiencing this. These early-stage gingivitis symptoms were found to be equivalent or slightly more pronounced in smokers than in non-smokers, particularly regarding gum redness, which was notably pronounced in smokers.

Smoking did not mitigate gingivitis; instead, it marginally increased the incidence of gingivitis among smokers compared to non-smokers. This marginal impact is attributed to smokers' attention to oral hygiene, which curtailed plaque formation and subsequently reduced gingivitis symptoms. The majority of smokers were around 25 years old and relatively new to smoking, which likely contributed to the lower prevalence of gingivitis. However, as these individuals age and their smoking habits persist, chronic gingivitis symptoms are expected to rise, especially with increased cigarette consumption.

Blue gums could stem from genetic factors or chronic gingivitis. The study revealed that 4 smokers and 3 non-smokers exhibited blue gums. The similarity in findings between smokers and non-smokers does not definitively establish smoking as a significant factor in chronic gingivitis. This ambiguity may be due to the study's focus on young adults, where the effects of smoking on gums might not be fully evident, with chronic gingivitis symptoms likely emerging as the sample ages. Dental loss commonly occurs from accidents, diabetes, malnutrition, or chronic gingivitis when treatment is neglected, a hallmark of periodontal disease and gingivitis.

Gingivitis can progress to advanced stages involving sub-gingival plaque accumulation, impacting the tooth's bone and supporting structures, leading to periodontitis. Periodontitis manifests as pockets and tooth bone necrosis, critical symptoms that can eventually result in tooth loss [15]. current cigarette smokers exhibit the highest prevalence of moderate to severe periodontitis compared to former smokers and non-smokers [16,17]. The study indicated 6 smokers reported tooth loss compared to 9 non-smokers. However, these findings deviate from previous research due to the lack of medical examinations in this study, preventing the assessment of disease progression, age-related impacts, bone

density, or tooth bone health. The absence of detailed medical assessments, relying solely on self-reported symptoms, could introduce inaccuracies potentially influencing study outcomes. Despite these limitations, the study still offers valuable insights, yielding acceptable results for analysis.

## CONCLUSION

The study was carried out among students from the Faculty of Medical Technology, aged between 18 and 30 years, with the majority being under 25. It was observed that among the smokers in this group, smoking duration was relatively short, and cigarette consumption was not excessive. Most of them maintained good oral hygiene practices, ensuring a clean mouth. Although some dental issues like plaque, tooth decay, and gingivitis were identified, they were limited in scope and did not progress significantly. The impact of smoking within this student demographic at the Faculty of Medical Technology was constrained during this period.

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## Conflicts of Interest. Nil

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## موقف طلبة التقنية الطبية بجامعة الزاوية من التدخين وتأثيره على صحة الفم والأسنان

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### المستخلص

ارتبط استخدام التبغ بعلم الأسباب وزيادة شدة الآثار السلبية على صحة الفم، والتي تتراوح من تغير اللون الذي يحدث للأسنان إلى أمراض اللثة مثل التهاب اللثة والتهاب دواعم الأسنان. أجريت هذه الدراسة داخل كلية التكنولوجيا الطبية في الزاوية، وكان عدد الطلاب الذين شاركوا في الدراسة 73 طالباً تم اختيارهم للحصول على إجاباتهم على الأسئلة التي أثيرت واستبعد بعضهم لعدم إعطائهم إجابات مناسبة. كانت هذه دراسة مقارنة تمت من خلالها مقارنة الحالة الفموية للمدخنين وغير المدخنين، وهي تنطوي فقط على تعيين متطوعين من الذكور والمراهقين والبالغين الذين تتراوح أعمارهم بين 18 و 30 عاماً. تمت مقابلة المدخنين الحاليين بدورهم حول مدة التدخين والعدد المناسب من السجائر التي يدخنونها يوميًا وتمت مقابلة غير المدخنين حول نفس السؤال الذي طرح على المدخنين والذي كان حول الحالة الصحية للفم. من بين 60 مستجيباً كان هناك 32 مدخنًا و 28 غير مدخن. تم تشخيص رائحة الفم الكريهة في 22 موضوعًا. 15 (46.875%) منهم مدخنون. 7 (25%) من غير المدخنين يعانون من رائحة الفم الكريهة. وفيما يتعلق بالتهاب اللثة، أظهرت دراستنا أن 15 من المدخنين يبدو أن لديهم لثة ذات لون ومظهر جيد مقارنة بـ 16 من غير المدخنين تبدو اللثة وردية، و 13 من المدخنين تبدو اللثة حمراء مقارنة بـ 9 من غير المدخنين لديهم احمرار في اللثة. وقد يتطور التهاب اللثة في مراحل متقدمة ليشمل تراكم البلاك أسفل خط اللثة، مما يؤثر على عظم الأسنان والأنسجة الداعمة والتي تسمى التهاب دواعم السن، وفي هذا القسم لاحظنا أن 6 من المدخنين قالوا إنهم فقدوا أسنانهم مقارنة بـ 9 من غير المدخنين. لقد وجدنا أن غالبية أعضاء الدراسة لديهم نظافة فم جيدة، وبالتالي كان عدد الأشخاص المصابين بأمراض الفم محدودًا، كما لم يكن للتدخين تأثير كبير على تطور أمراض الفم.

**الكلمات المفتاحية:** صحة الفم، التدخين، الشباب البالغين، رائحة الفم الكريهة، التهاب اللثة، التهاب الأنسجة الداعمة