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## Evaluation of The Oral Health Status among Smoker Men Associated with Their Practices in Benghazi City-Cross sectional study

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**Abstract:** **Background:** Smoking is a major risk factor for systemic and oral diseases, yet many smokers demonstrate poor oral hygiene and irregular dental care evaluate the oral Therefore, the aim of this a study is evaluate oral health status of male smokers in Benghazi and assess associations with their smoking practices. **Methodology:** A cross-sectional study analyzed secondary data from 100 male smokers (response rate 82.5%) attending the Specialized Oral and Dental Education Center. A structured questionnaire collected socio-demographic and behavioral data, while oral health status was assessed using DMFT, OHI-S, and GI indices. Data were analyzed using SPSS version 28, applying Chi-square, ANOVA, and T-tests ($p \leq 0.05$). **Results:** Over half of participants were older than 35 years, 37% had higher education, and 78% reported good socioeconomic status. Most (80%) visited dentists only when in pain, and 34% brushed twice daily. DMFT was significantly higher among older, less educated, and poorer participants ($p < 0.001$). OHI-S and GI were also worse in those with low education and income. Smoking frequency showed a dose–response effect, with heavier smokers exhibiting higher caries and gingival inflammation. Notably, 58% expressed willingness to quit, mainly for medical reasons. **Conclusion and recommendation:** Smoking frequency and poor oral hygiene practices were strongly associated with adverse oral health outcomes. Preventive strategies should focus on oral health education, smoking cessation support, and regular dental check-ups.

**Keywords:** Smoking, Oral health, DMFT, OHI-S, Gingival Index, Benghazi.

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## INTRODUCTION

Tobacco and tobacco-related products are various types, but cigarette smoking is the most popular method of using tobacco. Each cigarette contains 10–14 mg of nicotine, 1–1.5 mg is absorbed into the body when smoked.

There are many major systemic adverse effects of cigarettes smoking consumption include various forms of cancer and cardiovascular diseases. Similarly, there is strong evidence that smoking has numerous negative effects on oral health like staining of teeth and dental restorations, reduction of the ability to smell and taste, development of oral diseases such as smokers' palate, smokers' melanosis and coated tongue, In addition, smoking can be partially related to oral pre-cancer, oral cancer, oral candidosis, periodontal disease, implant failure and dental caries [1-3].

Quit smoking greatly reduces the risk of developing many diseases. Also, good oral health practices and behaviors is an excellental way to minimize the impact of smoking on oral health, many researches found that dentists are good venue for providing cessation intervention for patients who smoke [4]. However, Dentists can see the adverse effects attributable to smoking immediately and easy recognition opportunity, most oral health professionals do not offer smoking cessation advice to their patients [5]. Moreover, Smokers have lower rates of dental care utilization and an annual visit to the dentist compared to non-smokersmake [6].

many studies assessed smokers characteristics on smoking and oral health care like brush their teeth, use dental flossing, regular dental check-ups, failing to quit, prefer to smoke frequently in the morning, use any other tobacco products other than conventional

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cigarettes(others: electronic cigarette or water pipe) and if they received any smoking cessation advice [7].

Accordingly, to provide a baseline data for planning and evaluation of oral health promotion programmes, this study was designed and conducted to evaluate the oral health status among smoker men associated with their practices in Benghazi city.

## METHODOLOGY

**Study design and subject**

The data used for this study was secondary data extracted from primary data that was collected through a cross-sectional study of a random sample 130 questions among male patients, the sample participants were chosen from a public dental Centre. Where our goal was the largest places in Benghazi that accommodate the largest number of sample, which is the Specialized Oral and Dental Education Center in Benghazi City. Details of the primary study have been reported by Halima *et al* [8].

The questionnaire that addressed the following topics was included in the first section: socio-demographic information such as age, Level of education and socioeconomic. It also included questions regarding the practices of smokers as oral hygiene and smoking habits.

The universal DMFT, simplified oral hygiene and gingival index was used to perform a diagnosis to assess oral health status.

**Statistical analysis**

Each questionnaire received an individual identification number to permit checking for any inconsistent responses. All questionnaires were collected and the data was entered on Microsoft office Excel 2021 database and checked for entry errors. The uncompleted questionnaires were excluded.

Data entry was followed by coding, analysis, and tabulation. The results were statistically analyzed using SPSS's statistical software for social science, version 28 (Chicago, IL, USA). Both qualitative and quantitative variables' descriptive statistics were shown as percentages. Chi square and the T-test were used to compare the data. P value of 0.5 or less was considered to be the threshold for significance.

## RESULTS

The distribution of males' sociodemographic information is displayed in **Table1**. It shows that a total of 100 questionnaires (out of 130) were received, giving a response rate of 82.5%. However, it found that more than half of 57% of the respondents were more than 35 years old. Regarding educational level, 37% were highly educated, and the majority of them had good income, according to socioeconomic status 78%.

**Table-1: Socio demographic data among participations**

| Variables | | Frequency | Percent % |
|---|---|---|---|
| **Age Group** | less than 35 | 43 | 43.0 |
| | more than 35 | 57 | 57.0 |
| **Educational level** | elementary school | 27 | 27.0 |
| | high school | 36 | 36.0 |
| | college educated | 37 | 37.0 |
| **Socioeconomic level** | Poor | 17 | 17.0 |
| | well off | 78 | 78.0 |
| | Rich | 5 | 5.0 |

**Table (2)** shows the males's practices, about 80% of samples were visiting a dentist only when there's pain and 34% brushing their teeth twice a daily. While, about 84% started the smoking during 15-20 years, and used 74% of them used them alone. About 44% drinks coffee with smoking. However, about 58% of them quit smoking due to medical reasons.

**Table-2: Oral health practices among smoker's males**

| Variables | | Frequency | Percent % |
|---|---|---|---|
| **Number of dental visits per year** | 1 - 2 once | 16 | 16.0 |
| | 2 - 3 once | 4 | 4.0 |
| | only when there's pain | 80 | **80.0** |
| **Frequency of tooth brushing daily** | once a day | 33 | 33.0 |
| | twice a day | 34 | **34.0** |
| | none | 20 | 20.0 |
| | once a week | 13 | 13.0 |
| **How old were you when you start smoking?** | 15-20 Y | 84 | **84.0** |
| | 25-45 Y | 15 | 15.0 |
| | 50-60 Y | 1 | 1.0 |

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| | | | |
|---|---|---|---|
| **How do you smoke?** | Alon | 74 | |
| | with family member | 9 | 9.0 |
| | with friends | 17 | 17.0 |
| **Having a habit after smoking** | Drinking tea. | 32 | 32.0 |
| | soft drink juice | 11 | 11.0 |
| | drinking coffee | 44 | **44.0** |
| | Rince with water | 7 | 7.0 |
| | Nothing | 6 | 6.0 |
| **If you quit smoking, what would be the reason?** | It's an expensive habit. | 7 | 7.0 |
| | for medical reasons | 58 | **58.0** |
| | Medical advice. | 8 | 8.0 |
| | Usage warning. | 7 | 7.0 |
| | Religious reasons | 18 | 18.0 |
| | Other reasons | 2 | 2.0 |
| **If you have succeeded in quitting smoking, what methods have you used?** | Session in specialized clinic. | 8 | 8.0 |
| | Medication | 53 | **53.0** |
| | Alternative treatment | 32 | 32.0 |
| | other | 7 | 7.0 |

According to frequency of smoking per a day, about 25% of the male used them for 1-3 times daily, while 40% used more than a pack daily (Figure 1).

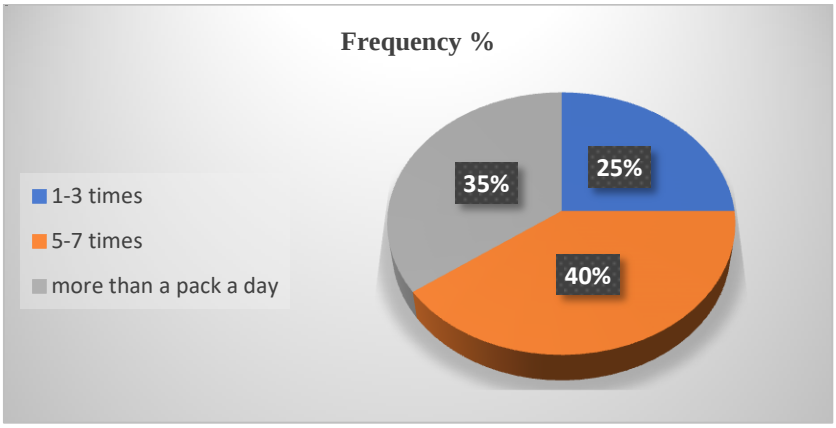


**Fig-1: Frequency of smoking daily**

However, there were a significant association between caries rate DMFT and Sociodemographic variables. On other hands, oral hygiene status and gingival index had a significant association with socioeconomic status.

**Table-3: Relationship between Sociodemographic data and DMFT, OHI-S and GI**

| | $Mean \pm SD$ | T - test | P - value |
|---|---|---|---|
| **Age group DMFT score** | | | |
| less than 35 | 4.302 ± 3.51 | - 3.648 | 0.000** |
| more than 35 | 8.596 ± 7.08 | | |
| **PHI_S** | | | |
| less than 35 | 1.293 ± 1.16 | - 0.373 | 0.710 |
| more than 35 | 1.376 ± 1.05 | | |
| **GI** | | | |
| less than 35 | 1.196 ± 1.03 | - 0.550 | 0.584 |
| more than 35 | 1.307 ± 0.96 | | |
| **Educational level DMFT score** | | | |
| elementary school | 10.037 ± 6.38 | 8.195 | 0.001** |

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| | | | |
|---|---|---|---|
| high school | 6.972 ± 5.99 | | |
| college educated | 4.135 ± 5.04 | | |
| **OHI_S** | | | |
| elementary school | 2.003 ± 0.088 | 11.485 | 0.000** |
| high school | 1.402 ± 1.14 | | |
| college educated | 0.795 ± 0.92 | | |
| **GI** | | | |
| elementary school | 1.877 ± 0.750 | 11.758 | 0.000** |
| high school | 1.294 ± 1.024 | | |
| college educated | 0.774 ± 0.871 | | |
| **Socioeconomic level DMFT score** | | | |
| poor | 11.176 ± 4.92 | 6.792 | 0.001** |
| well off | 6.064 ± 6.15 | | |
| Rich | 2.400 ± 1.34 | | |
| **OHI_S** | | | |
| Poor | 2.458 ± 0.639 | 15.530 | 0.000** |
| well off | 1.163 ± 1.04 | | |
| Rich | 0.300 ± 0.42 | | |
| **GI** | | | |
| poor | 2.076 ± 0.62 | 8.834 | 0.000** |
| well off | 1.124 ± 0.98 | | |
| Rich | 0.580 ± 0.68 | | |

According to relationship between smoker's practices and caries index, there were a significant associated between frequency of tooth brushing and caries rate as well as among times of smoking (**Table 4)**. However, regarding to oral hygiene status, there were a significant associated between OHI-S and frequency of dental visit, toothbrushing and smoking habit (**Table 5**). Furthermore, there were significant associations among frequency of tooth brushing, age for smoking started and other habits with smoking **(Table 6).**

**Table-4: Relationship between Smokers's practices and DMFT**

| | DMFT score | | ANOVA test | |
|---|---|---|---|---|
| | **Mean** | **(SD)** | **F value** | **P value** |
| **yearly number of visits to the dentist** | | | | |
| 1 - 2 once | 4.6250 | 2.41868 | 2.122 | 0.125 |
| 2 - 3 once | 3.0000 | 2.44949 | | |
| only when there's pain | 7.3625 | 6.67177 | | |
| **daily tooth brushing frequency** | | | | |
| once a day | 5.7879 | 6.49883 | 13.919 | **0.000**** |
| twice a day | 3.7059 | 2.40617 | | |
| none | 13.0500 | 6.94698 | | |
| once a week | 7.4615 | 3.82133 | | |
| **How old were you when you start smoking** | | | | |
| 15-20 Y | 7.2738 | 6.55349 | 2.456 | 0.091 |
| 25-45 Y | 3.6000 | 1.54919 | | |
| 50-60 Y | 10.0000 | --- | | |
| **How do you smoke** | | | | |
| Alon | 6.8919 | 5.86040 | 0.111 | 0.895 |
| with family member | 5.8889 | 4.56740 | | |
| with friends | 6.5882 | 8.28446 | | |
| **Having a habit after smoking** | | | | |
| Drinking tea. | 8.5625 | 6.47047 | 1.831 | 0.129 |
| soft drink - juice | 5.5455 | 2.76997 | | |
| drinking coffee | 6.7273 | 6.95288 | | |
| Rince with water | 3.0000 | 2.08167 | | |
| Nothing | 3.8333 | 2.48328 | | |
| **How many times do you smoke a day** | | | | |

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| | | | | |
|---|---|---|---|---|
| 1-3 Aday | 3.2353 | 1.67815 | 5.545 | **0.006**** |
| 5-7 Aday | 6.2955 | 5.81329 | | |
| more than a pack a day | 8.7949 | 7.07174 | | |
| **If you quit smoking, what would be the reason?** | | | | |
| It's an expensive habit. | 2.5714 | 3.73529 | 1.227 | 0.303 |
| for medical reasons | 7.7414 | 6.00164 | | |
| medical advice. | 5.1250 | 4.94072 | | |
| Usage warning. | 4.8571 | 3.38765 | | |
| Religious reasons | 6.8333 | 8.27647 | | |
| Other reasons | 5.0000 | 2.82843 | | |
| **If you have succeeded in quitting smoking, what methods have you used?** | | | | |
| Session in specialized clinic. | 3.2500 | 3.01188 | 1.879 | 0.138 |
| Medication | 7.9623 | 6.23255 | | |
| Alternative treatment | 5.8438 | 6.71594 | | |
| other | 5.7143 | 3.86067 | | |

**Table-5: Relationship between Smokers's practices and OHI-S**

| practice variable | | OHI_S | | | |
|---|---|---|---|---|---|
| | | **Good** | **Fair** | **Poor** | **P- value** |
| **yearly number of visits to the dentist** | 1 - 2 once | 13 | 3 | 0 | 0.046** |
| | | 81.3% | 18.8% | 0.0% | |
| | 2 - 3 once | 4 | 0 | 0 | |
| | | 100.0% | 0.0% | 0.0% | |
| | only when there's pain | 38 | 38 | 4 | |
| | | 47.5% | 47.5% | 5.0% | |
| **daily tooth brushing frequency** | once a day | 27 | 6 | 0 | 0.000** |
| | | 81.8% | 18.2% | 0.0% | |
| | twice a day | 24 | 10 | 0 | |
| | | 70.6% | 29.4% | 0.0% | |
| | none | 0 | 18 | 2 | |
| | | 0.0% | 90.0% | 10.0% | |
| | once a week | 4 | 7 | 2 | |
| | | 30.8% | 53.8% | 15.4% | |
| **How old were you when you start smoking** | 15-20 Y | 43 | 37 | 4 | 0.460 |
| | | 51.2% | 44.0% | 4.8% | |
| | 25-45 | 11 | 4 | 0 | |
| | | 73.3% | 26.7% | 0.0% | |
| | 50-60 | 1 | 0 | 0 | |
| | | 100.0% | 0.0% | 0.0% | |
| **How do you smoke** | Alon | 39 | 32 | 3 | 0.818 |
| | | 52.7% | 43.2% | 4.1% | |
| | with family member | 5 | 4 | 0 | |
| | | 55.6% | 44.4% | 0.0% | |
| | with friends | 11 | 5 | 1 | |
| | | 64.7% | 29.4% | 5.9% | |
| **Having a habit after smoking** | drinking tea. | 11 | 19 | 2 | 0.079 |
| | | 34.4% | 59.4% | 6.3% | |
| | soft drink juice | 5 | 5 | 1 | |
| | | 45.5% | 45.5% | 9.1% | |
| | drinking coffee | 28 | 15 | 1 | |
| | | 63.6% | 34.1% | 2.3% | |
| | Rince with water | 7 | 0 | 0 | |
| | | 100.0% | 0.0% | 0.0% | |
| | Nothing | 4 | 2 | 0 | |
| | | 66.7% | 33.3% | 0.0% | |

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| | | | | | |
|---|---|---|---|---|---|
| **How many times do you smoke a day** | 1-3 Aday | 14 | 3 | 0 | 0.041** |
| | | 82.4% | 17.6% | 0.0% | |
| | 5-7 Aday | 26 | 16 | 2 | |
| | | 59.1% | 36.4% | 4.5% | |
| | more than a pack a day | 15 | 22 | 2 | |
| | | 38.5% | 56.4% | 5.1% | |
| | 30-60 min | 22 | 9 | 0 | |
| | | 71.0% | 29.0% | 0.0% | |
| **If you quit smoking, what would be the reason?** | It's an expensive habit. | 5 | 2 | 0 | 0.954 |
| | | 71.4% | 28.6% | 0.0% | |
| | for medical reasons | 30 | 24 | 4 | |
| | | 51.7% | 41.4% | 6.9% | |
| | Medical advice. | 5 | 3 | 0 | |
| | | 62.5% | 37.5% | 0.0% | |
| | Usage warning. | 4 | 3 | 0 | |
| | | 57.1% | 42.9% | 0.0% | |
| | Religious reasons | 10 | 8 | 0 | |
| | | 55.6% | 44.4% | 0.0% | |
| | Other reasons | 1 | 1 | 0 | |
| | | 50.0% | 50.0% | 0.0% | |
| **If you have succeeded in quitting smoking, what methods have you used?** | Session in specialized clinic. | 4 | 4 | 0 | 0.523 |
| | | 50.0% | 50.0% | 0.0% | |
| | Medication | 26 | 23 | 4 | |
| | | 49.1% | 43.4% | 7.5% | |
| | Alternative treatment | 21 | 11 | 0 | |
| | | 65.6% | 34.4% | 0.0% | |
| | other | 4 | 3 | 0 | |
| | | 57.1% | 42.9% | 0.0% | |

**Table-6: Relationship between Smokers's practices and GI**

| **practice variable** | | **GI** | | | |
|---|---|---|---|---|---|
| | | Mild inflammation | Moderate inflammation | Severe inflammation | **P- value** |
| **yearly number of visits to the dentist** | 1 - 2 once | 10 | 5 | 1 | 0.131 |
| | | 62.5% | 31.3% | 6.3% | |
| | 2 - 3 once | 4 | 0 | 0 | |
| | | 100.0% | 0.0% | 0.0% | |
| | only when there's pain | 39 | 19 | 22 | |
| | | 48.8% | 23.8% | 27.5% | |
| **daily tooth brushing frequency** | once a day | 26 | 7 | 0 | 0.000** |
| | | 78.8% | 21.2% | 0.0% | |
| | twice a day | 24 | 6 | 4 | |
| | | 70.6% | 17.6% | 11.8% | |
| | none | 0 | 5 | 15 | |
| | | 0.0% | 25.0% | 75.0% | |
| | once a week | 3 | 6 | 4 | |
| | | 23.1% | 46.2% | 30.8% | |
| **How old were you when you start smoking** | 15-20 Y | 41 | 23 | 20 | 0.048** |
| | | 48.8% | 27.4% | 23.8% | |
| | 25-45 | 12 | 0 | 3 | |
| | | 80.0% | 0.0% | 20.0% | |
| | 50-60 | 0 | 1 | 0 | |
| | | 0.0% | 100.0% | 0.0% | |
| **How do you smoke** | Alon | 36 | 19 | 19 | 0.253 |
| | | 48.6% | 25.7% | 25.7% | |
| | with family member | 4 | 2 | 3 | |
| | | 44.4% | 22.2% | 33.3% | |

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| | | | | | |
|---|---|---|---|---|---|
| | with friends | 13 | 3 | 1 | |
| | | 76.5% | 17.6% | 5.9% | |
| **Having a habit after smoking** | drinking tea. | 11 | 7 | 14 | 0.006** |
| | | 34.4% | 21.9% | 43.8% | |
| | soft drink juice | 4 | 4 | 3 | |
| | | 36.4% | 36.4% | 27.3% | |
| | drinking coffee | 28 | 10 | 6 | |
| | | 63.6% | 22.7% | 13.6% | |
| | Rince with water | 7 | 0 | 0 | |
| | | 100.0% | 0.0% | 0.0% | |
| | Nothing | 3 | 3 | 0 | |
| | | 50.0% | 50.0% | 0.0% | |
| **How many times do you smoke a day** | 1-3 Aday | 14 | 3 | 0 | 0.041** |
| | | 82.4% | 17.6% | 0.0% | |
| | 5-7 Aday | 24 | 11 | 9 | |
| | | 54.5% | 25.0% | 20.5% | |
| | more than a pack a day | 15 | 10 | 14 | |
| | | 38.5% | 25.6% | 35.9% | |
| **If you quit smoking, what would be the reason?** | It's an expensive habit. | 5 | 0 | 2 | 0.710 |
| | | 71.4% | 0.0% | 28.6% | |
| | for medical reasons | 28 | 17 | 13 | |
| | | 48.3% | 29.3% | 22.4% | |
| | medical advice. | 5 | 2 | 1 | |
| | | 62.5% | 25.0% | 12.5% | |
| | Usage warning. | 5 | 0 | 2 | |
| | | 71.4% | 0.0% | 28.6% | |
| | Religious reasons | 9 | 4 | 5 | |
| | | 50.0% | 22.2% | 27.8% | |
| | Other reasons | 1 | 1 | 0 | |
| | | 50.0% | 50.0% | 0.0% | |
| **If you have succeeded in quitting smoking, what methods have you used?** | session in specialized clinic. | 3 | 4 | 1 | 0.225 |
| | | 37.5% | 50.0% | 12.5% | |
| | Medication | 24 | 15 | 14 | |
| | | 45.3% | 28.3% | 26.4% | |
| | Alternative treatment | 22 | 4 | 6 | |
| | | 68.8% | 12.5% | 18.8% | |
| | other | 4 | 1 | 2 | |
| | | 57.1% | 14.3% | 28.6% | |

## DISCUSSION

This study evaluated the oral health status and practices among male smokers in Benghazi city, providing valuable baseline data to guide preventive and educational strategies. The overall response rate was 82.5%, which strengthens the reliability of the findings, given that most of the distributed questionnaires were completed and returned.

However, the results revealed that smokers above 35 years of age, those with lower education, and those from poorer socioeconomic backgrounds had significantly higher DMFT scores compared to their counterparts. These findings are in agreement with Jiang *et al.* [2] who confirmed a positive correlation between smoking and dental caries in their systematic review. This rate may be explained by both biological and behavioral mechanisms leading to raise the caries process. As well as, the smoking reduces salivary flow and buffering capacity, promotes bacterial adhesion and interferes with remineralization processes. At the same time, individuals with limited education and income often exhibit weaker oral health awareness and reduced access to preventive care.

According to he oral hygiene index (OHI-S) and gingival index (GI) showed significant associations with education and socioeconomic status. Participants with only elementary education or poor income had the worst oral hygiene and highest levels of gingival inflammation. These findings mirror those of Beklen *et al.*, who found that smokers with inadequate oral hygiene practices experienced higher periodontal disease prevalence [9]. Interestingly, while some participants reported brushing twice daily, their oral hygiene and gingival scores still indicated disease. This

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highlights a brushing paradox, suggesting that the harmful biological effects of smoking—such as nicotine-induced vasoconstriction, suppressed immune function, and delayed tissue repair—can override the benefits of mechanical plaque control. Thus, good oral hygiene alone may not fully protect smokers against gingival and periodontal disease.

On other hands, about 80% of participants reported visiting the dentist only when experiencing pain. Preventive visits were rare, despite the visible impact of smoking on oral health. This behavior is consistent with Blasi *et al*., who demonstrated that smokers are less likely to engage in preventive dental care and often delay treatment until problems become severe. Such care-seeking patterns not only increase treatment costs but also lead to avoidable tooth loss and disease progression [10].

This also highlights a missed opportunity for oral health professionals to engage in smoking cessation counseling. Carr and Ebbert [11] emphasized that dentists are ideally positioned to provide cessation interventions because of their frequent contact with smokers and the visibility of smoking-related oral damage. However, as shown in our study and supported by Chan, Chan, and Tsang [12]. In additions, individuals should be encouraged for self-oral examination and regularly visit the dental clinics. This would play an important role in smoking cessation and early recognition of the cancer and better prognosis would be expected [13].

Moreover, most smokers (84%) initiated smoking between ages 15–20, underscoring the vulnerability of adolescents and young adults. This finding is consistent with regional observations that adolescence is a critical window for tobacco initiation and prevention [14]. Preventing initiation at this age could substantially reduce future oral disease burden. Furthermore, smoking frequency showed a strong dose–response effect: those smoking more than one pack per day recorded significantly higher DMFT, poorer oral hygiene, and more severe gingival inflammation compared to lighter smokers. These findings align with results from previous studies showing that heavy smokers experience higher caries experience and periodontal destruction [15-17].

A positive observation was that 58% of participants expressed willingness to quit smoking for medical reasons, with medication being the most common cessation method. This aligns with national data indicating that health concerns are the leading motivation for quitting among Libyan smokers [18]. Such readiness suggests that if properly supported, dental students and professionals could play a pivotal role in motivating and guiding cessation efforts during routine visits [19]. With proper training, dentists in Benghazi could provide brief, effective interventions that capitalize on the visible oral consequences of smoking, turning clinical encounters into opportunities for meaningful behavior change.

## CONCLUSION AND RECOMMENDATIONS

This study revealed significant associations between smoking practices and oral health outcomes. Caries rate (DMFT) was linked to sociodemographic variables, while oral hygiene status (OHI-S) and gingival index (GI) were related to socioeconomic status. Moreover, smoking frequency, age of initiation, and toothbrushing habits showed strong associations with caries and oral hygiene. Therefore, strongly recommended that, promote oral health education on smoking risks, encourage regular toothbrushing and dental visits, implement early prevention programs against smoking initiation, and integrate socioeconomic factors into oral health strategies.

### Limitations and Future Directions

The cross-sectional design of this study limits the ability to establish causality between smoking and oral health outcomes. As well as, further research with larger sample sizes is encouraged to explore causal relationships and long-term effects of smoking on oral health in Libyan populations.

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