BULLETIN OF STOMATOLOGY AND MAXILLOFACIAL SURGERY
Volume 21, Issue 12

DOI:10.58240/1829006X-2025.21.12-366

ORIGINAL RESEARCH

PREVALENCE OF DENTAL CARIES AMONG CIGARETTE SMOKER CASES ATTENDING AL- AMEED UNIVERSITY DENTAL CLINICS.

Dheyaa R Alhajjar,
MSc. Oral pathology assistant lecturer of the Oral Diagnosis Department College of Dentistry, Al-Ameed university, Najaf - Karbala Rd, Karbala, Karbala Governorate, https://orcid.org/0000-0002-1733-1899
Corresponding Author: Dheyaa R Alhajjar, MSc. Oral pathology assistant lecturer of the Oral Diagnosis Department College of Dentistry, Al-Ameed university, Najaf - Karbala Rd, Karbala, Karbala Governorate, 56001 Phone: +9647828863033; e-mail: dheyaaalhajjar@gmail.com, https://orcid.org/0000-0002-1733-1899
Received: Nov 29. 2025; **Accepted:** Dec 27, 2025; **Published:** Dec. 31, 2025

Abstract

Background: Regarding the association between the smoking and dental caries prevalence, there are multiple variable factors which can contribute directly or in another way to the increase in the prevalence of dental caries in smokers similar as the patient age, tobacco habits other than smoking, oral hygiene, drinking habits, eating habits, dental recalls and overall health. Due to that, it's delicate to conclude the correlation between a single positive factor which can causes increase in caries prevalence in smokers but the association between smoking and dental caries is well proved in aged patient groups.

Aims. this study aimed to assess the frequence of dental caries and its associated factors among cigarette smoker cases attending dental clinics in Al- Ameed university, college of dentistry, 2025.

Material and methods. In this study a total of 125 participants were examined, including 77 males and 48 females, ranging in age from 18 to 65 years, the number of smoker patient was 55 and 70 of the study sample were non-smokers. Demographic data, smoking status, and Dental caries assessment using the DMFT index for all permanent teeth, excluding wisdom teeth by a non-invasive clinical dental examination were determined for each participant.

Results. the results found that level of DMFT in females (8.96±3.90) is higher than males (7.87±3.10), but not significantly. There are no-significant differences between smokers and non-smokers regarding level of DMFT (P. value=0.432). The results found that level of DMFT in those who belonging to older age 56-65 years have higher significantly level of DMFT (14.33±3.14) compared to other age groups (P- value<0.001). The participants who freelance work have higher significantly level of DMFT (9.71±3.26) compared to other occupations (P-value<0.001). Patients had both hypertension and diabetes have higher significantly level of DMFT (11.17±4.17) than hypertension and those had no medical history at significantly less than 0.001.

Conclusions. There are limitations to this cross-sectional study. The results of which cannot establish a direct effect of cigarette smoking on the prevalence of dental caries. As such, we conclude the need for a more robust study design to ascertain whether smoking could potentially lead to increase the severity dental caries. A prospective cohort study could be a proper option.

Keywords: smoking, DMFT score, smoker, non-smoker

INTRODUCTION

Dental caries is a major healthcare problem as it's the most current complaint worldwide[1]. Nearly 100% of grown-ups are affected by dental caries [2]. World Health Organization (WHO) published a decade ago a review of global oral health status, which emphasized that despite great advancements in oral health in several countries, problems still persist[3]. Dental caries concentrates in groups with low socioeconomic status, and despite being fluently preventable, its frequence did n't significantly drop over the last thirty times [1]. Poor oral health may have a profound influence on general health; dental caries is still the most current complaint indeed in utmost industrialized countries as it affects up to 100 of both academy going children and grown-ups[4]. It not only affects oral health but also has an injurious effect on overall health and quality of life [5]. Due to the frequent consumption of sugars dental caries occurs as the biofilm microbiota that typically resides orally in homeostasis change to an acidogenic, aciduric, and cariogenic population [6]. Carious lesions have an advanced chance and prevalence of certain bacterial species Streptococcus mutans, Streptococcus sobrinus, and Lactobacilli,

insulated from advanced caries [7]. Clinically, the result of this shift can be unnoticeable or lead to a net mineral loss within the tooth's hard structures, performing in a visible carious lesion [8]. The biofilm bacteria produce organic acids, primarily lactic acid by metabolize Fermentable carbohydrates. These end products of bacterial metabolism accumulate in the biofilm, causing a pH drop and demineralization of the face subcaste of the tooth [9]. Regarding the nicotine goods on dental caries, numerous studies have been done, one of them is across-sectional epidemiological study in Sweden concluded that there was an association between smoking and oral health [10]. still, some trials have studied the effect of nicotine on Streptococcus mutans. A study conducted by Chanea et al set up that Streptococcus mutans adherence was significantly enhanced in the presence of nicotine[11]. There are multiple variable factors which can contribute directly or laterally to the increase in the prevalence of dental caries in smokers similar as the patient age, tobacco habits other than smoking, oral hygiene, drinking habits, eating habits, dental recalls and overall health [12]. Due to that, it's delicate to conclude the correlation between a single positive factor which can causes increase in caries prevalence in smokers but the association between smoking and dental caries is well proved in aged patient groups [13]. This study includes variables like patient age, gender, smoking, dental caries index, medical history, patient occupation and oral hygiene status using simplified oral hygiene index, which are the utmost document keys for dental caries development exploration. thus, this study aimed to assess the frequence of dental caries and its associated factors among cigarette smoker cases attending dental clinics in Al-Ameed university, council of dentistry, 2025.

MATERIALS AND METHODS

The project proposal was presented to the Chair of the Research Ethics Committee of Al-Ameed University College of dentistry. In accordance with international criteria, formal ethical approval was completed.

This cross-sectional study was conducted to assess the prevalence of dental caries among cigarette smoker patients attending Al-Ameed University dental clinics, Karbala, Iraq. A total of 125 participants were examined, including 77 males and 48 females, ranging in age from 18 to 65 years, the number of smoker patient was 55 and 70 of the study sample were non-smokers. The sample included individuals from various occupational backgrounds such as students, employees, and unemployed individuals. Dental caries was assessed using the DMFT index (Decayed, Missing, and Filled Teeth), which is a standardized method recommended by the World Health Organization (WHO) for measuring dental health status (i.e., “when a lesion of the tooth’s surface had an unmistakable cavity, undermined enamel, or a detectably softened floor or wall”). All permanent teeth, excluding wisdom teeth, were taken into consideration during the clinical examination (14). A non-invasive clinical dental examination was performed at the Dental Clinic of Al-Ameed university college of dentistry from February to May 2025. Clinical examinations were carried out in a dental chair under adequate lighting using a dental mirror and dental probe without radiographs by well-trained dentists. The information for each item on the questionnaire was copied to code sheets, the data was input into a personal computer, and the statistical package from SPSS-27 was used to evaluate the data. Simple statistics like frequency, percents, mean, standard deviation, and range displayed the data. A Chi-square test (X2-test) was utilized to identify the significance of qualitative data percentage differences. ANOVA analysis for calculating the least significant difference (L.S.D.) test were applied to determine the statistical significance of the data. P value of <0.05 was considered significant. L.S.D. Values were compared with values of means difference. Using Independent sample t. test to compare between two groups for numerical data. In addition, Enter Standard multiple- Linear Regression was used in this study. The P-value was considered statistically significant when it was equal to or less than 0.05.

RESULTS

Demographic characteristics of the study population

The results of this study indicate that the highest percentage (44.0%) of patients belonging to ages ≤25 years, followed by those aged 26-35 years (24.0%), 36-45 years (20.0%), 46-55 years (7.2%), while lowest percentage (4.8%) of patients are aged 56-65 years. The mean age was 31.6±12.6 (with range; 16-65) years. The gender ratio is 61.6% male to 38.4% female. The highest proportion (44.8%) of the participants were freelance work, followed by 40.0% students, 12.8% employed, and 2.4% housewives (table 1). As illustrating in table no.2, the results shows that 44.0% of participants were smokers. Regarding medical history, the majority of patients (72.8%) had no history of the disease. While smaller percentages (11.2%) of patients had hypertension and diabetes separately, 4.8% of the study sample had both. Concerning oral hygiene, 68.0% of the participants have a moderate level of oral health, 14.4% of the patients have fair and good levels of oral health, while the lowest percentage (3.2%) of the participants have bad level of oral hygiene (figure no.1).

Table 1. The distribution of patients according to demographic characteristics of the study population

		Freq.	%
Age groups	≤25 years	55	44.0
	26-35 years	30	24.0
	36-45 years	25	20.0
	46-55 years	9	7.2
	56-65 years	6	4.8
	Mean ±SD (Range)	31.6±12.6 (16-65)	
Gender	Male	77	61.6
	Female	48	38.4
Occupation	Employed	16	12.8
	Freelance work	56	44.8
	Student	50	40.0
	Housewife	3	2.4

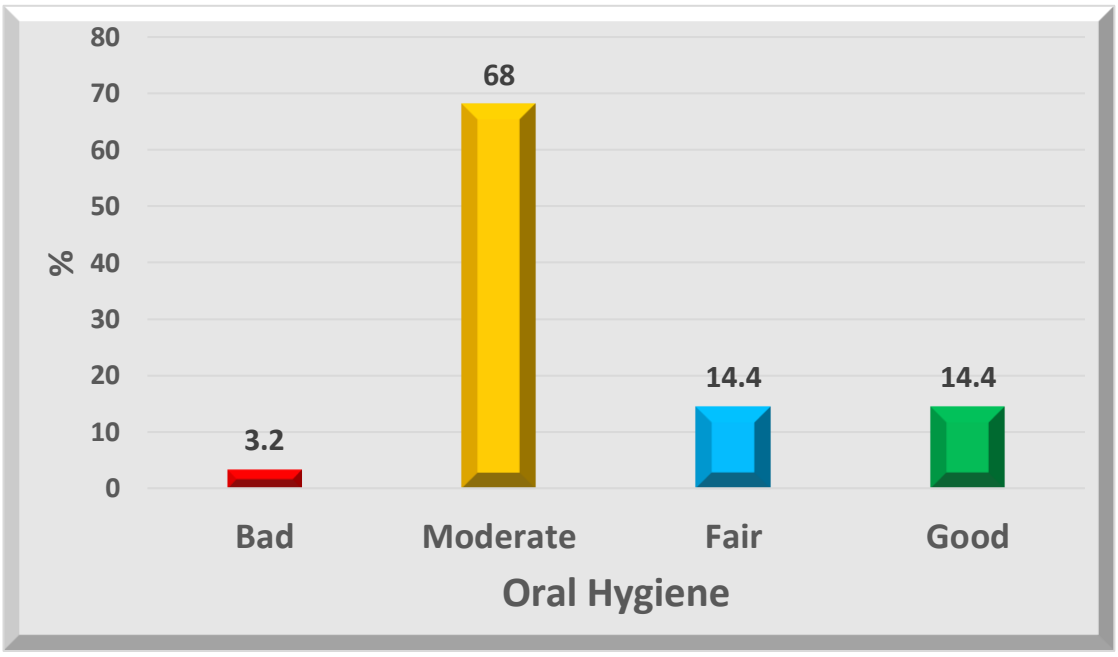

Figure 1. Oral hygiene status.

Table 2. The distribution of participants according to smoking, medical history, and oral hygiene

		Freq.	%
Smoking	Non-smokers	70	56.0
	Smokers	55	44.0
Medical history	Non	91	72.8
	Hypertension	14	11.2
	Diabetes mellitus	14	11.2
	DM and HT	6	4.8
Oral hygiene	Bad	4	3.2
	Moderate	85	68.0
	Fair	18	14.4
	Good	18	14.4

In table no.3, the results of this study indicates that the mean of DMFT was 8.29±3.46 with ranged (3-20).

Table 3. Mean number of Decayed, Missing, and Filled Permanent Teeth (mean DMFT)

		DMFT		
		Mean± SD	Range	P-value
Gender	Male	7.87±3.10	17.00	0.087 NS
	Female	8.96±3.90	15.00	
Smoking	Non-smokers	8.07±3.67	15.00	0.432 NS
	Smokers	8.56±3.17	17.00	

In Table 4, the results found that level of DMFT in females (8.96±3.90) is higher than males (7.87±3.10), but not significantly. There are no-significant differences between smokers and non-smokers regarding level of DMFT (P. value=0.432).

Table 4. The comparison between the levels of DMFT according to gender and smoking status

Descriptive Statistics for (Mean number of Decayed, Missing, and Filled Permanent Teeth (mean DMFT)					
	N	Mean	SD	Minimum	Maximum
DMFT	125	8.29	3.46	3.00	20.00

Independent sample t. test

As shown in table 5, the results found that level of DMFT in those who belonging to older age 56-65 years have higher significantly level of DMFT (14.33±3.14) compared to other age groups (P- value<0.001).

Table 5. The comparison between the levels of DMFT according to Age groups, Occupation, Medical history, and oral hygiene

		DMFT			Post hoc (LSD)
		Mean± SD	Range	P-value	
Age groups	≤25 years	7.00±3.40	17.00	<0.001	1.43
	26-35 years	8.07±2.73	11.00		
	36-45 years	9.28±2.35	8.00		
	46-55 years	10.11±3.41	10.00		
	56-65 years	14.33±3.14	9.00		
Occupation	Employed	7.13±2.06	7.00	<0.001	2.01
	Freelance work	9.71±3.26	15.00		
	Student	7.10±3.56	17.00		
	Housewife	7.67±1.53	3.00		
Medical history	Non	7.56±3.17	17.00	<0.001	1.81
	Hypertension	9.36±2.53	8.00		
	Diabetes mellitus	10.71±4.01	15.00		
	DM and HT	11.17±4.17	11.00		
Oral hygiene	Bad	7.75±3.30	7.00	<0.001	3.02
	Moderate	9.28±3.59	17.00		
	Fair	6.06±1.70	7.00		
	Good	5.94±1.63	6.00		

One-way ANOVA analysis

The participants who freelance work have higher significantly level of DMFT (9.71±3.26) compared to other occupations (P-value<0.001). Patients had both hypertension and diabetes have higher significantly level of DMFT (11.17±4.17) than hypertension and those had no medical history at significantly less than 0.001.

Finally, fair and good levels of oral hygiene is associated with lower significant level of DMFT compared to other categories (P- value <0.001). In Table 6, the current study found that older age (B=0.426) and females (0.274) are associated with a high level of DMFT. While the good health of oral (-0.235) is associated with a low level of DMFT. As for other variables, there was non-statistically significant relationship between variables such as occupation, and smoking at significantly level >0.

Table 6. Enter Standard multiple- Linear Regression for some variables associated with DMFT

Coefficientsa						
Model	Unstandardized Coefficients	Standardized Coefficients	T	P-value	95.0% Confidence Interval for B	
	B	Beta			Lower Bound	Upper Bound
(Constant)	2.563		1.326	0.187	-1.264	6.389
Age groups (older age)	1.257	0.426	4.361	<0.001	0.686	1.828
Gender (Female)	1.936	0.274	2.523	0.013	0.416	3.456
Occupation	0.596	0.125	1.325	0.188	-0.294	1.487
Smoking (Yes)	1.271	0.183	1.662	0.099	-0.243	2.785
Oral hygiene (good)	-1.052	-0.235	-2.913	0.004	-1.766	-0.337
a. Dependent Variable: DMFT						

Statistical Analysis

The information for each item on the questionnaire was copied to code sheets, the data was input into a personal computer, and the statistical package from SPSS-27 was used to evaluate the data. Simple statistics like frequency, percents, mean, standard deviation, and range displayed the data. A Chi-square test (X2-test) was utilized to identify the significance of qualitative data percentage differences. ANOVA analysis for calculating the least significant difference (L.S.D.) test were applied to determine the statistical significance of the data. P value of <0.05 was considered significant. L.S.D. Values werecompared with values of means difference.

Using Independent sample t. test to compare between two groups for numerical data. In addition, Enter Standard multiple- Linear Regression was used in this study. The P-value was considered statistically significant when it was equal to or less than 0.05.

DISCUSSION

In our research we have a significance between diabetic and hypertensive patients and DMFT score and this is consistent with many studies for example a systematic review indicated that patients with diabetes had significantly higher DMFT scores compared to non-diabetic individuals, emphasizing the impact of systemic health on oral conditions [15], A study found that hypertensive participants had a mean DMFT score of 15.80, significantly higher than the 13.62 observed in non-hypertensive individuals ($p < 0.001$) [16]. Regarding Gender Differences in DMFT Scores we have a relatively connection between DMFT score and female but no significance also there are many research support this fact one of them is a retrospective analysis showed that females exhibited higher DMFT scores than males, particularly in higher ranges, although the results were statistically insignificant [17]. There is high significance (<0.001) in our study among different age groups and DMFT score specifically in older age group, many studies support that where they show that older patients frequently have elevated DMFT scores, with averages reported as high as 15.5 in certain populations [18]. Regarding relation between oral hygiene and DMFT score there is a significance (0.004) and many studies prove our results like a significant correlation exists between age and poor oral hygiene, leading to higher DMFT scores in older age groups [19]. For the main part of our study which is the association between the smoking and dental caries prevalence, there are multiple variable factors which can contribute directly or in another way to the increase in the prevalence of dental caries in smokers similar as the patient age, tobacco habits other than smoking, oral hygiene, drinking habits, eating habits, dental recalls and overall health [12]. Due to that, it's delicate to conclude the correlation between a single positive factor which can causes increase in caries prevalence in smokers but the association between smoking and dental caries is well proved in aged patient groups [13]. Our study showed no significance in smoking effect on dental caries prevalence and this is conflict with many studies which revealed correlation [20,21] also there are early reports in literature which suggests that smoking actually reduces dental caries [22].

CONCLUSION

There are limitations to this cross-sectional study. The results of which cannot establish a direct effect of cigarette smoking on the prevalence of dental caries. As such, we conclude the need for a more robust study design to ascertain whether smoking could potentially lead to increase the severity dental caries. A prospective cohort study could be a proper option.

DECLARATIONS

Acknowledgments

The authors wish to affirm that they have no conflicts of interest pertaining to the current research.

Funding

This research not funding

Competing Interests

The no competing interests

REFERENCES

1.Schwendicke F, Dörfer CE, Schlattmann P, Foster Page L, Thomson WM, Paris S. Socioeconomic inequality and caries: a systematic review and meta-analysis. J Dent Res. 2015 Jan;94(1):10-8. doi: 10.1177/0022034514557546

2. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ. 2005 Sep;83(9):661-9.

3. Petersen PE. The World Oral Health Report 2003: continuous improvement of oral health in the 21st century--the approach of the WHO Global Oral Health Programme. Community Dent Oral Epidemiol. 2003 Dec;31 Suppl 1:3-23. doi: 10.1046/j..2003.com122.x.

4. Bagramian RA, Garcia-Godoy F, Volpe AR. The global increase in dental caries. A pending public health crisis. Am J Dent. 2009 Feb;22(1):3-8.

5. Al Agili DE. A systematic review of population-based dental caries studies among children in Saudi Arabia. Saudi Dental J. 2013 Jan; 25(1): 3–11. http://dx.doi.org/10.1016/j.sdentj.2012.10.002

6. Schwendicke F, Frencken JE, Bjørndal L et al. Managing Carious Lesions: Consensus Recommendations on Carious Tissue Removal. Adv Dent Res. 2016 May;28(2):58-67. doi: 10.1177/0022034516639271. PMID: 27099358.

7. Loesche WJ. Role of Streptococcus mutans in human dental decay. Microbiol Rev. 1986 Dec;50(4):353-80. doi: 10.1128/mr.50.4.353-380.1986. PMID: 3540569; PMCID: PMC373078.

8. Kidd EA. Clinical threshold for carious tissue removal. Dent Clin North Am. 2010 Jul;54(3):541-9. doi: 10.1016/j.cden.2010.03.001. PMID: 20630195.

9. Zero DT. Dental caries process. Dent Clin North Am. 1999 Oct;43(4):635-64. PMID: 10553248.

10. Axelsson P, Paulander J, Lindhe J. Relationship between smoking and dental status in 35-, 50-, 65-, and 75-year-old individuals. Journal Of Clinical Periodontology. 1998;25(4):297–305. doi: 10.1111/j.1600-051X.1998.tb02444.x.

11.Chanea K, Palmire A. Smoking and Candy on Oral Bacteria, Streptococcus mutans, Adherence. California State Polytechnic University Pomona. 2014.

12. Mittal N, Singh N, Naveen Kumar PG. Prevalence of Dental Caries among Smoking and Smokeless Tobacco Users Attending Dental Hospital in Eastern Region of Uttar Pradesh. Indian J Community Med. 2020 Apr-Jun;45(2):209-214. doi: 10.4103/ijcm.IJCM_245_19. Epub 2020 Jun 2. PMID: 32905180; PMCID: PMC7467184.

13. Andayasari L, Mubasyiroh R, Nurlinawati I, Sufiawati I. Association Between Tobacco Smoking and Dental Caries in the Indonesian Population: Results of a National Study in 2018. J Prev Med Public Health. 2023;56(4):357-367.
DOI: https://doi.org/10.3961/jpmph.22.417

14. Drachev SN, Brenn T, Trovik TA. Dental caries experience and determinants in young adults of the Northern State Medical University, Arkhangelsk, North-West Russia: a cross-sectional study. BMC Oral Health. 201717(1):136. doi: 10.1186/s12903-017-0426-x.

15. Weijdijk, L. P. M., Van der Weijden, G. V. D., & Slot, D. E. (2023). DMF scores in patients with diabetes: a systematic review and meta-analysis of observational studies. The Journal of Dentists, 104628. https://doi.org/10.1016/j.jdent.2023.104628

16. Barkaat, H., Atiq, T., Khurram, M., Ahmed, R., Iqbal, S., & Rashid, W. (2022). Assessment of DMFT Score in Lower Income Employees of the University of Faisalabad. Pakistan Journal of Medical and Health Sciences, 16(7), 548–549. https://doi.org/10.53350/pjmhs22167548

17. Samami, M., Joukar, F., Hassanipour, S. et al. Hypertension and DMFT: insights from the PERSIAN Guilan Cohort Study. BMC Oral Health 24, 1456 (2024). https://doi.org/10.1186/s12903-024-05236-z

18. K, M., Leelavathi, L., & K, Aravind. (2021). Association Of Gender And Caries Experience Based On Dmft Index - Retrospective Analysis Of Patient Records. The Journal of Contemporary Issues in Business and Government, 27(2), 3261–3268. https://doi.org/10.47750/CIBG.2021.27.02.332

19. Prihastari, L., Siregar, P. M., Nur, R. I., Mentari, S., & Taftyanti, Z. (2017). Survey epidemiologi: hubungan antara perilaku kesehatan gigi mulut dengan indeks dmf-t lansia usia 45-65 tahun di kecamatan kronjo, kabupaten tanggerang. 4(2), 101–107. https://doi.org/10.30659/ODJ.4.2.101-107

20. Wu J, Li M, Huang R. The effect of smoking on caries-related microorganisms. Tob Induc Dis. 2019 Apr 18;17:32. doi: 10.18332/tid/105913.

21. Bernabé E, Delgado-Angulo EK, Vehkalahti MM, Aromaa A, Suominen AL. Daily smoking and 4-year caries increment in Finnish adults. Community Dent Oral Epidemiol. 2014 Oct;42(5):428-34. doi: 10.1111/cdoe.12101.

22. Simón-Soro A, Belda-Ferre P, Cabrera-Rubio R, Alcaraz LD, Mira A. A tissue-dependent hypothesis of dental caries. Caries Res. 2013;47(6):591-600. doi: 10.1159/000351663.