Oral Health Determinants among Opium Users in Kerman, Iran

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Original Article

Abstract

Background: Promoting oral health is a complicated issue among drug abusers and opium is the most frequent drug abused in Iran. This study aims to find the oral health determinants of opium users in Kerman, Iran.

Methods: This cross-sectional study was a part of the second phase of Kerman coronary artery disease risk factors study (KERCADRS, 2014-2018). In this survey, the data of 1140 opium users were analyzed. The information about using a toothbrush, dental floss, number of dental visits at last year, age of first use of opium, duration, and opium consumption frequency was recorded. The total number of decayed, missing, and filled teeth (DMFT) index and Community Periodontal Index (CPI) was recorded by an oral examination. Poisson and logistic regressions analyses were used for assessing the relationship among variables.

Findings: The mean age of participants was 52 ± 12 years. 74.4% were men and 24.6% were women. The average DMFT index was 15.7 ± 7.6 and the prevalence of a healthy CPI score was 18.5%. Educational level ($P < 0.001$), brushing ($P < 0.001$), flossing ($P < 0.001$), dental visit ($P < 0.001$), first age of using opium ($P < 0.001$), frequency of consumption ($P < 0.001$), and age ($P < 0.001$) were associated with DMFT index. Only using floss ($P < 0.001$), dental visit [odds ratio (OR) = 1.80, $P = 0.030$], frequency of consumption (OR = 2.92, $P < 0.001$), and age ($P = 0.001$) were associated with CPI score.

Conclusion: The frequency of opium consumption has the same effect on caries incidence as oral hygiene habits. Moreover, using dental floss has a more significant effect on the periodontal health of participants.

Keywords: Oral health; Opium dependence; Oral hygiene; Addictive behavior

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Introduction

Dependency on opioids is a big challenge for public health managers and affects different aspects of human life. In 2016, the population size of opioid dependents was estimated as 28.5 million globally.[1] Based on the World Drug Report published by World Health Organization (WHO) in 2018, 275 million people used illicit drugs, such as cannabis, amphetamines, opioids, and cocaine. From 2016 to 2017, global opium production was 10500 tons.[2]

Studies in Iran, Indonesia, and India showed that oral health status among opium dependents was low,[1,3-6] and it was shown that the opioid dependents had a greater chance of mortality due to the high rate of tooth loss and decayed, missing, and filled teeth (DMFT) index.[7] Developing periodontal pockets was related to age. It was revealed that older opioid dependents had a greater DMFT index.[8] The Community Periodontal Index (CPI) among opioid dependents with more than five years of opioid use showed a similar result.[9] The dependent persons to the opioid had worse Gingival Index (GI) status than non-dependents.[10]

Poor practice in oral hygiene is an initial problem among drug dependents. Substance abusers use dental floss and toothbrush, rarely.[10-12] A 33-year follow-up study showed that dental visits could prevent narcotic abusers from losing their teeth.[13]

The duration of using illicit drugs has some meaningful effects on oral health. Owlia et al. showed a significant relationship between addiction duration and CPI among heroin, cocaine, and amphetamine users.[11] It was shown that decayed teeth, filled teeth, and CPI index were related to the addiction duration.[12] Investigation of the relationship between oral health behavior and addiction duration showed that oral health behavior was not affected by addiction duration.[13]

The study of drug users' oral health requires accurate statistical methods. Collecting representative samples of the community is one of the difficulties in this area. Access to dental treatment among drug users was studied in England by a sample of drug users attending participating pharmacies.[14] Shekarchizadeh et al. studied the oral health determinants of opiate dependents by a sample from dependents admitted to methadone maintenance centers.[8] Kalbassi et al. evaluated the oral health of drug abusers by a sample from drug abusers referred to addiction rehabilitation centers.[15] Jahanimoghadam et al. studied the oral health status of substance abusers by a sample from addicts admitted to rehabilitation centers.[10] Pourhashemi et al. studied the oral health determinants among female addicts by a sample of three rehabilitation centers.[5] It is remarkable to mention that these studies did not use count regressions or multivariable methods to analyze the DMFT index.

Determining the factors affecting drug users' oral health based on a representative sample is essential. In addition, finding a modified effect of the factors and comparing them requires complex statistical models. Therefore, this paper aims to study the oral health determinants among opium users in Kerman, Iran.

Methods

This cross-sectional study is a part of the second phase of the Kerman coronary artery disease risk factors study (KERCADRS) (conducted from September 2014 to April 2018). Totally, 9997 subjects were randomly selected from four predefined urban areas by one-stage cluster sampling (based on 420 postcodes among all city postcodes). More technical details about the sampling method and frame can be found in Najafipour et al. study.[16]

The people aged between 15-80 years old were entered into this study. An opium user in the research is defined as the individual who currently uses this substance. Former opium users that did not use it at the time of sampling were excluded.

A checklist collected information about using opium and oral hygiene habits. The checklist contained the questions about using a toothbrush, dental floss, number of dental visits at last year, age of first use of opium, duration of using opium, and frequency of daily consumption (daily or non-daily). In the rest of this paper, we refer to this set of variables as independent variables.

After the oral examination under dental unit light, an experienced dentist filled a checklist for participants' oral health profiles. The DMFT index was calculated by summing the number of decayed, missing (due to caries only), and restored teeth. Periodontal health status was

measured by CPI and scored by healthy, bleeding on probing, supragingival or subgingival calculus, pocket with 4-5 mm depth, and pocket > 6 mm depth. The CPI score is coded as 0 for healthy and 1 for other statuses.

In this paper, descriptive statistics of variables were presented by number and percentage. Poisson regression analysis was used to measure the effect of independent variables on DMFT. We used ordinal logistic regression for CPI and GI variables. The model's goodness of fit and collinearity of variables were checked, and regression coefficients and odds ratio (OR) presented their results. The tests were performed at a 5% level of significance.

Results

There were 1140 opioid users whose data were included in the analysis. The mean age was 52 ± 12 years, and from all of the participants, 828 (74.4%) were men and 292 (24.6%) were women. Most participants (68.9%) had less than a diploma in terms of the level of education. The average consumption duration of participants was 14.6 ± 11.2 years, which shows that the participants were exposed to opium for a long time, and the mean age at which opium was used for the first time was 41.9 ± 20.3 years. The average DMFT index was 15.7 ± 7.6, and only 211 (18.5%) had a healthy CPI score. Nearly half (43.9%) of opium users did not brush their teeth at least once a day. Moreover, more than half (52.5%) of them did not floss their teeth. The descriptive statistics of variables are presented with more details in table 1. The prevalence of daily opium consumption in men and women was 566 (66.75%) and 192 (65.75%), respectively. Daily consumption was more prevalent in opium users with below diploma educational level (n = 554, 70.57%) than those with above diploma education (n = 204, 57.46%) ($P < 0.001$). The prevalence of brushing and dental flossing was the same between daily users and others ($P = 0.582$, $P = 0.681$, respectively).

The effect of independent variables on DMFT: Univariate Poisson regression analysis of the relationship between DMFT index and independent variables is presented in table 2. There was a significant relation between DMFT and education ($P < 0.001$); the DMFT index increased in participants with lower educational level. Besides, the results showed that starting to use opium at older ages increased the DMFT index ($P < 0.001$). The DMFT index's mean increased with increasing duration and frequency of consumption ($P < 0.001$). Participants that used dental floss and brushing had a lower DMFT index on average ($P < 0.001$). Nevertheless, dental visits were inversely related to the DMFT index ($P < 0.001$).

Table 1. Demographic, oral hygiene, and addiction characteristics of participants

Variables	Value
Age (year)	55 ± 12
Sex	
Men	848 (74.4)
Women	292 (25.6)
Education	
Below diploma	785 (68.9)
Diploma and above	355 (31.1)
Brushing	
Not daily	501 (43.9)
Yes, at least once a day	639 (56.1)
Flossing	
No	599 (52.5)
Yes, sometimes or always	541 (47.5)
Yes, at least once a day	639 (56.1)
Dental visit	
Not visiting in the past year	802 (70.4)
At least once in the past year	338 (29.6)
Frequency of consumption	
Daily	382 (33.5)
Not daily	758 (66.5)
First age of using opium (year)	41.92 ± 20.37
Consumption duration (year)	14.67 ± 11.26
DMFT	15.70 ± 7.66
CPI	
Healthy	211 (18.5)
Not healthy	929 (81.5)

Data are presented as mean ± standard deviation (SD) or number and percentage
DMFT: Decayed, missing, and filled teeth; CPI: Community Periodontal Index

After adjusting the effect of other factors, multivariate analysis showed that educational level, brushing, dental visit, and the first age of using opium remained associated with the DMFT index. Although the variables of sex and flossing were not significantly associated with the DMFT index in univariate analysis, they became associated with the DMFT index in multivariate analysis. The daily consumption effect on the DMFT index was slightly more significant than using dental floss or brushing.

Table 2. Factors associated with decayed, missing, and filled teeth (DMFT) index

Variables		Univariate#			Multivariate#		
		Beta	SE	P	Beta	SE	P
Sex	Men	-0.020	0.023	0.4	-0.069	0.034	0.047*
	Women			1			1
Education	Below diploma	0.192	0.020	< 0.001*	0.141	0.030	< 0.001*
	Diploma and above			1			1
Brushing	Not daily	0.145	0.020	< 0.001*	0.137	0.029	< 0.001*
	Yes, at least once a day			1			1
Flossing	No	0.007	0.019	0.726	0.085	0.031	0.007*
	Yes, sometimes or always			1			1
Dental visit	Not visiting in the last year	0.044	0.019	0.027*	-0.054	0.028	0.058
	At least once in the last year			1			1
Frequency of consumption	Daily	0.250	0.020	< 0.001*	0.293	0.029	< 0.001*
	Not daily			1			1
First age of using opium		0.003	0.005	< 0.001*	0.003	0.001	0.016*
Consumption duration		0.003	0.001	0.004	0.003	0.001	0.096
Age		0.013	0.001	< 0.001*	0.008	0.001	< 0.001*

#Univariate and multivariate poisson regression coefficients, *Significant at 0.05 level of significance.
SE: Standard error

The effect of independent variables on CPI: The effect of independent variables on the CPI score was measured by univariate and multivariate logistic regression, and it is presented in table 3. The univariate analysis showed that the chance of healthy CPI score increased with the educational level of participants (P < 0.001), the first age of using opium (P = 0.004), consumption duration (P = 0.009), frequency of consumption (P < 0.001), brushing (P < 0.001), using dental floss (P < 0.001), dental visit (P < 0.001), and age (P < 0.001).

The multivariate analysis showed that most of the variables were not associated with the CPI score. Only using floss (P < 0.001), dental visit (P = 0.030), frequency of consumption (P < 0.001), and age (P = 0.001) were associated with CPI score.

Table 3. Factors associated with Community Periodontal Index (CPI)

Variables		Univariate#				Multivariate#			
		B	SE	P	Crude OR	Beta	SE	P	Adjusted OR
Sex	Men	0.029	0.173	0.868	1.030	0.469	0.311	0.132	1.598
	Women			1				1	
Education	Below diploma	0.721	0.156	< 0.001*	2.060	0.178	0.273	0.515	1.195
	Diploma and above			1				1	
Brushing	Not daily	0.808	0.155	< 0.001*	2.240	0.053	0.270	0.846	1.054
	Yes, at least once a day			1				1	
Flossing	No	1.247	0.166	< 0.001*	3.480	1.370	0.265	< 0.001*	3.936
	Yes, sometimes or always			1				1	
Dental visit	Not visiting in the last year	1.258	0.157	< 0.001*	1.030	0.593	0.273	0.030*	1.809
	At least once in the last year			1				1	
Frequency of consumption	Daily	-0.871	0.155	< 0.001*	1.030	-1.073	0.264	< 0.001*	0.342
	Not daily			1				1	
First age of using opium		0.016	0.005	0.004*	1.02	-0.011	0.015	0.471	0.989
Consumption duration		0.022	0.008	0.009*	1.02	0.003	0.009	0.732	1.003
Age		0.062	0.006	0.001*	1.06	0.051	0.015	0.001*	1.052

#Univariate and multivariate logistic regression coefficients [dependent variable: Community Periodontal Index (CPI), healthy = reference], *Significant at 0.05 level of significance
SE: Standard error; OR: Odds ratio

The difference between the significant association in multivariate and univariate analyses was related to variables' confounding role. According to the results, participants who used dental floss were 3.9 times more likely to have healthy periodontal status. Besides, a visit to the dentist at least once a year could increase the chances of healthy periodontal status by 1.6 times. Finally, daily opium dependents were 2.9 times more likely to have unhealthy periodontal status than non-daily opium dependents.

Discussion

In this study, 1140 opioid users participated, and the factors associated with oral health index were determined. The novelty of our research is to measure the effect of oral hygiene habits besides consumption habits. Our results showed that age, using brush and floss, and consumption frequency were significant factors on oral health of opium users. The main finding of this study is that opium consumption habits are as effective as oral hygiene on the oral health of opium users. This study showed that the mean DMFT score decreased with the lower frequency of opium consumption and using a toothbrush and dental floss. In addition, using dental floss and the lower frequency of opium consumption increased the chance of healthy periodontal status by 3.9 and 2.9 in opium users.

Oral health status and opium dependents' characteristics: In terms of demographic variables, the majority of participants were men. The mean age was in the middle age range, which was repeated by Owlia et al.[11] and Jahanimoghadam et al.[10] Their data was collected from the addicts admitted to rehabilitation centers. The mean age in their study was 37.72 ± 11.89 years, which was lower than our mean age. It could be attributed to the fact that the younger addicts have more motivation to use these services. In addition, the percentage of men was more than women in their study.[10,11] It could be related to the fact that men use opium more frequently. Most of the opium users in this study had a low educational level. This result is repeated by some studies.[10,17,18]

In terms of opium dependents' characteristics, most opium users did not use opium daily, and the mean age of first use was in the middle age range. This result contradicts the study of Jahanimoghadam et al.[10] It could be related to the fact that the sample was collected from rehabilitation centers in their study. People referring to these centers have more opium consumption and are younger.

The mean of the DMFT index indicates that, on average, half of the opium users' teeth were decayed or extracted due to decay. The high caries rate in drug users is related to sugar consumption, inappropriate nutrition, poor oral hygiene, and feeling less pain.[8,19] Furthermore, low education and socioeconomic status make oral health problems more complicated in this population. Some studies in developed countries showed that drug users did not have enough access to dental services.[14,20] It is expected that Iranian drug users do not have adequate access to dental services. Despite lower mean age in Jahanimoghadam et al.,[10] Shekarchizadeh et al.,[8] and Pourhashemi et al.[5] studies, the estimated means of DMFT index were higher rather than our estimation. This difference could be attributed to the fact that most of the rehabilitation centers' attendants suffer from opium consumption. The prevalence of healthy periodontium was very low among opium users. This result was in agreement with other studies.[3,5,18,21]

In this study, the results showed that oral hygiene was poor among participants. This result is in line with the results of some studies.[3,10,18,21] Opium could be a depressant.[22] One of the main signs of depression is neglecting hygiene and appearance. Therefore, poor oral health among opium users can be attributed to the fact that they do not care about their appearance.

Determinants of caries incidence: The demographic factors as determinants could confound the results of studies. Therefore, adjustment of these variables was reasonable to make the results of our study comparable with other studies. In multivariable analysis, the data showed that the men's DMFT index was significantly lower than women. Besides, the age of participants is associated with DMFT index positively. Unfortunately, most of the studies did not measure the adjusted means of demographic groups.[23-25] Therefore, we cannot compare our results with them.

Our data show an association between educational level, brushing teeth, dental flossing, age, and DMFT index. These associations are

reasonable. Moreover, the results indicate that frequency of consumption and the starting age of opium consumption have a negative and positive association with DMFT index, respectively. Positive association of DMFT index and age at start of drug abuse has been obtained in the study of Shekarchizadeh et al., but it was not significant in univariate analysis.[21] A study in India showed that the DMFT index was associated with addiction duration.[9] In our study, the duration of consumption was significantly associated with the DMFT index in univariate analysis. However, the association was not significant in multivariate analysis with a borderline P-value. The univariate association could be due to the confounding effect of other variables. Pourhashemi et al. showed that the number of missed teeth was associated with women's consumption duration, but decayed and filled teeth were not associated with consumption duration.[5] In the study, a linear regression was used to measure association, but drug users were expected to miss more teeth over time. Besides, Owlia et al. showed a significant association between edentulous status and age of drug users.[11] Therefore, the DMFT index among the early opium users is affected by the number of decayed teeth, and among the late opium users is affected by the missed teeth. Consequently, it is reasonable to expect that the association is confounded by the first age of using opium.

Consumption of sweet food is high among opium users.[26,27] They generally care less about their personal health.[3,28] In addition, opium consumption leads to dry mouth, which is an important cause of caries. In addition, a decrease in saliva secretion combined with an increase in acid produced by sweeteners accelerates the incidence of caries. Along with these factors, it is reasonable to expect an association between frequency of consumption, age, and oral hygiene habits and caries incidence.

Determinants of a healthy periodontium: Data showed that using dental floss, visiting a dentist, and non-daily consumption increased the chance of healthy gingiva. The variables of first age of using opium, tooth brushing, and consumption duration were associated with only DMFT in univariate analysis. In Pourhashemi et al. study, none of these factors was significant in female drug users.[5] Shekarchizadeh et al. found that age at the start of drug abuse, consumption duration,

and aging increased gingival problems (pocket formation).[8] Some strong confounding factors affect the relation between opium consumption characteristics and periodontal status. Periodontal diseases in the early stage are not detectable and require specialized examinations to diagnose them. Therefore, a dental visit increases the chance of a healthy periodontium.

The strength of our study is the representativeness of the sample. It is not restricted to a particular population of opium users. Besides, we do not restrict our study to the definition of addiction. Definitions of opium addiction and the opium-addicted population can ignore a part of the opium consumer.

Conclusion

Focusing on consumption frequency is as essential as flossing and brushing on dental caries incidence. However, if gingival health is taken into account, it can be concluded that using dental floss has a greater effect than reducing consumption.

Limitations: The examining dentist was experienced in our study, but we could not check the measurements by another dentist. Therefore, the DFMT and CPI scores could be biased systematically. Moreover, participants' answers to question about the age at first use and dental visit in the past year could be accompanied by a memory error.

Conflict of Interests

The Authors have no conflict of interest.

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Authors' Contribution

Conceptualization, data curation, data analysis, funding, investigation, methodology, software, supervision, writing-original draft, review and editing: SHK; conceptualization, data curation, funding, investigation, methodology, project administration, resources, writing-review and editing: AHN; conceptualization, data curation, data analysis, writing-review and editing: SK;

conceptualization, data curation, funding, investigation, methodology, software, writing–review and editing: HN; conceptualization, data

curation, funding acquisition, investigation, methodology, project administration, supervision, resources, writing–reviewing and editing: SK.

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عوامل تعیین‌کننده سلامت دهان و دندان در بین مصرف‌کنندگان تریاک در کرمان، ایران

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مقاله پژوهشی

چکیده

مقدمه: ارتقای بهداشت دهان و دندان، مسأله پیچیده‌ای در میان افراد سوء مصرف‌کننده مواد مخدر است و تریاک در ایران شیوع بیشتری دارد. پژوهش حاضر با هدف یافتن عوامل تعیین‌کننده سلامت دهان و دندان در مصرف‌کنندگان تریاک در کرمان انجام شد.

روش‌ها: این مطالعه مقطعی، بخشی از مرحله دوم مطالعه عوامل خطر بیماری عروق کرونر کرمان (Kerman coronary artery disease risk factors study یا KERCADRS) بین سال‌های ۲۰۱۴ تا ۲۰۱۸ بود. در این تحقیق، داده‌های ۱۱۴۰ کاربر تریاک مورد تجزیه و تحلیل قرار گرفت. اطلاعات مربوط به استفاده از مسواک، نخ دندان، تعداد مراجعه به دندان‌پزشکی در سال گذشته، سن اولین استفاده از تریاک، مدت زمان و دفعات مصرف تریاک نیز ثبت شد. شاخص‌های تعداد دندان پوسیده، از دست رفته و پر شده (Decayed, missing, and filled teeth یا DMFT) و شاخص پریودنتال جامعه (Community Periodontal Index یا CPI) با معاینه شفاهی ثبت گردید. به منظور ارزیابی رابطه بین متغیرها، از تحلیل رگرسیون های Poisson و لجستیک استفاده شد.

یافته‌ها: میانگین سنی شرکت‌کنندگان ۱۲ ± ۵۲ سال بود. ۷۴/۴ درصد مرد و ۲۴/۶ درصد زن بودند. میانگین شاخص DMFT برابر با ۷/۶ ± ۱۵/۷ و شیوع نمره CPI سالم ۱۸/۵ درصد بود. سطح تحصیلات (۰/۰۰۱ > P)، مسواک زدن (۰/۰۰۱ > P)، استفاده از نخ دندان (۰/۰۰۱ > P)، ویزیت دندان‌پزشکی (۰/۰۰۱ > P)، سن اول مصرف تریاک (۰/۰۰۱ > P)، دفعات مصرف (۰/۰۰۱ > P) و سن (۰/۰۰۱ > P) با شاخص DMFT در ارتباط بودند. فقط استفاده از نخ دندان (۰/۰۰۱ > P)، ویزیت دندان‌پزشکی [۱/۸۰ = (OR) Odds ratio، ۰/۰۳۰ = P]، دفعات مصرف (۲/۹۲ = OR، ۰/۰۰۱ > P) و سن (۰/۰۰۱ > P) با نمره CPI ارتباط نشان داد.

نتیجه‌گیری: فراوانی مصرف تریاک، همان تأثیر عادات بهداشت دهان و دندان را در بروز پوسیدگی دارد. همچنین، استفاده از نخ دندان، تأثیر قابل توجه‌تری بر سلامت پریودنتال شرکت‌کنندگان دارد.

واژگان کلیدی: سلامت دهان؛ وابستگی به تریاک؛ بهداشت دهان؛ رفتار اعتیادی

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