

## Association between Tooth Loss and Opium Addiction: Results of a Community-Based Study on 5900 Adult Individuals in South East of Iran in 2015

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### INTRODUCTION

Today, substance abuse has become a serious concern for people across the world.<sup>[1]</sup> It has detrimental physical and psychological effects to the human body which increases the risk of death from multiple causes.<sup>[2-4]</sup>

Oral health problems are among the wide range of disease that is known to be associated with drug abuse. Xerostomia due to the hypofunction of salivary glands results in a higher rate of dental abrasion, halitosis, taste impairment, and burning mouth syndrome.<sup>[5]</sup> Over

### ABSTRACT

**Background:** Like any other drug abuse, opium use is known to have detrimental effects on oral health. Oral hygiene neglect in opium users can lead to tooth loss resulting in further functional, esthetic, and dieting problems. Therefore, the aim of this study was to assess the association between tooth loss and opium addiction in a large-scale population.

**Materials and Methods:** This study was part of an extensive study related to the risk factors of cardiovascular disease and conducted by the center for physiological research during 2012–2015 in Kerman. A total of 5900, 15–75-year-old individuals, were recruited by a single-stage random cluster sampling method. Factors including opium and smoking consumption, factors related to oral health, hygiene, and the number of missing teeth were examined. Data were collected through questionnaires, interviews, and physical examination.

**Results:** Of 5900 individuals, 2662 (45.1%) were men and the rest were women, which 1011 individuals (17.1%) consumed opium. The prevalence of opium abuse was significantly higher in men. Regarding the oral dental indicators, the numbers of missing teeth ( $P < 0.001$ ), decayed ( $P = 0.01$ ), and the total index of decayed, missing, and filled teeth ( $P < 0.001$ ) were significantly higher in addicts as compared to nonaddicts. The gingival index and community periodontal index scores were significantly lower in addicts. Addicted women had a higher prevalence of tooth loss.

**Conclusions:** Opium addiction is associated with higher tooth loss, especially, in women opium users. Dental practitioners and health politicians should pay special attention to the oral health of addicts before tooth loss occurs.

**KEYWORDS:** *Opium, oral health, tooth loss*

sighting dental health care, low socioeconomic status and limited access to the dental team, and poor diet are factors which exacerbate oral health problems in addicts.<sup>[1,6]</sup> All above factors result in periodontal damage and severe tooth decay.

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A recent systematic review on 28 studies with valid data revealed greater tooth loss and severe periodontal destruction in substance addicted individuals. According to the data of this study, addicted patients were less likely to have received dental treatment.<sup>[7]</sup>

Drug addiction is very common in Iran and over the past 30 years has grown more than three times the population growth rate.<sup>[8,9]</sup> Opioids are the most commonly used drugs among Iranian addicts.<sup>[8]</sup> The belief that opium consumption has preventive effects on diseases such as cardiovascular disease and hypertension is common among lay Iranian people contributing to the high prevalence of opium use in this population.<sup>[10]</sup> Furthermore, unlike alcohol consumption, opium use is not forbidden even in religious people. Therefore, self-reported opium use is considered to be a reliable method.<sup>[3]</sup>

Very few studies have investigated the association between opium addiction and tooth loss.

In Iran, most studies assessing the relationship between drug dependency and dental status have been carried out on a limited number of individuals, mostly executed in drug abuse rehabilitation centers which do not represent the general population. Furthermore, these studies included a limited number of female individuals.

Therefore, the aim of the study was to assess the association between opium abuse and tooth loss in a large representative population in Kerman, South East of Iran, and to determine the determinants of this association.

## MATERIALS AND METHODS

The data of this cross-sectional study are obtained from the results of the first round of coronary artery disease risk factors (The KERCADR) cohort study; a study which was carried out on 5900 individuals, aged 15–75, in Kerman, the largest province in South East of Iran, in 2012–2015 more detailed information is stated in the first report of this study.<sup>[11]</sup> Nonproportion to size one-stage cluster random sampling was used to recruit eligible individuals. Two hundred and fifty postal codes were randomly selected from an updated roster of residential address. These codes were mapped, and social mobilizers referred to each addressed house. Eligible individuals were specified and invited to participate in the study. An appointment card was given to each eligible individual. Individuals with bleeding disorders, epilepsy, immune system deficiency, any type of cancer, chronic inflammatory disease, and bulimia were not included in the study. Furthermore, data related to pregnant women and individuals who used hash and heroin were excluded for data analysis. The final analysis was carried out on 5900, 15–75-year-old individuals.

Demographic information such as age, gender, occupation, educational status, familial status, location, and period of residency in Kerman was recorded.

Data related to opium use status were also obtained through a face-to-face interview with a trained general practitioner. Individuals were asked whether they ever used any type of drug and if they are still continuing. A pilot study carried out on a similar population in Iran stated self-reported opium use as a valid and reliable method for measuring opium use.<sup>[12]</sup> In the case of a positive answer, the type of drug was recorded. According to diagnostic and statistical manual of mental disorders (DMS-IV2), individuals who took opium derivatives (orally or in an inhaling form), at least three times a week, were considered addicted to opium.<sup>[13]</sup>

In this study, if a person noted smoking as his/her habit in the first interview of this survey, he/she was considered as a smoker.

A calibrated dentist carried out the dental examinations using a periodontal probe, plane mirror, and a head light. Decayed, missing, and filled teeth (DMFT) index was recorded according to the WHO criteria. Dental plaque and calculus were also recorded using plaque index and community periodontal index (CPI), respectively.

The study gained ethical approval from the Ethics Committee of Kerman University of Medical Science with ethic code number: 88/110 KA.

Data were analyzed using SPSS version 20 (Chicago, USA). Independent t-test, McNemar's test, Chi-square, and Fisher's exact test were used for statistical analysis. Adjusted multivariate regression analysis was performed to consider confounding factors. The significance level was set at  $P < 0.05$ .

## RESULTS

Overall 5900 individuals participated in this study, in which 2662 (45.1%) were male and 3238 (54.9%) were female. Results showed that 17.6% were dependent on some type of drug (currently or in the past), of which 95% noted dependency to opium. Regarding opium use, 1011 (17.1%) individuals mentioned that they frequently used opium; all of which also smoked cigarette. Among these, 831 individuals were currently smoking, and 180 reported a history of smoking.

Demographic characteristics and opium use status are presented in Table 1.

In general, the mean years of opium use were  $11.65 \pm 9.42$  years. Furthermore, 820 men and 191 women stated an addiction to opium. This difference was statistically significant ( $P = 0.001$ ).

Mean age of addicted individuals was  $56.01 \pm 13.49$  years, and nonaddicted individuals had a mean age of  $48.19 \pm 16.55$  years. This difference was statistically significant ( $P = 0.00$ ).

Table 2 presents the frequency of opium use in male and female individuals.

Among addicts to opium, women gained a higher mean missed teeth ( $P = 0.04$ ) and DMFT index ( $P = 0.03$ ) when compared to men. Other oral health indices were similar in both groups.

Table 3 presents dental health indices in addicted individuals according to gender.

Results showed that missed teeth ( $P < 0.001$ ), decayed teeth ( $P = 0.01$ ), and DMFT score ( $P = 0.001$ ) in addicted individuals were significantly higher than nonaddicted individuals, whereas filled teeth did not differ significantly between two groups. Likewise, gingival index (GI) and CPI were significantly lower in people who were addicted to opium.

Table 4 shows dental indices in opium addicted and nonaddicted individuals.

When adjusted for age, gender, CPI, and GI, results of logistic regression analysis revealed a significant difference between missed teeth and decayed teeth in opium addicted individuals compared to nonaddicted individuals ( $P = 0.001$ ).

### DISCUSSION

Results of this study showed that individuals who were addicted to opium had more extracted and decayed teeth than nonaddicted individuals. Saied-Moallemi *et al.*, Akbari *et al.*, and Ghane *et al.* also obtained similar results in Iran.<sup>[14-16]</sup> Rooban *et al.* also stated that tobacco use in any form increased the risk of dental caries.<sup>[17]</sup> The DMFT score was also higher in these individuals. This could be related to a wide range of causes. Marques *et al.* stated that the higher DMFT in substance abusers is due to their poor quality of life.<sup>[6]</sup> Furthermore, Mysels and Sullivan realized that frequent use of opium is associated with higher sugar consumption, justifying the higher number of dental caries in this group.<sup>[18]</sup> Likewise, Rooban *et al.* noted poor oral hygiene as the cause of higher DMFT in opium abusers.<sup>[19]</sup>

Similar to the finding of other studies in Iran regarding drug abuse, addiction to opium was much more prevalent in men compared to women (96.8% men and 3.2% women).<sup>[20]</sup> Another large scale study carried out on 4400 addicts who referred to a drug abuse rehabilitation center in Khuzestan province in Iran revealed that 97.5% of addicts were men and 2.5% were women.<sup>[9]</sup> Cultural

**Table 1: Demographic characteristics and drug use status**

Variable	Frequency (%)
Gender	
Male	2662 (45.1)
Female	3238 (54.9)
Occupation	
Housekeeper	2388 (40.5)
Self-employed	1359 (23)
Retired	840 (14.2)
Student	483 (8.2)
Other	830 (14.1)
Education status	
Under diploma	2858 (48.6)
Diploma	1928 (32.7)
Associate degree	427 (7.2)
Bachelor's degree	683 (11.6)
Narcotic drug use	
Never used	4863 (82.4)
Currently using	850 (14.4)
Quitted using	187 (3.2)
Opium use	
Yes	1011 (17.1)
No	488 (82.9)
Smoking status	
Yes	1011 (17.1)
No	4889 (82.9)
Other opium derivatives	
Yes	376 (6.4)
No	5524 (93.6)
Dependence on drugs	
Complete dependence	478 (8.1)
Occasional use	181 (3.1)
Quitted using	372 (6.3)
Never used	4869 (82.5)
Daily opium use	
Less than once a day	340 (5.8)
Twice a day	289 (4.9)
More than three times a day	289 (4.9)
Never	93 (1.4)

**Table 2: Opium use status according to gender**

Gender	Added to opium (%)	Nonaddicted to opium (%)	P
Male	820 (13.9)	1842 (31.2)	0.001 (Chi-square)
Female	191 (18.9)	3047 (51.6)	
Total	1011 (17.1)	4889 (82.9)	

reasons and the fact that addicted women in Iran are less socially accepted than men could be the reason for this great difference. Many Iranian women are ashamed to confess that they are addicted to any drug referring less to rehabilitation centers for quitting.

Although opium abuse was much more prevalent in men, dental caries due to addiction seem to affect women

more. Compared to addicted men, addicted women had a higher DMFT score and missed teeth. On the other hand, the CPI index was higher in men, but we cannot deduce that periodontal problems are more prevalent in addicted men than women because women had more extracted teeth and the reason for extraction was unknown (it could be due to severe periodontal problems leading to tooth loss). A recent study revealed the fact that physical and psychiatric comorbidities such as chronic pain, anxiety, and depression were more prevalent in opium dependent woman compared to men.<sup>[21]</sup> These mental and physical disorders may explain why addicted women refer less to dentists and remain untreated with more dental problems. Furthermore, depression may lead to oral hygiene neglect. Overall women seem to be more vulnerable to the harmful effects of drugs.<sup>[21]</sup>

Although GI was significantly lower in people who were addicted to opium, mean GI score for both addicted and nonaddicted individuals was in the range of 1–2 representing a mild gingival inflammation, slight color change, and no bleeding on probing for addicted and nonaddicted individuals. Since this difference was significant, we can deduce that nonaddicts were more likely to have gingival inflammation and gingival color change.

Regarding CPI, addicted individuals had a score of  $1.27 \pm 1.03$ , whereas nonaddicted individuals had a CPI score of  $1.65 \pm 0.83$ . The mean CPI score in both groups is in a range which shows that bleeding on probing and

calculus exists with no periodontal pocket. Nevertheless, this difference was statistically significant ( $P = 0.00$ ), which means that addicted individuals tend to have less bleeding on probing compared to nonaddicts. Masoumi *et al.* have also reported that gingival bleeding and periodontal diseases had lower scores in nonaddict people compared to a matched group of drug users.<sup>[22]</sup> Furthermore, Thavarajah *et al.* detected dental caries in all only drug abusers, whereas no gingivitis or periodontitis was detected in this group.<sup>[23]</sup>

In our study, all opium-addicted individuals were also smokers. Other studies in Iran also achieved the same results.<sup>[14,15]</sup> Smoking could be a risk factor for future addiction to drugs.

There are limitations to this study. Although some studies have considered self-report of opium use as a reliable and valid method for obtaining information on addiction status, there are of course individuals who have not totally been honest about their opium use. Furthermore, mean age of individuals was high (addicts and nonaddicts) and aging is an influencing factor in tooth loss. Maybe if a younger sample of individuals were recruited, the results would be more reliable.

### CONCLUSIONS

The higher prevalence of tooth loss among addicts to opium shows the fact that opium dependence has irrevocable and everlasting effects on oral health. These effects cannot be retrieved even after opium use cessation. Therefore, it is essential for dental practitioners to consider the diagnosis of opium addiction in their routine dental examination, inform patients about harmful effects to their teeth, and refer patients for further assessment and consultation.

Special attention should be paid to the oral health of addicted women which seem to be more affected by oral health consequences of opium dependence.

Furthermore, it is essential that a dentist be a part of the team for the treatment of drug abuse to educate addicts about the importance of oral hygiene and make sure regular dental visiting takes place.

**Table 3: Comparison of dental indices between male and female addicts to opium**

Variable	Male (mean±SD)	No.	Female (mean±SD)	No.	P (t-test)
Missed teeth	8.82±6.69	466	10.31±6.38	94	0.04*
Decayed teeth	9.45±5.08	514	9.80±5.13	99	0.52
Filled teeth	4.77±7.36	13	27.00±1.90	1	0.01*
DMFT	16.84±6.84	531	18.39±7.06	104	0.03*
Community periodontal index	2.07±0.30	516	2.05±0.26	98	0.49
Gingival index	1.84±0.41	520	1.76±0.42	102	0.06

\*Significant. DMFT=Decayed, missing, and filled teeth, SD=Standard deviation

**Table 4: Comparison of dental indices between opium-addicted and nonaddicted individuals**

Variable	Addicted to opium (mean±SD)	n	Nonaddicted to opium (mean±SD)	n	P (t-test)
Missed teeth	9.07±6.66	560	6.42±5.60	2771	<0.001*
Decayed teeth	9.50±5.09	613	8.95±4.00	3921	0.01*
Filled teeth	6.36±9.23	14	3.89±3.18	175	0.33
DMFT	17.10±6.90	635	13.35±5.63	4005	<0.001*
Community periodontal index	1.27±1.03	1000	1.65±0.83	4866	<0.001*
Gingival index	1.12±0.95	1011	1.32±0.77	4889	<0.001*

\*Significant. DMFT=Decayed, missing, and filled teeth, SD=Standard deviation

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## CONFLICTS OF INTEREST

There are no conflicts of interest.

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