



## Evaluating of Cervical Caries and Periodontitis among Drug Abusers in an Iranian Population

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### Authors' contributions

This work was carried out in collaboration between all authors. Authors FO and AB designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Authors FO, MHAK, MS and AB managed the analyses of the study. Authors FO and AB managed the literature searches. All authors read and approved the final manuscript.

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### ABSTRACT

**Aims:** Drug abuse is a matter socioeconomic problem, also can lead to many oral problems. The purpose of the present study is to investigate the prevalence of cervical caries, gingivitis and periodontitis and partially dentate conditions among drug addicts in outpatient drug rehab centers in Yazd.

**Methodology:** This cross-sectional study was conducted on 200 drug addicts referred to 5 outpatient drug rehab centers in Yazd that were randomly selected. The data were collected through clinical examination and a standard questionnaire. Then analyzed using the chi-square test. Level of statistical significance is:  $P = .05$ .

**Results:** Of 200 addicts who were studied, there were 192 persons were male and 8 were females.

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Mean age was:  $35 \pm 15$  years, the age range was 20-60 years. Percentages of oral of problem orderly were cervical caries (57%), periodontitis (63%), gingivitis (37%), partially edentulous (43%) and fully edentulous (21%). The most frequent drug abused was opium (91%) and heroin (27%), crystal (16%), hashish (11.5%). Pan (9.5%) and alcohol (8%). According to the chi-square test, there was a statistically significant relationship between age and cervical caries rate ( $P = .01$ ). There was also a statistically significant relationship between age and periodontal status ( $P < .001$ ). Relationship between all drugs and periodontal and cervical caries were statistically significant ( $P < 0.05$ ). There was a statistically significant relationship between age and edentulous status ( $P < .001$ ).

**Conclusion:** The rate of cervical caries, periodontal problems and edentulous states in the addicted groups, are relatively high in comparison with non-addicted societies. Accordingly this indicates a need to implement policies to improve oral and dental awareness and health in drug addicts.

*Keywords: Cervical caries; drug-abuse; edentulous gingivitis; periodontitis.*

## 1. INTRODUCTION

As one of the most important socioeconomic problems, drug addictions could be studied in view of their effects on oral and dental tissue. A wide range of factors impact addicts developing oral and dental problems; these include nutrition, behavioral patterns, type and frequency of abused drugs. This cross sectional study analyzes some of these important factors.

Previous reports recorded oral health problems of drug addicts, with high frequencies of IV(Intra Venous) drug abusers having oral health problems; most do not visit a dentist and only half attended a dentist in the past year [1,2].

These epidemiological data stem from areas, all placed along the transfer route of narcotic products from inside Iran. Drugs trafficking through these referral areas from which the addicts derive, provides substantial evidence that Iranian drugs trafficking facilitates addictive behavior. This research notes all the addicts admit easy access to drugs from Iranian sources in their areas.

Past studies reported most heroin addicts fail to comply with oral hygiene instructions, and most consume sugary snacks 2 or 3 times daily [3].

The progressive pattern of caries in methamphetamine addicts' mouth followed a specific trend similar to baby bottle tooth caries which is named as Meth mouth [4].

Some studies show this group develops dry mouths leading to progressive dental caries, increased plaque accumulation and consequent periodontal diseases as gingivitis and/or periodontitis [5].

Other studies in heroin addicts show significant saliva reduction in flow rates, with lower pH of stimulated and unstimulated saliva [5].

Dental caries progression and periodontal diseases can be attributed to poor oral hygiene, change in the micro flora, dry mouth and changes in the chemical composition of saliva. Initially tooth caries affects occlusal then interproximal surfaces, and if left untreated may result in total destruction of the dental crown [5].

One crucial study indicates cervical caries is the most prevalent dental decay among drug addicts. Consequently various hypotheses are proposed to explain this type of caries; these include that lactose is in heroin, formation of mucin-rich bacterial biofilm, frequent consumption of sugary foods, a vitamin and elemental nutritional imbalance and increasing concentration of lactic acid in addicts' blood [6].

Although there is a confirmed connection between drug addiction and poor oral hygiene, studies on Iranian populations are scant [5].

Various confounding factors, such as type of drug, dosage, duration of usage and oral health status all of which affect the rate of dental caries and periodontal disease formation in drug abusers, and also other cultural, geographical, economic and social elements affecting results from the studies cited, it becomes compelling, urgent and necessary to conduct this study to clarify and better understand the current situation so that ameliorating steps may be instituted.

The purpose of the present study was to investigate the frequency of cervical caries, gingivitis and periodontitis among drug abusers in outpatient drug rehab centers in Yazd.

## 2. MATERIALS AND METHODS

The present cross-sectional study was done in 5 outpatient drug rehab centers in Yazd. According to the average number of drug abusers referred to each center and depending on the different area of the city; each area was chosen by chance from the Welfare Center table. The method of collecting information was clinical examination and questionnaires. 200 addicts from referred persons to rehab centers were selected. Inclusion criteria were willing to participate in study and brushing their teeth once a day (according to self-report). They were examined during 6 months. The questionnaire contains three sections: First section was the patient demographic data, second one was a history of drug abuse, and type of drug and drug practices and the third section is about dental and oral health status of patients. The study protocol was approved in Ethical Committee of Yazd shahid Sadoughi University of medical science with IRB Number: IR. SSU REC. 1395.62 on data: 22/06/2016. After completing the questionnaire and obtaining informed consent from the subjects, a standardized oral examination was conducted by final year dental students. Recording of data used a modified WHO Personal History form [5]. Subsequent to confirmed diagnosis as addicts these subjects, were examined orally and referred for further medical examination and methadone therapy. Oral examination used a flashlight, tongue blade and mirror with visual examination and use of a probe (WHO) for periodontal and explorer (Fig 9 Hu-Friedy) for caries. Diagnosis for the research data was made, based on visible clinical features of the teeth Bleeding On Probing (BOP) for gingivitis (gentle at a pressure not exceeding 20 Grams) and periodontal findings of the soft tissue gingival structures.

Some cases were sent to Dental Faculty for further evaluation or treatment. The recorded data were analyzed using SPSS 18 and Chi-square test and statistical descriptions

were presented in the form of tables and graphs.

## 3. RESULTS

200 drug abusers interred to study group were constituted, 192 male (96%) and 8 female (4%), all of them referred to 5 outpatient drug rehab centers in Yazd. Mean age was:  $35 \pm 15$  years, age range was 20-60 years. They were subdivided into four age groups: (20- 30), (31-40), (41-50), (51-60). Most patients (47%) were 30-40 years. The duration of reported addictions were: - 3 patients (1.5%) had a history of drug addiction for less than a year, 33 (16.5%) were addicted for 1-5 years, and 164 (82%) were addicted for more than 5 years, before they were referred to the rehab centers.

114 patients had cervical caries and there was a statistically significant relationship between age and cervical caries rate ( $P = .01$ ) (Table 1).

According to the chi-square test there was no statistically significant relationship between patients' sex and frequency of cervical caries ( $P = .77$ ) and also there was no significant relation between duration of usage and frequency of this type of caries ( $P = .74$ ).

For periodontal status, the results indicated that 126 patients (63%) suffered from periodontitis and 74 subjects (37%) had gingivitis and there was a significant correlation between age and periodontal status ( $P < .001$ ) (Table 2).

Drug abusers with gingivitis and periodontitis were in the age range of 31 to 40. There was a significant relationship between sex and periodontal status ( $P = .004$ ) but there was no significant correlation between duration of usage and periodontal status ( $P = .33$ ).

86 persons were partially edentulous and 42 were fully edentulous and partial edentulous had the highest percentage of edentulous type (43%).

**Table 1. The association between cervical caries status and four age groups**

Age group	Cervical caries		Without cervical caries			P value
	Frequency	Percentage	Frequency	Percentage	Total	
20- 30	14	37/8	23	62.2	37	P = .01
31-40	59	62/8	35	37.2	94	
41-50	28	70	12	30	40	
51-60	13	44/8	16	55.2	29	
Total	114	57	86	43	200	

*Chi square test*

**Table 2. The association between periodontal status and four age groups**

Age group	Gingivitis		Periodontitis		Total	P value
	Frequency	Percentage	Frequency	Percentage		
20- 30	24	64.9	13	35.1	37	P < .001
31-40	36	38.3	58	61.7	94	
41-50	8	20	32	80	40	
51-60	6	20.7	23	79.3	29	
Total	74	37	126	63	200	

*Chi square test*

According to Table 3 there was a significant relationship between patient's age and edentulous frequency ( $P < .001$ ).

But there was no significant relation between edentulous status and their sex and duration of usage ( $P = .67$ ,  $P = .12$ ).

The results showed that the most used drug was opium (91%) and then respectively heroin (27%), crystal (16%), hashish (5.11%), smokeless tobacco (% 5.9) and alcohol (8%) had the highest rate of usage. Also 70% of the patients were smoker.

There was a significant relation between drug use and cervical caries and edentulous (Table 4), except that there was not any statistically significant correlation between opium and edentulous ( $P = .058$ ).

There was a statistically significant relationship between drug abuse and gingivitis and dental problems which indicates the effects of drug abuse on oral tissue

#### 4. DISCUSSION

Because of effect of oral health care on cervical caries and periodontal problem, addicts of this study were selected from persons with moderate oral hygiene. It means all of them brushed their teeth once a day.

Patients referred to rehab centers were evaluated in 4 different age decades. The most frequent of cervical caries was in the age range of 31 to 40 (55 patients) and there was a significant relation between cervical caries rate and age ( $P = .01$ ). Since edentulous in older age was prevalent, high dental caries rate was not expected in this group. In the age range of 20 to 30 fewer addicts referred to the rehabilitation, and the most referred patients were in the age range of 31 to 40 years.

Previous studies reported the average age of referred addicts to rehab centers were under 40 years [7-9].

Many medications and radiotherapy reduce the quality and quantity of saliva; similar salivary changes are prevalent in drug addicts, which is why there is a causally-related increased prevalence of cervical dental caries.

The reason for increased prevalence of caries in drug addicts, as affirmed in this study and other similar published reports, is because dry mouth is among the major serious side-effects of drug abuse. Xerostomia, as dry mouth, is also caused by taking methadone syrup during the rehabilitation process.

Immunosuppression in addicts considered as another risk factor causing cervical caries [10]. A Due to unhealthy lifestyles, digestive disorders and poverty in addicts, usually they have a higher consumption of sugar than the normal population [3].

Because of few number of women referred to rehab centers, and most of the referred women also wouldn't like to participate in the study. There was no significant relation between cervical caries and gender ( $P = .77$ ).

63% diagnosed with periodontitis and there was a significant relation between age and gender and the prevalence of periodontitis ( $P < .001$ ). In a study done in 2015 it was found that a very small percentage of addicts had healthy periodontium and the prevalence of periodontitis and gingivitis in the experimental group was significantly greater than the control group [11]. Direct contact of the drug with gum leads to swelling and bleeding and could separate the epithelium. In one study it was concluded that the greatest cause of periodontal disease in addicts and smokers was increased levels of dental plaque, indeed it was related to stagnant biofilm because ignoring oral hygiene [12].

**Table 3. The association between edentulous status and four age groups**

Age group	Fully edentulous		Partially edentulous		Without edentulous		Total	P value
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage		
20-30	0	0	5	13.5	32	86.5	37	P < .001
31-40	10	16	51	54.3	33	35.1	94	
41-50	13	32.5	20	50	7	17.5	40	
51-60	19	65.5	10	34.5	42	21	29	
Total	42	21	86	43	72	36	200	

*Chi square test***Table 4. The association between the rate of cervical caries, periodontitis and edentulous and drug types, in drug abusers**

Drug types	Cervical caries			Periodontitis			Edentulous		
	Frequency	Percentage	P value	Frequency	Percentage	P value	Frequency	Percentage	P value
Opium	94	55	P = .02	112	66	P = .03	124	66	P = .058
Crystal	9	32	P = .02	14	50	P < .001	12	42	P = .042
Heroin	19	35	P = .006	30	56	P < .001	29	53	P < .001
Hashish	9	39	P < .001	13	56	P < .001	13	56	P < .001
Cigarette	70	54	P < .001	89	69	P = .01	88	68	P < .001
Pan	8	44	P < .001	13	72	P < .001	11	61	P < .001
Alcohol	10	62	P < .001	14	87	P = .04	14	87	P < .001

*Chi square test*

In the current study there was no significant relation between the duration of drug use and periodontal status and cervical caries rate ( $P = .74$ ), while in the study conducted in 2015 it was found that the more drug use duration takes, the more prevalence of DMFT and periodontal disease will be happen [11]. Another report concluded that long duration of drug abuse and smoking is significantly threatening for periodontal health [13].

It seems that in the first year of drug use, its initial effects keep a progressive trend and then it turns to a steady state which is related to person's behavior pattern. And because they were similar in terms of oral health behaviors, it was expected that there would be no significant relation between duration of drug abuse and caries rate and periodontitis.

Probably the most adverse effects of drugs on dental and periodontal problem are direct exposure to them not their systemic effect. So it seems that in using vasoconstrictors drugs like cocaine, ligaments and bones have been more affected.

The most frequent drugs used, was opium (91%) and then respectively heroin (27%), crystal (16%), hashish (11.5%), pan (9.5%) and alcohol (8%). But it seems that since alcohol consumption is not morally acceptable in our society and also because of religious issues and social considerations, patients reported alcohol addiction incorrectly and it was under estimated.

In this study there was a significant relation between drug types (pan, alcohol, opium, crystal and heroin) and periodontal status and cervical caries.

In a study done in 2013 which was about the prevalence of caries in people addicted to heroin it was found that the average DMFT of case group was four times more than the control group [14]. Also in a study the prevalence of caries and periodontal status were investigated in heroin addicts. The results showed a high prevalence of caries and just 19% of addicts were caries free and most of them had gingivitis (42%), dental calculus (95%), shallow and Deep periodontal Pockets (42%) [15].

One study indicated that there was a statistically significant relationship between DMFT index and type of drug abused. who addicted to crack and crystal had more missing teeth than opium and

heroin addicts but there was no statistically significant relation between the drug type and periodontal disease [5]. However, a study done on American addicts, showed that there was no significant relation between DMFT and the drug types [16].

Another study investigated the effect of different types of drug addictions on oral health, it showed that there is a direct relation between plaque index and duration of using opium and intravenous heroin and the routine consumption of alcohol [17].

In this study, edentulous status of addicts was evaluated and there was a statistically significant relation between age ( $P < .001$ ) and edentulous and there was no significant relationship between other parameters and edentulous ( $P > .05$ ).

Another study reported that the average rate of tooth loss in smokers was more than nonsmokers [18].

The primary cause of tooth loss over time is dental plaque accumulation and poor oral hygiene. Based in this study 64% of referred patients were partially and fully edentulous and drug abuse can be the reason for increased tooth loss. The most frequent of partial edentulous observed in the age range of 31-40 years and the most frequent of full edentulous was in the age range of 51-60.

There was a significant relation between all drug types and the prevalence of edentulous. There was a significant relation between the prevalence of edentulous and heroin, pan, smoking and alcohol. There was also a significant relationship between crystal and edentulous. (Table 4).

In this study, along with drug addiction, smoking was also investigated. Studies have shown that in drug addicts and smokers, the number of sub gingival pathogenic bacteria is more than others and a decrease in plasma cell and serum IgG levels among smokers caused reduction in host response and thus it increases the periodontal disease [10]. In another study, there is a direct relationship between periodontal status and duration of smoking that 70% of subjects were smokers and drug addicts [19]. According to findings, using drugs and smoking alongside was the reason for periodontal diseases [20].

This genre of research has several acknowledged limiting influences. Focus on local

presenting problems dominate and, extrapolating to other situations, must dictate some reserve. The main challenge arising in this type of research comes from social mores, shaming values and reluctance to openly admit to addiction, all of which inhibit voluntary subject participation. In male dominated patriarchal societies, access to women and female voluntary participation, in studies like this, is a major challenge. Yet this research data was accumulated with moderate success through focused persistence, sustained interest and curiosity over an extended period.

## 5. CONCLUSION

The rate of cervical caries, periodontal problems and edentulous states in the addicted groups, are relatively high in comparison with non-addicted societies. Accordingly this indicates a need to implement policies to improve oral and dental awareness and health in drug addicts. Also it is imperative for referring welfare centers to include oro-dental assessment and care for drug addicts in rehab centers.

## CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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