

Original Research Article

Dental and oral health status of an Iranian population of drug abusers: A comparative study

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Abstract

Purpose: To evaluate the effects of hallucinogens, opioids and methamphetamines abuse on oral and dental health of an Iranian population.

Methods: In this descriptive cross sectional survey conducted in 2017, 500 drug abusers referred to addiction rehabilitation centers in Tehran Province in Tehran were selected as the study population. A questionnaire was developed to evaluate demographic data, self-reported oral health experiences during periods of substance abuse and details of substance abuse including types of substances abused, patterns and period of substance abuse.

Results: After excluding 23 addicts due to incomplete data, 500 peoples participated. Of the 500 included subjects, 390 (88 %) were male and 110 (22 %) were female. As for the qualitative variables the differences were found to be significant for route of abuse ($p < 0.001$), smoking ($p < 0.03$), pain ($p < 0.001$) and abnormal sounds ($p < 0.001$) of TMJ, sensitivity of chewing muscles ($p = 0.002$), smoking melanosis ($p < 0.05$), hypertrophic lesions ($p = 0.01$) and bleeding on probing ($p = 0.001$).

Conclusion: The findings reveal the poor dental and oral health status of drug addicts in Iran, especially methamphetamine abusers. Therefore, the results call for the design and implementation of oral health improvement programs for addicts in Iran.

Keywords: Drug abuse, Dental health, Addicts, Hypertrophic lesions, Chewing muscles, Smoking melanosis, Methamphetamine

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INTRODUCTION

Drug abuse is one of the world's most overwhelming health problems; it can be considered as a predominant problem, especially in Iran. In 2015, substances abuse-related conditions resulted in 307,400 deaths compared to 165,000 deaths in twenty years ago. Among these, the highest numbers were from alcohol

abuse-related disorders, which caused 137,500 deaths; opioid abuse-related disorders caused 122,100 deaths, amphetamine abuse-related disorders caused 12,200 deaths, and cocaine abuse disorders caused 11,100 [1,2].

Iran, located along the trade route of illegal drugs (the borders of Afghanistan), has one of the highest rates of drug addiction. Iranian health

ministry official report estimate there are more than two million substance addicts in this country of 80 million, constituting 2.75 % of the population. Substance abuse and its consequences impose a heavy burden on the individual and take a heavy toll in terms of severe health complications, dangerous behavior, violence, and social complications. The direct complications of substance abuse include, respiratory dysfunction, cirrhosis, cardiac crisis, infectious diseases such as AIDS, sepsis, leprosy, impetigo and endocarditis, nephropathy, and psychological complications such as melancholia as well as oral and dental health problems [3-5]. Oral health complications are among the most frequent health concerns associated with substance dependence. Many studies state that substance abuse can lead to periodontal diseases, dental caries, pathologic lesions, issues in teeth mobility, and missing teeth. In addition, there are other side effects and lifestyle factors such as the frequent consumption of sugary and fizzy drinks, xerostomia, bruxism, dental attrition, infrequent oral hygiene, and the destructive nature of some drugs that exacerbate the dental and oral health in drug abusers [6,7].

Meth mouth is an irreversible and incurable tooth decay that causes loss of teeth, xerostomia, bruxism, and other oral complications that are potentially symptomatic of the prolonged use of the substance methamphetamine. In addition, the most outstanding consequence of the long-term use of methamphetamine on oro-dental health is the development of tooth decay, in which the teeth of the addict appears to be dark and in the process of decaying. The effects of illicit drugs on oral and dental health have been evaluated in some studies over the recent decades, but only few have assessed the effects of hallucinogens [8-10].

In light of the increasing prevalence of drug abuse involving hallucinogens, opioids, and methamphetamines in Iran, especially among teenagers, and the severe effects of these substances, the aim of the study is to perform a comprehensive evaluation of their effects on the oral and dental health of drug abusers in order to improve the understanding of these complications, which can lead to prevention, early detection, and more effective treatments.

METHODS

In this descriptive survey conducted in 2017, 500 drug abusers who were referred to the addiction rehabilitation centers in Tehran province were selected as the study population. The required

information for the study was gathered by conducting face-to-face interviews with all the subjects, along with a thorough physical examination of their oral cavity.

Study subjects

The participants were recruited from the clinics of the metropolis of Tehran as its population represents a proper example for this study. Recognizing the substance addicts in the general population can be challenging while facing additional challenges like cooperation and compliance. This problem was solved by recruiting the subjects from the addiction treatment centers. The study has been confirmed by the ethical committee of Iran University of Medical Sciences (ref no. 128695/87). Written informed consent was obtained from each participant, and the study was carried out in accordance with the principles of the Declaration of Helsinki [11]. In the study, 500 drug addicts volunteered to participate in the investigation. Altogether, 15 clinics were selected for the survey.

Data collection

A comprehensive form was developed to evaluate the demographic data, self-declared oral health involvements during the periods of substance abuse, and its details like the types of drugs abused, patterns and the period of substance abuse. Additionally, twelve trained dentists performed clinical examinations to evaluate the dental and oral health status (by fulfilling a check-list) of the participants, and conducted face-to-face interviews with them. If necessary, the contributors were able to ask for further enlightenments regarding the questions. The form requested for data on the oral health behavior (OHB) components based on the earlier confirmed questionnaires [12,13]. Nine trained and calibrated examiners under the standard and regular circumstances, including flat mirror and typical dental light, and blunt explorer, conducted the dental checkup either in private dental clinics or rooms in rehabilitation centers. The temporomandibular joint function, hypoplasia of the first permanent molars, and dental anomalies were reported regarding to the World Health Organization criteria. The dentists explained the goal of the investigation to all volunteers and assured them that the data would be kept confidential.

Statistical analysis

The results for the variations in oral health were reported as the mean \pm standard deviation (SD)

for the quantitative variables and as percentages for the categorical variables. The data obtained from the study was analyzed with the help of the SPSS (ver.20) software. The statistically independent t test was used to evaluate the significance of the differences between the two groups (hallucinogenic and non-hallucinogenic drug users) in terms of the mean of the continuous variables, where $p < 0.05$ was considered as statistically significant. The upper reference values were defined as 95 percentile of the normal values in each group.

RESULTS

In this study, after the exclusion 23 participants due to incomplete data, the total number of subjects was 500. Among these 500 subjects, 390 (88 %) were male and 110 (22 %) were female. The mean age of the study population was 23.2 years old with the minimum and maximum ages being 18 and 60 years old, respectively. The profile of the group, patterns of drug abuse, and the comparative demographic and clinical characteristics of the participants are summarized in Tables 1, 2 and 3. Out of the 500 participants, 310 were addicted to Methamphetamine (crystal), 26 to 3,4-Methylenedioxymethamphetamine (ecstasy), 111 to Cannabis (marijuana i.e., herbal cannabis), 91 to Hashish (cannabis resin), 41 to Lysergic acid diethylamide (LSD), 75 to Opium (poppy tears), 29 to Diamorphine (heroin), and 46 to Crack cocaine (crack). Nearly all the participants were poly-drug users; in addition, 401 (80.2 %) subjects were active smokers at the time of study.

The differences between the two groups comprising hallucinogen addicts like crystal (Methamphetamine), ecstasy, and LSD and non-hallucinogen abusers like marijuana, hashish, opium, heroin, and crack, respectively, were evaluated. For the qualitative variables, the

differences were found to be significant regarding the route of abuse ($p < 0.001$), smoking ($p < 0.03$), pain ($p < 0.001$), abnormal sounds ($p < 0.001$) of TMJ, the sensitivity of the chewing muscles ($p = 0.002$), smoking melanosis ($p < 0.05$), hypertrophic lesions ($p = 0.01$), and bleeding on probing ($p = 0.001$). According to Table 1, the differences were found to be significant for the age, duration of abuse, DMFT indices, GPD, and PI of the crystal abusers, compared with the others.

DISCUSSION

The Iranian Ministry of Health and Medical Education ranked addiction as the fourth most important health problem in the country. The direct and indirect side-effects of illegal drug abuse on the dental and oral health has rarely been surveyed, probably due to the difficulties in recruiting the appropriate individuals. This challenge can be overcome by concentrating on those who are presently in the drug rehabilitation clinics, as previous studies have done [14,15]. The present study is in accordance with Shekarchizadeh *et al*, Bourgeois *et al* and Chen *et al* regarding the advantages of this method of recruitment of the subjects [14-16].

The results of this investigation revealed poor oral self-care among the addicts. Similar to the other reports, approximately, only 10 % of the participants regularly brushed their teeth at least twice in a day, and 88 % snacked on sugary products daily, either once or more. In the previous studies conducted in Iran, Brazil, and the USA, the addicts undergoing rehabilitation showed similar habits regarding cleaning the teeth, eating, and dental flossing [14]. These results are comparable to the study, though some investigations in China, England, and Netherlands have reported more favorable self-cleaning behaviors among the addicts [16-18].

Table 1: Oral and dental health characteristics between crystal (methamphetamine) abusers and other addicts

Variable	Non-crystal abusers		Crystal addicts		P-value
	CV	Mean	CV	Mean	
Age	4.111	31.15	4.165	24.30	<0.001
Abuse Duration (years)	2.412	10.2	1.74	3.5	<0.001
Mandible's ROM	3.229	44.51	3.101	33.9	<0.001
decay	5.001	9.82	2.102	14.98	<0.001
DMFT					
missing	2.010	10.42	3.572	8.23	<0.001
filled	5.267	2.41	1.742	3.38	<0.001
Plaque Index	4.113	77	6.005	80.11	0.001
GPD	2.332	26.549	4.631	24.96	0.03
CPITN	3.881	15.18	3.09	16.95	0.123
Maximum Mobility	7.12	0.43	0.566	0.31	0.061
Xerostomia Index	8.521	3.37	1.036	3.67	0.049

Table 2: Characteristics of two groups of addicts

Variable		Non-hallucinogen (%)	Hallucinogen (%)	P-value
Age (years)	<23	10.3	40.6	<0.001
	23-30	23.7	27.2	
	30-40	40.1	27.2	
	>40	25.9	5	
Sex	Male	93.2	95.1	0.96
	Female	6.8	4.9	
Frequency of abuse (per day)	Once	8.9	19.9	<0.02
	Twice	60.2	53.8	
	3 times or more	30.9	26.3	
Smoking	No	11.3	18.3	<0.03
	Yes	88.7	81.7	
Rout of use drugs	Inhalation	79.2	26.4	<0.001
	Eating	1.2	68.6	
	Nasal	4.5	2.1	
	Intravenous injection	15.1	2.9	
Feeling changes in the oral cavity	No	19.3	26.4	0.202
	Yes	80.7	73.6	
Feeling tooth decay	No	29.8	24.9	0.631
	Yes	70.2	75.1	
Feeling Changes in chewing	No	36.2	33.8	0.490
	Yes	63.8	66.2	
Toothache	No	30.6	38.8	0.293
	Yes	69.4	61.2	
TMJ* Pain	No	55.8	19.9	0.001
	Yes	44.2	80.1	
Abnormal sounds	No	49.6	20.2	0.001
	Yes	50.4	79.8	
Sensitive muscles	No	54.1	30.5	0.002
	Yes	45.9	69.5	
Pathologic lesions	No	55.3	57.9	0.502
	Yes	44.7	42.1	
Aphthous stomatitis	No	75.7	83.7	0.261
	Yes	24.3	16.3	
Lichenoid lesions	No	70.3	88.1	0.298
	Yes	29.7	11.9	
Smoking Melanosis	No	74.2	85.1	<0.05
	Yes	25.8	14.9	
Hypertrophic lesions	No	88.1	90.9	0.01
	Yes	11.9	9.1	
Spontaneous lesions	No	90	80.8	0.06
	Yes	10	19.2	
Dry mouth symptoms	No	23.2	4.3	0.05
	Yes	76.8	95.7	
Bleeding after probing	No	32.1	51.8	0.001
	Yes	67.9	48.2	
Dental sensitivity to heat and cold	No	27	32.5	0.124
	Yes	73	67.5	

Since most participants had an adequate level of knowledge towards dental and oral healthcare, these results can be attributed to addiction and the influence of drug abuse on the patient's behavior, type of drug and its abuse, age, and the duration of addiction. The dental and oral health status among the methamphetamine abusers (Table 1, Table 2) was much worse than that among the non-methamphetamine drug abusers, as reported for the general Iranian population in the previous studies [19-21] as well

as some other investigations around the world [22,23]. The present study shows a high predominance of TMJ disorders in the methamphetamine abusers as compared to the non-methamphetamine addicts. TMJ disorders can be attributed to the effect of methamphetamine on saliva (decreasing salivary flow), which results to enamel erosion, periodontal disease, and temporomandibular disorders [8-10]. The DMFT of the examined addicts showed a significant difference between

the methamphetamine and none methamphetamine abusers. The low DMFT score was associated with toothpaste use and the frequency of brushing the teeth. In addition, based on the previous local investigations, the DMFT score among our subjects (22.6) was much higher than that among the general Iranian population [24-26]. These results can be attributed to the acidic and corrosive properties of methamphetamine that affect the teeth [10], and the impurities in the drugs from the production processes [27].

Limitations of the study

The survey encountered some unavoidable limitations. First, we derived some data regarding oral health experiences from participants' self-reports and brief oral assessments. In addition, it is possible that individuals have a history of alcohol or multidrug use without a corresponding diagnosis in the participant's data.

CONCLUSION

The findings of this study reveal the poor dental and oral health status of the addicts, especially methamphetamine abusers. Thus, there is a need to design and implement oral health improvement programs for drug addicts in Iran.

DECLARATIONS

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Conflict of interest

The authors declare that no competing interests exist with regard to this study.

Contribution of authors

We declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors, Conceived and designed the experiments: SK; collected and analysed the data: SK, SLA; VA; Wrote the manuscript: VA, SLA. All authors read and approved the manuscript for publication.

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