

An oral cavity profile in illicit- Drug abusers?

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Abstract:

Background: The aim of this study is to shed the light on the oral cavity profile assessing teeth and periodontal tissues in previously illicit drug abusers of cannabis and heroin with different drug addiction circumstances. **Materials and Methods:** Study population included 100 inmates, aged 21–64 years, incarcerated for previous addiction to cannabis or heroin. Personal information and drug circumstances of addiction were registered with dental and periodontal parameters including daily teeth brushing frequency, decayed missed filled teeth (DMFT), plaque index (PI), gingival index (GI), bleeding on probing (BOP), recession, and clinical attachment loss (CAL). **Results:** Half of the population were illiterate, and 70% were married. Heroin was the most previously abused drug and more than 70% of the participants had been addicted for more than 12 months. Low teeth brushing activity profile dominated with higher values for DMFT and BOP in the heroin group compared with the cannabis (after age adjustment) (DMFT = 22.6 ± 7.9 , 18.5 ± 9.8 , respectively, $P = 0.03$) (BOP = $60\% \pm 30\%$, $66.6\% \pm 32\%$, respectively). In addition, higher values of BOP were recorded in the heroin injecting group compared with both of heroin fumes inhalation and cannabis smoking (BOP = $76.41\% \pm 27.7\%$, $59.12\% \pm 33.6\%$, $60.05\% \pm 31.8\%$ $P = 0.04$, respectively), whereas PI, GI, Reces, and CAL means were comparable among groups regardless of other addiction circumstances. **Conclusion:** Abused drug type and the way its chemical form being administered would negatively affect, directly or indirectly, the oral cavity concomitantly with the sustained state of self-negligence and less interest in implementing the oral hygiene measurements. Altogether, addiction circumstances synergize leading to a distinctive dental and oral profile which would impose a burden to adapt a more customized treatment approach.

Key words:

Dental profile, oral cavity, periodontal indices, prison inmates, substance abuse

Access this article online
Website: www.jisponline.com
DOI: 10.4103/jisp.jisp_716_18
Quick Response Code: 

INTRODUCTION

A recent increase has been registered in people misusing illicit drugs including cannabis and heroin in many countries worldwide.^[1] Drugs are abused on a daily frequency and in many different ways of administration depending on its chemical form beginning from sniffing, ingesting with food, topical transmucosal application, inhalation of the burning fumes, and ending with the intravenous injection to gain the rapid and profound euphoric effects.^[2,3]

Cannabis, known as weed or marijuana and hashish, with the psychoactive Δ -9-tetrahydrocannabinol substance has been primarily misused as a hallucinating natural agent.^[4] Mostly, cannabis is abused by smoking the dried plant followed by other ways of administration such as chewing, ingesting with food or oil essences.^[5] Comparably, opiates (natural like morphine, diacetylmorphine or heroin, and methylmorphine or codeine) and opioids (synthetic and semi-synthetic like propoxyphene and oxycodone, respectively) have been abused for its pain palliative effect. Burning the substance to inhale heroin fumes is a common way of administration, while acidic form is to be intravenously injected.^[6]

Addiction has been described as a chronic brain disease and has its tangible responsible molecules affecting the individual behavior which might be at a certain stage an impairing factor for cognitive functions, perception, reaction time, learning, memory, concentration, control of emotions and social skills due to the obsessive compulsive increased demand.^[7] Addiction to substances and illicit drugs usually starts during adolescence and young adulthood with the low level of education as an attributing factor to individuals under 19 years of age.^[8] The choice of drug used depends on various factors such as sex, social customs, economic status, Peer usage, popularity and easiness of availability.^[9] Added to the aforementioned, concept of changing lifestyle enhances an overall view of chronic

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How to cite this article: Al Bush MM. An oral cavity profile in illicit- Drug abusers? J Indian Soc Periodontol 2019;23:517-24.

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Submission: 02-12-2018
Accepted: 30-06-2019

oral health.^[10-12] Addiction substances have been confirmed to negatively influence many parts of the human body including the mouth reflecting an array of manifestations of abnormal conditions.^[13,14]

These conditions were classified as a resultant of the possible modifying chemical factors, like in abused drugs, which could directly or indirectly affect the oral cavity components including the mucosae, teeth, and their periodontal tissues.^[15,16]

Cannabis smoking gives similar compounds as of tobacco, except for nicotine, in regard to carbon dioxide, tartar, other respiratory irritants, and carcinogenic materials with immunosuppressive effects.^[17] It has been mentioned that smoking one cigarette of cannabis equals more than 20 ones of tobacco due to the absence of filter and the prolonged breath holding while smoking with an increased relation to carcinomas of the floor of the mouth and the tongue.^[18-20] On the other hand, different forms of chronic use of opioids can cause multiple conditions such as gastroesophageal reflux disease, immunosuppression, and renal damage as well as carcinogenic effects associated with increased incidence of cancers in bladder, kidney, and oral cavity.^[21]

Intraorally, cannabis and opiates abusers suffer from xerostomia,^[22-24] and long-term addiction of heroin and in-treatment methadone contributes to lower the oral hygiene status through direct pathologic effects or through poor oral hygiene and chronic malnutrition,^[25] manifested by increased incidence of dental caries and periodontal destruction.^[15,23,26-28] Moreover, higher rates of oral and dental problems were noticed in ways of administration other than those passing through the oral cavity like injecting heroin.^[29,30] Summed together, a question would be imposed concerning whether different drug abusing circumstances can leave a specific oral profile reflecting intensity and extension on teeth and periodontium?^[31,32]

MATERIALS AND METHODS

The questioned population involved 407 male inmates (ranged 21–64 years of age) from the central prison of Damascus were incarcerated for illicit drug use in the period extending from June to December 2017 during a dental health-care program for prison inmates. Personal interview was conducted with 100 inmates who were incarcerated for more than 1 month and had been addicted to one drug only cannabis or heroin before incarceration. Exclusion criteria included having systemic diseases, previous therapy with neuropsych medication, and abusing substances other than cannabis or heroin or more than one substance. All participants signed an informed written consent approving their participation in this cross-sectional study. Ethical approval to carry out the study was obtained from the Research Ethics Committee of the University of Damascus, faculty of dentistry, and the police central hospital. Personal information and addiction circumstances included type of first drug contact and its age, educational status, marital status, way of administration, daily quantity, and frequency along with the duration of addiction. Full-mouth examination was performed by a single examiner (author) and included daily teeth brushing times, dental and periodontal indices, decayed missed filled teeth (DMFT) score, plaque index (PI),

gingival index (GI), bleeding on probing index (BOP),^[33,34] recession (Reces), and clinical attachment loss (CAL).^[35] Measurements were taken using UNC 15 periodontal probe, while photographic images were captured by Nikon camera (CoolPix 4800, ×4 with 8.3 optical zoom). Statistics included cross-tabulation, Chi-square, ANOVA test, and Pearson correlation to investigate any significant differences or correlations between different variables in groups. All tests were performed at $P < 0.05$ by means of SPSS Statistics for Windows, V.20th (IBM Corp., Armonk, N.Y., USA).^[36]

RESULTS

The study population consisted of 100 males, mean age (39.2 ± 9.1 years) [Table 1], low educational status (illiteracy and elementary) formed 76%, and more than 70% were married [Figures 1 and 2]. All of the individuals were smoking, and the first contact with drug of choice was cannabis through the third decade of age [Table 2]. Heroin group comprised more than three quarters of the sample [Table 2]. Burning heroin fumes inhalation was a way of administration for 44% of the heroin abusers followed by injecting, while cannabis was smoked [Table 3 and Figure 3]. More than 40% of the sample individuals abused between 0.5–1 g of both drugs (mainly heroin) as a quantity divided into daily increments (frequency)

Table 1: Means of age, decayed missed filled teeth, and periodontal indices in the two groups of addicted drugs

Variable	AD		N (%)
	CN (n=22; 22%)	Heroin (n=78; 78%)	
Age (year)	37.68±9.41	40.73±8.86	100
DMFT	18.45±9.79	22.60±7.95	100
PI	2.59±0.59	2.65±0.77	100
GI	1.68±0.57	1.73±0.68	100
BOP	60.05±31.86	66.59±32.19	100
Recession (mm)	2.05±0.97	2.68±1.51	100
CAL (mm)	4.43±1.25	4.70±1.26	100

AD – Addicted drug; CN – Cannabis; DMFT – Decayed missed filled teeth; PI – Plaque index; GI – Gingival index; BOP – Bleeding on probing (%); CAL – Clinical attachment loss (mm); N – Total number

Table 2: Percentage of cases according to currently addicted drug, age and type of first addicted drug

AD	FAD		N
	CN	Heroin	
CN			
Age FCD			
<18	3	0	3
18-39	18	1	19
n	21	1	22
H			
Age FCD			
<18	8	1	9
18-39	43	21	64
>40	2	3	5
n	53	25	78
Total			
Age FCD			
<18	11	1	12
18-39	61	22	83
>40	2	3	5
Total n	74	26	100

AD – Addicted drug currently; CN – Cannabis; Age FCD – Age at the first contact with drugs; FAD – First addicted drug; N – Total number

of 4–6 times [Figure 4]. Individuals that had been addicted for more than 12 months before being incarcerated consisted 75% of the sample [Figure 4]. Interviewed individuals revealed that the primary reason for their cessation failure was the physical incapability despite the repeated trials and rehabilitation program enrollment, suggesting that the best way for prevention is to avoid bad fellowship to overcome the peer pressure [Figure 5]. The main purpose for recalling the

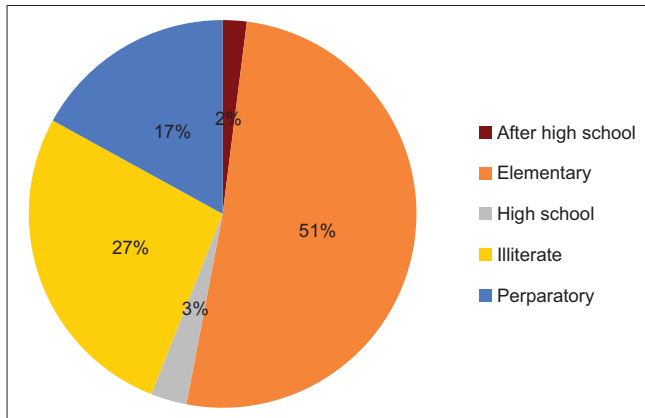


Figure 1: Sample distribution according to the educational status

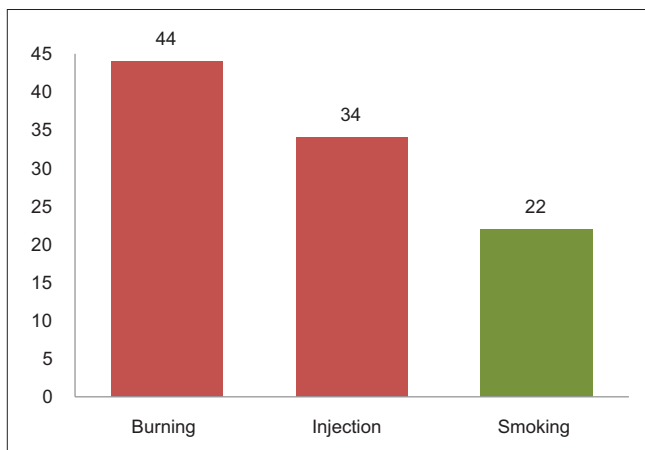


Figure 3: Sample distribution according to the way of drug administration of cannabis and heroin

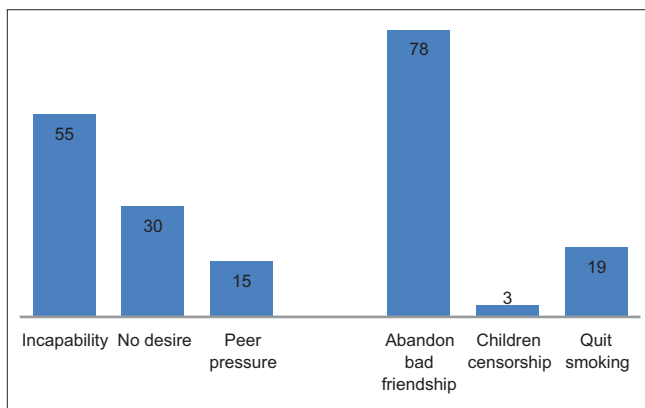


Figure 5: Cause of cessation failure and self-opinion for prevention (%)

dental clinic in this study was the dental pain due to rampant carious lesions [Figures 6-9], followed by the decrease in chewing ability due to the lack in dental units or its efficacy, while esthetics were the last [Figure 10]. Daily frequency of teeth brushing was low in the whole sample as 71% of them did not brush their teeth (57% in heroin and 14% in cannabis) (not mentioned in figures). Higher mean values of DMFT and BOP were registered in the heroin group compared with the cannabis one (after age adjustment) (DMFT = 22.6 ± 7.9 , 18.5 ± 9.8 , respectively, $P = 0.03$) (BOP = $66.6\% \pm 32\%$, $60\% \pm 30\%$, respectively) [Table 1 and Figure 11]. Differences in BOP means were statistically significant among individuals of

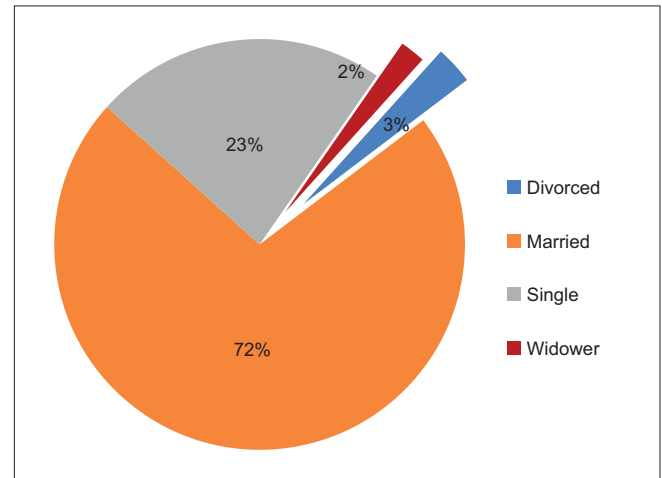


Figure 2: Sample distribution according to the marital status

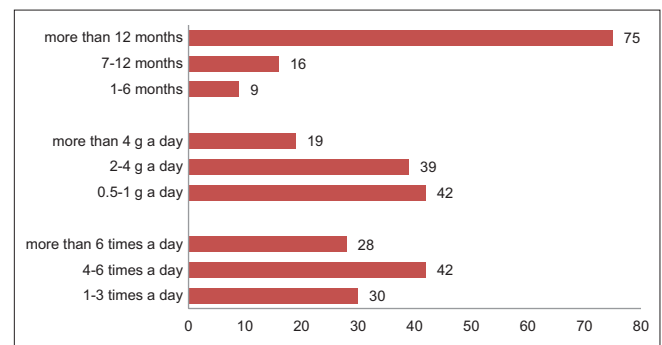


Figure 4: Sample distribution according to addiction circumstances of heroin (from above to bottom); abuse duration (month), daily quantity (g/day), daily frequency



Figure 6: Generalized cervical caries in a 33-year-old patient inhaled burnt heroin fumes for 9 years

the way of drug administration group (WyAdmin), burning to inhale heroin, injecting heroin, and smoking cannabis on behalf of the injecting group ($59.12\% \pm 33.6\%$, $76.41\% \pm 27.7\%$, $60.05\% \pm 31.8\%$ respectively, $P = 0.04$) [Tables 3 and 4]. Means of PI, GI, Reces, and CAL were comparable among different groups [Tables 1, 3, 4, and Figure 12]. Pearson test revealed several significant correlations ($P < 0.05$) [Table 5]. Age correlated

with recession, and PI correlated with GI. DMFT correlated positively with both of age and Reces, and BOP correlated



Figure 7: Generalized cervical caries with recessions in a 40-year-old patient inhaled burnt heroin fumes for 10 years



Figure 9: Generalized cervical caries with a very poor oral condition in a 36-year-old patient injected heroin for 8 years

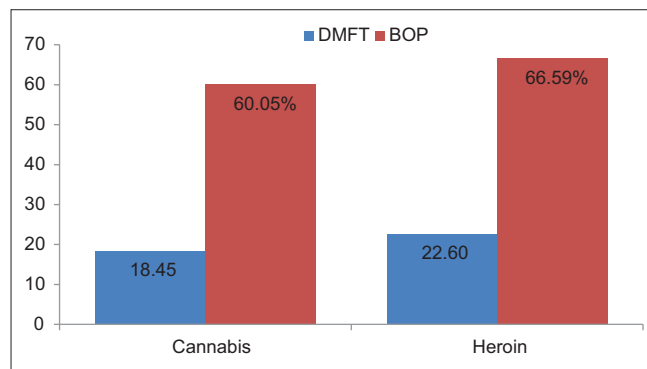


Figure 11: Means of decayed missed filled teeth score and bleeding on probing (%) in the two addicted groups



Figure 8: Generalized cervical caries with generalized periodontitis in a 48-year-old patient smoked cannabis for 17 years

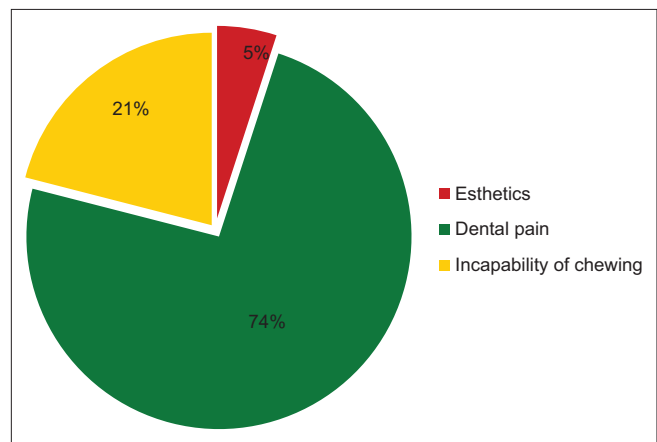


Figure 10: Sample distribution according to the current dental complaint

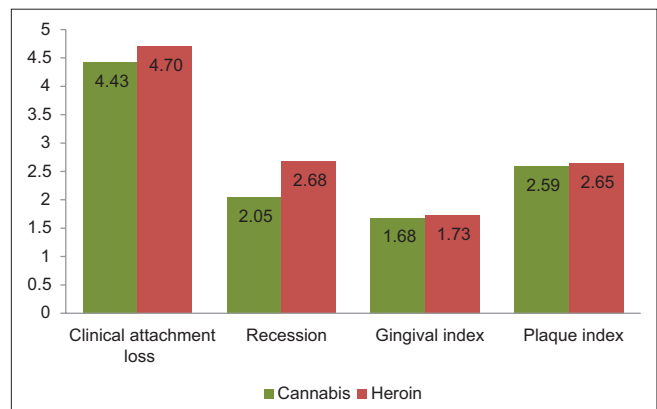


Figure 12: Means of plaque index, gingival index, recession (mm), and clinical attachment loss (mm) in the two addicted groups

Table 3: Means of teeth brushing times, decayed missed filled teeth, and periodontal indices in the three groups of way of drug administration

WyAdmin	Brush	DMFT	BOP (%)	Recession (mm)	CAL (mm)	n
Burning	0.43±0.7	23.18±7.03	59.12±33.65	2.79±1.3	4.57±1.25	44
Injecting	0.32±0.73	21.85±9.05	76.41±27.7	2.53±1.76	4.87±1.26	34
Smoking	0.45±0.67	18.45±9.79	60.05±31.86	2.05±0.97	4.43±1.25	22

DMFT – Decayed missed filled teeth; BOP – Bleeding on probing (%); CAL – Clinical attachment loss (mm); n – number of individuals in each group

with both of PI and GI, and CAL correlated with age, Reces, and GI. Teeth brushing times correlated negatively with each of age, DMFT, PI, and BOP [Table 5].

DISCUSSION

Drug abuse and addiction condition have been reported to increase in low educated population with poor lifestyle which Was noticed in our study population with more than half of them were married. These results agreed with those of Galea *et al.* 2007^[37] and Mbiyu and Ombui 2016,^[8] where their studies pointed out that the low level and inequality of education can be attributable (odds ratio = 3.49), to the introduction to drug abuse at early ages which occurs most frequently among youth aged between 18 and 35 years those who formed about 80% of our study population. Nonetheless, while individuals who abused drugs before adultery formed 12% of this study participants which may be due to fact that the chosen facility did not contain individuals younger than –18 years of age, the National Survey on Drug Use and Health statistics has shown that the prevalence of drug use among young people is reportedly higher than among adults.^[38] The marital status

is one of the behaviorally affected aspects of the addicted individuals which would be an added value to interchangeably precipitate the emotional disturbance, carelessness, and negligence.^[39] Beside the previous results, the interviewed individuals expressed that the physical incapability due to physical dependence had been the main reason for not being able to cease drug abuse. However, participants stated as a self-attitude experiment that abandoning bad fellowship is the best way for preventing drifting toward drug abuse reflecting the underlying peer pressure effect. These results came concomitant with Ranjan *et al.* 2010,^[9] study which indicated that illiteracy, low working status, and poverty are of the main sociodemographic factors for drug abuse, while peer pressure is playing a very important role in initiation of any type of drug abuse. Singla *et al.*'s^[10] review in 2016 concluded that the impact of the lifestyles behavior should be taken into consideration for the prevention of chronic diseases.

Cannabis ranked first in the list of the abused drugs globally with a 183 million abusers, then came opiates (opioids in general), with 57 million abusers.^[1] In addition, in the past year, 247 million people abused drugs of which 12 million injected

Table 4: Significance of differences in means values ($P>0.05$) of the decayed missed filled teeth and periodontal indices among the groups according to addiction circumstances variables

	$P>0.05$		Test type	$P>0.05$		Test type	$P>0.05$			Test type
	Brush	DMFT		PI	GI		BOP	Recession	CAL	
AD	0.47	0.03*	Independent Mann-Whitney U-test	0.08	0.63	Pearson Chi-square test	0.31	0.15	0.16	Independent Mann-Whitney U-test
WyAdmin	0.46	0.19	Independent samples Kruskal-Wallis test	0.32	0.79	Pearson Chi-square test	0.04*	0.17	0.29	Independent samples Kruskal-Wallis test
DlyFreq	0.39	0.62	Independent samples Kruskal-Wallis test	0.9	0.62	Pearson Chi-square test	0.98	0.51	0.7	Independent samples Kruskal-Wallis test
DlyQuant	0.29	0.64	Independent samples Kruskal-Wallis test	0.9	0.88	Pearson Chi-square test	0.25	0.75	0.3	Independent samples Kruskal-Wallis test
AddDur	0.87	0.66	Independent samples Kruskal-Wallis test	0.63	0.13	Pearson Chi-square test	0.07	0.2	0.71	Independent samples Kruskal-Wallis test

Significance at the $P=0.05$ level (two-tailed). AD – Addicted drug; WyAdmin – Way of administration; DlyFreq – Daily frequency; DlyQuant – Daily quantity; AddDur – Addiction duration; DMFT – Decayed missed filled teeth; PI – Plaque index; GI – Gingival index; BOP – Bleeding on probing (%); CAL – Clinical attachment loss (mm); *Significant difference $P < 0.05$

Table 5: Pearson correlation test among age, teeth brushing times, and periodontal indices

Correlations	Age	Brush	DMFT	PI	GI	BOP	Recession	CAL
Age (year)								
Pearson correlation	1	-0.365**	0.419**	-0.053	-0.014	0.031	0.564**	0.359**
Significant (two-tailed)		0.001	0.001	0.605	0.894	0.769	0.001	0.001
Brush								
Pearson correlation	-0.365**	1	-0.291**	-0.248*	-0.163	-0.252*	-0.215*	-0.212*
Significant (two-tailed)	0.001		0.003	0.013	0.105	0.014	0.036	0.039
PI								
Pearson correlation	-0.053	-0.248*	0.036	1	0.753**	0.385**	0.223*	0.279**
Significant (two-tailed)	0.605	0.013	0.723		0.001	0.001	0.030	0.006
GI								
Pearson correlation	-0.014	-0.163	0.054	0.753**	1	0.336**	0.213*	0.294**
Significant (two-tailed)	0.894	0.105	0.596	0.001		0.001	0.038	0.004
BOP (%)								
Pearson correlation	0.031	-0.252*	0.118	0.385**	0.336**	1	0.096	0.057
Significant (two-tailed)	0.769	0.014	0.254	0.001	0.001		0.353	0.582
Recession (mm)								
Pearson correlation	0.564**	-0.215*	0.376**	0.223*	0.213*	0.096	1	0.316**
Significant (two-tailed)	0.001	0.036	0.001	0.030	0.038	0.353		0.002
Total, n	100	100	100	100	100	100	100	100

*Correlation is significant at the 0.05 level (two-tailed); **Correlation is significant at the 0.01 level (two-tailed). DMFT – Decayed missed filled teeth; PI – Plaque index; GI – Gingival index; BOP – Bleeding on probing; CAL – Clinical attachment loss; n – number of individuals in each group

drugs, with the fact that many people both occasionally and regularly tend to be polydrug users.^[1] Heroin was the most previously abused drug in this study and the primary first abused drug was cannabis, while burning (opiates) occupied the most depended way of administration. The relative high accessibility to the cannabis different forms especially smoking, makes it the drug of choice for being abused primarily^[1] when it comes to the younger groups who already smoke cigarettes with the probable predilection to abusing a more powerful substance like cannabis and heroin.^[40] This trend towards early cannabis abuse was recognized in our study participants as 76% of them had declared abusing cannabis as the first addicted drug and after that abused opiates whether by inhaling or injecting.

Mood and behavior daily changes of the study participants rebounded into the oral cavity by an overwhelming state of self-negligence besides to a dominating low teeth brushing activity and decreased desire to recall the dental clinic despite its presence at the facility, as inmates recalled only when a dental pain or an abscess arose.^[41] The lifestyle of cannabis users combined with short-term decrease in saliva makes them highly susceptible to smooth-surface caries.^[42] In addition, marijuana abuse can lead to acidic erosion of enamel due to cannabinoid hyperemesis, in which frequent episodes of vomiting occurs.^[18] Likewise, heroin abusers appear with typical cervical lesions, but caries in these patients cover a wider area, darker, and usually limited to buccal and labial surfaces which may be pathognomonic abusers.^[16,43]

Many studies reported that more cervical plaque on teeth with high gingival bleeding is frequently present in addicts and that heroin users show poor oral health in terms of caries and periodontal conditions stressing on the findings indicating that oral hygiene of substance abusers was poor as compared to nonsubstance abusers.^[44-47]

Higher mean values of DMFT score in our participants reflected significant differences in the heroin group compared with the cannabis (DMFT = 22.6 ± 7.9 , 18.5 ± 9.8 , respectively, $P = 0.03$) which corresponded with study by Molendijk *et al.* 1996,^[48] that revealed a high rate of plaque accumulation and calculus deposits in the majority of drug abusers resulting from oral hygiene neglect, xerostomia, and alteration in microbial profile. Furthermore, it showed that only 36% of the addicts visited the dentist in 1 year and 18% brush their teeth less than once a day as seen in an addicting population in Dutch community. Similarly, Du *et al.* 2001^[26] demonstrated that addicts are subject to many oral diseases which the least of them are the dental caries and periodontal disease. They indicated that the way of administration was a risk factor for the calculus accumulation. On the other hand, our study did not find a significant relation between oral cavity profile with the daily quantities and frequencies of abused drug. Titsas and Ferguson 2002^[23] mentioned that the degree of education and the duration of heroin addiction formed risk factors for high score of DMFT assuming that this type of carious lesions originates as a result of complicated factors synergism, including the general self-negligence, shortage of money to seek dental treatment, and the style of living that depends on the fast food containing high levels of carbohydrates and sweetening sugar. Osborn *et al.* 2003,^[22]

when investigated oral health status and behavioral risk factors in a group of previously addicted inmates found that the mean DMFT = 20.4 suggesting the necessity of more attention to oral health promotion.^[49]

BOP values were higher in the heroin group compared with the cannabis one, while other periodontal indices were comparable among the different groups. The slightly higher clinical attachment loss in the heroin group compared with the cannabis one (CAL = 4.43 ± 1.25 , 4.70 ± 1.26 respectively) was with no statistical significance ($P > 0.05$). Nonetheless, these results came along with the study of D'Amore *et al.*,^[50] comparing the oral health of several drugs abusers including marijuana and opioids, found no significant differences in means of periodontal indices between the groups, but stated that opioid addiction is significantly related to a worse overall oral health. Concordantly, Gupta *et al.*,^[51] indicated that poorer oral hygiene had associated poor periodontal health in illicit drug abuse, and collectively with Kayal *et al.*,^[46] when reported that 60% of the drug addicted sample had had moderate chronic periodontitis with mean CAL higher in heroin. Dayakar *et al.*^[52] evaluated the periodontal status of the sample of 82 male inmates of age group 18–60 years where the prevalence of periodontal disease was 97.5% and the majority of the prisoners were severely affected with loss of attachment with 35% had loss of attachment more than 3 mm. Saini *et al.*'s^[53] review in 2013 mentioned that high incidence of periodontal diseases with heavy calculus deposits characterized by loss of attachment were observed in the substance abusers.

Injecting heroin was accompanied by higher BOP values within the heroin group when compared with burning to inhale heroin, and with smoking cannabis group ($P < 0.05$), indicating an existence of an active inflammatory condition. Intravenous drug addicts had a rapidly progressive dental decay and higher numbers of missing teeth even with satisfactory dental hygiene compared with the nonintravenous ones.^[22,54]

Within the scope of this study, some limitations arose and presented in the fact that all the participants were smokers; additionally, the relatively small number of the studied sample due to the difficulty of having such a population gathered in one such a place and be able to gain a certain degree of mutual confidence and acceptance to do the personal interview and get information otherwise more personal.

CONCLUSION

Despite the suggested direct effect of drug abuse on the oral cavity components,^[55] the daily quantity and frequency with the duration of the addictive state may be of less importance compared with the type of the drug and its way of administration. Heroin caused more devastating condition at the oral cavity level compared to cannabis. Furthermore, the more potential injectable heroin revealed more active inflammatory gingival condition at the level of the periodontal tissues compared with other ways of administration. General cognitive and probable underlying socioeconomic incomppliance are complicated with the fact of an evident self-negligence factor represented in the inability to cease drug abuse due to peer pressure and the frequent contacts with substances, or in relenting to seek dental care and implementing the oral hygiene measurements.

Altogether, an image of rampant cervical carious lesions with a compromised integrity of periodontal tissues would impose bearing in mind the possibility of treating a patient who might be concealing a condition of a chemical substance-abuse imposing the necessity for increased awareness^[56] towards both of the general and oral cavity health with a probable need to establishing a customized treatment plan with upgraded prognoses.^[57] Further investigations are required to enhance the knowledge potential toward the substance abuse effects on the oral cavity at the mucosal and immunity levels. In addition, a more persistent question is whether the aforementioned findings mirror those of increased dental decay and periodontal disease in people with severe mental illness or eating disorders.

Acknowledgement

The author would like to thank Dr. Ousama Aldieri, DDS., administrative manager at the Al Sham University, Prof. Razan Khattab, PhD., University of Damascus, for their unlimited help in the study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- United Nations Publications. World Drug Report 2017. Available from: https://www.unodc.org/wdr2017/field/Booklet_1_EXSUM.pdf. [Last accessed on 2018 Aug 12].
- Greydanus DE, Hawver EK, Greydanus MM, Merrick J. Marijuana: Current concepts. *Front Public Health* 2013;1:42.
- Novak SP, Kral AH. Comparing injection and non-injection routes of administration for heroin, methamphetamine, and cocaine users in the United States. *J Addict Dis* 2011;30:248-57.
- Ritter JM, Lewis LD, Mant TG, Ferro A. Drugs and alcohol abuse. In: Purdy S, editor. *A Text Book of Clinical Pharmacology and Therapeutics*. 5th ed. London: Hachette Livre; 2008. p. 437-8.
- Benowitz N. Section II. Specific poisons and drugs: Diagnosis and treatment. In: Kent O, editor. *Poisoning and Drug Overdose*. 6th ed. New York, USA: The McGraw-Hill Companies, Inc.; 2012. p. 269-71.
- Albertson TE. Section II. Specific poisons and drugs: Diagnosis and treatment. Opiates and opioids. In: Kent O, editor. *Poisoning and Drug Overdose*. 6th ed. New York, USA: The McGraw-Hill Companies, Inc.; 2012. p. 310-2.
- Iyalomhe GB. Cannabis abuse and addiction: A contemporary literature review. *Niger J Med* 2009;18:128-33.
- Mbiyu NM, Ombui K. Influence of Literacy levels on Drug and Substance Abuse Among the Youth in Kiyambu County, Kenya. *Interl J Manage Commer Innov* 2017;4:367-73.
- Ranjan DP, Chaturvedi RM, Namita N. A study of socio-demographic factors contributing to the habit of drug abuse in the urban slum community of Mumbai. *Biomed Res* 2010;21:277-84.
- Singla N, Acharya S, Prabhakar RV, Chakravarthy K, Singhal D, Singla R. The impact of lifestyles on the periodontal health of adults in Udupi district: A cross sectional study. *J Indian Soc Periodontol* 2016;20:330-5.
- Verster J, Brady K, Galanter M, Conrod P. Drug abuse and behavioral disinhibition. In: Vandana K, editor. *Drug Abuse and Addiction in Medical Illness*. New York: Springer-Verlag; 2012. p. 25-34.
- Wood NK, Goaz PW. The diagnostic sequence. In: Wood N, editor. *Differential Diagnosis of Oral and Maxillofacial Lesions*, 5th ed. St. Louis, Missouri: Mosby; 1997. p. 46-54.
- Baghaie H, Kisely S, Forbes M, Sawyer E, Siskind DJ. A systematic review and meta-analysis of the association between poor oral health and substance abuse. *Addiction* 2017;112:765-79.
- Krishna KR, Uppalwar P. Mouth- A diagnostic mirror of various diseases. *IJSS Case Rep Rev* 2015;1:35-8.
- Armitage GC. Development of a classification system for periodontal diseases and conditions. *Ann Periodontol* 1999;4:1-6.
- Neville BW, Damm DD, Allen CM, Chi AC. Abnormalities of teeth. In: Neville B, editor. *Oral and Maxillofacial Pathology*. 24th ed. St. Louis, Missouri: Saunders/Elsevier; 2016. p. 49-65.
- Tsai J, Rolle IV, Singh T, McAfie TA, Grant AM. Patterns of marijuana and tobacco use associated with suboptimal self-rated health among US adult ever users of marijuana. *Prev Med Rep* 2017;6:251-7.
- Cho CM, Hirsch R, Johnstone S. General and oral health implications of cannabis use. *Aust Dent J* 2005;50:70-4.
- Yardimci G, Kutlubay Z, Engin B, Tuzun Y. Precancerous lesions of oral mucosa. *World J Clin Cases* 2014;2:866-72.
- Neville BW, Day TA. Oral cancer and precancerous lesions. *CA Cancer J Clin* 2002;52:195-215.
- Rashidian H, Zendehdel K, Kamangar F, Malekzadeh R, Haghdoost AA. An ecological study of the association between opiate use and incidence of cancers. *Addict Health* 2016;8:252-60.
- Osborn M, Butler T, Barnard PD. Oral health status of prison inmates – New South Wales, Australia. *Aust Dent J* 2003;48:34-8.
- Titsas A, Ferguson MM. Impact of opioid use on dentistry. *Aust Dent J* 2002;47:94-8.
- Darling MR, Arendorf TM. Review of the effects of cannabis smoking on oral health. *Int Dent J* 1992;42:19-22.
- Shizukuishi S, Hayashi N, Tamagawa H, Hanioka T, Maruyama S, Takeshita T, et al. Lifestyle and periodontal health status of Japanese factory workers. *Ann Periodontol* 1998;3:303-11.
- Du M, Bedi R, Guo L, Champion J, Fan M, Holt R. Oral health status of heroin users in a rehabilitation centre in Hubei Province, China. *Community Dent Health* 2001;18:94-8.
- Friedman H, Newton C, Klein TW. Microbial infections, immunomodulation, and drugs of abuse. *Clin Microbiol Rev* 2003;16:209-19.
- Fazzi M, Vescovi P, Savi A, Manfredi M, Peracchia M. The effects of drugs on the oral cavity. *Minerva Stomatol* 1999;48:485-92.
- Bidlack JM. Detection and function of opioid receptors on cells from the immune system. *Clin Diagn Lab Immunol* 2000;7:719-23.
- Prigerson HG, Desai RA, Rosenheck RA. Older adult patients with both psychiatric and substance abuse disorders: Prevalence and health service use. *Psychiatr Q* 2001;72:1-8.
- Axelsson P. External modifying factors involved in periodontal diseases. In: Axelsson P, editor. *Diagnosis and Risk Prediction of Periodontal Disease*. Illinois: Quintessence Publication, Co., Inc.; 2002. p. 119.
- Requa-Clark BS, Holroyd S. *Applied Pharmacology for the Dental Hygienist*. 3rd ed. St. Louis, Missouri: Mosby; 1995. p. 13-9.
- Badersten A, Nilvéus R, Egelberg J. Scores of plaque, bleeding, suppuration and probing depth to predict probing attachment loss 5 years of observation following nonsurgical periodontal therapy. *J Clin Periodontol* 1990;17:102-7.
- Joss A, Adler R, Lang NP. Bleeding on probing. A parameter for monitoring periodontal conditions in clinical practice. *J Clin Periodontol* 1994;21:402-8.
- Dhingra K, Vandana KL. Indices for measuring periodontitis: A literature review. *Int Dent J* 2011;61:76-84.
- Norman G, Streiner D. The basics. In: Norman G, editor. *Biostatistics: The Bare Essentials*. Colorado: BC: Decker Inc.; 2008. p. 2-5.
- Galea S, Ahern J, Tracy M, Rudenstine S, Vlahov D. Education inequality and use of cigarettes, alcohol, and marijuana. *Drug*

- Alcohol Depend 2007;90 Suppl 1:S4-15.
38. Substance Abuse and Mental Health Services Administration. National Survey on Drug Use and Health: Detailed Tables. Available from: <https://www.samhsa.gov/data/sites/default/files/NSDUH-Deftabs-2016/NSDUH-Deftabs-2016.pdf>. [Last accessed on 2018 Jun 11].
39. Homish GG, Leonard KE, Cornelius JR. Illicit drug use and marital satisfaction. *Addict Behav* 2008;33:279-91.
40. Warren JC, Smalley KB, Barefoot KN. Perceived ease of access to alcohol, tobacco and other substances in rural and urban US students. *Rural Remote Health* 2015;15:3397.
41. Sujak SL, Abdul-Kadir R. Oral health profile of a group of Malaysian drug addicts. *Ann Dent Univ Malaya* 1999;6:4-7.
42. Schulz-Katterbach M, Imfeld T, Imfeld C. Cannabis and caries – Does regular cannabis use increase the risk of caries in cigarette smokers? *Schweiz Monatsschr Zahnmed* 2009;119:576-83.
43. Lowenthal AH. Atypical caries of the narcotics addict. *Dent Surv* 1967;43:44-7.
44. Angelillo IF, Grasso GM, Saggiocco G, Villari P, D'Errico MM. Dental health in a group of drug addicts in Italy. *Community Dent Oral Epidemiol* 1991;19:36-7.
45. Davis RK, Baer PN. Necrotizing ulcerative gingivitis in drug addict patients being withdrawn from drugs. Report of two cases. *Oral Surg Oral Med Oral Pathol* 1971;31:200-4.
46. Kayal RA, Elias WY, Alharthi KJ, Demyati AK, Mandurah JM. Illicit drug abuse affects periodontal health status. *Saudi Med J* 2014;35:724-8.
47. Reddy S, Kaul S, Agrawal C, Prasad MG, Agnihotri J, Bhowmik N, *et al.* Periodontal status amongst substance abusers in Indian population. *ISRN Dent* 2012;2012:460856.
48. Molendijk B, Ter Horst G, Kasbergen M, Truin GJ, Mulder J. Dental health in dutch drug addicts. *Community Dent Oral Epidemiol* 1996;24:117-9.
49. Douglass CW. Risk assessment and management of periodontal disease. *J Am Dent Assoc* 2008;139:252.
50. D'Amore MM, Cheng DM, Kressin NR, Jones J, Samet JH, Winter M, *et al.* Oral health of substance-dependent individuals: Impact of specific substances. *J Subst Abuse Treat* 2011;41:179-85.
51. Gupta T, Shah N, Mathur VP, Dhawan A. Oral health status of a group of illicit drug users in Delhi, India. *Community Dent Health* 2012;29:49-54.
52. Dayakar MM, Shivprasad D, Pai PG. Assessment of periodontal health status among prison inmates: A cross-sectional survey. *J Indian Soc Periodontol* 2014;18:74-7.
53. Saini GK, Gupta ND, Prabhat KC. Drug addiction and periodontal diseases. *J Indian Soc Periodontol* 2013;17:587-91.
54. Reece AS. Dentition of addiction in Queensland: Poor dental status and major contributing drugs. *Aust Dent J* 2007;52:144-9.
55. Little JW, Miller CS, Rhodus NL. Patient evaluation and risk assessment. In: Little WJ, Falace DA, editors. *Dental management of the medically compromised patient*. 9th ed. St. Louis, Missouri: Elsevier; 2018. p. 1-19.
56. McNeely J, Wright S, Matthews AG, Rotrosen J, Shelley D, Buchholz MP, *et al.* Substance-use screening and interventions in dental practices: Survey of practice-based research network dentists regarding current practices, policies and barriers. *J Am Dent Assoc* 2013;144:627-38.
57. Scully C, Cawson R. Aspects of drug and material use in dentistry. In: Scully C, editor. *Medical Problems in Dentistry*. 5th ed. Edinburgh, New York: Elsevier Churchill Livingstone; 2005. p. 353-9.