Illicit drug abuse affects periodontal health status

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ABSTRACT

الأهداف : تحديد الحالة الصحية للثة بين مدمني المخدرات في جدة، المملكة العربية السعودية .

الطريقة : تم تجنيد عدد من مرضى إدمان المخدرات من مستشفى الأمل لإعادة التأهيل في جدة من شهر أكتوبر إلى شهر ديسمبر 2012م . تم استخدام استبيان لتحديد البيانات الاجتماعية والديموغرافية، وتدابير صحة الفم وتعاطي المخدرات السابقة . كما أجري فحص كامل للثة .

النتائج : شارك ما مجموعه 57 مريضاً من الذكور في الدراسة . كان القنب المخدر المفضل للأغلبية (66.7%)، تليه الأمفيتامينات (52.6%)، والكحول (43.9%) والهيروين (35.1%) والكوكايين 8.8% . وكان جميع المشاركين يعانون من شكل من أشكال التهاب اللثة المزمن . 60% من العينة مصابة بالتهاب لثة متوسط في حين تتأثر 29.1% من العينة بالتهاب اللثة البسيط و 10.9% من العينة بالالتهاب الشديد . متعاطي الكوكايين مصابين بأقل نسبة من المواقع ذات فقدان المرتكز الخفيف وأعلى نسبة من المواقع ذات فقدان المرتكز المعتدل والحاد . كما أن مستخدمي الكوكايين والهيروين لديهم أعلى متوسط فقدان مرتكز لثوي مقارنة بغير المستخدمين . تم العثور على جيوب دواعم السن بمقدار 5–6 ملم . كان متعاطي الكوكايين يعانون من أعلى نسبة من جيوب من 5–6 ملم التي عثر عليها في 80% من المستخدمين .

الخاتمة : يرتبط تعاطي المخدرات غير المشروعة، وخاصة الهيروين والكوكايين، مع شكل أكثر شدة من التهاب اللثة .

Objective: To determine periodontal health status among drug addicts in Jeddah, Kingdom of Saudi Arabia.

Methods: Drug addiction recovery patients were recruited from Al-Amal Rehabilitation Hospital, Jeddah, Kingdom of Saudi Arabia between October and December 2012. A questionnaire was used to determine socio-demographic data, oral hygiene measures, and previous drug abuse. Full periodontal charting was carried out including probing depth, recession, attachment loss, bleeding on probing, and plaque index.

Results: A total of 57 male patients participated in the study. Cannabis was the drug of choice of most (66.7%) of the subjects, followed by amphetamines (52.6%), alcohol (43.9%), heroin (35.1%), and 8.8% reported using cocaine. All participants had some form of periodontitis with moderate chronic periodontitis affecting 60% of the sample, while mild periodontitis affected 29.1%, and severe periodontitis affected 10.9% of the sample. Cocaine and heroin users showed higher mean clinical attachment loss compared with non-users ($p<0.05$). Pocket depths of 5-6 mm were found in more than half of the sample. Cocaine users had the highest percentage (80%) of pocket depths that ranged from 5-6 mm.

Conclusion: Illicit drug use, especially heroin and cocaine, is associated with more severe forms of periodontitis.

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Illicit drug addiction has become a problematic phenomenon everywhere in the world. According to the 2012 world drug report, the prevalence of drug abusers worldwide is estimated to be between 3.4-6.6% of people aged 16 to 64.[1] In Saudi Arabia, the most prevalent substance abused is alcohol (43%). This is followed by amphetamine (41.8%), cocaine (35.5%), and heroin (26.1%).[2] Illicit drugs can be administered orally, intravenously, or by inhalation. In Saudi Arabia, two-thirds of illicit drug abusers use the oral route followed by the intravenous route, and lastly the nasal route.[2] Drug addiction has many deleterious effects such as depression, anxiety, memory loss, various neuropsychological disorders, and even death that can be caused by internal bleeding or malignant hyperthermia.[1,3] In addition, drug abuse can result in oral manifestations such as mucosal ulcerations; dental caries, and tooth wear.[3-5] Methamphetamine abuse causes the clinical picture of meth mouth that is characterized by rampant dental caries, xerostomia, and significant inflammation and destruction of periodontal tissues.[5] Studies examining oral health among drug addicts found that they are more prone to caries, bleeding gingiva, and dysplastic changes.[6,7] In another study it was found that most drug users had a dry mouth, muscle pain, and loss of sensation. More specifically, ecstasy users experience more loss of sensation and grinding of teeth than non-users.[8] Thomson and associates[9] in 2008 found an increased incidence of attachment loss associated with increased cannabis exposure. Zahrani[2] (2006) conducted a study on drug abusers held in 3 narcotic addict rehabilitation centers in Saudi Arabia, and reported that more than 50% of the participants presented with calculus deposits and over 4 mm pocket depths. There is a paucity of epidemiological research regarding the periodontal health of drug addicts. To determine the level of resources required to treat these patients, the prevalence of periodontal disease in this population needs to be quantified. The aim of the present study was to determine the periodontal health status and oral hygiene in drug addicts in Jeddah, Kingdom of Saudi Arabia.

Methods. *Study population.* A cross-sectional study was conducted at Al-Amal Hospital (drug rehabilitation center) in Jeddah, Kingdom of Saudi Arabia from October to December 2012. A total of 57 male inpatients who are recovering drug addicts, agreed to participate in the study. Ethical approval to carry out the study was obtained from the Research Ethics Committee at King Abdulaziz University Faculty of Dentistry. Written informed consent was obtained from each subject after explaining the scope of the study. Data related to demographic information, oral hygiene measures (brushing habits, halitosis, and bleeding gingiva), social status, and drug abuse (types, patterns and period of drug abuse) history were obtained from a questionnaire that was anonymously completed.

Data collected. Full mouth periodontal charting was carried out by 2 examiners. The examiners were trained and calibrated on 5 subjects not related to the study and more than 90% inter- and intraexaminer agreement was obtained. Six sites (mesiobuccal, buccal, distobuccal, mesiolingual, lingual, and distolingual) per each tooth excluding the third molars were examined. Percentage of bleeding was calculated after measuring bleeding on probing at 6 sites in all teeth 30-60 seconds after probing measurements. Plaque was assessed using the Silness-Loe index, which was based on recording both soft debris and mineralized deposits.[10] Gingival recession was recorded as the distance in millimeters from the cemento-enamel junction to the gingival margin and probing depth as the distance from base of the pocket to the gingival margin. The clinical attachment level (CAL) for each site was computed by adding the values of gingival recession and probing depth.

Statistical analysis. The chi-square test was used to examine significant differences in periodontitis severity (mild, moderate, and severe) among different substance users. One-way ANOVA was used to calculate differences in plaque score and bleeding index. Student t-test was used to compare the difference in mean CAL between users and non-users of each drug. Data were analyzed using a commercially available statistical software IBM Statistical Package for Social Sciences version 20 (IBM Corp, Armonk, NY, USA).

Results. Socio-demographic data and oral hygiene measures are presented in **Table 1**. Generally, the participants were young, around 53% were 30 years old or younger, and 29.8% were between 31 and 40 years old. Thirty-four subjects (59.6%) reported low educational achievement with primary and intermediate degree. Secondary school or university education was reported by 40.4% of the participants. Almost 72% of the participants reported an income of 5,000 SR ($1300) or less/month, and only 7% reported a higher income. Half of the participants reported brushing their teeth on a daily basis, and 17.5% never brushed their teeth. The prevalence rate of self-reported medical abnormalities was unremarkable. All participants were smokers and poly-drug users, abusing one or more types of illicit

Table 1 - Demographic data and oral hygiene measures among drug addiction recovery patients (N=57).

Variable	No.	(%)
Age groups		
<20 years	5	(8.8)
20-30 years	25	(43.9)
31-40 years	17	(29.8)
>40 years	10	(17.5)
Education		
Primary (up to 6th grade)	13	(22.8)
Intermediate (up to 9th grade)	21	(36.8)
Secondary (up to 12th grade)	13	(22.8)
Higher education	10	(17.6)
Income (Saudi Riyals)		
<5,000	41	(71.9)
5,000-10,000	12	(21.1)
>10,000-20,000	4	(7.0)
Oral hygiene (brushing)		
Yes	29	(50.9)
No	10	(17.5)
Sometimes	18	(31.6)

Table 2 - Addiction information among drug addiction recovery patients (N=57).

Variables	No.	(%)
Drug used		
Amphetamine	30	(52.6)
Cannabis	38	(66.7)
Cocaine	5	(8.8)
Heroin	20	(35.1)
Method of drug intake		
Mouth	38	(66.7)
Nose	4	(7.0)
Intravenous	18	(31.6)
Period of addiction		
<5 years	11	(19.3)
>5 years	46	(80.7)

drugs in the past (**Table 2**). Cannabis was the drug of choice of most participants, followed by amphetamines, and alcohol. The use of heroin was reported by 35.1% of the participants, and 8.8% reported the use of cocaine. Approximately two-thirds of the participants reported

Table 3 - Plaque and bleeding index among drug addiction recovery patients (N=57).

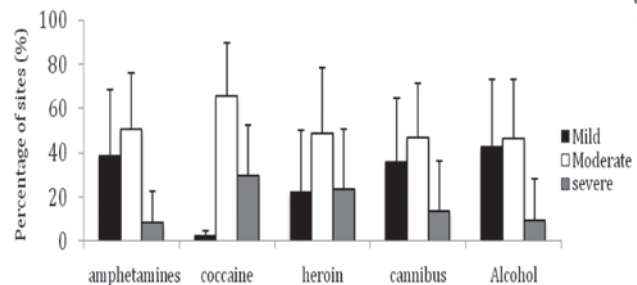| Drug	Plaque index (Silness-Loe) ± SD	Bleeding index (%) ± SD
Amphetamines	1.76 ± 0.70	45.12 ± 34.9
Cocaine	2.06 ± 0.88	44.52 ± 41.5
Heroin	2.12 ± 0.82	34.43 ± 30.6
Cannabis	1.83 ± 0.73	42.56 ± 31.4
Alcohol	1.7 ± 0.73	43.85 ± 33.6

Figure 1 - Clinical attachment level (CAL) for each site was computed by summing gingival recession and probing depth. The CAL for each site was designated as mild (1-2 mm), moderate (3-4 mm) or severe (≥ 5mm) and percentage of sites with each designation was calculated per drug type.

Table 4 - Association of mean CAL with drugs in drug addiction recovery patients (N=57).

Drug	User (mean CAL)	Non-user (mean CAL)	*P*-value
Amphetamines	2.70±0.85	3.18±1.08	0.072
Cocaine	3.80±0.51*	2.85±0.99	0.040
Heroin	3.35±1.20*	2.70±0.78	0.018
*Indicates *p*<0.05 by students t-test (95% confidence interval) comparing users and non-users of a drug			

taking drugs via the oral route followed by intravenous and nasal routes. Eighty-one percent reported that they were abusing drugs for more than 5 years. Bleeding and plaque indices were measured for each participant. The mean bleeding and plaque indices were 40.2 and 1.8, with no significant difference between different drug users (**Table 3**). A lower plaque level was found in the participants who reported brushing (*p*=0.03). There was a statistically significant association in the mean bleeding index (*p*=0.001), and plaque index (*p*=0.003) with the severity of the periodontal condition. Heroin addicted participants had higher plaque levels when compared with other drug users (*p*=0.035). The clinical examination found that all participants had some degree

of periodontitis. Mild periodontitis was found in almost a third (29.1%) of the sample, moderate periodontitis was found in 60%, and severe periodontitis was found in 10.9% of the population. Cocaine users had the lowest percentage of sites with mild CAL, and the highest percentage of sites with moderate and severe CAL as shown in **Figure 1**. Amphetamines, cocaine, and heroin users showed a trend toward higher mean clinical attachment loss than non-users of these substances, but was only statistically significant for cocaine and heroin users (**Table** 4). More than half of the sample had deep pockets. Pockets 5 to 6 mm were found in 52.8% and pockets of 7 mm or more were found in 12.7%. Cocaine users had the highest percentage (80%) of pockets of 5 to 6 mm.

Discussion. This cross-sectional study was conducted to evaluate the periodontal health status of a group of drug addiction rehabilitation patients. The study population is of low education level and socioeconomic status, and this was found to be usually associated with poor oral health.[6,11] Another expected finding is the association between periodontal breakdown and increased age, which is a well-established association.[6,12] In addition, we found a positive correlation between the level of oral hygiene and the severity of periodontal disease. The prevalence of periodontal disease varies from 35-47%.[12,13] In the present study, all subjects were diagnosed with chronic periodontitis, which is markedly higher than the general population. In addition, there is a difference in severity distribution, which is characterized with a higher percentage of mild periodontitis compared with moderate and severe periodontitis in most epidemiologic studies. In this study, moderate periodontitis was the most prevalent, affecting 60% of the participants while mild periodontitis affected 29%, and severe periodontitis affected 11%. In a study examining the prevalence of periodontal destruction in adults 30 to 90 years old, it is estimated that 21.8% are affected with mild periodontitis, and 12.6% are affected with moderate to severe periodontitis.[13] A more recent study demonstrated that 8.7% are affected with mild, 30.0% affected with moderate, 8.5% of the population affected with severe periodontitis.[12] This suggests that drug addicts have a higher tendency for developing moderate to severe periodontitis.

The effect of drug abuse on periodontal health has not been well studied, although numerous studies have documented the negative effects of chronic illicit drug use on the periodontium. Thomson et al[9] examined the effect of cannabis smoking on periodontal disease, and concluded that it may be an independent risk factor for periodontal disease. Multiple studies suggest that heroin users have poor oral health and severer periodontal disease.[4,14] In addition, the present study found that heroin users had a higher level of attachment loss compared with other drug users. Contrary to the present study, no significant association was found between cocaine abuse and attachment loss as reported by Khocht and colleagues.[15] This may be due to the small number of cocaine users in the present study. Most studies on methamphetamines focus on the condition called meth mouth without an emphasis on the periodontal status. Although not statistically significant, the present study found increased attachment loss in methamphetamine users compared to non-users.

The compromised periodontal health among drug addicts can be related to lifestyle factors including: poor oral hygiene, poor nutrition, and limited access to dental care.[3,4,7] A higher mean of bleeding on probing and Plaque Index (PI) in drug abusers was observed in this study compared with those for the general population of the same age groups.[12,16] This suggests that the negligence of oral hygiene measures in this sample is a leading reason for poor periodontal health. In addition, most drug addicts smoke tobacco in addition to illicit drugs, which is an established risk factor for periodontal disease.[12,17,18] Causality could also be biologically explained due to direct systemic effects of these drugs. For example opioids, amphetamines, cannabis, and alcohol are known to cause xerostomia, which reduces the saliva production that protects against dental decay and periodontitis.[19] Cannabis has been shown to have other oral epithelial effects such as stomatitis, leukoedema, and leukoplakia.[7] Methamphetamines have been shown to decrease cell vitality and increase cytotoxicity in immune cells.[20] This may then decrease the ability of the immune system to protect against invading pathogens and increase the risk of disease progression. Taken together, these effects could be considered as contributing factors to the increased severity of periodontal breakdown observed in this population.

Within the scope of this study, it can be concluded that drug abuse in general is associated with increased severity of periodontal disease. Furthermore, investigations with larger sample sizes are needed to strengthen these results and to determine the mechanism by which these drugs affect periodontal health. The periodontal health status among the studied sample is poorer than the general population. Better dental care for patients who abuse illicit is needed to promote their oral health. In addition, collaboration between the social and health care sectors is required for their management.

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