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Intranasal heroin use – an emerging trend in Lebanon: A single institution study presenting sociodemographic profiles of intranasal versus intravenous users

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ABSTRACT

Background: High production levels and availability of heroin in Middle East and North African (MENA) countries have been leading to the continuous rise in injecting drug use. On the contrary, in most Western countries, the proportion of heroin injectors may be falling. Interestingly, in Lebanon heroin sniffing has been gaining popularity. We therefore aimed at exploring the characteristics of intranasal heroin use compared to intravenous heroin use in patients admitted to treatment at Skoun, Lebanese Addiction Center. **Methods:** Between January and September 2013, 186 heroin-dependent users participated in this study: 92 were heroin sniffers and 94 injectors. Data collection was carried out using structured questionnaires on different sociodemographic characteristics and psychological and social functioning. **Results:** Injectors were significantly younger and had lower levels of employment compared to heroin sniffers. Analysis of health-risk profiles revealed that although injectors were significantly at higher risk of overdose, Hepatitis C infection, and anxiety, sniffers were not risk-free. Other sociodemographic and health-risk profiles did not materialize between the two study groups. **Conclusion:** The study provides evidence that heroin sniffers share many common characteristics with heroin injectors and therefore do not represent a protected group of heroin users.

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Introduction

Heroin injection continues to be the predominant method of heroin use in the Middle East and North Africa (MENA) region. While 83% of the global supply of heroin is produced in Afghanistan, over 75% of its production is trafficked through Pakistan and MENA (Mumtaz et al., 2014). Although opiate use is not new to this region, it is plausible that the high production levels and low prices in MENA may have led to the subsequent rise in injecting drug use (United Nations Office on Drugs and Crime, 2014).

More recently, most European and North American countries have been observing a shift in the patterns of heroin use, toward a non-injecting route (Kelley & Chitwood, 2004). In fact, intranasal heroin use (or “sniffing”) is now being reported as the most widely used method of taking heroin among users admitted to treatment centers in Newark, Chicago, New York (Hamilton et al., 2000; Warren & Hudson, 2013), and France (Cadet-Taiou et al., 2010; Costes et al., 2009; Costes, 2010). These data suggest that the proportion of heroin injectors may be falling in most Western

countries, accompanied by a parallel increase in the proportion of heroin sniffers (Barrio et al., 2013).

Studies have found that the main reasons for adopting or maintaining a sniffed or smoked route include the influence of the social environment (i.e. the fear of social “stigma” around injecting) (Swift et al., 1999) that exists even among heroin users themselves (Casriel et al., 1988); concern about the negative health consequences of injecting (E. J. van Ameijden et al., 1994), particularly fear of HIV infection (Hamid et al., 1997; Mathias, 1999); and the market availability of heroin for smoking (in base form) (De la Fuente et al., 1996) or sniffing (in salt form) at competitive prices (Andrade et al., 1999; Hamid et al., 1997; Sotheran et al., 1999). It has been suggested that routes of heroin use differ geographically depending on the source of production and type of heroin available (Ciccarone, 2009).

In Lebanon, which is a small country in the Middle East with a population of approximately 4.5 million (World Health Organization. Latest data available from the Global Health Observatory: Country profile statistics,

Lebanon, 2013), no clear data exist on the types of heroin available in the drug markets and neither do official statistics on the consumption rates of illicit substances. However, until 2010, field experts estimated that patients suffering from substance use disorder in Lebanon ranged from 10,000 to 15,000, with heroin users accounting for 59% of this population, especially among the 15–25 years age group (National Health Statistics Report in Lebanon, 2012).

In our clinical practice at Skoun, Lebanese Addiction Center, many patients seeking treatment were reporting intranasal use as their primary method of heroin use, which is an unusual pattern of use in this part of the world as previously noted. We therefore aimed at exploring the prevalence and characteristics of intranasal heroin use and comparing them to intravenous heroin use in patients admitted to treatment at Skoun. To our knowledge, this is likely the first study in the Middle East and North Arab countries to address the issue of intranasal heroin use and present the characteristics of intranasal versus intravenous users.

Materials and methods

Participants

Skoun, Lebanese Addiction Center, is an outpatient center located in Beirut that receives patients seeking treatment for substance use disorder and other addictive disorders.

Between January and September 2013, patients seeking outpatient treatment at Skoun, with a diagnosis of heroin dependence according to the *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV-TR), were approached for participation. Participants included were 18–60 years old. They were asked to sign a written informed consent as part of their acceptance to participate. It has been made clear that refusal to participate in this study will not affect positively or negatively their treatment process at Skoun.

Assessment

Data collection was carried out using structured questionnaires that included variables on sociodemographic characteristics, previous medical history, patterns of illicit substance(s) use, and psychological and social health of users. Heroin dependence was assessed according to the criteria of *Diagnostic and Statistical Manual of Mental Disorders*, fourth edition (DSM-IV/ TR) (American Psychiatric Association, 2000). Patterns of illicit substance(s) use over the past four weeks before treatment initiation were conducted according

to the validated questionnaire Treatment Outcome Profile (TOP). TOP is an outcome monitoring tool for substance misuse services (National Treatment Agency for Substance Misuse, 2007).

Self-reports concerning the user's health and social functioning in the last two weeks have been measured according to the World Health Organization Quality of Life Scale (WHO QOL-8) and Kessler-10 plus (K10) validated questionnaire. These scales measure quality of life across several domains (overall quality of life and health perception, quality of physical and psychological life, and quality of social relationships and living arrangement) as well as a global measure of distress based on questions about anxiety and depression symptoms that were experienced in the most recent four weeks before treatment admission (Network of Alcohol and other Drugs Agencies, 2012). The utilized scales were translated and blindly back-translated in Arabic by two separate professional translators. An expert panel helped solve discrepancies between both translations and the final version was used in our study.

Furthermore, each patient admitted at Skoun systematically undergoes a screening for hepatitis C, hepatitis B, and HIV, as part of his/her treatment policy. Screening results for those patients who agreed to be part of this study have therefore been used.

All questionnaires were administered by two psychiatrists working at Skoun. An intranasal or intravenous route of heroin use was assessed according to users' reports of the most frequent way of use in the last 12 months prior to treatment admission.

Data analysis

The aim of this study was to provide descriptive data on the differences between intranasal and intravenous heroin use in terms of sociodemographics, substance use, and psychological health. Chi-square tests, independent *t*-test, and analysis of variance (ANOVA) were used for categorical and continuous variables, respectively. Bonferroni adjustment was used for comparisons of means and proportions for variables with more than two categories.

Also, we aimed to assess the influence of the route of administration in predicting adverse health-related events, such as Hepatitis C infection and overdose history. For this, we use bivariate and multivariate logistic regression models. Analyses were conducted and adjusted for the significant sociodemographic factors. Models were computed using the forward conditional method and statistical significance was defined as *P*-value <0.05.

Statistical analyses were conducted using IBM Statistical Package for Social Sciences (SPSS) version 22 (IBM SPSS Statistics for Windows, Version 22.0 Armonk, NY: IBM Corp.)

Results

Sample demographics

One hundred and eighty-six participants were included in this study. Ninety-two (49.5%) of the users sniffed heroin and 94 (50.5%) of the users injected it.

The median age of participants was 39.5 years (range: 19–60 years of age), and 98% of participants were male. There were significant differences at baseline between intranasal and intravenous heroin users in terms of age and work status. Heroin sniffers were slightly older than injectors (53.3% vs. 34%; $P = 0.03$) and were more likely to be employed (89.13% vs. 74.47%; $P = 0.01$). There were no significant differences at baseline between the two study groups in terms of gender, level of education, marital status, monthly income, and household level and parent's civil status (Table 1).

Medical history

Both heroin injectors and sniffers have previously been treated, although injectors were about two times more likely than sniffers to enroll in a detoxification program (AOR = 0.03, CI = 0.28–0.94, $P = 0.03$).

Table 1. Sociodemographic characteristics.

Characteristics		Injectors (%) N = 94	Sniffers (%) N = 92	P-value
Gender	Male	93 (98.94)	89 (96.74)	0.30
	Female	1 (1.1)	3 (3.3)	
Age*	≤30 years	62 (66)	43 (46.7)	0.01
	>30 years	32 (34)	49 (53.3)	
Work status*	Employed	70 (74.47)	82 (89.13)	0.01
	Unemployed	24 (25.53)	10 (10.87)	
Educational level	Low to moderate level	74 (78.7)	82 (89.1)	0.06
	High level	20 (21.3)	10 (10.9)	
Civil status	Single, never married	60 (63.83)	63 (68.48)	0.64
	Married	26 (27.66)	20 (21.74)	
	Divorced	8 (8.51)	9 (9.78)	
Subject's average monthly income	<\$200	28 (29.79)	32 (34.78)	0.76
	\$200–\$1300	49 (52.13)	45 (48.91)	
	>\$1300	17 (18.09)	15 (16.3)	
Parents' civil status ^a	Married	69 (73.4)	62 (67.39)	0.27
	Divorced	12 (12.77)	8 (8.7)	
	Widowed	10 (10.64)	19 (20.65)	
Average monthly household	<\$1300	58 (61.7)	54 (58.7)	0.7
	\$1300–\$3300	29 (30.85)	33 (35.87)	
	>\$3300	(7.45)	5 (5.43)	

^aThree subjects from the injectors group and three subjects from the sniffers group did not answer this question.

* $P < 0.05$.

Both heroin injectors and sniffers reported that they have had positive histories of heroin overdose and Hepatitis C infection; however, heroin injectors were about two times more likely than sniffers to acquire Hepatitis C infection (AOR = 0.45, CI = 0.2–0.99, $P = 0.05$) and about four times more likely than sniffers to have overdosed (AOR = 0.27, CI = 0.07–1.04, $P = 0.05$) (Table 2).

Substance use profile

Substance use profiles were similar for both groups. No significant differences were observed in the patterns and amounts of alcohol, heroin, stimulants, and cannabis consumption reported by heroin injectors and sniffers (Table 3).

Psychosocial health

Table 4 shows different measures for the psychological health of heroin users measured over the last two weeks. Our results showed similar reports of heroin sniffers and injectors on life quality satisfaction levels, personal relationships levels, daily life activities satisfaction levels, and depression. Differences were only significant in terms of anxiety-related sensations, which were more experienced among injectors than sniffers (64.29% vs. 47.62%, $P = 0.04$) at the time of treatment admission.

Discussion

Our analyses offered an examination of the differences between heroin injectors and sniffers admitted to treatment at Skoun, Lebanon, as well as an exploration of the possible predictors of health-risk profiles in this population.

First, we observed that patients who injected heroin were significantly younger than those who sniffed. Fuller et al. (2001) reported that injecting drug use most often begins in late adolescence, at the age of 18 years or older. The present sample was fairly typical in this respect. However, while heroin sniffers represent an older group, it is possible that a sizable proportion of this group had shifted from injecting to non-injecting practices at some point in their substance use lifespan or history (Fischer et al., 2006). Studies that investigated reasons for former injectors to transition away from needle use described users' substance use pattern or chronological changes to be "maturing out" of their injection or to difficulty of injection due to vein access problems (Bravo et al., 2003), as frequent injections may cause vascular damage, irrespective of "safe"

Table 2. Multivariate logistic regression for the assessment of the influence of the route of administration in predicting adverse health-related events.

Medical history		Injectors (%) N = 94	Sniffers (%) N = 92	Adjusted odds ratio	Confidence of interval	P-value
Hepatitis C infection,* n (%)	Positive	22 (23.4)	13 (14.13)	0.45	0.2 – 0.99	0.05
History of heroin overdose,* n (%)	Positive	12 (12.77)	3 (3.26)	0.27	0.07 – 1.04	0.05
	None	33 (35.1)	47 (51.8)			
Previous detoxification treatment admission,* n (%)	1–3 times	49 (52.13)	35 (38.04)			
	4–10 times	8 (8.51)	10 (10.87)	0.51	0.28 – 0.94	0.03
	11–20 times	3 (3.19)	0 (0)			
	More than 20 times	1 (1.06)	0 (0)			
Previous outpatient treatment admission, n (%)	None	46 (48.94)	68 (73.91)	0.78	0.43 – 1.44	0.43
	1–3 times	46 (48.94)	42 (45.65)			
	4–6 times	2 (2.13)	1 (1.09)			
Previous residential treatment admission, n (%)	None	64 (68.09)	69 (75)			
	1–3 times	28 (29.79)	23 (25)	0.76	0.39 – 1.48	0.42
	4–6 times	2 (2.13)	0 (0)			

*P < 0.05.

Table 3. Substance use profile.

Substance use/28 days	Injectors N = 94	Sniffers N = 92	P-value
Alcohol (Mean cups ± SD)	7.43 ± 21.01	3.71 ± 12.08	0.14
Heroin (Mean grams ± SD)	59.22 ± 38.22	52.44 ± 36.2	0.22
Cocaine (Mean grams ± SD)	3.2 ± 11.35	1.95 ± 8.01	0.39
Cracks (Mean grams ± SD)	2.17 ± 8.05	1.11 ± 6.53	0.33
Cannabis (Mean joints ± SD)	14.49 ± 24.69	9.11 ± 18.86	0.11

Table 4. Quality assessment of physical and psychological health of users^a.

Psychological assessment		Injectors (%) N = 38	Sniffers (%) N = 31	P-value
Quality of life	Dissatisfied	17 (44.74)	11 (35.48)	0.16
	Neither	16 (42.11)	10 (32.26)	
Self-satisfaction	Satisfied	5 (13.16)	10 (32.26)	0.62
	Dissatisfied	9 (23.68)	7 (22.58)	
Daily life activities	Neither	16 (42.11)	10 (32.26)	0.71
	Satisfied	13 (34.21)	14 (45.16)	
Depression ^b	Dissatisfied	12 (31.58)	7 (22.58)	0.30
	Neither	10 (26.32)	9 (29.03)	
Anxiety*, ^b	Satisfied	16 (42.11)	15 (48.39)	0.04
	No	13 (46.43)	13 (61.9)	
	Yes	15 (53.57)	8 (38.1)	
	No	10 (35.71)	11 (52.38)	
	Yes	18 (64.29)	10 (47.62)	

^a38 out of 94 injectors have provided their reports on this questionnaire and 31 out of 92 sniffers have provided their reports.^b10 subjects from the injectors groups and from the sniffers group did not answer these questions.

*P < 0.05.

injecting practices (Darke et al., 2001). Griffiths et al. (1994) described this group of heroin users who stopped their injection practices because of the physical consequences to be on a “vein Holiday” and that they might convert back to intravenous use. However, needle use transitions were apparently driven by changes in users’ circumstances such as a change in social networks, place of residence, and employment status (Galai et al., 2003; Sibthorpe & Lear, 1994). Although our cross-sectional study did not allow for detailed analysis on shifting patterns of heroin use, it provided

congruent finding to these previous studies in terms of employment status, where we found higher levels of employment among heroin sniffers than injectors.

Many studies have reported on the health conditions of heroin injectors; however, few studies have investigated the condition of non-injecting heroin users, particularly among heroin sniffers.

The risk of overdose in connection with the intranasal heroin use has long been considered to be less than that in connection with injection, and authorities in many countries have encouraged the administration of heroin by routes other than injection as part of its “harm reduction” programs (Cox et al., 1999; Van Ameijden & Coutinho, 2001). However, this latter notion of safer routes of heroin administration has been contradicted by a report that out of 953 cases of fatal heroin intoxication, 10 involved routes of administration other than injection, and 7 out of these 10 involved sniffing the drug and the other two swallowing the drug (Darke & Ross, 2000). Thiblin et al. (2004) suggested a number of factors to be leading to heroin intoxication. Some of these factors include prolonged drug abuse, initial lowered tolerance or tolerance lowered followed by a period of abstinence, the simultaneous use of other drugs or medications, and physical weakness due to organic disease.

Another medical concern associated with heroin sniffing is viral infection. Although injecting drug use has been considered as the main mode of Hepatitis C virus (HCV) transmission and infection (Aceijas & Rhodes, 2007), a number of studies have confirmed that non-injection drug users, on average, have a viral Hepatitis C infection (HCV) prevalence that is higher than that of the general population (5–12% vs. 2%) (Gyarmathy et al., 2002; Nyamathi et al., 2002). Studies have also discussed the potential ability practices (i.e., sharing non-injecting drug equipment),

personal hygiene practices, non-commercial tattooing, and/or high-risk sexual behaviors on the acquisition of hepatitis C infection (Howe et al., 2005). In this study, there were a small proportion of heroin sniffers who presented with positive indications for hepatitis C infection and drug overdose. While we were not able to measure the association between HCV infections and sharing non-injecting drug equipment, our findings draw attention to the possible risk practices among intranasal heroin users. These practices as well as the social context in which risk-taking behaviors tend to occur should be explored more thoroughly in future studies.

Finally, our analyses provide preliminary data on higher levels of anxiety-related sensations experienced among heroin injectors. This is concomitant with results reported by Preston and Epstein (2011), who found that anxiety caused by stress was positively associated with negative mood and negatively associated with feelings of happiness and relaxation. In his work, Preston and Epstein utilized an ecological momentary assessment (EMA) scale that assesses stress over periods of up to 25 weeks. Studies done by Salem et al. (2014) and by Tull et al. (2007) found that a positive relationship exists between heroin dependence and anxiety-related sensation. Our results support their findings; however, the correlation of this relationship between different types of heroin users remains unclear and future investigations of this relationship are therefore needed.

In summary, this study provides evidence of the similar sociodemographic characteristics, heroin and other substance use profiles, and several aspects of quality of life that are shared between heroin sniffers and heroin injectors. Also, although our results showed a significantly higher risk for overdose, HCV infection, and anxiety sensation among heroin injectors, sniffers were not risk free.

Limitations of our study should be acknowledged. First, since this study is cross-sectional, we were only able to report on subjects' most common route of heroin use over the last 12 month period before treatment admission; no data were available on shifting patterns through the years of substance use.

Second, our study suffered from an overall low sample size of 186 participants in which only four of the participants were females. This is due to the fact that women are less likely than men to enter treatment for substance misuse problems. The rate of illicit drug use is about half that of men and furthermore women only make up between 10% and 30% of most treatment samples (Henderson et al., 2013).

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Declaration of interest

All co-authors have significantly contributed to the manuscript, have reviewed and agreed upon the manuscript content. In addition, all co-authors declare that they have no conflicts of interest in relation to the work described.

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