

THE ASSOCIATION BETWEEN SOCIAL CHARACTERISTICS AND PATTERNS OF SUBSTANCE USE DISORDER; A CROSS-SECTIONAL STUDY ON SUDANESE PATIENTS

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ABSTRACT

Objective: This study aimed to examine the association between different social factors and patterns of substance use disorder in Sudan.

Methods: Data were collected using a structured interviewer-rated questionnaire designed by the researchers, and distributed to the patients who have drug use disorder at the two main psychiatry teaching hospitals in Khartoum state, Sudan.

Results: The total number of participants was 124 and the majority (95.2%) were males, and 54.8% were single. The onset is mostly before the age of 25 years. The most common substance was cannabis followed by alcohol. Only 61 participants (49.1%) had come to the hospital seeking treatment of their own free will, and 41.9% of participants had a family history of substance use which was significantly associated with early-onset. The majority of participants (69.4%) started using psychoactive substances at the age of 15–25 years. Half of the participants use drugs only in a group of friends. Bad relations between parents, and between participants and parents were perceived by participants to have a role in starting drug use.

Conclusion: Substance use is more common among males with an early onset. A family history of substance use associates with an earlier onset. The study shed the light on the social aspects of substance use in Sudan and recommended more efforts to restrict the availability of illicit drugs in the country.

Keywords: Social aspects, Psychoactive, Substances, Addiction, The pattern of drug use, Sudan.

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INTRODUCTION

Psychoactive substance use has been reported since antiquity, and some of its negative consequences were recorded by Aristotle many centuries BD [1]. Since that time and till present, a very wide variety of psychoactive substances in different forms and administration routes were used in almost every place in the world throughout human history [1,2].

Substance abuse is closely related to the social life of individuals and communities in different ways. The etiological factors associated with substance abuse involve many social aspects, such as age, gender, occupation, marital status, and other social events and circumstances. On the other hand, substance abuse impacts social life from various perspectives, including the economic burden of getting the substance, treatment of physical complications related to harmful use, loss of productivity and family income, and the cost of traffic accidents. Other social consequences may include aggressiveness, increase crimes rate, marital and family disruption, and other relationship problems [3-6].

Many studies done regarding the assessment of social factors that may affect or lead to starting drug use, a study done in Ghana - in a private specialist clinic located in the Accra Metropolis in 2005, showed that the mean age of first drug abuse was 19.18 years, while 90% of abuser were males, and about 20% of the participants had marital problems due to substance abuse, and 20% of them had problems at work due to drugs [6].

Furthermore, a study was conducted in Osogbo Osun State, Nigeria to determine the prevalence and pattern of stimulant use and its socio-demographic associations among secondary school students. The prevalence of stimulant use was 20.3%, and users engaged more in the use of common and cheap stimulants (coffee and kola nut). The majority of users started at the age 13 years or below. Stimulant use was associated with younger age group, poor school attendance,

polygamous background, low education of mother, high education of father, and permissive mother [7].

There was a relevant study conducted in Eastern Saudi Arabia regarding Socio-demographic correlates and patterns of drug abuse. It assessed 116 patients according to the Diagnostic and Statistical Manual for Mental Disorder. Eighty-three percent of the patients were below the age of 32 years, 52.6% were unemployed and the majorities were of intermediate education. Eighty-four percent of the patients abused heroin either alone or in combination with other drugs [8].

In a study conducted in India on alcohol abuse and its socio-demographic correlates in a rural community, 4670 persons above 15 years of age were selected. The result showed that the prevalence of alcohol abuse in the sample was 24.7% (36.1% for males and 13.4% for females) and the percentage of dependents was 3%. Alcohol abuse was found to be significantly higher in males, Hindus, married, age group more than 20 years, illiterates, and among those engaged in agriculture [9]. There are many other different studies regarding the social aspects of alcohol and substance use, in several countries around the world [10-12].

Although drug use disorder has a burden impact on the community, and during the last decades a lot of social, psychological, and legal problems have been associated with substance use, unfortunately, there are few scientific studies to access the magnitude of the problem in Sudan. On the other hand, the presence of psychological and social stresses can lead either to start using drugs or to increase the amount of substance used. This study examined the association between different social factors and patterns of substance use disorder in Sudan.

METHODS

This was a descriptive cross-sectional hospital-based study conducted at the two main psychiatry teaching hospitals in Khartoum state;

Taha Baasher and El-Tijani El-Mahi hospitals. They are the only two governmental psychiatry hospitals in Khartoum, besides two other hospitals belonging to the ministry of defense and the ministry of interior, and two private psychiatry hospitals.

Data have been collected during the period from June to December 2015, and it included all patients with drug use disorder who attended those two hospitals during the study period. Patients which have been diagnosed with other primary psychiatric disorders, and those with severe cognitive impairment to the extent that interferes with understanding and answering the research questions, were excluded from the study. Patients with only tobacco and cigarette smoking were not included in this study.

Data were collected using a structured interviewer-rated questionnaire designed by the researchers to serve the objectives of this study, assessing different social aspects such as the age of participant, religion, sex, residence, occupational level, level of education, marital status, age when starting using drugs, the reason behind starting drugs, availability of drugs, and relationship between the participant and his parents. Data were analyzed by the statistical package of social studies (SPSS- version 22), and the relationship between different variables was tested using the Chi-square test with $p < 0.05$ considered significant. The results were expressed in tables representing numbers, percentages, and P values when appropriate.

The study was ethically approved by the Sudanese Medical Specialization Board- IRB, consent of the hospital administrations was obtained officially, and written informed consent has been taken from all participants in this study, after explaining its purpose and assuring them about confidentiality, voluntary participation, and that the study will not interfere with patient management.

RESULTS

The total number of participants was 124 and the majority (95.2%) were males ($n=118$). Regarding age, 51 (41.1%) of participants were between 15 and 25 years, while 44 (35.5%) of participants were between the age of 26–35 years. One-hundred and thirteen participants (91.1%) were Muslims compared to 11 (8.9%) Christians and there were no participants from other religions. There was no remarkable difference regarding participant's residence in this study as 32 participants (25.8%) were from Omdurman city, 28 (22.6%) were from Khartoum city, and 31 (25%) from Khartoum-North city, the main three cities in Khartoum state, and 33 (26.6%) were from outside the state. Among participants, 46.8% had studied till secondary school while 40.3% reached university level (Table 1). Regarding occupation, 29.8% of drug users in this study were students compared to 28.2% who were unemployed. Among participants, 29.8% were married compared to 14.5% who were divorced while 54.8% were still single (Table 1). Only 61 participants (49.1%) had come to the hospital seeking treatment of their own free will, while the rest of the participants were either forced to come to the hospital by their families (43.5%) or due to the development of withdrawal symptoms (7.4%). only 41.9% of participants had a family history of substance use (Table 1).

The majority of participants (69.4%, $n=86$) started using psychoactive substances at the age of 15–25 years, followed by 32 participants (25.8%) who started substance use between the ages of 26-35 years (Table 2). Half of the participants use drugs only with their friends compared to 23.4% who use drugs only alone. More than half of the participants (58.8%) stated that they tried to stop using drugs at least one time in their life (Table 2). Regarding types of substances, 42% of participants were using cannabis compared to 35.3% who were using alcohol, the others were using tramadol, benzodiazepines, and cough syrups, as shown in Table 2. Among participants, 42.8% attributed their substance use at the start to their peers' pressure, while 43.5% said that the start was an experiment motivated by curiosity, while 13.7% started using drugs as self-medication. Two-thirds of participants stated that drugs are easily available to them and they can find them without any

Table 1: Distribution of the study sample according to socio-demographic factors

Socio-demographic factors	n (%)
Gender	
Male	118 (95.2)
Female	6 (4.8)
Marital status	
Single	68 (54.8)
Married	37 (29.8)
Divorced	18 (14.5)
Widowed	1 (0.8)
Age groups	
15–25	51 (41.1)
26–35	44 (35.5)
36–45	19 (15.3)
>45	10 (8.1)
Occupation	
Student	37 (29.8)
Employed	52 (41.9)
Unemployed	35 (28.3)
Residence	
Khartoum	28 (22.6)
Omdurman	32 (25.8)
Khartoum-north	31 (25)
Outside Khartoum state	33 (26.6)
Religion	
Muslims	113 (91.1)
Christians	11 (8.9)
Level of education	
Primary	8 (6.5)
Secondary	58 (46.8)
University	50 (40.3)
Postgraduate	8 (6.4)
Family History of drug use	
Yes	52 (41.9)
No	72 (58.1)
Total	124 (100)

difficulties (Table 2). A bad relationship between parents was perceived by 21.8% of participants to have an impact on starting drug use, while 37.9% of participants considered their bad relationship with their parents as a factor which have led them to substance use (Table 2).

There was no remarkable difference in the availability of psychoactive substances between Khartoum and other areas in the study ($p > 0.05$) as shown in Table 3. The same table is showing a significant association ($p = 0.040$) between participant age and availability of drugs; 11.8% of the younger age group faced some difficulties in getting substances, while no one reported that from the older age groups.

Alcohol appeared to be more common as a start in younger age groups but the difference was not statistically significant ($p = 0.098$) as presented in Table 4. The same table also shows that 82.7% of those with a positive family history of substance use have started using substances at or before the age of 25 years, compared to 66.7% of those with negative family history ($p = 0.030$). There was a statistically significant association between occupation and the mode of using substances ($p = 0.001$). In general, those who prefer to be alone while using substances were few, but the least proportion was among students (16.2%) compared to 22.8% among unemployed and 28.8% among employed participants (Table 5).

DISCUSSION

This study was conducted to assess the association between social factors and characteristics of substance use among patients attending governmental psychiatric hospitals in Khartoum, Sudan. The majority of participants were under 35 years of age (76.6%). Many studies have consistently shown that substance use is a problem for the youth, for example, in a study in Saudi Arabia conducted in 1995; 87% of the participant were below 32 years of age [8]. In this study, 95.2% of the

drug users were males which are consistent with the notion that males are associated with aggression, violence, and adventurism, which are potent factors in the initiation of substance abuse. Women are, on the other hand, conceptualized as more emotional less aggressive, and less adventurous. In general, the community does not easily accept females when they start using drugs [12].

Less than half of the participants in this study had come to the hospital seeking treatment of their own free will, without being forced by other

people or by the effect of complications. In general, substance users do not ask for treatment on their own because of several reasons, for example, not being convinced that they have a problem or need treatment, don't know about the availability or the benefit of treatment, or where to get it. They usually come or be brought, to the health facility for other health problems resulting from substance use such as injury, overdose, or other physical problems [13].

In the current study, 41.9% of participants had a family history of substance use. It is well established that a family history of substance use is a risk factor to have substance use disorder [14,15]. It is not only a genetic effect but also because of the consequences of parents' substance use like family dysfunction, aggression, conflicts, and psychiatric disorders, which increase the chance of substance use in children [15,16]. Studies also indicated the role of cultural issues and accordingly the risk increases with the depth or strength of the relationship with the drug user's relative [15,17,18]. Moreover, the current study showed a significant association between family history and early onset of substance use, the finding which is supported by some international studies [19,20].

More than two-thirds of participants in the current study (69.4%) started using psychoactive substances at the age of 15-25 years, which is in harmony with the regional and global findings. The mean age for starting substance use was 17.30 (SD±4.89) years in a Tunisian study [21] and 20.9 (SD±7.7) years in an Indian one [3]. Substance use in adolescence and early adulthood was found to be affected by many risk factors other than familial factors, such as physical, emotional, and sexual abuse, child neglect, deviant peer relationships, bullying, and peer pressure [20]. Early exposure to substance use requires attention since studies reported its association with various problematic consequences such as substance-related disorders [22], risky sexual behaviors and sexually transmitted disease [23], scholastic and academic problems [24], and involvement in criminal activities [25].

Among participants in the present study, 50% prefer to use drugs with their friends and 23.4% use drugs only while alone. The reason for some people to use drugs while alone is revealed by some studies to be related to stigma and the need to hide this behavior from others [26]. This reason may be appropriate to justify the significant association found by the current study between employment and using substances while alone since the employed participants are likely to avoid anything that may affect their reputation at work. Furthermore, preferring to use substances alone may be related to the personality trait or character and the level of sociability. Another reason is that some substance users may not be willing to share their substances with others due to financial reasons [27]. Using substances while alone adds more risk by excluding the chance for others to intervene in case of intoxication or overdose which may lead to serious complications including death [28].

Table 2: Distribution of the study sample according to pattern and characteristics of drug use

Pattern and characteristics of substance use	n (%)
Age of first substance use	
<15 years	5 (4)
15-25 years	86 (69.4)
26-35 years	32 (25.8)
>35 years	1 (0.8)
Mode of drug use	
Using alone only	29 (23.4)
Using only with friends	62 (50)
Using alone and with friends	33 (26.6)
Attempts to stop	
Yes	73 (58.9)
No	51 (41.1)
Types of drugs	
Alcohol	44 (35.3)
Cannabis	52 (42.2)
Tramadol	14 (11.3)
Benzodiazepines	7 (5.6)
Akisol (trihexyphenidyl)	5 (4)
Cough syrups	2 (1.6)
Perceived reason for starting drug use	
Experiment	54 (43.5)
Peer pressure	53 (42.8)
Self-medication	17 (13.7)
Perceived level of drug availability	
Easily available	83 (67)
Available	34 (27.4)
Available with some difficulty	7 (5.6)
Not available	0
Perceived impact of the bad relationship between parents on starting drug use	
Yes	27 (21.8)
No	95 (76.6)
Not sure	2 (1.6)
Perceived impact of the bad relationship between patient and his parents on starting drug use	
Yes	47 (37.9)
No	72 (58.1)
Not sure	5 (4)
Total	124 (100)

Table 3: Availability of substances compared according to residence and age groups of participants

Residence	Availability of substance			p-value	Total (%)
	Easily available n (%)	Available n (%)	Available with some difficulty n (%)		
Omdurman	23 (71.9%)	9 (28.1%)	0	0.226	32 (100)
Khartoum	23 (60.7%)	4 (14.3%)	1 (3.6%)		28 (100)
Khartoum North	17 (54.8%)	11 (35.5%)	3 (9.7%)		31 (100)
outside Khartoum state	20 (60.6%)	10 (30.3%)	3 (9.1%)		33 (100)
Total (N)	83	34	7		124
Age groups				0.040*	
16-25 year	36 (70.6%)	9 (17.6%)	6 (11.8%)		51 (100)
26-35 year	27 (61.4%)	16 (36.4%)	1 (2.3%)		44 (100)
36-45 year	11 (57.9%)	8 (42.1%)	0		19 (100)
>45 year	9 (90%)	1 (10%)	0		10 (100)
Total	83	34	7	124	

Data are presented as numbers and percentages. *Statistically significant (p<0.05)

Table 4: The relationship between the age at which the patient started substance use and the first substance to be used, and Family history of substance use

Age at which the patient start using drugs	First substance to be misused					Total	Family history of substance use		Total
	alcohol	Cannabis	tramadol	benzodiazepine	cough syrup		Yes	No	
≤25 year	34 (66.7%)	49 (80.3%)	3 (75%)	3 (60%)	2 (66.7%)	91	43 (82.7%)	48 (66.7%)	91
≥26 year	17 (33.3%)	12 (19.7%)	1 (25%)	2 (40%)	1 (33.3%)	33	9 (17.3%)	24 (33.3%)	33
Total	51 (100%)	61 (100%)	4 (100%)	5 (100%)	3 (100%)	124	52 (100%)	72 (100%)	124
p value	0.098					0.030*			

Data are presented as numbers and percentages. *Statistically significant (p<0.05)

Table 5: The relationship between participants' occupation and mode of using drugs

Occupation	Mode of using drugs			Total	p-value
	Using only alone	only with friends	alone and with friends		
Employed	15 (28.8%)	17 (32.7%)	20 (38.5%)	52 (100%)	0.001*
Unemployed	8 (22.8%)	17 (48.6%)	10 (28.6%)	35 (100%)	
Student	6 (16.2%)	28 (75.7%)	3 (8.1%)	37 (100%)	
Total	29	62	33	124	

Data are presented as numbers and percentages. *Statistically significant (p<0.05)

More than half of the participants (58.8%) stated that they tried to stop using drugs at least one time in their life. This reflects one of the features of substance use disorder when the patients repeatedly attempt to quit substance use; however, the number here may not represent all participants with the disorder because some of them might have attempted to decrease the amount or limit their use but not to quit, others might have been thinking about that or having the wish to cut down without actual attempts, which are also included in the diagnostic criteria of the disorder [29]. The most common substance of abuse among participants in this study was cannabis followed by alcohol. This is similar to a previous epidemiological study done among university students in Sudan, which reported that the prevalence of cannabis was higher followed by alcohol, after excluding tobacco [30]. The reason may be that both cannabis and alcohol are locally produced, available, and affordable for most people although they are prohibited in Sudan. Both cannabis and alcohol use share the legal ban, alcohol use is more culturally rejected and disagreed among Sudanese people which may further limit its use [31].

Participants in the present study related their substance use to some factors such as peer pressure, experience due to curiosity, and bad relationships with their parents which all have been reported by the previous studies as risk factors for substance use [20]. There is a significant association shown by this study between participants' age and the availability of drugs. No one above the age of 35 years reported any difficulty in getting the substance compared to 11.8% of the below-25-years age group. Bearing in mind that these are the current participants' ages, not the age of onset, this may be expected since the older participants had longer experience with many drug suppliers and different sources which make it easy to find substances. The study concluded that substance use disorder is more common in males with onset before the age of 25 years in most cases. The most common substance was cannabis followed by alcohol. Having a positive family history of substance use is associated with starting substance use at an earlier age. The study also shed the light on some of the social aspects of substance use in Sudan. Further research is recommended with a larger sample to maximize knowledge about the problem of substance use disorder in Sudan. More efforts should be paid to avail addiction management facilities and to restrict the availability of illicit drugs in Sudan.

AUTHOR CONTRIBUTION

OF was the originator for the conception and design of the paper and the acquisition, analysis, and interpretation of data, and drafted a

considerable part of the manuscript. AO contributed to the acquisition and interpretation of data. AI wrote most of the manuscript including the discussion part, revised the whole manuscript, and prepared it for publication. All authors agreed and approved the final publishable version of this paper. They remain accountable for all aspects of the paper.

CONFLICT OF INTERESTS

The authors have no conflict of interest.

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REFERENCES

- Crocq MA. Historical and cultural aspects of man's relationship with addictive drugs. *Dialogues Clin Neurosci* 2007;9:355-61. doi: 10.31887/DCNS.2007.9.4/macroq. PMID: 18286796; PMCID: PMC3202501
- Vetulani J. Drug addiction. Part I. Psychoactive substances in the past and present. *Pol J Pharmacol* 2001;53:201-14. PMID: 11785921
- Kumar N, Kanchan T, Unnikrishnan B, Thapar R, Mithra P, Kulkarni V, et al. Profile of substance use among patients attending De-addiction centres in a coastal city of southern India. *PLoS One* 2013;8:e57824. doi: 10.1371/journal.pone.0057824. Epub 2013 Feb 28. PMID: 23469075; PMCID: PMC3585211
- Daley DC. Family and social aspects of substance use disorders and treatment. *J Food Drug Anal* 2013;21:S73-6. doi: 10.1016/j.jfda.2013.09.038. PMID: 25214748; PMCID: PMC4158844
- World Health Organization. World Health Organization and United Nations Office on Drugs and Crime. Principles of Drug Dependence Treatment. Geneva: World Health Organization; 2008. Available from: <http://www.unodc.org/documents/drug-treatment/UNODC-WHO-Principles-of-Drug-Dependence-Treatment-March08.pdf> [Last accessed on 2022 Jun 20].
- Lamptey J. Socio-demographic characteristics of substance abusers admitted to a private specialist clinic. *Ghana Med J* 2005;39:2-7. doi: 10.4314/gmj.v39i1.35973. PMID: 17299533; PMCID: PMC1790802
- Egunranti BA, Fatoye FO, Morakinyo O. Stimulant use among secondary school students in Osogbo, Nigeria. *Niger Postgrad Med J* 2009;16:218-23. PMID: 19767910
- Hafeiz HB. Socio-demographic correlates and pattern of drug abuse in Eastern Saudi Arabia. *Drug Alcohol Depend* 1995;38:255-9. doi: 10.1016/0376-8716(95)90001-x. PMID: 7555626
- Sundaram KR, Mohan D, Advani GB, Sharma HK, Bajaj JS. Alcohol abuse in a rural community in India. Part I: Epidemiological study. *Drug*

- Alcohol Depend 1984;14:27-36. doi: 10.1016/0376-8716(84)90016-4. PMID: 6489150
10. Harrington M, Robinson J, Bolton SL, Sareen J, Bolton J. A longitudinal study of risk factors for incident drug use in adults: Findings from a representative sample of the US population. *Can J Psychiatry* 2011;56:686-95. doi: 10.1177/070674371105601107. PMID: 22114923
 11. Zenic N, Ostojic L, Sasic N, Pojskic H, Peric M, Uljevic O, *et al.* Examination of the community-specific prevalence of and factors associated with substance use and misuse among Rural and Urban adolescents: A cross-sectional analysis in Bosnia and Herzegovina. *BMJ Open* 2015;5:e009446. doi: 10.1136/bmjopen-2015-009446. PMID: 26546145; PMCID: PMC4636607
 12. Madianos MG, Gefou-Madianou D, Richardson C, Stefanis CN. Factors affecting illicit and licit drug use among adolescents and young adults in Greece. *Acta Psychiatr Scand* 1995;91:258-64. doi: 10.1111/j.1600-0447.1995.tb09779.x. PMID: 7625208
 13. Substance Abuse and Mental Health Services Administration (US); Office of the Surgeon General (US). *Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs, and Health*. Washington, DC: US Department of Health and Human Services; 2016 Nov. PMID: 28252892
 14. Redonnet B, Chollet A, Fombonne E, Bowes L, Melchior M. Tobacco, alcohol, cannabis and other illegal drug use among young adults: The socioeconomic context. *Drug Alcohol Depend* 2012;121:231-9. doi: 10.1016/j.drugaldep.2011.09.002. Epub 2011 Sep 28. PMID: 21955362
 15. Shahraki G, Sedaghat Z, Fararouei M. Family and social predictors of substance use disorder in Iran: A case-control study. *Subst Abuse Treat Prev Policy* 2019;14:17. doi: 10.1186/s13011-019-0201-x. PMID: 31060577; PMCID: PMC6501311
 16. Available from: <https://www.destinationsforteens.com/destinations-blog/family-history-and-addiction-risk> [Last accessed on 2022 Jun 20].
 17. Fuller-Thomson E, Filippelli J, Lue-Crisostomo CA. Gender-specific association between childhood adversities and smoking in adulthood: Findings from a population-based study. *Public Health* 2013;127:449-60. doi: 10.1016/j.puhe.2013.01.006. Epub 2013 Mar 5. PMID: 23465733
 18. Rana M, Marhorta D. Family environment as a predictor of aggressive behaviour. *Stud Psychol* 2005;47:61-74.
 19. Dawson DA. The link between family history and early onset alcoholism: Earlier initiation of drinking or more rapid development of dependence? *J Stud Alcohol* 2000;61:637-46. doi: 10.15288/jsa.2000.61.637. PMID: 11022800
 20. Whitesell M, Bachand A, Peel J, Brown M. Familial, social, and individual factors contributing to risk for adolescent substance use. *J Addict* 2013;2013:579310. doi: 10.1155/2013/579310. Epub 2013 Mar 20. PMID: 24826363; PMCID: PMC4008086
 21. Sellami R, Feki I, Zahaf A, Masmoudi J. The profile of drug users in Tunisia: Implications for prevention. *Tunis Med* 2016;94:531-4. PMID: 28603825
 22. Hingson RW, Heeren T, Winter MR. Age at drinking onset and alcohol dependence: Age at onset, duration, and severity. *Arch Pediatr Adolesc Med* 2006;160:739-46. doi: 10.1001/archpedi.160.7.739. PMID: 16818840
 23. Stueve A, O'Donnell LN. Early alcohol initiation and subsequent sexual and alcohol risk behaviors among urban youths. *Am J Public Health* 2005;95:887-93. doi: 10.2105/AJPH.2003.026567. PMID: 15855470; PMCID: PMC1449273
 24. King KM, Meehan BT, Trim RS, Chassin L. Marker or mediator? The effects of adolescent substance use on young adult educational attainment. *Addiction* 2006;101:1730-40. doi: 10.1111/j.1360-0443.2006.01507.x. PMID: 17156172; PMCID: PMC2238681
 25. Odgers CL, Caspi A, Nagin DS, Piquero AR, Slutske WS, Milne BJ, *et al.* Is it important to prevent early exposure to drugs and alcohol among adolescents? *Psychol Sci* 2008;19:1037-44. doi: 10.1111/j.1467-9280.2008.02196.x. PMID: 19000215; PMCID: PMC3664402
 26. Bardwell G, Boyd J, Kerr T, McNeil R. Negotiating space and drug use in emergency shelters with peer witness injection programs within the context of an overdose crisis: A qualitative study. *Health Place* 2018;53:86-93. doi: 10.1016/j.healthplace.2018.07.011. Epub 2018 Jul 27. PMID: 30059897; PMCID: PMC6150825
 27. Small W, Moore D, Shoveller J, Wood E, Kerr T. Perceptions of risk and safety within injection settings: Injection drug users' reasons for attending a supervised injecting facility in Vancouver, Canada. *Health Risk Soc* 2012;14:307-24. doi: 10.1080/13698575.2012.680950
 28. Papamihali K, Yoon M, Graham B, Karamouzian M, Slaunwhite AK, Tsang V, *et al.* Convenience and comfort: Reasons reported for using drugs alone among clients of harm reduction sites in British Columbia, Canada. *Harm Reduct J* 2020;17:90. doi: 10.1186/s12954-020-00436-6. PMID: 33228676; PMCID: PMC7682134
 29. Martin CS, Chung T, Langenbucher JW. How should we revise diagnostic criteria for substance use disorders in the DSM-V? *J Abnorm Psychol* 2008;117:561-75. doi: 10.1037/0021-843X.117.3.561. PMID: 18729609; PMCID: PMC2701140
 30. Osman T, Victor C, Abdulmoneim A, Mohammed H, Abdalla F, Ahmed A, *et al.* Epidemiology of substance use among university students in Sudan. *J Addict* 2016;2016:2476164. doi: 10.1155/2016/2476164. Epub 2016 Feb 24. PMID: 27006856; PMCID: PMC4783543
 31. Ibn Auf A, Alnor MA. Sudanese medical students' perceptions of psychoactive substance use. *Addict Health* 2020;12:186-95. doi: 10.22122/ahj.v12i3.269. PMID: 33244395; PMCID: PMC7679488