www.jmscr.igmpublication.org
Index Copernicus Value: 79.54
ISSN (e)-2347-176x ISSN (p) 2455-0450
crossrefDOI: https://dx.doi.org/10.18535/jmscr/v7i3.112

IGM Publication
Journal Of Medical Science And Clinical Research
An Official Publication Of IGM Publication

Pattern of substance abuse among attendants of Neuropsychiatric Centre of Kamengein Burundi

Authors
Bigirindavyi Dismas[1*], Amira Gamal Seifeldin[2], Hany Hassan Ziady[3]
[1]Directorate General of Health Services, Ministry of Public Health and AIDS Fighting, Burundi
[2,3]Department of Community Medicine, Faculty of medicine, Alexandria University, Egypt
[*]Corresponding Author
Bigirindavyi Dismas
Telephone: + 257 79580957 (Burundi), +2 01097906319 (Egypt), Email: *bidismas@gmail.com*

Abstract

Background: *Substance abuse constitutes a major public health problem which is associated with a wide range of social and health impacts on the addicts, their families, and the society as a whole.*

Objective(s): *This study aimed to explore the pattern and social determinants of substance abuse among attendants of Kamenge Neuropsychiatric Centre in Burundi.*

Subjects and Methods: *A cross-sectional study was carried out on substance abusers who attended Neuropsychiatric Centre of Kamenge from September to November 2017and provided their oral informed consent to participate in the study. The interview questionnaire was divided into two sections. The first section identified the socio-demographic characteristics of respondents whereas the second section explored the pattern of substance abuse as self-reported by attendees. The obtained data were analyzed by descriptive and analytic statistics using the SPSS version 20.0 software. The significance of the results was set at the 0.05 level of significance.*

Results: *The studied substance abusers were 98, their mean age was 27.8 years (standard deviation, SD = ± 8.7), ranging from 16 to 57 years. Most of them were males (92.9%), single never married (75.5%), came from nuclear families (84.7%), and lived in cities (71.4%). The largest proportion of them were unemployed (46.9%) while half of them had secondary education level (50.0%). Family history of substance misuse was reported by more than three-fifths of the respondents (64.3%). Among the studied subjects, the most frequent substance of initiation was alcohol (43.9%), followed by tobacco (29.6%) and cannabis (26.5%). The mean age of onset of substance use initiation was 14.2 years (SD = ± 3.5), ranging from seven to 26 years. The most common contributing factors for substance use initiation was by curiosity (37.8%). Poly-substance abuse was common among the studied subjects (94.9%). This pattern of recurrent substance abuse was significantly associated with being male, being single, living in cities, and having high education level. The most frequent combination of substances was made by alcohol, tobacco, and cannabis (32.7%). Subsequently, the most frequent routes of taking substances in combination was smoking (or inhalation) and oral ingestion (43.9%).*

Conclusion: *Substance abuse is essentially a health problem of single and unemployed young people who started using substances at an earlier age. National data on current pattern of substance abuse are needed to be included in effective preventive programs required to encourage adopting positive attitudes among school going teenagers toward self-confidence and adequacy, as to prevent risk behavior taking among them.*

Keywords: *Psycho-active substances, substance abuse, drug misuse, Burundi.*

Introduction

Psycho-active substances are substances and drugs that produce changes primarily in the brain, by altering principally dopamine neurotransmission system, and secondary or concomitantly in the functioning of several biological systems of the addict's body.[1-4]According to their neurological properties, substances are classified into three categories notably psychodepressants (like alcohol, opium, cannabis, etc.) psychostimulants (like cocaine, nicotine, amphetamine-types stimulants**,** Ecstasy, etc.), and hallucinogens (like Lysergic Acid Diethylamide–LSD, tryptamines, etc.).[3,5]

Problematic substance use or drug misuse refers to the use of psycho-active substances for non-medical or non-scientific purposes.[3,5]Substance abuse is the maladaptive pattern of using psycho-active substances that does not conform to social norms nor clinical drug use guidelines.[3,6] Untreated substance abuse can lead to substance dependence and wide spectrum of mental and/or organicco-morbid disorders along with various socio-economic consequences.[4,7,8]

Worldwide, substance abuse problem affects many ages, particularly adolescents and young adults, regardless their socio-demographic characteristics.[9-10]In 2016, the World health Organization Global Information System on Alcohol and Health (GISAH) 2016 reported that 68% (111million) of males and 32.0% (53 million) of females, have had alcohol use disorders.[9] A total of 933 million were estimated to be current daily smokers worldwide with remarkable decrease in the majority of developed countries. [11]

In 2017, United Nations Office on Drugs and Crime (UNODC) reported that around 250 million people (5.3% of the global adult population aged 15-64 years), had used illicit drugs at least once in 2015. Out of whom, 29.5 millions (0.6% of the global adult population) suffered from drug use disorder. [10]

The Republic of Burundi is one of the state members of the East African Community. In this country, despite the lack of a comprehensive survey data related to substance abuse problem at national level, certain estimates from the United States Institute for Health Metrics and Evaluation (U.S IHME) and WHO GISAH indicated that around 192 thousands individuals (128 thousands of males and 64 thousands of females), aged 15 years and older, presented alcohol or other drug use disorders in 2016. [9,12] In 2012, the prevalence rate of daily smokers was 13.9% of the population. [12]

Objective

The aim of the present study was to explore the pattern of substance abuse among substance abusers attending Neuropsychiatric Centre of Kamenge (NPCK) in Burundi for treatment. Specifically, the study was conducted to identify the socio-demographic characteristics of the studied substance abusers, identify the types of substances abused, and reveal possible social determinants of substance abuse.

Subjects and Methods

Across-sectional study was carried out on substance abusers who attended the NPCK's outpatient and inpatient services for assessment and management, over a period of two months (September 9 to November 9, 2017).

Substance abusers, who voluntarily accepted to participate in the study and did not present with severe mental disorders that affected the communication with them, were confidentially interviewed by the investigator through using a constructed interview questionnaire. This tool was designed to collect needed data according to the study objective.

French translated copy of the constructed interview questionnaire was developed and cross-checked by a local experienced physician for the purpose of ease communication with respondents at interview time. Local language ("Ikirundi") was used for oral communication with illiterate participants.

A pilot study was carried out one week earlier before starting the actual study field work (in the first week of September 2017) in order to make up contact with the NPCK staff and test the suitability of the study tools.

Regarding the field work accomplishment, four regular visits per week were assumed by the investigator in the NPCK during the period of the field work (from 9th of September to 9th of November 2017).

The outpatient and inpatient services of the Centre were visited two times a day to cover both morning and afternoon admitted substance abusers. Each substance abuser was interviewed after exiting from the physician's office and laboratory ward.

Attendees who were hospitalized during weekend days were interviewed earlier on Monday, after the morning staff meeting to which the investigator attended regularly. The data were collected using anonymous questionnaires. Weekly revision of the available data was done to ensure completeness. After the field work period, the raw data were revised, coded, and transformed into coding sheets.

Statistical analyses were performed using the IBM Statistical Package for Social Sciences (SPSS version 20.0) system. [13] Analytical statistics were computed by using Fisher's Exact, and Monte Carlo tests to test the significance of the data. The significance of the results was set at the 0.05 level of significance.

Ethical considerations

An official agreement for the conduction of the study was obtained from the Ethical Committee of the Alexandria University Faculty of Medicine and Neuropsychiatric Centre of Kamenge. An informed oral consent was obtained from each participant who agreed to participate in the study.

Objectives of the study, types of needed information, and expected benefits to be obtained were clearly explained to each interviewed substance abuser. After the data analysis and final report presentation, all sheets used in data collection were discarded.

The research steps were done in compliance with the international guidelines for research ethics and that of Helsinki Declaration. Total confidentiality of any given information and collected data was assured.

Results

Socio-demographic characteristics of the studied substance abusers

Table 1 shows that the studied substance abusers were 98 and their mean age was 27.8 ± 8.7 years, ranging from 16 to 57 years. Most of them were males (92.9%) and came from nuclear families (84.7%). Three-quarters of them (75.5%) were single (never married) whereas around 16.4% of them were legally married. Most of them lived in cities (71.4%). The largest proportion of them were unemployed (46.9%), while each of private workers and students accounted for less than one-fifth of them (18.4%) respectively. Half of them (50.0%) had secondary education level. Less than half of them (42.9%) had basic education level. Illiterate and university graduates accounted for 5.1% and 2.1% of them respectively. More than half of the studied subjects (52.0%) belonged to average and rich households (monthly incomes more than BIF 53,043).

Table 1: Socio-demographic characteristics of the studied substance abusers.

Socio-demographic characteristics		Studied subjects (N=98)	
		n	%
Sex			
Male		91	92.9
Female		7	7.1
Age at visit			
Min – Max		16 – 57	
Median		25.0	
Mean age $\overline{X}$ ± SD		27.8 ± 8.7	
Type of the family			
Nuclear		83	84.7
Extended		9	9.2
Single family (orphan teenager headed households)		6	6.1
Marital status			
	Single (never married)	74	75.5
	Live in free union*	3	3.1
Unmarried	Separated	2	2.0
	Divorced	2	2.0
	Widowed	1	1.0
Married	Legal marriage	16	16.4
Residence areas			
Urban city (Capital Bujumbura)		49	50.0
Semi urban cities (provincial cities)		21	21.4
Rural areas (villages)		22	22.5
Foreign cities in Democratic Republic of Congo and Tanzania		6	6.1
Religion			
Christianity		76	77.6
Muslim		22	22.4
Educational level			
Illiterate		5	5.1
Basic education		42	42.9
Secondary school (junior and high school)		49	50.0
University graduates		2	2.0
Occupational status			
Unemployed		46	46.9
Private work (driver, trader, private sector worker)		18	18.4
Student		18	18.4
Farmer or cultivator		9	9.2
State employee**		5	5.1
Others ***		2	2.0
Monthly household incomes			
Less than BIF 13,261: Extremely poor households		19	19.4
Between BIF 13,261 to 53,043: Poor households		28	28.6
More than BIF 53,043: Average and rich households		51	52.0

*State employee (n=5): one healthcare worker, one soldier, and three policemen.
**Others as domestic worker and street connected vendor.

Pattern of substance abuse among the studied subjects

1. **Family history of substance misuse and types of substances of initiation**

Family history of substance misuse was reported by 63 substance abusers (64.3%). The largest proportion of the studied substance abusers started by alcohol consumption (n=43;43.9%), followed by those who started by tobacco smoking (n=29; 29.6%) and cannabis use (n=26; 26.5%).

2. **Age of onset of and contributing factors for substance use initiation**

Table 2 shows that the mean age of onset of substance use initiation was14.2 ±3.5 years, ranging from seven to 26 years. Most of the studied substance abusers started using psycho-active substances at the age group of 12 to 17 years (66.3%). Cumulatively, it was found that the vast majority of the studied substance abusers started using substances at the age 17 years or younger (less than 18 years) (86.7%).

As shown in table 2the main reason for initiating the use of psycho-active substances was curiosity (37.8%) followed by peer pressure (not peer network) (26.5%). The overall contributing factors for substance use initiation can be grouped into two categories which are (1) psychological factors reported by 57 substance abusers (58.2 %) and (2) social or cultural factors reported by 41 substance abusers (41.8%).

Table 2: Age of onset of and contributing factors for substance use initiation.

Studied substance abusers (N=98)		
Age of onset of substance use initiation (in years)	n	%
≤ 11 years	20	20.4
12–17 years	65	66.3
≥ 18 years	13	13.3
Min–Max	7–26 years	
Median	14.0 years	
Mean age : $\overline{X}$ ±SD	14.2 ± 3.5 years	
Contributing factors for substance use initiation*	n	%
(1) Individual psychological factors		
Curiosity	37	37.8
For enjoyment (fun/joy-seeking)	17	17.3
To alleviate frustration or cope with psychological stress (dispute, conjugal conflicts)	3	3.1
(2) Social and/or cultural factors		
Peer pressure (not peer network)	26	26.5
Presence of an addicted person in the family	5	5.1
Social norms favorable to alcohol use	5	5.1
Death of a family member	3	3.1
Having strict parents	2	2.0

*Categories are mutually exclusive.

3. **Mono- and poly-substance abuse among studied substance abusers**

Table 3 indicates that mono-substance abuse accounted for 5.1% of the studied sample. The combination of more than one substance (recurrent poly-substance abuse) was reported by the majority of the studied substance abusers (94.9%). The largest proportion of them combined three types of substances namely alcohol, tobacco, and cannabis (32.7%).

Table 3: Substance combination and duration of substance abuse among the studied subjects

Studied substance abusers (N=98)	n	%
Number of substances abused		
One substance	5	5.1
Two to three substances	76	77.6
Four or more substances	17	17.3
Min-Max	1.0 – 7.0 substances	
Median	3.0 substances	
Average number of substances: $\overline{X}$ ±SD	2.8 ± 0.98 substances	
Types of substance combinations		
Alcohol, tobacco, and cannabis	32	32.7
Tobacco and cannabis	14	14.3
Alcohol, tobacco, cannabis, and heroin	11	11.3
Alcohol and tobacco	6	6.2
Tobacco , cannabis, and heroin	6	6.2
Cannabis and heroin	5	5.1
Alcohol alone	3	3.1
Alcohol and cannabis	3	3.1
Alcohol, cannabis ,and heroin	2	2.0
Alcohol, tobacco, cannabis, and cocaine	2	2.0
Alcohol, tobacco, cannabis, cocaine, and heroin	2	2.0
Alcohol and sedatives/hypnotics	2	2.0
Alcohol, tobacco, cannabis, cocaine, heroin ,LSD, and sedatives/hypnotics	1	1.0
Alcohol and cocaine	1	1.0
Alcohol, cannabis, and cocaine	1	1.0
Alcohol, tobacco, cannabis, poppers, and sedatives	1	1.0
Tobacco alone	1	1.0
Tobacco and cocaine	1	1.0
Tobacco smoking, cannabis, and cocaine	1	1.0
Cannabis alone	1	1.0
Cannabis and cocaine	1	1.0
Cannabis , cocaine, and heroin	1	1.0

4. Routes of substance administration

It was revealed that the most frequent route of taking substance was smoking (or inhalation) (n=92, 93.9%) followed by oral ingestion (n=73, 4.5%), sniffing (or snorting) (n=30, 30.6%) and injection (n=12, 12.2%) routes. As a reflection of substances combination, table 4 shows that the largest proportion of the studied substance abusers used substances by combining smoking (or inhalation) and oral ingestion routes(43.9%), followed by smoking (or inhalation) alone (16.3%).

Table 4: Routes of taking substances in combination.

Studied subjects (N=98)		
Routes of taking substances in combination*	**n**	**%**
Smoking (or inhalation) and oral ingestion	43	43.9
Smoking (or inhalation) alone	16	16.3
Smoking (or inhalation), sniffing (or snorting), and oral ingestion	16	16.3
Smoking (or inhalation), sniffing (or snorting), oral ingestion, and parenteral (injection)	8	8.2
Oral ingestion alone	5	5.1
Smoking (or inhalation) and sniffing (or snorting)	5	5.1
Smoking (or inhalation) and parenteral (injection)	4	4.1
Sniffing (or snorting) and oral ingestion	1	1.0

*Categories are mutually exclusive.

5. Socio-demographic determinants of regular substance abuse

Table 5 shows that the involvement in poly-substance abuse was significantly associated with gender, marital status, residence areas, and education level of the studied subjects.

Regarding gender variable, it was found that the rate of poly-substance abuse was higher among males (96.7%) than females (71.4%), and this difference was statistically significant (p= 0.040).

According to marital status, it was revealed that unmarried and single substance abusers reported higher rates of poly-substance abuse (100.0% and 97.4% respectively) than married (81.2%) abusers; and this difference was statistically significant (p= 0.024).

As regard the residence areas, it was found that substance abusers who resided urban and semi urban localities reported higher rates of poly-substance abuse (100.0% and 92.6% respectively) than those who came from rural areas (86.4%), and this difference was statistically significant (p= 0.044).

Regarding educational levels, it was revealed that substance abusers with secondary and higher level of education had the highest rate of poly-substance abuse (100.0%) than both those with basic education (90.5%) and illiterate (80.0%). This difference was statistically significant (p= 0.040).

The other socio-demographic variables (age at onset of drug use initiation, religious affiliation, occupational status, household monthly incomes, and family history of substance misuse), were not significantly associated with the number of substances abused.

Table 5: Distribution of the studied substance abusers according to the association of socio-demographic characteristics and number of substances abused.

Socio-demographic characteristics	Number of substances abused						Test of significance and p value
	One: Mono-substance abuse (n=5)		Two or more: Poly-substance abuse (n=93)		Total (N=98)		
	n	%	n	%	n	%	
Gender							
Male	3	3.3	88	96.7	91	100.0	Fisher's Exact
Female	2	28.6	5	71.4	7	100.0	p = 0.040*
Marital status							
Single (never married)	2	2.7	72	97.3	74	100.0	Monte Carlo
Married	3	18.8	13	81.2	16	100.0	X^2_{MC}= 7.465
Unmarried**	0	0.0	8	100.0	8	100.0	p = 0.024*
Age at onset of drug use initiation							
≤11 years	0	0.0	20	100.0	20	100.0	Monte Carlo
12-17 years	4	6.2	61	93.8	65	100.0	X^2_{MC}= 1.404
≥18 years	1	7.7	12	92.3	13	100.0	p = 0.496
Residence areas							
Rural areas	3	13.6	19	86.4	22	100.0	
Urban City	0	0.0	49	100.0	49	100.0	Monte Carlo
Semi-urban cities (of Burundi and foreign countries)	2	7.4	25	92.6	27	100.0	X^2_{MC}= 6.240 p = 0.044*
Religion							
Christianity	4	5.3	72	94.7	76	100.0	Fisher's Exact
Muslim	1	4.5	21	95.5	22	100.0	p = 0.893
Educational levels							
Illiterate	1	20.0	4	80.0	5	100.0	Monte Carlo

Basic education	4	9.5	38	90.5	42	100.0	X^2_{MC}= 6.730 p = 0.040*
Secondary school and higher	0	0.0	51	100.0	51	100.0	
Occupational status							
Unemployed	1	2.2	45	97.8	46	100.0	Monte Carlo X^2_{MC}= 5.140 p = 0.162
Skilled: state and self employed	3	13.0	20	87.0	23	100.0	
Unskilled: Farmers and others	1	9.1	10	90.9	11	100.0	
Students	0	0.0	18	100.0	18	100.0	
Household monthly incomes							
Below poverty line (≤ BIF53,043)	3	6.9	44	93.1	47	100.0	Fisher's Exact p = 0.669
Average rich and rich (> BIF 53,043)	2	3.9	49	96.1	51	100.0	
Family history of substance misuse							
Yes	3	4.8	60	95.2	63	100.0	Fisher's Exact p = 0.839
No	2	5.7	33	94.3	35	100.0	

*Significant at p-value ≤0.05

Discussion

This cross-sectional study explored the pattern of substance abuse among 98 addicts attending inpatient and outpatient services of the national reference Neuropsychiatric Centre of Kamenge (NPCK) in Burundi, from September 9 to November 9, 2017.

The studied sample included more males (92.9%) than females (7.1%). Additionally, the rate of poly-substance abuse was higher among males (96.7%) than females (71.4%), with significant difference (p=0.040) (Table 5).Similar findings were reported by Maruf et al, [14]in year 2016, in Bangladesh, and Ndetei et al, [8]in year 2008, in Kenya, who found that most of the drug abusers attending De-addiction clinics were males (90.5% and 82.4% respectively).

The male predominance in the present study and the gap existing between males and females may reflect differences in opportunities to use psycho-active substances due to influence of the social and cultural factors rather than intrinsic gender vulnerability.[15,16] The rate of family history of substance misuse (64.3%) may be appreciated as direct negative role models, borne in the family by parents/relatives, which increase the curiosity about psycho-active substances among children.[17] Moreover, it may be seen as an indirect indicator of genetic heritability of substance abuse among offspring. [18]

The present study's population was young considering that the mean age of the studied sample was27.8 ± 8.7 years, which is similar to that reported by Maruf et al, [14]in year 2016, in Bangladesh, and Ndetei et al, [8]in year 2008, in Kenya (samples' mean age of 28.8±8.0 years and 31.9± 7.8years respectively). These findings may be attributed to socio-demographic characteristics of populations of low-income countries like Burundi.[19,20]

On identifying the types of substances of initiation, it was noted that the largest proportion (43.9%) of the studied substance abusers started by alcohol consumption. The common contributing factor for substance use initiation was curiosity about psycho-active substances (37.8%) followed by peer pressure (26.5%). Similar findings were reported by Goswami and Goswamee, [21] in year 2017, in India, who found that the most common factors for substance use initiation were by curiosity (39.0%) and peer pressure (24.0%).Curiosity is meant by the individual psychological feeling of discovering and taking substances while peer pressure refers to the influence of peer group on an individual to take substances irrespective of his/her personal believes. [22]

Their current poly-substance abuse was a common behaviour among the studied substance abusers (94.9%).The most frequent combination of substances was made by three substances namely alcohol, tobacco, and cannabis (32.7%). Subsequently, the most frequent routes of taking substances in combination was smoking (or inhalation) and oral ingestion combination (43.9%) followed by smoking alone (16.3%). These findings are similar to those reported by Goodarzi et al, [23]in year 2011, in Iran.

The finding that unmarried substance abusers reported higher rates of poly-substance abuse than married substance abusers, with significant difference (p=0.024) may be attributed to the early age of initiating substance use among studied subjects(14.2 ± 3.5 years) and socio-economic context related to each marital status. Evidence suggested that the earlier the exposure to substance abuse occurs, the more likely drug initiators may become regular poly-substance abusers and dependent later in adulthood. [24]Also, risk taking behaviors are likely to be notified among single people, particularly young males. [25] This has been called young male syndrome which includes substance misuse, risky sexual behaviors, etc. [25,26]

On the other hand, married citizens, compared to unmarried and single people, may have social and occupational commitments that are important enough to prevent them from being involved in poly-substance abuse in order to avoid potential impairment, maximize their chance ofworking productively, stabilize family resources, etc.[4,15,27] This statement corroborates the 2010 report released by the United State National Institute on Drug Abuse which had reported that drug abuse rate is lowest in persons that are married while those who were single and unmarried showed much higher rates of abuse. [4]

According the current study, substance abusers with high education level (50.0% of the studied sample) reported highest rate of poly-substance abuse (100.0%) than both those with basic education (89.4%) and illiterate (80.0%); and this difference was statistically significant (p=0.023). This is similarly to the studied conducted by Rather et al,[27] in year 2013, in India, who found that more than half (53.5%) of the studied substance abusers had secondary school level, and were involved in poly-drugs abuse. School going teenagers may usually save money they receive from parents and/or relatives to buy substances. Moreover, as they spend major part of their time outside parental homes, they are more likely to discover new substances and participate in social/recreational activities where drugs may be misused and/or shared among peers.[22]

Substance abusers who lived in urban and semi urban localities, who represented more than three-quarters of the studied sample (77.5%), reported also a rate of poly-substance abuse that is higher than that of rural subjects. Urban residents may be exposed to the growing market of psycho-active substances in cities, either legally produced (like alcohol and tobacco) or trafficked from neighbouring countries (like cocaine, cannabis, heroin, etc.) to Burundian cities.[28,29]

Conclusion

The present study most likely provided a large overview of the wide range of psycho-active substances abused by addicts attending Neuropsychiatric Centre of Kamenge, in Burundi, for treatment. It revealed that substance abuse is essentially a health problem of single and unemployed young people who started using substances at an earlier age, with curiosity about psycho-active substances and peer pressure as their main reasons of substance use initiation. Young males who lived in cities were more likely to be involved in poly-substance abuse than females do. Preventive programs should be planned and implemented accordingly to encourage adopting positive attitudes among school going teenagers toward self-confidence and adequacy, as to prevent risk behavior taking among them.

Limitations of the present study

The present study was a cross-sectional study with a non-probability sampling method and based on self-reported information. The study population may not be representative of the general population, and therefore, limit the application of the findings of the current study to all substance abusers potentially present in the community.

Recommendation

Conduct further researches that may take into consideration the profile of the primary providers and sources of supply of substances in order to establish the realistic pattern of substance abuse at national level. The collected data should be integrated in effective preventive programs required to encourage adopting positive attitudes among school teenagers toward self-confidence and adequacy, as also to prevent risk taking behaviors among them.

Conflict of interest: None to declare.
Financial support : None.

References

1. Di Chiara G, Bassareo V, Fenu S, De Luca MA, Spina L, Cadoni C, et al. Dopamine and drug addiction: The Nucleus Accumbens Shell Connection. *Neurophar* 2004;47(Suppl 1):227–41.
2. Kalivas PW, Volkow ND. The neural basis of addiction: A pathology of motivation and choice. *Am J Psychiatry* 2005;162:1403–13.
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, 5th ed. Arlington, VA: American Psychiatric Association 2013; p. 481–590.
4. United States Department of Health and Human Services, National Institute of Health, National Institute on Drug Abuse. Research report series. Comorbidity: Addiction and Other Mental Illness. Rockville: NIDA 2010; NIH publication number 10-5771.
5. Tripathi KD. Essentials of Medical Pharmacology, 4th Edition Updated Reprint. New Delhi: Jaypee brothers, Medical Publishers (P) Ltd 2001; p. 67–74.
6. American Society of Addiction Medicine. Public policy statement: Definition of Addiction. Washington D.C. ASAM. [Online]. 2011. [Cited: July 6, 2017]. Available from. htt://www.asam.org/advocacy/find-a-policy-statement/view-policy-statement/public-policy-statements/2011/12/15/the-definition-of-addiction.
7. Newcomb MD, Locke T. Health, social, and psychological consequences of drug use and abuse. In: Sloboda Z, editor. Epidemiology of drug abuse. Springer: New York 2005; p. 45–59.
8. Ndetei DM, Pizzo M, Kuria MW, Khasakhala L, Maru HM, Mutiso V. Substance abuse and psychiatric co-morbidities: A Case Study of Patients at Mathari Psychiatric Hospital, Nairobi, Kenya. *Afr J Drug Alcoh Studies* 2008;7(1):53–8.
9. World Health Organization, Global Information System on Alcohol and Health (GISAH). Global Health Observatory (GHO) data: Total alcohol per capita (≥ 15 years of age) consumption in litres of pure alcohol [Online].2016. [Cited: March 30, 2018].Available from http://www.who.int/gho/alcohol/en/.
10. United Nations Office on Drug and Crime. World drug report 2017. Vienna: United Nations publication 2017; Sales No. E.17.XI.7.
11. World Health Organization. Tobacco fact sheet. Geneva: World Health Organization [Online]. 2016. [Cited: March 12, 2018] Available from http://www.who.int/mediacentre/factsheets/fs339/en/.
12. United States Institute for Health Metrics and Evaluation, Global Burden of Disease Collaborative Network. Global burden of disease study 2016 results. Seattle: United

States Institute for Health Metrics and Evaluation (IHME) 2017.
13. International Business Machines Corporation (IBM). IBM SPSS statistics for Windows, Version 20.0. Armonk: IMB Corporation; 2011.
14. Maruf MM, Khan MZR, Jahan N. Pattern of Substance Use: Study in a De-addiction Clinic. *Oman Med J* 2016;31(5):327–31.
15. Van-Etten MI, Anthony JC. Male-female differences in transitions from first drug opportunity to first use: Searching for Sub-group Variation by Age, Race, Religion, and Urban Status. *J Wom Health Gend Based Med* 2001;10(8):797–804.
16. Albert E. Women of Burundi. A Study in Social Values. In: Paulme D, editor. Women of Tropical Africa. Berkeley: University of California Press 1963; p. 179–217.
17. Bierut LJ, Dinwiddie SH, Begleiter H, Crowe RR, Hesselbrock V, Nurnberger JI, et al. Familial transmission of substance dependence: Alcohol, Marijuana, Cocaine, and habitual Smoking: A Report from the Collaborative Study on the Genetics of Alcoholism. *Arch Gen Psychiat* 1998; 55(11):982–8.
18. Goldman D, Oroszi G, Ducci F. The genetics of addictions: Uncovering the Genes. *Nat Rev Genetics* 2005; 6(7):521–32.
19. Zinkina J, Korotayev A. Explosive Population Growth in Tropical Africa: Crucial omission in development forecasts-emerging risks and way out. *World Futures* 2014;70(2):120–39.
20. Republic of Burundi, Institute of Statistics and Economic Studies of Burundi (ISTEEBU). Third Demographic and Health Survey in Burundi (DHS III) 2016-2017. [French version: Troisième enquête démographique et de santé au Burundi (EDS III) 2016-2017]. Bujumbura, ISTEEBU 2017.
21. Goswami H, Goswamee G. Perception of substance abuse: Prevalence, Causes, and Socio-economic Status. *The Clarion- Intern MultidiscJ* 2017;6(2):75–81.
22. Brook JS, Whiteman M, Gordon AS. Stages of drug use in adolescence: Personality, peer, and family correlates. *Developmental Psychol*ogy 1983;19(2):269–77.
23. Goodarzi F, Karrari P, Eizadi-Mood N, Mehrpour O, Misagh R, Setude S, et al. Epidemiology of drug abuse (chronic intoxication) and its related factors in a MMT Clinic in Shiraz, Southern Iran. *Iran J Toxicol* 2011;4(4):377–80.
24. Kandel DB, Yamaguchi K. Developmental patterns of the use of legal, illegal, and medically prescribed psychotropic drugs from adolescence to young adulthood. *NIDA Res Monograph* 1985;56:193–235.
25. Niraula SR, Chhetri DB, Singh GK, Nagesh S, Connell FA. Drug abuse pattern and risk taking behaviors among drug Abusers in Dharan, Nepal. *J Sub Abuse Alcohol* 2015;3(4):1040–6.
26. Tapert SF, Aarons GA, Sedlar GR, Brown SA. Adolescent substance use and sexual risk-taking behavior. *J Adol Health* 2001;28(3):181–9.
27. Rather YH, Bashir W, Sheikh AA, Amin M, Zahgeer YA. Socio-demographic and clinical profile of substance abusers attending a regional drug De-addiction Centre in chronic conflict area: Kashmir, India. *Malays J Med Sc*i 2013;20(3):31–38.
28. International Criminal Police Organization. Connecting Police for a safer world: Burundi ICPO/INTERPOL Bujumbura [Online].2018. [Cited: September 9, 2018]. Available from https://www.interpol.int/Member-countries/Africa/Burundi.
29. Wolvelaer FV. Alcohol addiction treatment programmes in Bujumbura, Burundi. M.D Thesis. Ghent University, Faculty of Psychology and Educational Science 2015;24–8.