

Motivation for Addiction among College Students: Nonmedical Prescription of Drugs and Substances Abuse

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Abstract : This study was aimed to investigate the prevalence of drugs and non-medical substances abuse and the motivating factor between college students in Philadelphia University. **Material and Method:** This was a cross-sectional study. We recruit students from the Philadelphia University through Jan to May 2018. This study involved 843 students aged 21.479 ± 2.281 , 531 male and 312 female. Participants were randomly selected from different faculty, involving Pharmacy (n=306), Engineering (n=196), Nursing (n=74), Sciences (n=84), Business managements (n=46), Information technology (n=58), and Arts (n=79). The study's main outcome was described as demographic distribution, list of most commonly abused drugs, non-medical substances which have central nervous effect and list of motivation for using these medical and non-medical substances. **Results:** in this study, 93.00% of respondents were recorded to use at least one drug or non-medical substance, 67.50% of all students were using drugs and 84.94% were using non-medical substance. The most commonly abused drug for sleep induction was the Antihistamines (Chlorpheniramine, Diphenhydramine and Chlorpheniramine), which were used by 60.11% of students followed by less commonly codeine products 4.92%, Sleep inducing herbal product (Luna) 4.10%, Anticonvulsant drugs (Gabapentin, Pregabalin) 4.37%, Benzodiazepines (Lorazepam, Alprazolam) 4.10%, and Opioid pain medication (Tramadol) 1.91%. Eye drops containing decongestant and antihistamine were, surprisingly, used orally by 1.64% of students. Triprolidine antihistamine and pseudoephedrine decongestant combination, likewise, antidepressant, fluoxetine, were used by 0.82% of students. Diazepam was restricted to 0.55% of students and rarely Atropine, Haloperidol, Chlordiazepoxide + Clidinium Bromide combination and Quetiapine were used by only 0.27% of students. Cigarette and Other smoke were among the most commonly used substance between college students (44.81%). CNS stimulants, energy drinks, and Caffeine contain drinks were widely administered by students (30.87%, 25.14%). Alcohol drinks were recorded in 13.66% of students and less commonly (1.09%) using G-tonic energy drink. student who lives in city were significantly higher among student user of drugs (p value=0.0024). Whereas, the gender, college, maternal status, family size, parents education and family economic state were not differ significantly in relation to the number of drugs used. In the other hand, the non-medical substances were significantly higher in male in comparison to the female student (p= 0.0000), and not significantly differed with college, maternal status, living place, family size, parent's education and family economic state. In this study, the relaxation, chills out, and unbends together with enjoyment were the main motivating factors for abusing chemicals between college students (48.47%, 36.99%). To get more energy and not to sleep were the motivating factors in 28.44% and 23.21% of students consequently, and 20.54% of students select to be stronger within their group by using drugs or substances. **Conclusions:** Despite of controlled prescription of CNS effecting drugs in Jordan, there are many cases of such drug abuse between college students. Many students who become addicted to these drugs mainly after purchasing them with a valid prescription from a physician, others have collages advise considering them as sleep control and relaxation inducer. CNS stimulants, energy drinks, and Caffeine contain drinks were widely administered by students and some times reaches to the overdose.

Keywords: Addiction, college students, Motive for substance abuse, non-medical prescription of drugs.

Introduction: Addiction is a psychological and physical failure of cut off anything that causes psychosocial, mental and biological harm [1]. Addiction is not including the dependence of heroin or cocaine as what is common; this includes a chemical substance, drug. It could be a behavioral addiction which person is unable to stop doing specific activities

as gambling. Addiction is a brain chronic disorder recognized by compulsive substance use despite harmful results, it causes 115 deaths every day in the USA. Once addiction is occurred, people cannot control the way of consuming the substance or doing an activity, therefore they will be dependent on that addicted material in their life and increased risk for

relapse despite years of abstinence [2, 3]. Drug addiction can change gene expression in the mesocorticolimbic projection [4], therefore different transcription factors are produced as Δ FosB, cAMP and nuclear factor kappa B (NF- κ B), elevation of Δ FosB expression in D1-type medium spiny neurons in the nucleus accumbens have important role in neural effects. Δ FosB has been associated in several-addicted drug as cannabinoids, cocaine, methylphenidate, nicotine and opiates [5]. So a strategy of blocking Δ FosB could be beneficial in treat addictive disorders. Increased level of dopamine production may have an important effect in the reinforcing qualities of different stimuli types [6, 7]. In an addictive state, changing in dopamine neurotransmission is an earlier sign prior addiction [8]. Addiction is resulted from drug-induced alterations in reward or reinforcement, which include tolerance, sensitization, and dependence in reward-reinforcement mechanisms. Reward is defined with positive emotional effects, and Reinforcement is a stimulus, which generates a response to be maintained and increased [9]. Regulators of G protein signaling (RGS) proteins, particularly RGS4 and RGS9-2, have accomplished in opioid sensitization [10]. Any change of epigenetic regulation in gene expression could have role in drug addiction progressing. There are three types of epigenetic modifications within neurons: histone modifications, epigenetic methylation of DNA at CpG sites and epigenetic down regulation or up regulation of microRNAs [11]. College Students are the most layers for turn to drugs; this can be related to different motivated reasons such as: (1) Stress: some of students are using drugs to get rid of a lot duties, part-time training and social obligations, (2) Course load: in order to stay awake and do the huge home works, some of them are taking stimulants, such as Adderall which can be obtained without legal prescription, (3) Curiosity: College students are preferring to explore everything and unfortunately they became addicted by the first drug experimentation, (4) Peer pressure: performance-enhancing drugs are more likely to try these substances for themselves. (5) Mental disorders, (6) Troubled relationships. Protective factors, on the other hand, reduce a person's risk figure 1 Barbiturates, benzodiazepines and hypnotics are prescription central nervous system depressants, these medications can be misused for relaxation and avoid stress, Benzodiazepines such as: diazepam (Valium),

alprazolam (Xanax), lorazepam (Ativan), clonazepam (Klonopin) and chlordiazepoxide (Librium). Many signs and symptoms can be observed from addicted these medications: slowed breathing and hypotension, drowsiness, irritability or mood changing, involuntary eye movements, memory problems and dizziness. Stimulants contain amphetamines, methamphetamine, cocaine, methylphenidate and amphetamine-dextroamphetamine (Adderall) are misused to get high energy in order to enhance performance, signs and symptoms include: feeling of exhilaration and excess confidence, rapid or rambling speech, nasal congestion, insomnia, increased energy and restlessness, paranoia and dilated pupils. Lysergic acid diethylamide (LSD) and phencyclidine (PCP) are most common hallucinogens used in addiction, LSD can lead up to tremors, tachycardia, hypertension and permanent mental changes, whereas PCP can lead up to lack of pain sensation, intolerance to loud noise and seizures or coma. Opioids are narcotic medications used legally for sever pain, and illegally for addiction, these include: heroin, morphine, codeine, methadone and oxycodone. Signs and symptoms of opioids addiction are: slurred speech, constricted pupils, agitation, runny nose and confusion.

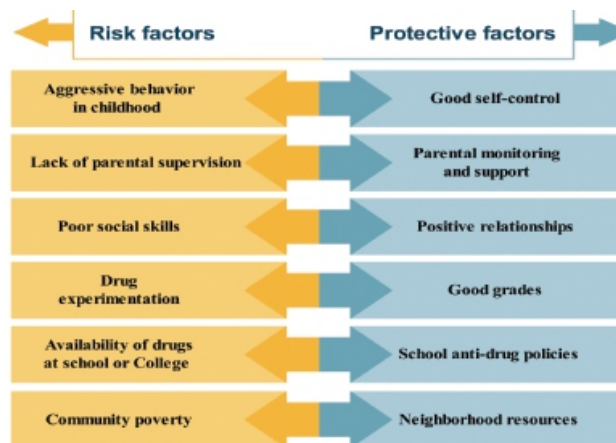


Figure 1: risk factors and protective factors for college student against drug addiction [12, 13, and 14]

Addicted People may suffer from one or more associated health issues, for example: cardiovascular, lung disease or cancer or mental disorders, and there is high evidence to have Human immunodeficiency virus (HIV) and hepatitis C [15, 16], this relate to sharing contaminated injected equipment and unprotected unsafe sexual intercourses.

Treatment strategy of addiction involve three

objectives, (1) Treating withdrawal, (2) Staying in treatment and (3) Preventing relapse, in addition to this. There is a behavioral therapy strategies include: contingency management, cognitive-behavioral therapy and motivational enhancement therapy.

Subject, material and methods

Study population: This was a cross-sectional study. We recruit students from Philadelphia University through Jan to May 2018. This study involved 843 students aged 21.479 ± 2.281 , 531 male and 312 female. Participants were randomly selected from different faculty, involving Pharmacy (n=306), Engineering (n=196), Nursing (n=74), Sciences (n=84), business managements (n=46), Information technology (n=58), and Arts (n=79) Table 1. The trained assistant conducted an interview with a paper version of the questionnaire for the whole of the participant. On the moral side, the names of the student were excluded from the questionnaire. The study's main outcome was described as demographic distribution, list of most commonly abused drugs, non-medical substances which have central nervous effect and list of motivation for using these medical and non-medical substances. Drugs and non-medical substances, which weren't recorded to be used by students, were excluded from the study. For drugs and non-medical substances, the respondent is asked to indicate the number of days they used particular substances in the last month prior to the beginning of the study. The interview was confidential and takes about 25 minutes.

Statistics: Study groups with all variables have been compared. A medium and standard deviation compared the quantitative variables. Comparison of categorical variables using Chi-square test. Statistically significant was a P value < 0.05. For statistical analysis, IBM SPSS version 22 has been used.

Results and discussion: Eight hundred and forty — three respondents attended this study. The age ranged from 19 to 24 years (mean \pm SD = 21.479 ± 2.281). 93.00% of respondents were recorded to use at least one drug or non-medical substance, 67.50% of all students were using drugs and 84.94% were using the non-medical substance. Table 1 shows the demographic distribution of the study population and the number of drugs and non-medical substances were used. The faculty of pharmacy students were the larger number in Philadelphia University, therefore, the

motivation for abuse of chemicals was recorded as the larger percentage. The most commonly abused drug for sleep induction was the Antihistamines (Chlorpheniramine, Diphenhydramine and Chlorpheniramine), which were used by 60.11% of students followed by less commonly codeine products 4.92%, Sleep inducing herbal product (Luna) 4.10%, Anticonvulsant drugs (Gabapentin, Pregabalin) 4.37%, Benzodiazepines (Lorazepam, Alprazolam) 4.10%, and Opioid pain medication (Tramadol) 1.91%. Eye drops containing decongestant and antihistamine were, surprisingly, used orally by 1.64% of students. Triprolidine antihistamine and pseudoephedrine decongestant combination, likewise, antidepressant, fluoxetine, were used by 0.82% of students. Diazepam was restricted to 0.55% of students and rarely Atropine, Haloperidol, Chlordiazepoxide + Clidinium Bromide combination and Quetiapine were used by only 0.27% of students (Table 2). Cigarette and Other smoke were among the most commonly used substance between college students (44.81%). CNS stimulants, energy drinks, and Caffeine contain drinks were widely administered by students (30.87%, 25.14%). Alcohol drinks were recorded in 13.66% of students and less commonly (1.09%) using G-tonic energy drink (Table 3). Figure 1 shows that a student who lives in city were significantly higher among student user of drugs (p value=0.0024). Whereas, the gender, college, maternal status, family size, parents education and family economic state were not differ significantly in relation to the number of drugs used. In the other hand, the non-medical substances were significantly higher in male in comparison to the female student (p=0.0000), and not significantly differed with college, maternal status, living place, family size, parent's education and family economic state. In this study, the relaxation, chills out, and unbends together with enjoyment were the main motivating factors for abusing chemicals between college students (48.47%, 36.99%). To get more energy and not to sleep were the motivating factors in 28.44% and 23.21% of students consequently, and 20.54% of students select to be stronger within their group by using drugs or substances. As a students, 14.41% of students tray to use chemical to facilitate their ability for quick learning. Although less common motivating factor, some student had nothing to do and some of them have a goal to reduce their weight, while others, tray to enhance their courage between friends and to give

attention to others Table 4 and figure 2.

Table 1: Demographic Distribution of the study population

Students (n=843)	Character	Students using drugs	Students using substance
Total	All students using drugs or substances 784 (93.00%)	569 (67.50%)	716 (84.94%)
Gender	Male n=531 (62.99%)	346 (68.55%)	437 (82.30%)
	Female n=312 (37.01%)	226 (72.44%)	190 (60.90%)
College	Pharmacy n=306 (36.30%)	189 (61.76%)	218 (71.24%)
	Engineering n=196 (23.25%)	128 (65.31%)	157 (80.10%)
	Nursing n=74 (8.78%)	49 (66.22%)	50 (67.56%)
	Sciences n=84 (9.96%)	58 (69.05%)	61 (72.61%)
	Biasness managements n=46 (5.46%)	32 (69.56%)	35 (76.09%)
	Information technology n=58 (6.88%)	31 (53.45%)	30 (51.72%)
Age	Arts n=79 (9.37%)	69 (87.34%)	54 (68.35%)
Age	Male	21.71 ± 1.82	
	Female	21.20 ± 2.93	
Maternal status	Married n=39 (4.63%)	18 (46.15%)	31 (79.49%)
	Unmarried n=804 (95.37%)	558 (69.40%)	597 (74.25%)
Living place	City n=672 (79.72%)	498 (74.11%)	496 (73.81%)
	Urban n=171 (20.28%)	128 (74.85%)	131 (76.61%)
Family size	2-5 n=241 (28.59%)	155 (64.32%)	181 (75.10%)
	6-9 n=532 (63.11%)	357 (67.11%)	386 (72.56%)
	>10 n=70 (8.30%)	51 (72.86%)	53 (75.71%)
Parents education	Secondary school n=218 (25.86%)	147 (67.43%)	165 (75.69%)
	Bachelor n=625 (74.14%)	429 (68.64%)	537 (85.92%)
Family economic state	Middle income n=306 (36.30%)	195 (63.73%)	233 (76.14%)
	High income n=537 (63.70%)	370 (68.90%)	389 (72.44%)

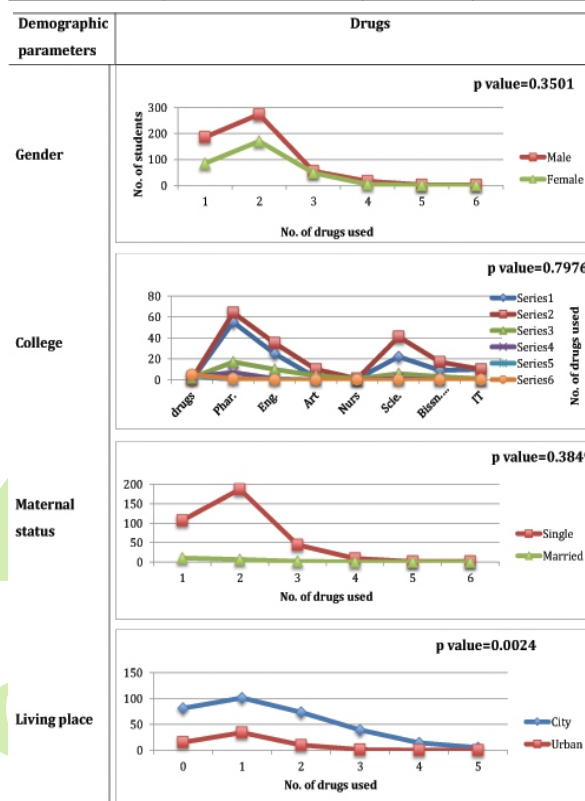
Table 2: Prevalence of drugs use in study population

Drug			
Trade name	Target drug	No.	Percentage
Atihistamin (Allerfin, Snip, Panadol sinus, panadol cold and flu)	Chlorpheniramine, Diphenhydramine and Chlorpheniramine	507	60.11%
Apitropin	Atropine sulfate	2	0.27%
Codeine	Codeine	41	4.92%
Gabatrex, Lyrica, Neurantoin	Gabapentin, Pregabalin	37	4.37%
Haldol	Haloperidol	2	0.27%
Lorans, Xanax	Lorazepam, Alprazolam	35	4.10%
Luna	Sleep inducer herbal product	39	4.64%
Poxidium (Chlordiazepoxide+ Clidinium Bromide)	(Chlordiazepoxide + Clidinium Bromide)	2	0.27%
Prisoline eye and nasal drops (Naphazoline Chlorpheniramine Maleate)	Prisoline eye and nasal drops (Naphazoline, Chlorpheniramine Maleate)	14	1.64%
Prozac (fluoxetine)	Prozac (fluoxetine)	7	0.82%

Seroquel (Quetiapine)	Seroquel (Quetiapine)	2	0.27%
Tramal (Tramadol)	Tramal (Tramadol)	16	1.91%
Trifed (Triprolidine-pseudoephedrine), Unifed DM (Triprolidine Hydrochloride, Pseudoephedrine Hydrochloride + Dextromethorphan Hydrobromide) Eazit	Trifed (Triprolidine-pseudoephedrine)	7	0.82%
Valium (diazepam)	Valium (diazepam)	5	0.55%

Table 3: Prevalence of non-medical substances use in study population

Substances	Character	No.	Percentage
Alcohol		48	13.66%
Cigarette or Other smoke		139	44.81%
Caffeine (Coffee sting, instant, Espresso)	High caffeine contain	212	25.14%
G- tonic		4	1.09%
Large quantities of chocolate		98	25.41%
Red Bull, Cold red, power horse, Pump DMG, XXL dring, Bison, Monster, MR-burn, G-tonic		113	30.87%



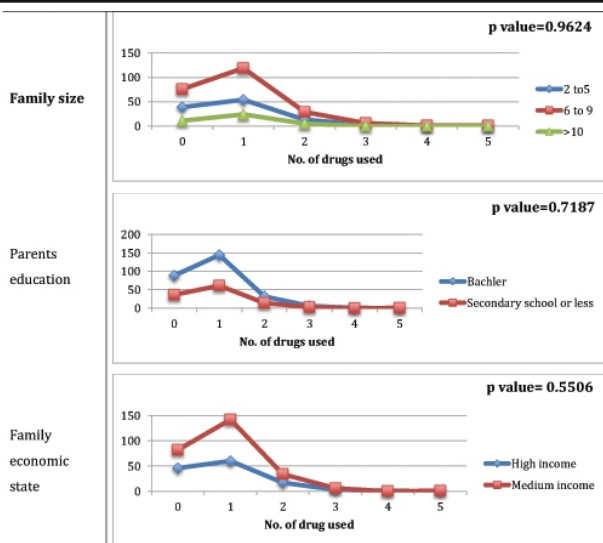


Figure 1: Comparison of Socio- demographic parameters using drugs (TN=843).

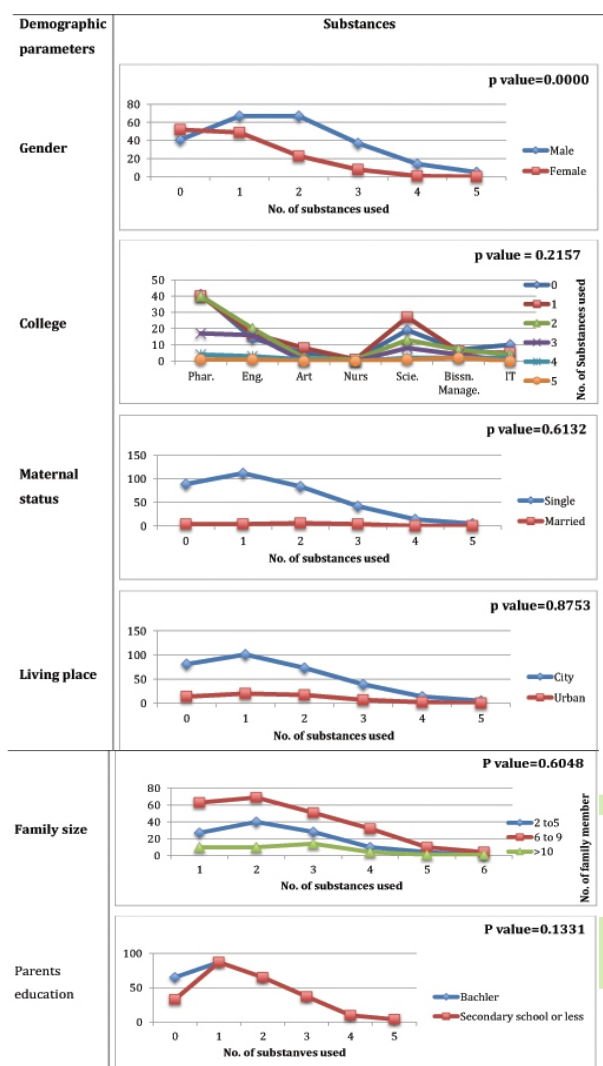


Figure 2: Comparison of Socio- demographic parameters using different substances (TN=843).

Table 4: Motivation for drugs and substances used (N=784).

Motivation	No.	Prevalence
To relax, chill out, unbend	380	48.47%
For enjoyment	290	36.99%
To have more energy to play	223	28.44%
Not to sleep	182	23.21%
In order not to stand out from the group	161	20.54
I had to learn something quickly	113	14.41%
I had nothing else to do, out of boredom	71	9.06%
To eat less	35	4.46%
To gain courage in dealing with others	25	3.19%
To attract attention in the group	9	1.15%

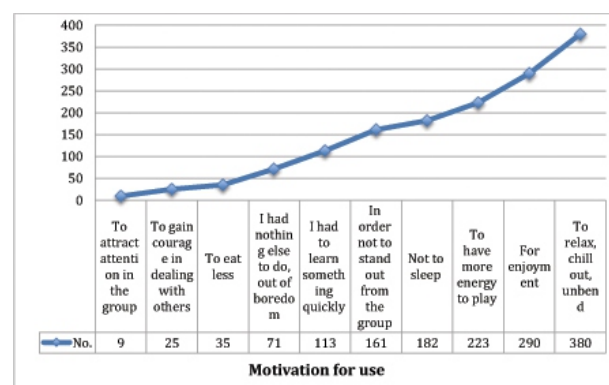


Figure 3: Motivation factors for drugs and non-medical substances use (TN=843).

Discussion: In this study we investigate the prevalence of drugs and non-medical substances abused and the motivating factor between college students in Philadelphia University. The respondents primarily reported using antihistamines for induction of sleep (17) and treating insomnia and difficulty in falling sleep, some students have problem of maintaining sleep during the night and others suffering from early wakening. In this study, the most commonly use of antihistamine between college students was due to the cheap cost and simply obtaining from the private pharmacy. Codeine is the gateway drug into addiction to other drugs specially opioid group, therefore, its abuse is of increasing concern in many countries because of its availability in different over-the-counter medical preparations such as painkiller and cough relief products (18). Many students reported relaxation effect of codeine and other prefers the euphoric effect as the main beneficial of using. Some cases report the use of combination of codeine and alcohol because of their augmentation on CNS depressive effect. Although some students view codeine as a weak opiate and its

use is associated with drowsiness, apathy and constipation and difficulty to purchase from the pharmacy, it still misused by 4.92% of college student. LUNA is a unique natural over-the-counter supplement used for sleeping aid; it's contained a wide variety of ingredients effective for fast sleep induction. The main effect of these herbal is to help relaxation and longer sleep. Although Luna is not harmful and doesn't cause addiction as stated by FDA (19), students reporting that they might become psychologically dependent on these products with continuous use, they feel sleeplessness if missed the night dose. Despite of controlled prescription of anticonvulsant drugs (Gabapentin, Pregabalin), Benzodiazepines (Lorazepam, Alprazolam), and Opioid pain medication (Tramadol) in Jordan, there are many cases of such drug abuse between college students. Many students who become addicted to these drugs mainly after purchasing them with a valid prescription from a physician, others have collages advise considering them as sleep control and relaxation inducer. Some cases prefer using Gabapentin or Pregabalin due to the invisible symptoms of addiction to friends or family. High cost of Gabapentin and Pregabalin and difficulty of obtaining them was reported as two limiting point in continuous use and restrict their usage as available. Three cases reporting weight gain as the most important adverse effect of Pregabalin use and they withdraw them from their schedule. Benzodiazepines (Lorazepam, Alprazolam) are the most widely prescribed drugs for generalized anxiety and panic disorder. In clinical field, their use was highly associated with addiction rate and considered as limiting problem for their prescription (20). 70% of students using Benzodiazepines by valid prescription to one of their family, the remaining forced difficulty to have these drugs by legal ways. Surprisingly, 14 students (1.64%) prefer the use of ophthalmic and nasal drops containing Naphazoline, Chlorpheniramine Maleate (Prisoline) orally for sleep induction and report a rapid effect with easily purchasing from the pharmacy. This needs further investigation and restriction for prescribing. Triprolidine antihistamine and pseudoephedrine decongestant combination, fluoxetine, Diazepam, atropine, haloperidol, chlordiazepoxide + clidinium Bromide combination and Quetiapine shows the lest prevalence among drugs due to prescription restrictions and control in Jordan. Alcohol drinking

was reported in 13.66% of the students, mainly male, and mostly they drinking at the weekend and holiday. Cigarette smoking was reported in more than 44% of student, for male the prefer cigarette and the electric cigar. The male students use hubble-bubble (Narghile) mostly with friends at cafes, on the other hand, female mostly using hubble-bubble (Narghile) and rarely cigarette. Abuse of energy drinks was reported in more than 30% of students. These drinks almost used at the examination periods and some student use up-to 3 bottle daily for 2-3 consecutive days. The main adverse effects reported by the student are palpitation, tremor, chest pain, insomnia and headache. Urination and nausea was reported by 10% of energy drinker student, which is one of the limiting use side effects especially during exam. In this study, mostly, there are no significant variability in abuse of drugs and non-medical substances in different socio-demographic parameters of students, except; students who are lives in city shows a higher prevalence of drug abuse, which could be due to easy getting medication from the wide distribution of private pharmacy. In the other hand, male shows a significant higher prevalence of using non-medical substances comparing to the female. This is mainly due to restriction of alcohol and higher prevalence of cigarette smoking between male in comparison to female. In this study, mostly, all of motivating factors for drugs and non-medical substances use are related to the college environments and study stress. Approximately one half of the students suffering from stress and tray to use drug or substance that make them relaxed especially round examination time. Many students report using drugs substances as a way for enjoyment particularly during holiday and weekend. In the other hand, CNS stimulant was an option for students to have more time for doing their college job and to read more during examination. More than 20% of students have confusion problem especially when they are within group and when lecturer ask them to make presentation, most of these student used drugs daily and less than 10% have had using drug on need. Smoking, coffee and codeine motivation in some students, especially female, was to decrease eating and to get slim body, although some of female reported no reduction in body weight but the get encouragement and more self-confidence.

Strength and limitations: Strength: All of the studies on drug and non-medical substances abuse previously

conducted to the general population and no study was done on college student, the strength of our study is the involvement of a critical group of community which are living under appropriate condition for using substances and wide "acceptable" situation of study overload that encourage the use of these substance.

Limitations: The self-report chemicals use and motivation for use of students considered as an important problem in such cross-sectional studies. In the other hand, the variability in the amount of drugs or non-medical substances used daily is varied between student and other factors should be considered that may affect motivation and substances use like genetic, medical health, environmental, social, and psychological.

Conclusion and recommendations: Antihistamine was the main drug abuse for sleep induction between college students due to cheapest and easily achievable. Prescription control is required to prevent drug abuse, not only for drugs intended for oral or parenteral route of administration. Some students tend to use unexpected dosage form for addiction to cheat the pharmacists to get drugs. Academic guidance is important to investigate any environmental, academic, social, and psychological problems, which may be a cause for drug abuse between students. Self-confidential and awareness courses for college student are essential to be one of the academic requirement in college stage.

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