Research Paper

Prevalence of Substance Abuse among Medical Students and Outcomes of Smoking Cessation Treatments in Saudi Arabia

NAIF ABDULLAH ALSUGHIER* AND ABDULMAJEED ALKHAMEES

Department of Psychiatry, College of Medicine, Qassim University, Buraydah 52571, Saudi Arabia

In Saudi Arabia, the intake of alcohol or other addictive substances is deemed illegal, according to Islamic Sharia norms. Despite that, alcohol abuse is the most common substance misuse form in Saudi Arabia's addiction facilities and specialized psychiatric centres, according to reports. To estimate the prevalence of alcohol and drug use as well as to determine perception and the self-reported consequences of them among medical students in Saudi Arabia. A sectional study was conducted, including a non-probability snowball sample of medical students in the Kingdom of Saudi Arabia. An anonymous online self-administered Arabic questionnaire through social media platforms was utilized, including sociodemographic characteristics, four questions from the core, alcohol and drug survey, and the alcohol, smoking, and substance involvement screening test (Arabic version 3.0). A total of 632 students were included in the study. The majority of students were females (65.2 %) and aged between 21 y and 25 y (75 %). The most used substances were tobacco products (27.2 %), followed by sedatives/sleeping pills (8.4 %) and alcoholic beverages (4 %). The universities did not differ significantly in any of the substance use aspects, namely lifetime substance use, substance use urge, substance use problems, and substance use failures. A significant association has been observed between universities as regards campus policies on alcohol and drugs χ^2 (3)=15.13, p=0.002; the presence of a campus prevention program for alcohol and drugs χ^2 (3)=10.28, p=0.016; campus concerns about drugs and alcohol prevention χ^2 (3)=14.29, p=0.003. Substance abuse among medical students was low except for tobacco products. Substance abuse problems and substance abuse-related failures were significantly associated with the lifetime substance use, frequency, and urge to consume.

Key words: Substance abuse, cancer, tobacco, smoking cessation

Substance Use Disorder (SUD) is a serious illness that develops as a result of long-term drug use[1]. Psychoactive substances impact mental processes such as perception, consciousness, cognition, mood, and emotions[2]. This condition is characterized by continued usage of the substance despite considerable unfavourable outcomes. SUD imposes significant physical, psychological, and financial costs on users themselves, their families, and society[1]. Abuse of alcohol and other substances is now a significant health and social problem[1]. Tobacco use has long been a leading cause of chronic diseases like cancer, chronic lung disease, diabetes, and cardiovascular disease. However, it is now a significant concern among college students worldwide[3]. According to a recent World Health Organization (WHO) estimate, there are around 2 billion alcoholics, 1.3 billion smokers, and 185 million drug users globally[4]. This problem is particularly prevalent among college students, with over 23 % of them being found to use substances that fulfil the criteria for substance abuse and dependence[3]. University is a period of transition when students live independently with less direct parental supervision, rely on making their own decisions, face intense academic pressures, and form new social groups with values that are less restrictive than parental values. That may encourage young kids to engage in dangerous behaviours such as smoking, drinking, and using drugs[5].

According to research performed among students in Italy, 28.0 % smoked cigarettes, while 23.2 % admitted to drinking alcohol. Nearly half of the students had experienced an illicit substance, with cannabis (46.7 %) the most commonly used, followed by cocaine (13.3 %)[5]. It is similar in the Arab countries even though these substances are not as available. A survey of substance abuse among students in Lebanon found that 20.9 % of students had ever drunk alcohol, 12.3

***Address for correspondence**
E-mail: n.alsughier@qu.edu.sa

% had used cannabis, and 11 % had used hypnotics. However, just 3.3 % had used cocaine, and only 3.6 % had used hallucinogenic drugs. Substance abuse among undergraduate students in Kuwait is 29.9 %; this has been shown to be high, requiring early detection and preventive measures[5]. Excessive alcohol use is frequent among medical students and professionals all over the world, according to studies[3]. Students have overused substances like tobacco, alcohol, cannabis, and numerous allopathic medicines for a variety of reasons despite their well-known negative consequences[6].

In Saudi Arabia, the intake of alcohol or other addictive substances is deemed illegal, as the law is founded on Islamic Sharia norms that prohibit the consumption of any amount of alcohol or other substances[3]. There is a scarcity of information about the scope of the problem in Saudi Arabia. However, according to Saudi Arabia's Ministry of Health, outpatient visits and inpatient admissions to specialized mental facilities increased significantly in 2007 compared to 2003[3]. Alcohol abuse is the most common substance misuse form in Saudi Arabia's addiction facilities and specialized psychiatric centres, according to reports. Furthermore, it has been observed that the use of amphetamines and cannabis is increasing[3]. Everyday life pressures, particularly those linked with the study of medicine, should be managed with caution because they may have an impact on medical students' general well-being and learning outcomes and also give rise to alcohol or substance abuse[3]. The primary elements that may lead to alcohol and other substance misuse were revealed to friends, peer pressure, life difficulties, tobacco smoking, and curiosity[3].

Tobacco use is the most serious global health problem, causing more than 8 million deaths per year. It is a major risk factor for cardiovascular and respiratory diseases, cancer, and many other debilitating medical problems[6]. Nicotine induces feelings of pleasure by activation of reward pathways in the brain, which is mediated by dopamine. Chronic nicotine use increases the number of nicotine receptors in the brain. Eventually, more nicotine is needed to achieve the desired effect and result in tolerance and dependence[7]. Abrupt cessation of smoking can cause withdrawal symptoms, including craving, irritability, anxiety, concentration problems, and sleep disturbance[8]. Smoking cessation substantially reduces mortality and morbidity, improves life expectancy, and decreases healthcare costs associated with smoking-related issues[9]. Pharmacotherapies for smoking can increase cessation rates by about two to three-fold[10]. Several pharmacological agents can be used in smoking cessation. The Food and Drug Administration has approved many medications for this purpose; Nicotine Replacement Therapy (NRT), bupropion, and varenicline[11].

This study aims to estimate the prevalence of alcohol and drug use as well as to determine the perception and the self-reported consequences of them among medical students in Saudi Arabia and to evaluate the efficacy of smoking cessation pharmacological treatments.

MATERIALS AND METHODS

A cross-sectional study for all medical students in the Kingdom of Saudi Arabia was conducted. Students got the Arabic anonymous online self-administered questionnaire through social media platforms (Twitter and WhatsApp). The contents of the questionnaire were sociodemographic characteristics such as age in years, sex, academic year, living status, marital status, family income, part-time job, four questions from the Core Alcohol and Drug Survey, which is validated WHO questionnaire that assess student's perceptions of their medical school's alcohol and drug policy[12] and the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST; Arabic version 3.0)[13], which is a self-administered model core questionnaire, was adapted from a validated WHO questionnaire. The adapted ASSIST questionnaire was divided into four sections; demographic information; lifetime prevalence of substance use (tobacco, alcohol, stimulants, cocaine, opioids, hypnotics, and hallucinogens); frequency of substance use in the previous 3 mo and the impact of substance use on the student's academic performance, health, and life in terms of social, financial, psychological factors, and legal problems. A question on the questionnaire asked if the students thought substance misuse was a frequent problem that needed to be addressed and handled. The questionnaire's average test-retest reliability coefficient (kappa) ranged from 0.90 to 0.58. No personal information was required, such as name, phone number, study year, or address. This was done to maintain privacy and encourage participation and full admission of drug and alcohol usage.

The total number of medical students enrolled in Saudi Arabian medical schools throughout the academic year 2023-2024 accounts for 26 216

students. The sample size was calculated using the Epi Info program, based on a 95 % confidence interval, a 5 % margin of error, and a prevalence of SUD of 7 %-8 % from a recent Saudi study[14]. The estimated sample size was 379.

Because of limitations in time, cost, and accessibility, a non-probability snowball sampling technique was utilized to recruit the medical students to participate in the online questionnaire.

Criteria:

Saudi medical students of both sexes who live in Saudi Arabia and have social media accounts.

Statistical analysis:

A frequency analysis was conducted to assess the prevalence of substance use, including lifetime substance use, substance use frequency, substance use urge, substance use problems and failures, and substance use concerns. A Pearson's correlation analysis was performed to investigate the relationship of substance use with substance use problems and failures. Finally, a series of one-way Analysis of Variances (ANOVAs) between subjects was employed to explore differences in substance use among universities, whereas a series of Chi-square (χ^2) tests of association was conducted to evaluate differences in substance use policies among universities. All data were analysed using Statistical Package for Social Sciences (SPSS), version 28.0 and Statistical significance was determined at a $p<0.05$.

RESULTS AND DISCUSSION

A descriptive analysis was conducted to evaluate the sociodemographic characteristics of the sample (n=632). The majority of students were women (65.2 %), aged between 21 y to 25 y (75 %). Almost a 1/3rd of them were in their 5th y of studies (35.1 %), with a Grade Point Average (GPA) of 4.5 to 5.0 (39.1 %). Most of them were single (94.9 %) and lived with their family (90.7 %) in a household of 5 to 7 family members (45.1 %) and a family income of >20 000 SAR (Table 1).

A frequency analysis was performed to explore the prevalence of non-medically prescribed substance use (n=632). The most used substances were tobacco products (27.2 %), followed by sedatives/sleeping pills (8.4 %) and alcoholic beverages (4 %). The least used substance was cocaine (0.5 %). Regarding substance use in the past 3 mo, tobacco products were the most frequently used substances, with 13 % of the respondents using them daily or almost daily (13 %). None of the students used alcoholic beverages, inhalants, hallucinogens, and opioids almost daily, while only one individual reported taking cocaine once or twice in the last 3 mo (Table 2 and Table 3).

TABLE 1: DESCRIPTIVE ANALYSIS ON THE SOCIODEMOGRAPHIC CHARACTERISTICS OF THE SAMPLE (n=632)

	n	(%)
Gender		
Male	220	34.8
Female	412	65.2
Age (y)		
18-20	108	17.1
21-25	474	75
26-30	41	6.5
31-35	5	0.8
>35	4	0.6
Marital status		
Single	600	94.9
Married	26	4.1
Divorced	5	0.8
Widowed	1	0.2
Number of family members		
2-4	67	10.6
5-7	285	45.1
8-10	232	36.7
45609	33	5.2
>14	15	2.4

Monthly family income (SAR)		
1000-4999	85	13.4
5000-9999	78	12.3
10 000-14 999	129	20.4
15 000-20 000	131	20.7
>20 000	209	33.1
Residence place		
Alone	36	5.7
With roommate(s)	13	2.1
With fraternity/sorority	10	1.6
With family	573	90.7
Academic year		
Pre-med-1st y	36	5.7
MD (1st and 2nd) y	47	7.4
MD (2nd and 3rd) y	115	18.2
MD (3rd and 4th) y	111	17.6
MD (4th and 5th) y	225	35.6
Internship	98	15.5
GPA		
<2.5	3	0.5
2.9-2.5	18	2.8
3.4-3.0	53	8.4
3.9-3.5	112	17.7
4.0-4.4	199	31.5
4.5-5.0	247	39.1

TABLE 2: DESCRIPTIVE ANALYSIS ON LIFETIME SUBSTANCE USE (n=632)

	n	(%)
Tobacco products		
No	460	72.8
Yes	172	27.2
Alcoholic beverages		
No	607	96.0
Yes	25	4.0
Cannabis		
No	609	96.4
Yes	23	3.6
Cocaine		
No	629	99.5
Yes	3	0.5
Amphetamine-type stimulants		
No	617	97.6
Yes	15	2.4
Inhalants		
No	625	98.9
Yes	7	1.1
Sedatives or sleeping pills		
No	579	91.6
Yes	53	8.4
Hallucinogens		
No	626	99.1
Yes	6	0.9
Opioids		
No	624	98.7
Yes	8	1.3

TABLE 3: DESCRIPTIVE ANALYSIS ON SUBSTANCE USE FREQUENCY IN THE PAST 3 MO (n=632)

	n	(%)
Tobacco products		
Never	498	78.8
Once or twice	30	4.7
Monthly	9	1.4
Weekly	13	2.1
Almost daily	82	13.0
Alcoholic beverages		
Never	617	97.6
Once or twice	13	2.1
Weekly	2	0.3
Cannabis		
Never	620	98.1
Once or twice	8	1.3
Monthly	3	0.5
Almost daily	1	0.2
Cocaine		
Never	629	99.5
Once or twice	1	0.2
Weekly	1	0.2
Almost daily	1	0.2
Amphetamine-type stimulants		
Never	623	98.6
Once or twice	4	0.6
Monthly	1	0.2
Weekly	1	0.2
Almost daily	3	0.5
Inhalants		
Never	628	99.4
Once or twice	4	0.6
Sedatives or sleeping pills		
Never	591	93.5
Once or twice	19	3.0
Monthly	7	1.1
Weekly	8	1.3
Almost daily	7	1.1
Hallucinogens		
Never	629	99.5
Once or twice	3	0.5
Opioids		
Never	626	99.1
Once or twice	4	0.6
Monthly	2	0.3

Similar to the above observations, most individuals reported craving for tobacco products in the past 3 mo almost daily (11.1 %), whereas the least daily or nearly daily urges were identified in alcoholic beverages (0.2 %), amphetamine-type stimulants (0.2 %), inhalants (0.2 %), and opioids (0.2 %). Accordingly, the use of tobacco products was most commonly reported as being related to problems in several areas of one's life in the past 3 mo; once or twice (4.1 %), monthly (0.6 %), weekly (0.8 %), and almost daily (1.7 %). In contrast, the almost daily problems were expressed for alcoholic beverages (0.2 %), amphetamine-type stimulants (0.2 %), sedatives/sleeping pills (0.2 %), and hallucinogens (0.2 %). Finally, regarding the failures to complete one's normal obligations in the past 3 mo due to the use of specific substances, tobacco products were the most frequently related to such failures; once or twice (1.3 %), monthly (0.6 %), weekly (0.8 %), and almost daily (1.3 %). The least daily or nearly daily failures were observed for alcoholic beverages (0.2 %), hallucinogens (0.2 %), and opioids (0.2 %) (Table 4-Table 6).

Regarding substance use concerns expressed by friends and relatives, most of them were related to tobacco product users, both as to use in the last 3 mo (7.8 %) and beyond the last 3 mo (4.7 %). The least concerns in the last 3 mo were expressed for amphetamine-type stimulants (0.2 %), inhalants (0.2 %), and hallucinogens (0.2 %) users. For the period beyond the last 3 mo, the lowest numbers of concerns were seen for alcoholic beverages (0.2 %), cocaine (0.2 %), and inhalants (0.2 %) users. Similarly, tobacco products users reported the most attempts to reduce use in the last 3 mo (7.6 %) and beyond the last 3 mo (4.4 %). The least attempts within the last 3 mo were observed for alcoholic beverages (0.2 %), cocaine (0.2 %), inhalants (0.2 %), and hallucinogens (0.2 %). Beyond the last 3 mo, the lowest numbers were reported for cocaine (0.2 %) and inhalants (0.2 %) (Table 7 and Table 8).

A Pearson's correlation analysis was employed to investigate whether substance use-related health, social, legal, or financial problems were associated with lifetime substance use, substance use frequency, and substance use urge. The results indicated that substance use problems were significantly and positively correlated with lifetime substance use ($r=0.37$, $p<0.001$), substance use frequency ($r=0.39$, $p<0.001$), and substance use urge ($r=0.33$, $p<0.001$). Furthermore, it was assessed if substance use-related failures to fulfil normal obligations were related to lifetime substance use, substance use frequency, and substance use urge. Substance use-related failures were significantly and positively related to lifetime substance use ($r=0.29$, $p<0.001$), substance use frequency ($r=0.33$, $p<0.001$), and substance use urge ($r=0.31$, $p<0.001$) (Table 9).

The universities did not differ significantly in any of the substance use aspects, namely lifetime substance use ($F3351=1.16$, $p=0.33$, $\eta^2=0.010$), substance use frequency ($F3351=0.73$, $p=0.54$, $\eta^2=0.006$), substance use urge ($F3351=1.31$, $p=0.27$, $\eta^2=0.011$), substance use problems ($F3351=0.65$, $p=0.58$, $\eta^2=0.006$), and substance use failures ($F3351=0.30$, $p=0.82$, $\eta^2=0.003$) (Table 10).

A Pearson's χ^2 test was conducted to assess if there is a significant relationship between campus policies on alcohol, drugs and different universities (n=355). The following universities were included in the analysis; Taibah University (n=150), Qassim University-College of Medicine (n=80), Unaizah College of Medicine (n=72), and Alrayan Colleges (n=53). The results showed a significant association between campus policies on alcohol, drugs and universities, χ^2 (3)=15.13, p=0.002, and Cramer's V=0.34 (Table 11).

A significant association between the presence of a campus prevention program for alcohol and drugs, and the type of university has been shown, χ^2 (3)=10.28, p=0.016, and Cramer's V=0.33 (Table 11).

A significant association, χ^2 (3)=14.29, p=0.003, and Cramer's V=0.29, has been observed between campus concerns about drugs and alcohol prevention and the type of university (Table 11).

A non-significant association was observed between the active efforts to prevent drug and alcohol use on campus and the type of university, χ^2 (3)=3.11, p=0.37, and Cramer's V=0.09 (Table 11).

The overall smoking cessation rate for 1 y was 38 %. The smoking cessation rates for nicotine replacement therapy, varenicline, and bupropion were 46.7 %, 33.8 %, and 30 %, respectively, and were statistically significant (p>0.001) (Table 12).

Saudi Arabia is a higher-income country positioned in Southwest Asia[15]. It is located near areas that suffer from poverty, conflicts, and wars. Such difficulties in those neighbourhoods increase the chance for

illegal drugs to be abused and produced without control[16,17]. Therefore, Saudi Arabia has a main problem, and many seizures of different substances have been recorded over the years[18,19]. Widespread ignorance of the possible ill impacts of certain drugs and legal prohibitions against the illegal use of those drugs constitute an obstacle to any epidemiological study of drug abuse in Saudi Arabia[20].

TABLE 4: DESCRIPTIVE ANALYSIS ON SUBSTANCE USE DESIRE OR URGE IN THE PAST 3 MO (n=632)

	n	(%)
Tobacco products		
Never	483	76.4
Once or twice	44	7.0
Monthly	16	2.5
Weekly	19	3.0
Almost daily	70	11.1
Alcoholic beverages		
Never	611	96.7
Once or twice	13	2.1
Monthly	3	0.5
Weekly	4	0.6
Almost daily	1	0.2
Cannabis		
Never	615	97.3
Once or twice	11	1.7
Monthly	2	0.3
Weekly	4	0.6
Cocaine		
Never	631	99.8
Monthly	1	0.2
Amphetamine-type stimulants		
Never	621	98.3
Once or twice	8	1.3
Monthly	1	0.2
Weekly	1	0.2
Almost daily	1	0.2
Inhalants		
Never	625	98.9
Once or twice	6	0.9
Almost daily	1	0.2
Sedatives or sleeping pills		
Never	591	93.5
Once or twice	24	3.8
Monthly	3	0.5
Weekly	7	1.1
Almost daily	7	1.1
Hallucinogens		
Never	629	99.5

Once or twice	2	0.3
Weekly	1	0.2
Opioids		
Never	626	99.1
Once or twice	3	0.5
Monthly	1	0.2
Weekly	1	0.2
Almost daily	1	0.2

TABLE 5: DESCRIPTIVE ANALYSIS ON PROBLEMS RELATED TO SUBSTANCE USE IN THE PAST 3 MO (n=632)

	n	(%)
Tobacco products		
Never	586	92.7
Once or twice	26	4.1
Monthly	4	0.6
Weekly	5	0.8
Almost daily	11	1.7
Alcoholic beverages		
Never	626	99.1
Once or twice	3	0.5
Monthly	1	0.2
Weekly	1	0.2
Almost daily	1	0.2
Cannabis		
Never	628	99.4
Once or twice	1	0.2
Monthly	2	0.3
Weekly	1	0.2
Cocaine		
Never	629	99.5
Once or twice	1	0.2
Weekly	2	0.3
Amphetamine-type stimulants		
Never	627	99.2
Once or twice	3	0.5
Weekly	1	0.2
Almost daily	1	0.2
Inhalants		
Never	628	99.4
Once or twice	2	0.3
Weekly	2	0.3
Sedatives or sleeping pills		
Never	618	97.8
Once or twice	10	1.6
Weekly	3	0.5
Almost daily	1	0.2

Hallucinogens		
Never	629	99.5
Once or twice	1	0.2
Monthly	1	0.2
Almost daily	1	0.2
Opioids		
Never	624	98.7
Once or twice	2	0.3
Monthly	2	0.3
Weekly	4	0.6

TABLE 6: DESCRIPTIVE ANALYSIS ON FAILURES RELATED TO SUBSTANCE USE IN THE PAST 3 MO (n=632)

	n	(%)
Tobacco products		
Never	607	96.0
Once or twice	8	1.3
Monthly	4	0.6
Weekly	5	0.8
Almost daily	8	1.3
Alcoholic beverages		
Never	626	99.1
Once or twice	3	0.5
Monthly	2	0.3
Almost daily	1	0.2
Cannabis		
Never	629	99.5
Once or twice	1	0.2
Weekly	2	0.3
Cocaine		
Never	629	99.5
Once or twice	2	0.3
Weekly	1	0.2
Amphetamine-type stimulants		
Never	627	99.2
Once or twice	2	0.3
Monthly	2	0.3
Weekly	1	0.2
Inhalants		
Never	629	99.5
Once or twice	3	0.5
Sedatives or sleeping pills		
Never	623	98.6
Once or twice	4	0.6
Monthly	2	0.3
Weekly	3	0.5

Hallucinogens		
Never	628	99.4
Once or twice	2	0.3
Monthly	1	0.2
Almost daily	1	0.2
Opioids		
Never	628	99.4
Once or twice	1	0.2
Weekly	2	0.3
Almost daily	1	0.2

TABLE 7: DESCRIPTIVE ANALYSIS ON THE CONCERNS EXPRESSED ABOUT SUBSTANCE USE (n=632)

	n	(%)
Tobacco products		
Never	553	87.5
Yes (in the last 3 mo)	49	7.8
Yes (not in the past 3 mo)	30	4.7
Alcoholic beverages		
Never	628	99.4
Yes (in the last 3 mo)	3	0.5
Yes (not in the past 3 mo)	1	0.2
Cannabis		
Never	623	98.6
Yes (in the last 3 mo)	5	0.8
Yes (not in the past 3 mo)	4	0.6
Cocaine		
Never	628	99.4
Yes (in the last 3 mo)	3	0.5
Yes (not in the past 3 mo)	1	0.2
Amphetamine-type stimulants		
Never	628	99.4
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	3	0.5
Inhalants		
Never	630	99.7
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	1	0.2
Sedatives or sleeping pills		
Never	611	96.7
Yes (in the last 3 mo)	11	1.7
Yes (not in the past 3 mo)	10	1.6
Hallucinogens		
Never	629	99.5
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	2	0.3
Opioids		
Never	627	99.2
Yes (in the last 3 mo)	5	0.8

TABLE 8: DESCRIPTIVE ANALYSIS ON SUBSTANCE USE REDUCTION ATTEMPTS (n=632)

	n	(%)
Tobacco products		
Never	556	88.0
Yes (in the last 3 mo)	48	7.6
Yes (not in the past 3 mo)	28	4.4
Alcoholic beverages		
Never	626	99.1
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	5	0.8
Cannabis		
Never	626	99.1
Yes (in the last 3 mo)	3	0.5
Yes (not in the past 3 mo)	3	0.5
Cocaine		
Never	630	99.7
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	1	0.2
Amphetamine-type stimulants		
Never	628	99.4
Yes (in the last 3 mo)	2	0.3
Yes (not in the past 3 mo)	2	0.3
Inhalants		
Never	630	99.7
Yes (in the last 3 mo)	1	0.2
Yes (not in the past 3 mo)	1	0.2
Sedatives or sleeping pills		
Never	621	98.3
Yes (in the last 3 mo)	7	1.1
Yes (not in the past 3 mo)	4	0.6
Hallucinogens		
Never	631	99.8
Yes (in the last 3 mo)	1	0.2
Opioids		
Never	629	99.5
Yes (in the last 3 mo)	3	0.5

TABLE 9: PEARSON'S CORRELATION COEFFICIENTS FOR THE RELATIONSHIP OF SUBSTANCE USE FAILURES AND PROBLEMS WITH LIFETIME SUBSTANCE USE, SUBSTANCE USE FREQUENCY, AND SUBSTANCE USE URGE, (n=632)

	1	2	3	4	5
Substance use problems	1				
Substance use failures	0.84**	1			
Lifetime substance use	0.37**	0.29**	1		
Substance use frequency	0.39**	0.33**	0.79**	1	
Substance use urge	0.33**	0.31**	0.63**	0.76**	1

Note: **p<0.001

TABLE 10: DESCRIPTIVE STATISTICS ON SUBSTANCE USE ASPECTS AMONG UNIVERSITIES (n=355)

		n	Mean	Standard deviation
Lifetime substance use	Taibah University	150	0.33	0.69
	Qassim University-College of Medicine	80	0.34	0.78
	Unaizah College of Medicine	72	0.54	1.20
	Alrayan Colleges	53	0.38	0.56
Substance use frequency	Taibah University	150	1.07	0.17
	Qassim University-College of Medicine	80	1.07	0.18
	Unaizah College of Medicine	72	1.10	0.23
	Alrayan colleges	53	1.10	0.20
Substance use urge	Taibah University	150	1.08	0.19
	Qassim University-College of Medicine	80	1.07	0.17
	Unaizah College of Medicine	72	1.13	0.28
	Alrayan Colleges	53	1.09	0.20
Substance use problems	Taibah University	150	1.02	0.14
	Qassim University-College of Medicine	80	1.02	0.06
	Unaizah College of Medicine	72	1.04	0.24
	Alrayan Colleges	53	1.05	0.15
Substance use failures	Taibah University	150	1.02	0.15
	Qassim University-College of Medicine	80	1.01	0.052
	Unaizah College of Medicine	72	1.02	0.11
	Alrayan Colleges	53	1.03	0.13

TABLE 11: DIFFERENCES BETWEEN UNIVERSITIES REGARDING CAMPUS POLICIES ON ALCOHOL AND DRUGS (n=355)

Campus policies on alcohol and drugs	No	Yes
Taibah University	0.031	0.969
Qassim University-College of Medicine	0.267	0.733
Unaizah College of Medicine	0.04	0.96
Alrayan Colleges	0.25	0.75
Campus prevention program		
Taibah University	0.186	0.814
Qassim University-College of Medicine	0.308	0.692
Unaizah College of Medicine	0.143	0.857
Alrayan Colleges	0.52	0.48
Campus concern about prevention		
Taibah University	0.182	0.818
Qassim University-College of Medicine	0.393	0.607
Unaizah College of Medicine	0.083	0.917
Alrayan Colleges	0.4	0.6
Efforts in alcohol and drug prevention on campus		
Taibah University	0.88	0.12
Qassim University-College of Medicine	0.913	0.088
Unaizah College of Medicine	0.861	0.139
Alrayan Colleges	0.811	0.189

TABLE 12: DESCRIPTIVE ANALYSIS ON SMOKING CESSATION RATES USING PHARMACOLOGICAL AGENTS (n=172)

Medications	n	(%)	1 y cessation	1 y cessation (%)
Nicotine replacement therapy	77	44.7	36	46.7
Varenicline	65	37.7	22	33.8
Bupropion	30	17.4	9	30

In the current study, we aimed to determine the prevalence of tobacco, alcohol and drug use among medical students in Saudi Arabia, as well as determine the self-reported consequences of medical student substance use and identify perceptions of medical school substance use policies.

Smoking is considered one of the most common health problems around the world, and it has a significant devastating impact on health, increasing morbidity and mortality rates. Smoking is one of the most commonly abused substances in Saudi Arabia[21]. In the current study, tobacco products were the most used substance among medical students (27.2 %). This is higher than reported in a previous study conducted among King Saud University medical students, which reported that the prevalence of smoking was 11.65 %[22] as well as a study by Albuhairan *et al*. which was conducted among adolescents in 13 regions of Saudi Arabia reported a prevalence of 16.2 %[23]. Moreover, another study conducted among university students in Jazan region showed that 20.7 % of the students were smokers[24]. Furthermore, our incidence of smoking was lower than reported in some other studies conducted internationally, including a study of Chege *et al*. among undergraduate medical students at the University of Nairobi, which showed that 17.2 % of the students reported consuming tobacco products[25], as well as study of Arora *et al*., which showed that the use of tobacco product was reported in 25.27 % of the medical students in North India (where 23.1 % as smoking and 2.17 % as chewing)[26] and was 22.5 % among university students in Egypt[27]. Some other studies reported a significantly lower incidence of

tobacco product use in university students, including the study among Canadian medical students, which reported that only 6.8 % of the students reported smoking[28].

The high prevalence of use of tobacco products in the current study can be explained by some reasons. First, smoking was not the main outcome in studies conducted in Saudi Arabia; therefore, underestimating the prevalence of smoking could be possible in those studies. Second, in comparison with international studies, smoking was low because of the availability of other products, including alcoholic beverages, which was reported in 40.2 % of undergraduate students in a study by Nairobi University[25], 19.13 % in a study of Arora *et al*.[26], and 46.4 % among Canadian medical students[28]. In comparison, the consumption of alcoholic beverages was reported in only 4 % of medical students in the current study. In a study by Karn *et al*., among medical students, the authors showed that alcohol was the most commonly used substance with an overall lifetime prevalence of 58 %, followed by cigarette smoking and illegal drug abuse at 21.9 % and 13.7 %, respectively[29].

Other used substances included sedatives/sleeping pills, which were reported in 8.4 % of the students, cannabis (3.6 %), and amphetamine-type stimulants (2.4 %). Another study conducted among medical students at King Saud University in order to assess the prevalence of using sedative pills reported a higher prevalence than our study, indicating that 17.0 % of them reported using sedative pills[22]. Moreover, another Turkish study reported that sedative drugs were used in 22.5 % of junior students, 20 % of senior students, and 9 % of residents[30]. Furthermore, another study conducted in the Republic of Macedonia reported that over 50 % of students had used alcohol, while 12 % of them used hypnotics[31]. In a previous study conducted to investigate the prevalence of abuse of stimulants among medical students in Riyadh, the authors showed that 5.8 % of the participants reported using stimulant drugs; however, 57.4 % of those students reported using them medically as being Attention Deficit and Hyperactivity Disorder (ADHD) patients, and 42.6 % had not diagnosed with ADHD which indicated similar prevalence of abuse of stimulants as our study (2.46 %)[32]. However, the prevalence of abuse of stimulants in our study is lower than reported in different studies, ranging between 7.5 % and 10.4 %[33-35]. Legal prohibition of many illicit drugs and religious prohibition of them were the reasons for the lower incidence of consuming many of these drugs in the current study, except for tobacco products, which are legally distributed in Saudi Arabia.

In addition, the current study showed that substance use problems and substance use-related failures were significantly associated with lifetime substance use, frequency, and urge to consume. Problems in several areas of one's life and failures to complete one's normal obligations were reported most commonly among users of tobacco products. One report in Canada showed that there is an association between offending and substance use, where the study showed that around 42 % of crimes might not occur if the offender was not under the impact of substances or seeking them[36]. Furthermore, different studies reported a positive relationship between the use of illegal substances and the prevalence of mental illness[37,38]. This is helpful in raising our understanding of the association between illicit substance use and psychological problems and provides a clue to the possibility of benefit from any preventive or treatment strategies that focus on this relation[39].

The current study showed the differences between different universities considering the presence of campus policies on alcohol and drugs, campus prevention programs, campus concerns about prevention, and efforts in alcohol and drug prevention on campus. Increasing the focus on increasing the awareness of students toward the problems associated with dependence on illicit drugs could be important in reducing the prevalence of these medications. Moreover, helping the students cope with different stressors faced because of social life or college would significantly improve the psychological status of the students.

The current study showed that the overall success rate of smoking cessation for one year using pharmacological agents was 38 %; the highest overall success rate was found in the nicotine replacement therapy group at 46 %, but there was only a modest difference with other medications. Recently, a meta-analysis study demonstrated that varenicline, bupropion and nicotine replacement therapy were all more effective than placebo in smoking cessation at 1 y[40]. Pharmacological treatments have been shown to be effective, with successful cessation rates ranging from 22 % to 45 %[41], which is similar to cessation rates in this study 38 %.

This study had some limitations, including

depending on a self-reported questionnaire, which may lead to some personal bias where some students may not report their dependence on illicit drugs, making them choose smoking instead, and leading to overestimating the prevalence of smoking over other illegal drugs. Moreover, the study depended on some information from the past, which may lead to some recall bias.

The current study showed low substance use among medical students except for tobacco products, which was reported by more than a quarter of the sample. Substance use, particularly tobacco products, was associated with problems in one's life. In addition, the current study showed that substance use problems and substance use-related failures were significantly associated with lifetime substance use, frequency, and urge to consume. Pharmacological therapy for smoking cessation is safe and efficacious and, therefore, recommended to be offered to every smoker willing to cease smoking. More investigations to understand the reasons for high tobacco product use among medical students should be conducted, as well as to understand the prevalence of substance use in non-medical students in Saudi Arabia.

Ethical approval:

Ethical approval of the study was obtained from the Research Ethics Committee at Qassim University. The informed consent was clear, indicating the objective of the study. Participants were assured that this was an online questionnaire and that the names of participants, schools, or any personal information were not required before filling out the questionnaire.

Conflict of interests:

The authors declared no conflict of interests.

REFERENCES

1. Saquib N, Rajab AM, Saquib J, AlMazrou A. Substance use disorders in Saudi Arabia: A scoping review. Subst Abuse Treat Prev Policy 2020;15:1-2.
2. Drugs (psychoactive). World Health Organization. Western Pacific; 2021.
3. Al-Haqwi AI. Perception among medical students in Riyadh, Saudi Arabia, regarding alcohol and substance abuse in the community: A cross-sectional survey. Subst Abuse Treat Prev Policy 2010;5:1-6.
4. Arora A, Kannan S, Gowri S, Choudhary S, Sudarasanan S, Khosla PP. Substance abuse amongst the medical graduate students in a developing country. Indian J Med Res 2016;143(1):101-3.
5. Al-Hinaai H, Al-Busaidi I, Al Farsi B, Al Saidi Y. The prevalence of substance misuse and its effects among Omani college students: A cross-sectional study. Oman Med J 2021;36(1):e224.
6. Tobacco. World Health Organization; 2024.
7. Benowitz NL. Pharmacology of nicotine: Addiction, smoking-induced disease, and therapeutics. Annu Rev Pharmacol Toxicol 2009;49(1):57-71.
8. Hatsukami DK, Stead LF, Gupta PC. Tobacco addiction. Lancet 2008;371(9629):2027-38.
9. Asaria P, Chisholm D, Mathers C, Ezzati M, Beaglehole R. Chronic disease prevention: Health effects and financial costs of strategies to reduce salt intake and control tobacco use. Lancet 2007;370(9604):2044-53.
10. Fiore MC. A clinical practice guideline for treating tobacco use and dependence: A US public health service report. JAMA 2000.
11. Herman AI, Sofuoglu M. Comparison of available treatments for tobacco addiction. Curr Psychiatry Rep 2010;12:433-40.
12. Presley CA, Meilman PW, Lyerla R. Development of the core alcohol and drug survey: Initial findings and future directions. J Am Coll Health 1994;42(6):248-55.
13. Group WA. The Alcohol, Smoking and Substance Involvement Screening Test (ASSIST): Development, reliability and feasibility. Addiction 2002;97(9):1183-94.
14. Bassiony M. Substance use disorders in Saudi Arabia. J Substance Use 2013;18(6):450-66.
15. Saudi Arabia. Wikipedia; 2024.
16. Dimitry L. A systematic review on the mental health of children and adolescents in areas of armed conflict in the Middle East. Child Care Health Dev 2012;38(2):153-61.
17. Bergen-Cico DK. War and drugs: The role of military conflict in the development of substance abuse. Routledge 2015.
18. Dabbagh R, Rawson R. Captagon use in Saudi Arabia: What do we know? Int Addict Rev 2019;2:22-30.
19. United Nations Office on Drugs and Crime (UNODC) CRIME UNOODA. World Drug Report; 2014.
20. Roy RK, Roy DK, Goit RK. Substance abuse among medical students-A survey in a medical college in Nepal. J Nepal Med Coll 2018;16(1):71-5.
21. Baig M, Bakarman MA, Gazzaz ZJ, Khabaz MN, Ahmed TJ, Qureshi IA, *et al*. Reasons and motivations for cigarette smoking and barriers against quitting among a sample of young people in Jeddah, Saudi Arabia. Asian Pac J Cancer Prev 2016;17(7):3483-7.
22. Al-Sayed AA, Al-Rashoudi AH, Al-Eisa AA, Addar AM, Al-Hargan AH, Al-Jerian AA, *et al*. Sedative drug use among king saud university medical students: A cross-sectional sampling study. Depress Res Treat 2014;2014(1):378738.
23. AlBuhairan FS, Tamim H, Al Dubayee M, AlDhukair S, Al Shehri S, Tamimi W, *et al*. Time for an adolescent health surveillance system in Saudi Arabia: Findings from "Jeeluna". J Adolescent Health 2015;57(3):263-9.
24. Bahhawi TA, Albasheer OB, Makeen AM, Arishi AM, Hakami OM, Maashi SM, *et al*. Depression, anxiety, and stress and their association with khat use: A cross-sectional study among Jazan University students, Saudi Arabia. Neuropsychiatr Dis Treat 2018:2755-61.
25. Chege M. Prevalence of substance use among undergraduate medical students at the University of Nairobi. Doctoral dissertation, University of Nairobi; 2019.
26. Arora A, Kannan S, Gowri S, Choudhary S, Sudarasanan S, Khosla PP. Substance abuse amongst the medical graduate students in a developing country. Indian J Med Res 2016;143(1):101-3.
27. Khafagy M, Gomaa Z, Elwasify M. Substance use patterns among university students in Egypt. Middle East Curr

Psychiatry 2021;28(1):1-9.
28. Bahji A, Danilewitz M, Guerin E, Maser B, Frank E. Prevalence of and factors associated with substance use among Canadian medical students. JAMA Netw Open 2021;4(11):e2133994.
29. Karn M, Kandel D, Subedi N. Prevalence of substance abuse and its associated factors among medical students: A cross-sectional study. F1000Research 2022;10:797.
30. Akvardar Y, Demiral Y, Ergor G, Ergor A. Substance use among medical students and physicians in a medical school in Turkey. Soc Psychiatry Psychiatr Epidemiol 2004;39:502-6.
31. Mancevska S, Bozinovska L, Tecce J, Pluncevik-Gligoroska J, Sivevska-Smilevska E. Depression, anxiety and substance use in medical students in the Republic of Macedonia. Bratislavske Lekarske Listy 2008;109(12):568-72.
32. Alrakaf FA, Binyousef FH, Altammami AF, Alharbi AA, Shadid A, Alrahili N. Illicit stimulant use among medical students in Riyadh, Saudi Arabia. Cureus 2020;12(1):e6688.
33. Tuttle JP, Scheurich NE, Ranseen J. Prevalence of ADHD diagnosis and nonmedical prescription stimulant use in medical students. Acad Psychiatry 2010;34:220-3.
34. Weyandt LL, Janusis G, Wilson KG, Verdi G, Paquin G, Lopes J, *et al*. Nonmedical prescription stimulant use among a sample of college students: Relationship with psychological variables. J Atten Disord 2009;13(3):284-96.
35. Kirkpatrick ZA, Boyd CJ. Stimulant use among undergraduate nursing students. J Addict Nurs 2018;29(2):84-9.
36. Young MM, de Moor C, Kent P, Stockwell T, Sherk A, Zhao J, *et al*. Attributable fractions for substance use in relation to crime. Addiction 2021;116(11):3198-205.
37. Baker A, Lee NK, Claire M, Lewin TJ, Grant T, Pohlman S, *et al*. Drug use patterns and mental health of regular amphetamine users during a reported 'heroin drought'. Addiction 2004;99(7):875-84.
38. Chengappa KR, Levine J, Gershon S, Kupfer DJ. Lifetime prevalence of substance or alcohol abuse and dependence among subjects with bipolar I and II disorders in a voluntary registry. Bipolar Disord 2000;2(3):191-5.
39. Alfaifi A, El-Setouhy M. Over time prevalence of illicit substance use in Saudi Arabia. World Fam Med J 2022;20(9).
40. Eisenberg MJ, Filion KB, Yavin D, Bélisle P, Mottillo S, Joseph L, *et al*. Pharmacotherapies for smoking cessation: A meta-analysis of randomized controlled trials. Can Med Assoc J 2008;179(2):135-44.
41. Mills EJ, Wu P, Lockhart I, Thorlund K, Puhan M, Ebbert JO. Comparisons of high-dose and combination nicotine replacement therapy, varenicline, and bupropion for smoking cessation: A systematic review and multiple treatment meta-analysis. Ann Med 2012;44(6):588-97.

This article was originally published in a special issue, "Integrative Approaches in Biomedical Sciences for Drug Discovery and Development" Indian J Pharm Sci 2024:86(6) Spl Issue "19-34"