

## Prevalence of Substance Use among Medical and non-Medical Students in the University of Kufa

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### Article information:

Received: 2024-08-10

Accepted: 2024-09-03

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<https://doi.org/10.70863/karbalajm.v17i2.2150>

### Abstract

**Background:** Substance use involves psychoactive drug consumption (both legal and illegal), including alcohol, tobacco, heroin, cocaine, and medically restricted drugs. It's a global public health issue, with over 275 million people using substances, with a 22% increase since 2010. In Iraq, substance use is a major concern, especially among males. This study aims to assess the prevalence of substance use among students at the University of Kufa and to identify its associated factors.

**Methods:** A cross-sectional study was conducted at the University of Kufa from February 15th to March 15th, 2023. Socio-demographic data was collected using a specially designed questionnaire, and 396 participants from four different colleges were randomly selected.

**Results:** The study enrolled 396 participants with almost equal proportions from each included college. The mean age was 21.4 years. More than half of the participants were females. Substance use of any type was reported by a total of 159 students, giving an overall prevalence of 40.2%. Tobacco use was the most commonly used substance in recent years (19.9%) which was significantly higher among males ( $P < 0.001$ ). Painkiller use was the second most common (10.1%) with a significantly higher prevalence among females ( $P = 0.002$ ).

**Conclusion:** This study concludes that substance use is present among college students mainly tobacco and painkillers. Peer pressure is one of the important factors that influence substance use, especially among the vulnerable age group of 20-24 years.

**Keywords:** substance use; university students; Tobacco; Iraq.

### Introduction

Substance use refers to the use of psychoactive drugs and substances, whether legal or illegal, including alcohol, tobacco, heroin, cocaine, and other drugs restricted for medical use. It is an emerging public health concern worldwide [1]. According to recent United Nation's reports, approximately 1.3 billion use nicotine, alcohol is used by 2.3 billion people, and illicit drugs are used by about 296 million people worldwide [2]. The number of substance users has increased by 22% since 2010 [2-3]. Substance use in the Middle East presents a complex and evolving challenge influenced by cultural, social, and political factors. Despite strict drug control measures, there is evidence of increasing substance use and associated consequences [4]. In Iraq, substance use, especially tobacco and alcohol, is a public

health concern, particularly among males. Current estimates are likely under-reported due to cultural constraints and reliance on self-reported surveys [5].

The Diagnostic and Statistical Manual of Mental Disorders (DSM) is a widely recognized classification system for diagnosing and researching mental disorders. The latest version, DSM-5, defines the essential feature of a substance use disorder as "a cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems." [6-7]. Tolerance was defined by DSM-5 as "Individual requires increasingly higher doses of the substance to achieve the desired effect, or the usual dose has a reduced effect". Whereas withdrawal was defined as "a collection of signs and symptoms that occurs

when blood and tissue levels of the substance decrease” [6, 8].

Substance use among university students is regarded as a significant public health concern, as university environments can contribute to the initiation and escalation of substance use behaviors.

Studies show a high prevalence of substance use among university students, with approximately 60% of United States' college students consuming alcohol in the past 30 days. Marijuana is the most commonly used illicit drug among university students, while misuse of prescription stimulants and opioids is also a growing problem [9-10]. The consequences of substance use among university students are diverse, including negative impacts on academic performance, mental health, physical well-being, social relationships, and future employment [9, 11].

Tobacco use is the leading cause of preventable deaths worldwide, responsible for over 8 million deaths annually. It poses serious health risks, including cancer, cardiovascular diseases, respiratory disorders, and reproductive complications [12-13]. The World Health Organization (WHO) Framework Convention on Tobacco Control (FCTC) aims to reduce tobacco consumption and its harm through measures like taxation, advertising restrictions, and smoking cessation programs [14]. In Iraq, the prevalence of tobacco smoking exceeds 20% of the general population, with the highest proportion being among young males under 40. It is prevalent across all socioeconomic groups [15-16].

Alcohol consumption is associated with negative health outcomes, including liver disease, cardiovascular problems, and increased cancer risk. Harmful alcohol use contributes to social and economic burdens, such as impaired productivity, accidents, and increased healthcare costs. Heavy episodic drinking or binge drinking is a concern among young adults and college students, with 30% of US college students and 35% of European students aged 15-16 engaging in binge drinking [17-19].

This study provides insights on substance use prevalence among university students, informing interventions and enabling future research on substance use trends. It aims to assess the prevalence of substance use among students at University of Kufa and to identify its associated factors.

## Materials and Methods

### Study design and setting

An analytic cross-sectional study was conducted at the University of Kufa in Najaf, Iraq. The data collection was performed from February 15th, 2023 till March 15th, 2023. The study sample was obtained using a simple random sampling technique, and the sample size was calculated using the Fisher Formula as follows:

$$\text{Sample Size} = \frac{Z_{1-\alpha/2}^2 p(1-p)}{d^2}$$

$Z = 1.96$ ,  $P =$  the proportion (0.5),  $d =$  relative precision (0.05)

$$\begin{aligned} \text{Sample Size} &= \frac{1.96^2 \times 0.5 * (1 - 0.5)}{0.05^2} \\ &= 384.2 \approx 384 \end{aligned}$$

Two medical colleges (College of Pharmacy and College of Dentistry) and two non-medical colleges (college of basic education and College of English Language) were randomly selected from the list of all colleges in the university. Four hundred questionnaire forms were used to accommodate for any possible non-response, and a total of 396 students were included from the four different colleges. Students in the 1st and 5th stages were excluded.

### Data collection tool

Data was collected after obtaining informed consent from participants using a specially designed questionnaire that was developed and used previously in the Iraqi National Household Survey of Alcohol and Drug Use (2014) as well as in another Iraqi study conducted at Kerbala University [5,20]. The questionnaire included socio-demographic characteristics that included age, sex, stage, marital status, residence (whether living in urban cities, towns, or rural villages), as well as economic status, which was classified according to monthly income into poor (less than 500'000 Iraqi dinars per month), fair (500'000 – 1'000'000 Iraqi dinars per month), and good (more than 1'000'000 Iraqi dinars per month). It also included detailed questions about substance use including whether the students used substances at any time, history of use within the last year and last month, age at starting use, frequency of substance use, as well as knowing other persons who used the same substance. Substances that were queried in the questionnaire included: tobacco, alcohol, cannabis, captagon (fenethylamine), crystal meth (methamphetamine), inhalants, cough syrups, benzhexol, benzodiazepines, tramadol, pain killers (including codeine, pethiding, neodol, etc), somadril (carisoprodol), and other medications (including allermine, methadone, and phenobarbital). Students were encouraged to

respond to the form with honesty and clarity. Students were assured that the information obtained would be kept confidential, and privacy would be maintained throughout the study. No personal information (names, phone numbers, etc.) was requested from the students.

### Ethical approval

Ethical approval was obtained from the research ethical committee in the College of Medicine at the University of Kerbala administration (261/6/7 on 22 January 2023). Approval was also obtained from the University of Kerbala and informed verbal consent was obtained from each student before data collection. Data obtained using questionnaire forms were coded to protect the privacy of the participants, and no personal identification information was collected from the participants.

### Statistical analysis

SPSS<sup>®</sup> software (version 23.0 For Linux<sup>®</sup> operating system) was used to perform statistical analysis for this study. Questionnaire forms were input into a specifically structured database, and statistical analysis was performed. Continuous variables were represented as means  $\pm$  SD, while categorical variables were represented as frequencies and percentages. Student's t-test was used to compare means between two groups, while the chi-square test was used to assess the relationship between categorical variables. Further, the 95% confidence interval (CI) was measured for the prevalence. A p-value of  $\leq 0.05$  was considered statistically significant.

### Result

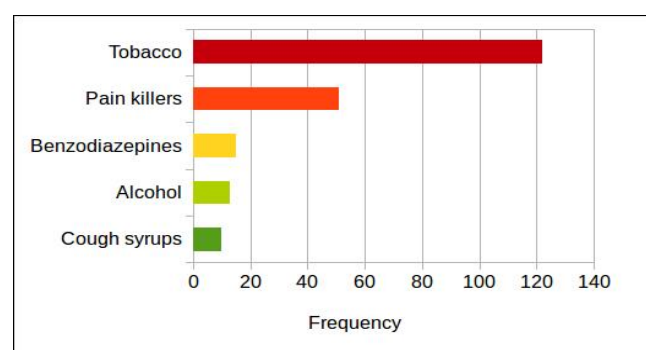
This study included a total of 396 participating students. The age of participants ranged from 18 years to 32 years, with a mean age of 21.4 years. The majority of participants were students of the 2nd grade (48.0%). Female participants formed the larger proportion (56.8%) compared to the proportion of male participants (43.2%). The majority of participants were single (84.8%), living in their family homes (83.1%), and their residence in urban areas (81.6%). More than half of the participants (55.8%) reported having fair economic status (Table 1).

Substance use of any type was reported by a total of 159 students, giving an overall prevalence of 40.2%. The most common substance used at any time as reported by participating students was tobacco smoking, with a frequency of 122 (30.8%) of total participants. The second most common substance that was used at any time as reported by participants was pain killers with a frequency of 51 (12.9%), followed by benzodiazepines in 15

students (3.8%), alcohol in 13 students (3.3%), and cough syrups in 10 students (2.5%) (Figure 1).

**Table 1.** Socio-economic characteristics of participating students

Characteristics		Frequency (%)
Marital status	Single	336 (84.8%)
	Married	53 (13.4%)
	Divorced/Widow	7 (1.8%)
Type of residence	Students' dormitory	35 (8.8%)
	Shared residence	4 (1.0%)
	Family house	329 (83.1%)
Income	Outside home city	28 (7.1%)
	Good	154 (38.9%)
	Fair	221 (55.8%)
Residence	Poor	21 (5.3%)
	Urban	323 (81.6%)
	Rural	73 (18.4%)



**Figure 1.** Top five types of substance that was used at any time among students in Al-Kufa University

Regarding substance use within the recent year, the most common was tobacco (19.9%) followed by painkillers (10.1%) and benzodiazepines (2.3%), (Table 2). Tobacco smoking within the last year was reported by 79 students (19.9% of total participants, 95% C.I. = 16.0% - 23.9%), forming the highest prevalence of substance use among students in the University of Kufa (Table 3). Tobacco smoking within the last year was compared with the demographic and socio-economic characteristics of the participants. Regarding age, students who smoked tobacco were significantly older ( $22.6 \pm 2.4$  years) than students who did not smoke tobacco ( $21.1 \pm 2.0$  years),  $P < 0.001$ .

Tobacco smoking was significantly higher among male students compared to female students ( $P < 0.001$ ). More than one-third of the male students (37.6%) were tobacco smokers, compared to a proportion of 6.7% among female students. The field of study was also found to be significantly associated with tobacco smoking. Students in the medical field of study (dentistry and pharmacology) had a significantly lower proportion of tobacco smoking (11.2%) compared

to students in non-medical field of study (basic education, and English language) with a proportion of (28.5%,  $P < 0.001$ ). Marital status was also significantly associated with tobacco smoking ( $P = 0.023$ ). Tobacco smoking was higher among married students (34.0%) compared to single students (17.9%) or divorced or widows (14.3%). Tobacco smoking was also found to be significantly higher among students living with other students (dormitory or shared students' residence) with a proportion of (37.3%) compared to students living with their family homes (16.4%,  $P < 0.001$ ). Rural residence was also associated with higher tobacco smoking ( $P = 0.002$ ). No significant relationship was observed between tobacco smoking and income ( $P = 0.099$ ). Table 4 provides a detailed comparison between tobacco smokers and non-smokers in regard to demographic and socio-economic characteristics.

**Table 2.** Frequency of substance use within last year among participating students

Substance	Frequency (%)
Tobacco	79 (19.9%)
Pain killers	40 (10.1%)
Benzodiazepines	9 (2.3%)
Alcohol	7 (1.8%)
Cough syrups	5 (1.3%)
Tramadol	5 (1.3%)
Crystal meth	3 (0.8%)
Benzhexol	3 (0.8%)
Captagon	2 (0.5%)
Opioids	2 (0.5%)
Somadril	2 (0.5%)
Inhalants	1 (0.3%)
Cannabis	1 (0.3%)

**Table 4.** Comparison between tobacco smokers and non-smokers regarding demographic characteristics

Characteristics	Tobacco smoking within last year		Total	P-value	
	Yes	No			
Gender	Male	64 (37.6%)	107 (62.6%)	171 (43.2%)	<0.001*
	Female	15 (6.7%)	210 (93.3%)		
Field of Study	Medical	22 (11.2%)	174 (88.8%)	196 (49.5%)	<0.001*
	Non-medical	57 (28.5%)	143 (71.5%)	200 (50.5%)	
Marital status	Single	60 (17.9%)	276 (82.1%)	336 (84.8%)	0.023*
	Married	18 (34.0%)	35 (66.0%)	53 (13.4%)	
	Divorced/Widow	1 (14.3%)	6 (85.7%)	7 (1.8%)	
Type of Residence	At home with family	54 (16.4%)	275 (83.6%)	329(83.1%)	<0.001*
	With other students	25 (37.3%)	42 (62.7%)	67 (16.9%)	
Residence	Urban	55 (17.0%)	268 (83.0%)	323 (81.6%)	0.002*
	Rural	24 (32.9%)	49 (67.1%)	73 (18.4%)	
Income	Good	24 (15.6%)	130 (84.4%)	154 (38.9%)	0.099
	Fair	48 (21.7%)	173 (78.3%)	221 (55.8%)	
	Poor	7 (33.3%)	14 (66.7%)	21 (5.3%)	

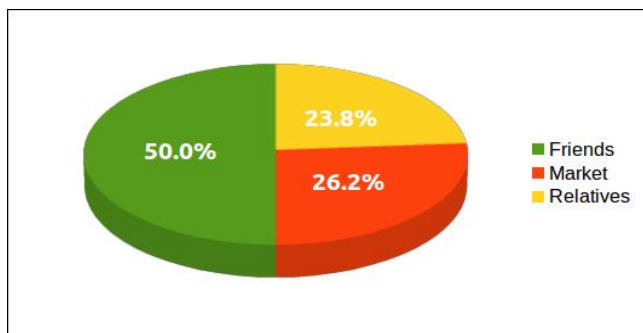
P-value was calculated using chi-square test

\* Significant at  $P < 0.05$

**Table 3.** Prevalence of Tobacco smoking among participating students

Variable		N (%)	95% C.I.
Students who used tobacco at any time	Yes	122 (30.8%)	26.3% - 35.4%
	No	274 (69.2%)	
Students who used tobacco within the recent year	Yes	79 (19.9%)	16.0% - 23.9%
	No	317 (80.1%)	
Students who used tobacco within the recent month	Yes	73 (18.4%)	14.6% - 22.3%
	No	323 (81.6%)	

The median age at which tobacco smokers had started smoking for the first time was 18 years, with a range of 5-28 years. Students who smoked tobacco within the past 12 months formed 64.8% of those who had smoked tobacco at any time. The most common form of tobacco smoking was hookah in 49.2% of smoking students, followed by cigarettes in 46.7% of them. Electronic cigarettes were smoked by 22.1%. The mean number of cigarettes smoked per day was 16, while the mean number of minutes spent smoking hookah daily was 50 minutes. The mean number of minutes spent using electronic cigarettes per day was 15 minutes. The source of the first cigarette was friends in 50%, followed by buying it themselves in 26.2% and relatives in 23.8% (Figure 2).



**Figure 2.** Source of first cigarette among smokers  
Prevalence of painkillers use within the recent year was reported by 40 students, forming 10.1% of total participants with a 95% C.I. of 7.1% - 13.1%, as detailed in Table (5). Students who reported knowing in person someone who used painkillers formed (11.9%). There was a significant difference in age between students who used painkillers ( $20.5 \pm 1.3$  years) and those who did not use painkillers

( $21.5 \pm 2.2$  years),  $P < 0.001$ . Regarding gender, painkiller use was significantly higher among females (14.2%) compared to males (4.7%,  $P = 0.002$ ). No other significant differences were observed (Table 6).

Benzodiazepine use within the recent year was reported by nine students, giving a prevalence of 2.3%, as detailed in Table (7). A proportion of students (3.8%) reported knowing in person someone who used benzodiazepines. Regarding demographic characteristics, there was no significant difference in age between those who used benzodiazepines ( $22.1 \pm 1.9$  years) and those who did not ( $21.4 \pm 2.2$  years,  $P = 0.229$ ). No significant relationship was observed between benzodiazepine use and any of the demographic and socio-economic characteristics of participants ( $P > 0.05$ ) (Table 8).

**Table 5.** Prevalence of painkillers use among participating students

Variable		N (%)	95% C.I.
Students who used pain killers at any time	Yes	51 (12.9%)	9.6% - 16.2%
	No	345 (87.1%)	
Students who used pain killers within the recent year	Yes	40 (10.1%)	7.1% - 13.1%
	No	356 (89.9%)	
Students who used pain killers within the recent month	Yes	28 (7.1%)	4.6% - 9.6%
	No	368 (92.9%)	

**Table 6.** Comparison between students who used pain killers and those who didn't regarding demographic characteristics

Characteristics	Painkillers use within last year		Total	P-value	
	Yes	No			
Gender	Male	8 (4.7%)	163 (95.3%)	171 (43.2%)	0.002*
	Female	32 (14.2%)	193 (85.8%)		
Study field	Medical	24 (12.2%)	172 (87.8%)	196 (49.5%)	0.161
	Non-medical	16 (8.0%)	184 (92.0%)	200 (50.5%)	
Marital status	Single	35 (10.4%)	301 (89.6%)	336 (84.8%)	0.759
	Married	4 (7.5%)	49 (92.5%)	53 (13.4%)	
	Divorced/ Widow	1 (14.3%)	6 (85.7%)	7 (1.8%)	
Type of Residence	At home with family	33 (10.0%)	296 (90.0%)	329(83.1%)	0.918
	With other students	7 (10.4%)	60 (89.6%)	67 (16.9%)	
Residence	Urban	36 (11.1%)	287 (88.9%)	323 (81.6%)	0.147
	Rural	4 (5.5%)	69 (94.5%)	73 (18.4%)	
Economic status	Good	17 (11.0%)	137 (89.0%)	154 (38.9%)	0.666
	Fair	22 (10.0%)	199 (90.0%)	221 (55.8%)	
	Poor	1 (4.8%)	20 (95.2%)	21 (5.3%)	

P-value was calculated using chi-square test

\* Significant at  $P < 0.05$

**Table 7.** Prevalence of benzodiazepines use among participating students

Variable		N (%)	95% C.I.
Students who used benzodiazepines at any time	Yes	15 (3.8%)	1.9% - 5.7%
	No	381 (96.2%)	
Students who used benzodiazepines within the recent year	Yes	9 (2.3%)	0.8% - 3.7%
	No	387 (97.7%)	
Students who used benzodiazepines within the recent month	Yes	4 (1.0%)	0.1% - 1.9%
	No	392 (99.0%)	

**Table 8.** Comparison between students who used benzodiazepines and those who didn't regarding demographic characteristics

Characteristics	Benzodiazepines use within last year		Total	P-value	
	Yes	No			
Gender	Male	4 (2.3%)	167 (97.7%)	171 (43.2%)	0.938
	Female	5 (2.2%)	220 (97.8%)		
Study field	Medical	3 (1.5%)	193 (98.5%)	196 (49.5%)	0.327
	Non-medical	6 (3.0%)	194 (97.0%)	200 (50.5%)	
Marital status	Single	8 (2.4%)	328 (97.6%)	336 (84.8%)	0.898
	Married	1 (1.9%)	52 (98.1%)	53 (13.4%)	
	Divorced/ Widow	0 (0.0%)	7 (100%)	7 (1.8%)	
Type of Residence	At home with family	7 (2.1%)	322 (97.9%)	329(83.1%)	0.668
	With other students	2 (3.0%)	65 (97.0%)	67 (16.9%)	
Residence	Urban	8 (2.5%)	315 (97.5%)	323 (81.6%)	0.567
	Rural	1 (1.4%)	72 (98.6%)	73 (18.4%)	
	Income	Good	2 (1.3%)	152 (98.7%)	
Fair	7 (3.2%)	214 (96.8%)	221 (55.8%)		
Poor	0 (0.0%)	21 (100%)	21 (5.3%)		

P-value was calculated using chi-square test

Alcohol drinking within recent years was reported by 7 students, giving a prevalence of 1.8% of total participating students (95% C.I. 0.5% - 3.1%) as detailed in Table (9). Twenty-nine students (7.3%) reported knowing someone who drinks alcohol. Regarding demographic characteristics, no significant difference was observed in age between those who used alcohol within recent years ( $22.7 \pm$

1.7 years) and those who did not ( $21.4 \pm 2.2$  years,  $P = 0.108$ ). Alcohol drinking was significantly higher among males (3.5%) compared to females (0.4%,  $P = 0.022$ ). Income was also found to be significantly related to alcohol consumption ( $P = 0.016$ ). No other significant differences were observed in relation to alcohol drinking (Table 10).

**Table 9.** Prevalence of alcohol use among participating students

Variable	Yes	N (%)	95% C.I.
Students who used alcohol at any time	Yes	13 (3.3%)	1.5% - 5.0%
	No	383 (96.7%)	
Students who used alcohol within the recent year	Yes	7 (1.8%)	0.5% - 3.1%
	No	389 (98.2%)	
Students who used alcohol within the recent month	Yes	2 (0.5%)	0.0% - 1.2%
	No	394 (99.5%)	

**Table 10.** Comparison between students who drink alcohol and those who didn't regarding demographic characteristics

Characteristics	Alcohol drinking within last year		Total	P-value	
	Yes	No			
Gender	Male	6 (3.5%)	165 (96.5%)	171 (43.2%)	0.022*
	Female	1 (0.4%)	224 (99.6%)	225 (56.8%)	
Study field	Medical	2 (1.0%)	194 (99.0%)	196 (49.5%)	0.264
	Non-medical	5 (2.5%)	195 (97.5%)	200 (50.5%)	
Marital status	Single	6 (1.8%)	330 (98.2%)	336 (84.8%)	0.937
	Married	1 (1.9%)	52 (98.1%)	53 (13.4%)	
	Divorced/ Widow	0 (0.0%)	7 (100%)	7 (1.8%)	
Type of Residence	At home with family	5 (1.5%)	324 (98.5%)	329(83.1%)	0.407
	With other students	2 (3.0%)	65 (97.0%)	67 (16.9%)	
Residence	Urban	5 (1.5%)	318 (98.5%)	323 (81.6%)	0.485
	Rural	2 (2.7%)	71 (97.3%)	73 (18.4%)	
Income	Good	3 (1.9%)	151 (98.1%)	154 (38.9%)	0.016*
	Fair	2 (0.9%)	219 (99.1%)	221 (55.8%)	
	Poor	2 (9.5%)	19 (90.5%)	21 (5.3%)	

P-value was calculated using chi-square test

\* Significant at  $P < 0.05$



## Discussion

The highest proportion of students included in the present study were within the age group of 20-24 years, which is a highly vulnerable group to substance abuse. It has been reported that people aged between 15 and 24 years had the highest increase in deaths resulting from drug abuse overdose in 2020 [21].

Regarding substance use, the highest reported substance use within the recent 12 months was tobacco, accounting for approximately one-fifth of the participants (19.9%). This finding is slightly lower than the finding reported by Alasady et al. (2019) in their study conducted at the University of Kerbala in 2019, in which they reported a prevalence of tobacco use of 23% within the last 12 months [20]. However, the finding in the present study is lower than the finding reported by Khodadost et al. (2020) in their meta-analysis which reported a pooled prevalence of cigarette smoking of (28%) among college students in Iran [22].

Tobacco smokers among students at the University of Kufa were significantly older than non-smokers (22.6 years vs. 21.1 years, respectively). This finding suggests that many of the students start smoking during their study years at the university. This is supported by the finding by Bin Abdulrahman et al. (2022) in their study conducted at a public university in Riyadh, Saudi Arabia, in which they found that approximately half of the participants started smoking within the last five years at the time of inquiry [23].

Tobacco smoking among male students was significantly higher than female students (37.6% vs 6.7%, respectively). Both of those proportions were slightly higher than the proportions of the general population in Iraq, which were reported to be between (29-31%) among males and (3-4%) among females [24-25]. This variation could be attributed to the high vulnerability of this certain age group (college years) in comparison to other age groups in the general population.

The higher prevalence of smoking among males compared to females (whether among college students or the general population) could be affected by possible under-reporting among females, mainly due to certain social and cultural norms among the Iraqi population. However, it has been reported that the prevalence of smoking among females tends to be generally lower than among males, mostly in developing countries [26-27].

Tobacco smoking within recent years was found to be significantly lower among students in the medical field of study (dentistry and pharmacology studies) compared to those in a non-medical field of study (basic education and English language studies), with proportions of (11.2%) and (28.5%), respectively. This finding is consistent with the finding reported by Abdelraouf et al. (2024) in their study, who reported smoking a proportion of (6.4%) among medical students compared to a proportion of (19.8%) among non-medical students [28]. This observation suggests that medical education may have altered students' attitudes toward tobacco smoking.

In the present study, students living in rural areas had a significantly higher prevalence of smoking. In addition, students who were living with other students in dormitories had a higher proportion of smoking (37.3%) compared to those living with their families (16.4%). Nasser et al. (2018) reported similar findings in their study conducted in Yemen, with proportions of (23.2%) and (8.5%), respectively [29]. This difference could be attributed to peer pressure by colleagues sharing the same residence who may urge their roommates to experience tobacco smoking. Source of the first cigarette in half of the smokers were friends. This is mostly due to the students being vulnerable to social influences and peer pressure [30].

Painkiller use within the recent year was the second reported substance use in the present study, with a proportion of (10.1%) among participating college students. Interestingly, the age of painkillers users was significantly lower than those who did not use painkillers. This could reflect an alarming trend of increasing painkiller use among younger age groups, as it has been reported that younger age groups are more likely to be involved in drug abuse than older groups [31].

Another finding was that female students tend to have a significantly higher proportion of painkiller users compared to male students. Although it has been reported that males are more likely to have drug abuse, it was found that abuse of non-prescription drugs was higher among females, especially for painkillers and tranquilizers [32].

Benzodiazepine use was reported in (2.3%) of the participants. There has been no relationship between benzodiazepine use and either age, gender, study field, or other demographic characteristics. Benzodiazepine use is regarded as an increasing global health concern [33]. It has been reported that the increased prescription of benzodiazepines had contributed to the increased use of those medications, which was associated with an

increase in deaths related to benzodiazepine overdose [34-35].

## Conclusions

The most common substance used among college students aged 20-24 is tobacco, with around one-fifth of students reporting smoking, particularly among males and those living in dormitories, rural areas, or who are married. Half of student smokers started due to peer pressure, and a lower percentage were in medical fields like medicine and pharmacy, suggesting academic curricula may have been effective in changing attitudes towards smoking. The second most prevalent substance use was painkillers, especially among younger female students, potentially related to self-medication among medical field students. Other substances used included benzodiazepines, alcohol, cough syrups, and tramadol.

**Funding:** There is no funding for this research

**Conflict of interest:** The authors state that there is no conflict of interest

**Author contributions:** Conceptualization: A.R.M., A. A.A., A.H.A., Methodology: A.R.M., M. M.W., A. A.A., A.H.A., Formal analysis and investigation: A.R.M., M. M.W., Writing: A.R.M., Resource: A.R.M., Supervision: A. A.A., A.H.A.

## References

- McLellan A. Substance misuse and substance use disorders: Why do they matter in healthcare? *Transactions of the American Clinical and Climatological Association.* 2017; 128:112-130. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5525418/>.
- United Nations. World Drug Report 2023. United Nations Office on Drugs and Crime; Vienna, Austria. 2023. [https://www.unodc.org/res/WDR2023/WDR23\\_E\\_xsum\\_fin\\_DP.pdf](https://www.unodc.org/res/WDR2023/WDR23_E_xsum_fin_DP.pdf).
- Lo T, Yeung J, and Tam C. Substance abuse and public health: a multilevel perspective and multiple responses. *International Journal of Environmental Research and Public Health.* 2020;17:2610. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7177685/>.
- Khafagy M, Gomaa Z and Elwasify M. Substance use patterns among university students in Egypt. *Middle East Current Psychiatry.* 2021;28:59. <https://meccp.springeropen.com/articles/10.1186/s43045-021-00140-6>.
- Al-Hemiery N, Dabbagh R, Hashim M, Al-Hasnawi S, Abutiheen A, Abdulghani E et al. Self-reported substance use in Iraq: findings from the Iraqi National Household Survey of Alcohol and Drug Use, 2014. *Addiction.* 2017;112(8):1470-1479. <https://pubmed.ncbi.nlm.nih.gov/28238214/>.
- Diagnostic and statistical manual of mental disorders: DSM-5. Washington (D.C.): American Psychiatric Publishing, 2013. <https://psychiatryonline.org/doi/book/10.1176/appi.books.9780890425596>.
- Regier D, Kuhl E, and Kupfer D. The DSM-5: Classification and criteria changes. *World Psychiatry.* 2013;12(2):92-98. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3683251/>.
- Hasin D, O'Brien C, Auriacombe M, Borges G, Bucholz K, Budney A et al. DSM-5 Criteria for substance use disorders: recommendations and rationale. *American Journal of Psychiatry.* 2013;170(8):834-851. <https://pubmed.ncbi.nlm.nih.gov/23903334/>.
- Arria A, Caldeira K, Bugbee B, Vincent K and O'Grady K. The academic consequences of marijuana use during college. *Psychology of Addictive Behaviors.* 2015;29(3):564-575. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4586361/>.
- Schulenberg J, Johnston L, O'Malley P, Bachman J, Meich R and Patrick M. Monitoring the future national survey results on drug use, 1975-2016: Volume II, college students and adults ages 19-55. Institute for Social Research, The University of Michigan, 2017.
- Welsh, J, Shentu, Y, Sarvey, D. Substance use among college students. *Focus,* 2019;17(2):117-127. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6527004/>.
- World Health Organization. WHO report on the global tobacco epidemic 2019: Offer help to quit tobacco use. World Health Organization, 2019.
- Goodchild M, Nargis N and d'Espaignet E. Global economic cost of smoking-attributable diseases. *Tobacco Control.* 2018; 27:58-64. <https://pubmed.ncbi.nlm.nih.gov/28138063/>.
- Craig L, Fong G, Chung-Hall J and Puska P. Impact of the WHO FCTC on tobacco control: perspectives from stakeholders in 12 countries. *Tobacco Control.* 2019;28:s129-s135. <https://pubmed.ncbi.nlm.nih.gov/31147481/>.
- Baey H, Wahhudi M, Hashim H, Ali O, Nadhim N and Shamkih B. Smoking among health care providers, identification of associated factors in Hilla City during the year 2011. *Medical Journal of Babylon.* 2011;8(4):569-581. <https://www.iasj.net/iasj/article/245668>.
- Al-Badri H, Ali M, Ali A and Sahib A. Socio-economic determinants of smoking among Iraqi adults: data from non-communicable risk factor STEPS survey 2015. *PLoS ONE.* 2017;12(9):e0184989. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0184989>.
- Rehm J and Shield K. Global burden of alcohol use disorders and alcohol liver disease. *Biomedicines.* 2019;7:99. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6966598/>.
- Rehm J, Allamani A, Elekes Z, Jakubczyk A, Manthey J, Probst C et al. Alcohol dependence and treatment utilization in Europe – a representative cross-sectional study in primary care. *BMC Family Practice.* 2015;16:90. <https://pubmed.ncbi.nlm.nih.gov/26219430/>.
- Johnston L, Meich R, O'Malley P, Bachman J, Schulenberg J, Patrick M. Monitoring the future national survey results on drug use, 1975-2019: overview, key findings on adolescent drug use. Institute for Social Research, The University of Michigan, 2020. URL:



20. Alasady M, Prevalence of substance use among students of the University of Kerbala. A dissertation submitted to the Arab Board for Health Specialization, Scientific council of Family Medicine, Iraq. 2019.
21. Hsiung H, Patel K, Hundal H, Baccouche B and Tsao K. Preventing substance abuse in adolescents: a review of high-impact strategies, *Cureus*, 2022;14(7):e27361. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9417217/>.
22. Khodadost M, Maajani K, Noroozi A, Motevalian S, Naserbakht M, Sarvi F et al. Prevalence of cigarette smoking among college students in Iran: an updated systematic review and meta-analysis of observational studies, *Medical Journal of the Islamic Republic of Iran*, 2020;34(165):1-9. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8004567/>.
23. Bin Abdulrahman K, Alghamdi H, Alfaleh R, Albishri W, Almuslamani W, Alshakrah A et al. Smoking habits among college students at a public University in Riyadh, Saudi Arabia, *International Journal of Environmental Research and Public Health*, 2022;19:11557. <https://pubmed.ncbi.nlm.nih.gov/36141829/>.
24. Hussain Z and Sullivan R. Tobacco in post-conflict settings: the case of Iraq, *ecancer*, 2017;11(735):1-9. <https://pubmed.ncbi.nlm.nih.gov/28596801/>.
25. Ibrahim B, Al-Humaish S, and Al-Obaide M. Tobacco smoking, lung cancer, and therapy in Iraq. *Current Perspective Frontiers in Public Health*, 2018;6(311):1-5. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6212484/>.
26. Ng M, Freeman M, Fleming T, Robinson M, Dwyer-Lindgren L, Thomson B et al. Smoking prevalence and cigarette consumption in 187 countries, 1980-2012. *JAMA*, 2014;311(2):183-192. <https://pubmed.ncbi.nlm.nih.gov/24399557/>.
27. Hagen E, Garfield M and Sullivan R. The low prevalence of female smoking in the developing world: gender inequality or maternal adaptations for fetal protection? *Evolution, Medicine, and Public Health*, 2016;2016:195-211. <https://pubmed.ncbi.nlm.nih.gov/27193200/>.
28. Abdelraouf M, Abdalla R, Mohamed D, Ahmed A, Abuzaid M, Issak M et al. Prevalence of smoking and its associated factors among students of the University of Dongola, Northern State, Sudan: a cross-sectional study. *Annals of Medicine & Surgery*, 2024;86(5):2543-2548. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC11060252/>.
29. Nasser A, Salah B, Regassa L, Alhakimy A and Zhang X. Smoking prevalence, attitudes and associated factors among students in health-related departments of community college in rural Yemen. *Tobacco Induced Diseases*, 2018;16(31):1-7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6659497/>.
30. Robalino J and Macy M. Peer effects on adolescent smoking: are popular teens more influential?. *PLoS ONE*, 2018;13(7):e0189360. <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0189360>.
31. Vasilenko S, Evans-Polce R, Lanza S. Age trends in rates of substance use disorders across ages 18–90: Differences by gender and race/ethnicity. *Drug and Alcohol Dependence*, 2017;180:260-264. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5757874/>.
32. Milani S, Lloyd S, Serdarevic M, Cottler L, Striley C. Gender differences in diversion among non-medical users of prescription opioids and sedatives. *The American Journal of Drug and Alcohol Abuse*. 2020;46(3):340-347. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7939137/>.
33. Votaw V, Geyer R, Rieselbach M and McHugh K. The epidemiology of benzodiazepine misuse: A systematic review. *Drug and Alcohol Dependence*, 2019;200:95-114. <https://pubmed.ncbi.nlm.nih.gov/31121495/>.
34. Bachhuber M, Hennessy S, Cunningham C and Starrels J. Increasing benzodiazepine prescriptions and overdose mortality in the United States, 1996–2013. *American Journal of Public Health*, 2016;106(4):686-688. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4816010/>.
35. Jones C and McAninch J. Emergency department visits and overdose deaths from combined use of opioids and benzodiazepines. *American Journal of Preventive Medicine*, 2015;49(4):493-501. <https://pubmed.ncbi.nlm.nih.gov/26143953/>.