Prevalence and Risk Factors of Alcohol, Tobacco, and Substance Use among Medical Students in Southern Iran in 2024: A Growing Concern

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What's Known

- Studies conducted in Iran have reported a wide range of cigarette smoking prevalence among medical students, with rates varying from 10.5% to 46.7%.
- Regarding alcohol consumption, prevalence rates of 18.3%, 19.9%, and 13% have been reported among medical students in Iran.

What's New

- The lifetime prevalence of substance use was 27.5% for alcoholic beverages and 26.7% for tobacco products.
- Significant associations were identified between substance use and the students' stage of training, economic status, history of mental illness, history of substance use in family and friends, electronic device use, and satisfaction with their major.

Abstract

Background: Alcohol, smoking, and substance use among medical students are significant health concerns that impact their well-being and their future roles as health advocates. This study aimed to investigate the prevalence of these behaviors and related risk factors among medical students in southern Iran.

Methods: This cross-sectional study was conducted among medical students in Shiraz, in southern Iran, in 2024. Data were collected using the World Health Organization's alcohol, smoking, and substance involvement screening test (ASSIST), supplemented with questions on demographic details, family and friend substance use, mental health, and major satisfaction. The sample was selected using the stratified random selection method. Logistic regression models were used to identify factors associated with substance use, controlling for potential confounders. P<0.05 was considered statistically significant. All analyses were performed using SPSS software (version 26, SPSS Inc., USA).

Results: The study included 360 medical students, of whom 51.9% were men, with a mean age of 22.62±3.02 years. The lifetime prevalence was 27.5% for alcoholic beverages, 26.7% for tobacco products, 14.4% for sedatives or sleeping pills, and 15.8% for electronic cigarettes and vapes. Logistic regressions analysis revealed that having a family member who uses substances (OR=1.8, 95% CI:1.01-3.5), having a friend who uses substances (OR=3.9, 95% CI: 2.0-7.8), being male (OR=1.8, 95% CI: 1.03-3.2), and having a recent history of mental illnesses (OR=2.8, 95% CI: 1.1-7.1) were positively associated with lifetime cigarette use.

Conclusion: The prevalence of alcohol, smoking, and substance use among medical students in southern Iran is concerning. These findings emphasized the significance of targeted interventions to reduce and prevent use within this population.

Introduction

The issue of alcohol, smoking, and substance (ASS) is a complex global health issue with extensive detrimental consequences for individuals, families, and society. According to the World Health Organization (WHO), smoking is the second leading cause of

death worldwide.[1] Tobacco use is estimated to cause more than six million deaths annually, a figure forecast to rise to over eight million by 2030.[2] Similarly, alcohol consumption is a significant risk factor for physical and mental disorders and is also associated with various cancers and other health-related fatalities.[3] The rising prevalence of ASS use among university students is a growing concern, particularly among medical students, who are expected to uphold high standards as future advocates and promoters of well-being.[4]

A study in Iran reported prevalence rates of 14% for smoking, 9% for alcohol use, and 11% for drug use.[5] Epidemiological studies indicated that young people and university students have a higher prevalence of illicit ASS use than other age groups.[6] Among medical students specifically, previous studies in Iran showed a wide variation in ASS use prevalence, ranging from 10.5% to 46.7%.[7, 8] A meta-analysis of Iranian university students reported one-year prevalence rates of 23% (95% CI: 8-39) for alcohol consumption, 21% (95% CI: 6-37) for cigarette smoking, and 14% (95% CI: 10-18) for other substance use.[9] Furthermore, factors such as stress, academic pressure, peer influence, and social norms have been identified as contributors to increased smoking and drug use among medical students. Personal characteristics, such as sex, age, and a family history of substance use, were also found to be associated with these behaviors.[10, 11]

The harmful effects of ASS involvement on students' health, academic performance, and well-being are well-documented.[12] Investigating the situation is therefore essential for informed planning. Epidemiological studies are widely considered the foundational step for designing preventive programs. By examining the prevalence, patterns, and associated factors, we can gain valuable insights into these behaviors among medical students. The resulting data are instrumental for developing targeted interventions and prevention strategies to promote healthier lifestyles. Given the varied findings of previous research and growing concern about ASS use among medical students, a detailed exploration in this field is warranted. This study was conducted at Shiraz University of Medical Sciences in southern Iran, which has a large and diverse student population that enhances the generalizability of the findings. The university's prominent role in regional medical education further supports the reliability and applicability of the results to similar contexts and populations.[13] Therefore, this study aimed to investigate the prevalence of ASS use and its related risk factors among medical students in southern Iran in 2024.

Participants and Methods

Study Design

This cross-sectional study was conducted in 2024 among medical students at Shiraz University of Medical Sciences in Shiraz, southern Iran. A total of 360 students were recruited. The study protocol was approved by the Ethics Committee of Shiraz University of Medical Sciences (code: IR.SUMS.MED.REC.1403.245). All participants provided written informed consent, and the study adhered to ethical principles to ensure participant confidentiality and privacy.

Participants

Eligible participants were medical students enrolled at Shiraz University of Medical Sciences for at least 3 months. Students at the residency level or above, transfer students, and those with incomplete or defective data were excluded from the study.

Instruments

Data were collected using a written questionnaire consisting of three parts: demographic information, the World Health Organization's alcohol, smoking, and substance involvement screening test (ASSIST), and questions on factors associated with substance use. The ASSIST instrument investigated involvement with various substances, including tobacco products, alcoholic beverages, opioids, cannabis, amphetamine-type stimulants, sedative or sleeping pills, inhalants, hallucinogens, cocaine, and other substances, collectively referred to as ASS in this study. The questions covered the frequency of ASS use over the past 3 months and lifetime use. The instrument also assessed several domains, including the desire to use, the impact of use on health, social, legal, or financial aspects, concern from close relations, difficulties in performing expected tasks, unsuccessful efforts to quit or reduce use, and any history of intravenous drug use.[14]

The ASSIST questionnaire included questions with numerically scored response options. Questions 2-5 assessed the frequency of substance use, with response options of "never", "once or twice", "monthly", "weekly", or "daily or almost daily". The scores for each question were as follows: Q2: 0, 2, 3, 4, 6; Q3: 0, 3, 4, 5, 6; Q4: 0, 4, 5, 6, 7; Q5: 0, 5, 6, 7, 8. Questions 6 and 7 ask about experiencing problems related to substance use, with the options: "no, never" (score 0), "yes, but not in the past 3 months" (score 3), or "yes, in the past

3 months" (score 6). The interviewer recorded the scores for questions 2 to 7, which were subsequently totaled for each substance to generate an overall risk score. This score was categorized into three risk levels: "Low" (a score of 3 or less, or 10 or less for alcohol), "moderate" (4-26, or 11-26 for alcohol), and "high" (27 or higher).

The ASSIST instrument has undergone three primary stages of testing, confirming its reliability, validity in international contexts, and its suitability for integration into brief intervention strategies.[15, 16] Additionally, Hooshyari and colleagues assessed the validity and reliability of the Persian translation of this test in Iran, reporting a Cronbach's alpha between 0.79 and 0.95 for the entire test and its subscales, indicating high internal consistency.[17]

For the present study, content validity was assessed using the content validity ratio (CVR) and content validity index (CVI). Fifteen experts, including physicians and sociologists with relevant research experience, reviewed the items. They rated each item on a three-point scale for essentiality. Based on Lawshe's table, a minimum CVR threshold of 0.51 was applied, calculated using the formula:

$$CVR=(Ne-N/2)/(N/2)$$

Where Ne is the number of experts rating the item as "essential". Items with a CVR below this threshold were eliminated, resulting in a final CVR of 0.75 for the remaining items. To assess relevance, experts also scored items on a four-point scale. The CVI was calculated as the average of these scores across items, yielding a value of 0.85. All items were retained after this process, as a CVI above 0.80 is generally considered acceptable. Face validity was confirmed by experts in substance use, who verified that the questions accurately reflect students' experiences with substance-related issues. The overall content validity assessment confirmed that the questionnaire comprehensively addresses key aspects of substance use. Experts validated that the items covered critical dimensions of substance use, enhancing the questionnaire's reliability and effectiveness in capturing relevant data for the study.

The use of electronic cigarettes and vapes was investigated using specific survey questions. Participants were asked to report the frequency of their use both over their lifetime and within the past 3 months.

Sampling Process

A stratified random sampling method was employed. The student population was divided into strata based on their academic year (basic sciences, pre-clinic, and clinic) to ensure representation across key subgroups. A random sample was then selected from each stratum.

The sample size was calculated using the following formula:

$$n=Z^2P(1-P)/d^2$$

With a 95% confidence level (Z), an expected prevalence (P) of 40% derived from a pilot study, and a precision (d) of 0.05. The Kaiser-Meyer-Olkin measure of sampling adequacy was above 0.7, confirming the sample's suitability for factor analysis.

Data were collected via paper-based, self-administered surveys, distributed in lecture halls during class time. The surveys took approximately 10-15 min to complete. To ensure anonymity and confidentiality, completed surveys were deposited by students into a sealed ballot box, and researchers had no access to participant identities. Participation was voluntary, and students could withdraw at any time without penalty.

Due to a low percentage of missing data (<2%), a complete case analysis (listwise deletion) was performed, resulting in the exclusion of six participants from the final analysis.

Statistical Analysis

Data were screened and cleaned to ensure they met the necessary assumptions for statistical analysis. This process included an evaluation of missing data, outliers, multicollinearity, and distribution normality.

Descriptive statistics were computed, with continuous variables summarized using mean and standard deviation, and categorical variables using relative frequencies. For univariate analysis, the Chi square test was employed to compare groups. All variables showing a statistically significant association in the univariate analysis at a P<0.20 were included in the logistic regression models. This approach was used to identify factors associated with the outcomes while controlling for potential confounders. The threshold for statistical significance was set at P<0.05. All analyses were performed using SPSS software (version 26, SPSS Inc., USA).

Results

This study included 360 medical students, with a mean age of 22.62±3.02 years; 51.9% were men and 48.1% were women. Among the participants, 42.5% reported lifetime ASS use, while 33.6% reported ASS use within the past 3 months (table 1).

Table 1: The frequency of alcohol, smoking, and substance (ASS) use during lifetime and the past 3 months according to demographic characteristics of medical students

Variables		n (%) N=360	Use during lifetime						Use during the past 3 months					
			Yes n (%)	No n (%)	cOR (CI 95%)	P value	aOR (CI 95%)	P value	Yes n (%)	No n (%)	cOR (CI 95%)	P value	aOR (CI 95%)	P value
Sex	Female	173 (48.1)	62 (35.8)	111 (64.2)	1.0	0.014*	1.0		48 (27.7)	125 (72.3)	1.0	0.023*	1.0	
	Male	187 (51.9)	91 (48.7)	96 (51.3)	1.6 (1.1-2.5)		1.6 (0.9-2.7)	0.054	73 (39.0)	114 (61.0)	1.6 (1.1-2.5)		1.6 (0.9-2.7)	0.70
Stage of student	Basic sciences	188 (52.2)	65 (34.6)	123 (65.4)	1.0	<0.001*	1.0	<0.001*	52 (27.7)	136 (72.3)	1.0	<0.001*	1.0	0.002*
	Pre-clinic	95 (26.4)	37 (38.9)	58 (61.1)	1.0 (0.6-1.8)	0.719	1.1 (0.6-2.0)	0.719	28 (29.5)	67 (70.5)	1 (0.6-1.8)		1 (0.5-1.8)	0.989
	Clinic	77 (21.4)	51 (66.2)	26 (33.8)	2.9 (1.7-5.1)	<0.001*	3.4 (1.7-6.7)	<0.001*	41 (53.2)	36 (46.8)	2.9 (1.7-5.1)		2.9 (1.5-5.5)	0.001*
Living place	With parents	176 (48.9)	76 (43.2)	100 (56.8)	1.0	0.798			58 (33.0)	118 (67.0)	1.0	0.796		
	Dormitory	184 (51.1)	77 (41.8)	107 (58.2)	0.9 (0.6-1.4)				63 (34.2)	121 (65.8)	1.1 (0.6-1.6)			
Being native	Yes	169 (46.9)	77 (45.6)	92 (54.4)	1.0	0.269			58 (34.3)	111 (65.7)	1.0	0.789		
	No	191 (53.1)	76 (39.8)	115 (60.2)	0.7 (0.5-1.2)				63 (33.0)	128 (67.0)	0.9 (0.6-1.4)			
Family economic status	Lower than average	14 (3.9)	7 (50.0)	7 (50.0)	1.0	0.045*	1.0	0.040*	4 (28.6)	10 (71.4)	1.0	0.726	1.0	
	Average level	262 (72.8)	101 (38.5)	161 (61.5)	0.6 (0.2-1.8)		0.7 (0.2-2.3)	0.571	86 (32.8)	176 (67.2)	1.2 (0.3-4)			
	Higher than average	84 (23.3)	45 (53.6)	39 (46.4)	1.1 (0.3-3.5)		1.5 (0.4-5.3)	0.518	31 (36.9)	53 (63.1)	1.4 (0.4-5)			
Family quarrel	Low	126 (35.0)	48 (38.1)	78 (61.9)	1.0	0.215			36 (28.6)	90 (71.4)	1.0	0.137	1.0	
	High	234 (65.0)	105 (44.9)	129 (55.1)	1.3 (0.8-2.1)				85 (36.3)	149 (63.7)	1.4 (0.8-2.2)		1.1 (0.6-2.0)	0.613
Family support	Low	77 (21.4)	44 (57.1)	33 (42.9)	1.0	0.003*	1.0		35 (45.5)	42 (54.5)	1.0	0.013*	1.0	
	High	283 (78.6)	109 (38.5)	174 (61.5)	0.4 (0.2-0.7)		0.6 (0.3-1.1)	0.110	86 (30.4)	197 (69.6)	0.5 (0.3-0.8)		0.6 (0.3-1.2)	0.247
Recent mental illness	Never	74 (20.6)	21 (28.4)	53 (71.6)	1.0	0.010*	1.0	0.125	17 (23.0)	57 (77.0)	1.0	0.016*	1.0	0.134
	Moderate	203 (56.4)	89 (43.8)	114 (56.2)	1.9 (1.1-3.5)		1.7 (0.8-3.5)	0.118	67 (33.0)	136 (67.0)	1.6 (0.8-3)		1.4 (0.6-2.9)	0.345
	High	83 (23.1)	43 (51.8)	40 (48.2)	2.7 (1.3-5.2)		2.3 (1.03-5.3)	0.042*	37 (44.6)	46 (55.4)	2.6 (1.3-5.3)		2.3 (0.9-5.4)	0.055
History of ASS use in the family	No	284 (78.9)	104 (36.6)	180 (63.4)	1.0	<0.001*	1.0		78 (27.5)	206 (72.5)	1.0	<0.001*	1.0	
	Yes	76 (21.1)	49 (64.5)	27 (35.5)	3.1 (1.8-5.3)		1.6 (0.8-3.1)	0.107	43 (56.6)	33 (43.4)	3.4 (2-5.8)		1.8 (1.02-3.3)	0.048*
History of ASS use in friends	No	150 (41.7)	36 (24.0)	114 (76)	1.0	<0.001*	1.0		24 (16.0)	126 (84.0)	1.0	<0.001*	1.0	
	Yes	210 (58.3)	117 (55.7)	93 (44.3)	3.9 (2.5-6.3)		4 (2.2-7.2)	<0.001*	97 (46.2)	113 (53.8)	4.5 (2.6-7.5)		4.1 (2.2-7.5)	<0.001*
Satisfaction with major	Very satisfied	138 (38.3)	52 (37.7)	86 (62.3)	1.0	0.008*	1.0		43 (31.2)	95 (68.8)	1.0	0.022*	1.0	0.126
	Satisfaction on an average level	165 (45.8)	66 (40.0)	99 (60.0)	1.1 (0.6-1.7)		0.8 (0.5-1.5)		49 (29.7)	116 (70.3)	0.9 (0.5-1.5)		0.7 (0.4-1.2)	0.261
	Partly unsatisfied	37 (10.3)	25 (67.6)	12 (32.4)	3.4 (1.5-7.4)		3 (1.1-7.8)	0.020*	20 (54.1)	17 (45.9)	2.5 (1.2-5.4)		1.9 (0.7-4.7)	0.163
	Completely unsatisfied	20 (5.6)	10 (50.0)	10 (50.0)	1.6 (0.6-4.2)		1.2 (0.3-3.7)	0.727	9 (45.0)	11 (55.0)	1.8 (0.6-4.6)		1.4 (0.4-4.3)	0.555
Physical activity	Inactive	78 (21.7)	37 (47.4)	41 (52.6)	1.0	0.147	1.0	0.763	27 (34.6)	51 (65.4)	1.0	0.397		
	Moderate	234 (65.0)	91 (38.9)	143 (61.1)	0.7 (0.4-1.1)		0.7 (0.4-1.4)	0.462	74 (31.6)	160 (68.4)	0.8 (0.5-1.5)			
	Active	48 (13.3)	25 (52.1)	23 (47.9)	1.2 (0.5-2.4)		0.8 (0.3-1.9)	0.682	20 (41.7)	28 (58.3)	1.3 (0.6-2.8)			

Variables		n (%) N=360	Use during lifetime						Use during the past 3 months					
			Yes n (%)	No n (%)	cOR (CI 95%)	P value	aOR (CI 95%)	P value	Yes n (%)	No n (%)	cOR (CI 95%)	P value	aOR (CI 95%)	P value
Sleep	Appropriate	238 (66.1)	98 (41.2)	140 (58.8)	1.0	0.478			74 (31.1)	164 (68.9)	1.0	0.158	1.0	0.934
	Inappropriate	122 (33.9)	55 (45.1)	67 (53.9)	1.1 (0.7-1.8)				47 (38.5)	75 (61.5)	1.3 (0.8-2.1)		1.0 (0.5-1.8)	
Electronic device and social network use	Appropriate	214 (59.4)	77 (36.0)	137 (64.0)	1.0	0.002*	1.0	0.133	57 (26.6)	157 (73.4)	1.0	<0.001*	1.0	0.043*
	Inappropriate	146 (40.6)	76 (52.1)	70 (47.9)	1.9 (1.2-2.9)		1.4 (0.8-2.4)		64 (43.8)	82 (56.2)	2.1 (1.3-3.3)		1.7 (1.01-2.9)	

*Factors that were statistically significant (P<0.05); cOR=Crude odds ratio; aOR=Adjusted odds ratio; ASS: Alcohol, smoking, and substance

Chi square tests revealed several factors positively associated with lifetime ASS use: male sex (P=0.014), clinical stage of training (P=0.014), high family economic status (P=0.045), low family support (P=0.003), a recent history of mental illness (P=0.010), a positive history of ASS use among family and friends (P<0.001), being completely unsatisfied with their major (P=0.008), and inappropriate use of electronic devices and social networks (P=0.002).

Similarly, factors associated with ASS use in the past 3 months included: male sex (P=0.023), clinical stage of training (P<0.001), low family support (P=0.013), a recent history of mental illness (P=0.016), a positive history of ASS use among family and friends (P<0.001), inappropriate use of electronic devices and social networks (P<0.001), and being completely unsatisfied with their major (P=0.022, table 1).

Logistic regression analyses were performed, including all variables significantly associated with ASS use in the univariate analyses at P<0.20. According to the results, being in the clinical stage (OR=3.4, 95% CI: 1.7-6.7), having a lower family economic status (OR=2.38, 95% CI: 1.2-4.6), a recent history of mental illness (OR=2.3, 95% CI: 1.03-5.3), a positive history of ASS use among friends (OR=4, 95% CI: 2.2-7.2), and being partly unsatisfied with their major (OR=3, 95% CI: 1.1-7.8), were all positively associated with lifetime ASS use (P<0.05).

For ASS use in the past 3 months, the positively associated factors (P<0.05) were: being in the clinical stage (OR=2.9, 95% CI: 1.5-5.5), a positive history of ASS use among friends (OR=4.1, 95% CI: 2.2-7.5), family members (OR=1.8, 95% CI: 1.02-3.3), and inappropriate use of electronic devices and social networks (OR=1.7, 95% CI: 1.01-2.9; table 1).

Table 2 presents the risk categories and the frequency distribution of ASS use among medical students. Figure 1 illustrates the prevalence of specific substances used over their lifetime and in the past 3 months, indicating the highest prevalence for alcoholic beverages, tobacco products, and electronic cigarettes. Figure 2 shows the variation in ASS use across academic years, with the highest rates observed in the seventh year.

Additionally, the demographic and key characteristics of medical students were examined in relation to cigarette and alcohol use over their lifetime and in the past 3 months, utilizing the Chi square test and logistic regression.

Table 2: Risk category and frequency distribution of alcohol, smoking, and substance (ASS) use among medical students

Substance	Risk category	n (%)	Use during lifetime n (%)	Use during the past 3 months n (%)					
				Never	Once or twice	Monthly	Weekly	Daily or almost daily	Total
Tobacco products	Lower risk	290 (80.6)	96 (26.7)	282 (78.3)	40 (11.1)	12 (3.3)	12 (3.3)	14 (3.9)	78 (21.6)
	Moderate risk	69 (19.2)							
	High risk	1 (0.3)							
Opioids	Lower risk	355 (98.6)	11 (3.1)	354 (98.3)	6 (1.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (1.7)
	Moderate risk	5 (1.4)							
	High risk	0 (0.0)							
Cannabis	Lower risk	353 (98.1)	11 (3.1)	349 (96.9)	8 (2.2)	3 (0.8)	0 (0.0)	0 (0.0)	11 (3.0)
	Moderate risk	7 (1.9)							
	High risk	0 (0.0)							
Amphetamine-type stimulants	Lower risk	354 (98.3)	8 (2.2)	355 (98.6)	4 (1.1)	1 (0.3)	0 (0.0)	0 (0.0)	5 (1.4)
	Moderate risk	6 (1.7)							
	High risk	0 (0.0)							
Sedatives or sleeping pills	Lower risk	337 (93.6)	52 (14.4)	327 (90.8)	22 (6.1)	4 (1.1)	5 (1.4)	2 (0.6)	33 (9.2)
	Moderate risk	23 (6.4)							
	High risk	0 (0.0)							
Alcohol beverages	Lower risk	347 (96.4)	99 (27.5)	291 (80.9)	41 (11.4)	26 (7.2)	2 (0.6)	0 (0.0)	69 (19.2)
	Moderate risk	13 (3.6)							
	High risk	0 (0.0)							
Inhalants	Lower risk	355 (98.6)	10 (2.8)	355 (98.6)	1 (0.3)	3 (0.8)	1 (0.3)	0 (0.0)	5 (1.4)
	Moderate risk	5 (1.4)							
	High risk	0 (0.0)							
Hallucinogens	Lower risk	358 (99.4)	3 (0.8)	359 (99.7)	1 (0.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.3)
	Moderate risk	2 (0.6)							
	High risk	0 (0.0)							
Cocaine	Lower risk	357 (99.2)	2 (0.6)	360 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Moderate risk	3 (0.8)							
	High risk	0 (0.0)							
Others	Lower risk	360 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Moderate risk	0 (0.0)							
	High risk	0 (0.0)							
Electronic cigarettes and vape			57 (15.8)	320 (88.9)	18 (5.0)	8 (2.2)	7 (1.9)	7 (1.9)	40 (11.1)
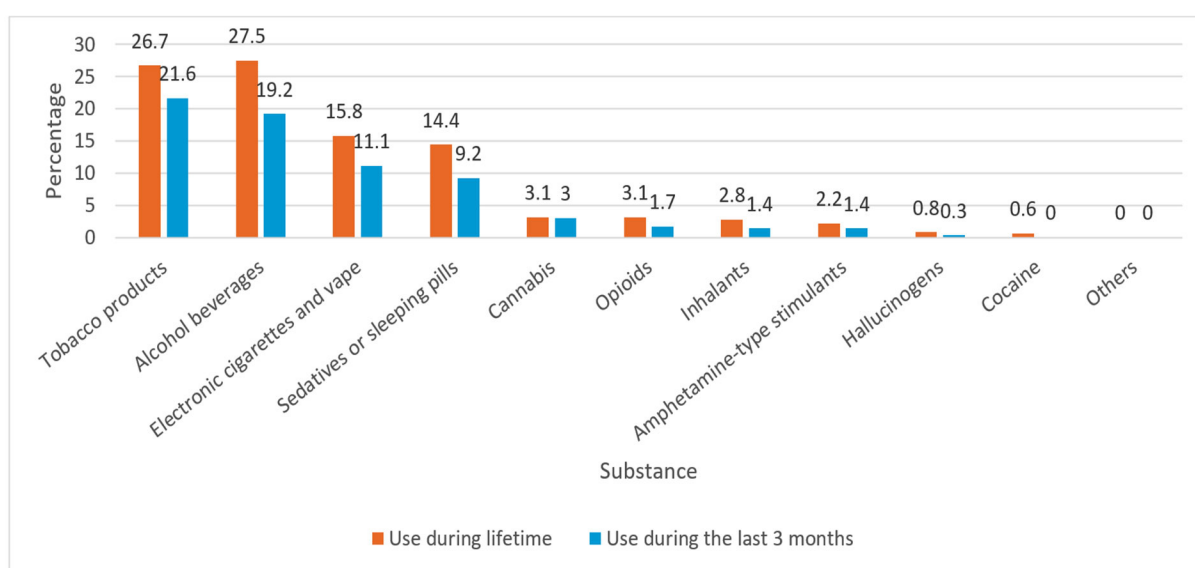
Figure 1: The diagram shows the frequency distribution of alcohol, smoking, and substance (ASS) use among medical students during their lifetime and the past 3 months.
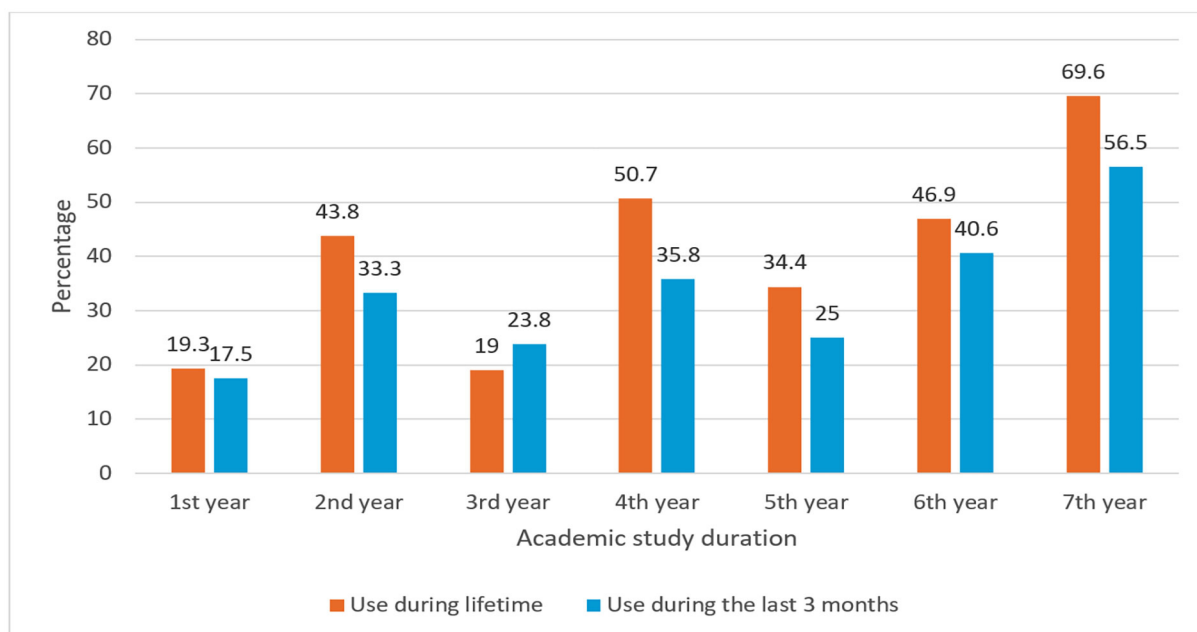
Figure 2: The diagram shows the prevalence of alcohol, smoking, and substance (ASS) use during lifetime and the past 3 months, which was assessed according to the duration of the academic study.

For cigarette use, Chi square tests indicated that low family support (P=0.014 for lifetime and P=0.049 for past 3 months), recent mental health issues (P=0.011 for lifetime and P=0.002 for past 3 months), and a history of substance use among family (P<0.001 for both lifetime and past 3 months) and friends (P<0.001 for both lifetime and past 3 months) were significantly associated with both lifetime use and use in the past 3 months.

Furthermore, male sex (P=0.008), the student's academic stage (P=0.029), and inappropriate use of electronic devices and social networks (P=0.015) were significantly associated with lifetime cigarette use, while poor sleep (P=0.041) was associated with cigarette use in the past 3 months.

For alcohol use, significant associations were found for male sex (P=0.003 for lifetime and P=0.013 for past 3 months), students' academic stage (P<0.001 for lifetime and P=0.002 for past 3 months), a history of substance use among family (P<0.001 for both lifetime and past 3 months) and friends (P<0.001 for both lifetime and past 3 months), low physical activity (P=0.015 for lifetime and P=0.009 for past 3 months), and inappropriate use of electronic devices and social networks (P=0.004 for lifetime and P=0.013 for past 3 months). Additionally, higher family economic status was associated with lifetime alcohol consumption (P=0.044, table 3).

Logistic regression models for cigarette and alcohol use included all variables with a univariate association at P<0.20 (table 4).

For cigarette use, the analysis indicated that having a family member who uses cigarettes (lifetime OR=1.8, 95% CI: 1.01-3.5; past three months OR=2.0, 95% CI: 1.02-3.8), having a friend who uses cigarettes (lifetime OR=3.9, 95% CI: 2.0-7.8; past 3 months OR=4.7, 95% CI: 2.2-10.1), and a recent history of mental illness (lifetime OR=2.8, 95% CI: 1.1-7.1; past three months OR=2.2, 95% CI: 1.1-4.3) were positively associated with both lifetime use and use in the past three months. Additionally, being male (OR=1.8, 95% CI: 1.03-3.2) was associated with lifetime use, and being completely unsatisfied with their major (OR=1.8, 95% CI: 1.03-3.2) was associated with use in the past months (OR=3.9, 95% CI: 1.0-14.7).

For alcohol us, positive associations for both lifetime and past three-month use were found for: having a friend who uses alcohol (lifetime OR=3.6, 95% CI: 1.9-7.0; past three months OR=5.9, 95% CI: 2.6-13.4), being in the clinical stage (lifetime OR=3.3, 95% CI: 1.5-7.6; past three months OR=3.8, 95% CI: 1.6-9.2), and inappropriate use of electronic devices and social networks (lifetime OR=1.8, 95% CI: 1.01-3.2; past three months OR=1.9, 95% CI: 1.02-3.7). Furthermore, male sex (OR=1.8, 95% CI: 1.02-3.3) and a higher-than-average family economic status(OR=1.9, 95% CI: 1.02-3.7) were associated with lifetime use, while higher physical activity was associated with use in the past three months (OR=2.2, 95% CI: 1.01-4.8).

Table 3: Demographic and key characteristics of the medical students by cigarette and alcohol use during the lifetime and past 3 months

Variable		Cigarette						Alcohol					
		Use during lifetime			Use during the past 3 months			Use during lifetime			Use during the past 3 months		
		User n (%)	Non-user n (%)	P value	User n (%)	Non-user n (%)	P value	User n (%)	Non-user n (%)	P value	User n (%)	Non-user n (%)	P value
Sex	Female	35 (20.2)	138 (79.8)	0.008*	30 (17.3)	143 (82.7)	0.055	35 (20.2)	138 (79.8)	0.003*	24 (13.9)	149 (86.1)	0.013*
	Male	61 (32.6)	126 (67.4)		48 (25.7)	139 (74.3)		64 (34.2)	123 (65.8)		45 (24.2)	141 (75.8)	
Stage of student	Basic sciences	41 (21.8)	147 (78.2)	0.029*	35 (18.6)	153 (81.4)	0.071	40 (21.3)	148 (78.7)	<0.001*	32 (17.0)	156 (83.0)	0.002*
	Pre-clinic	26 (27.4)	69 (72.6)		19 (20.0)	76 (80.0)		22 (23.2)	73 (76.8)		12 (12.6)	83 (87.4)	
	Clinic	29 (37.7)	48 (62.3)		24 (31.2)	53 (68.8)		37 (48.1)	40 (51.9)		25 (32.9)	51 (67.1)	
Living place	With parents	45 (25.6)	131 (74.4)	0.645	35 (19.9)	141 (80.1)	0.423	48 (27.3)	128 (72.7)	0.925	30 (17.1)	145 (82.9)	0.330
	Dormitory	51 (27.7)	133 (72.3)		43 (23.4)	141 (76.6)		51 (27.7)	133 (72.3)		39 (21.2)	145 (78.8)	
Being native	Yes	46 (27.2)	123 (72.8)	0.824	37 (21.9)	132 (78.1)	0.922	50 (29.6)	119 (70.4)	0.404	31 (18.3)	138 (81.7)	0.691
	No	50 (26.2)	141 (73.8)		41 (21.5)	150 (78.5)		49 (25.7)	142 (74.3)		38 (20.0)	152 (80.0)	
Economic status of the family	Lower than average	5 (35.7)	9 (64.3)	0.181	4 (28.6)	10 (71.4)	0.252	3 (21.4)	11 (78.6)	0.044*	1 (7.1)	13 (92.9)	0.062
	Average level	63 (24.0)	199 (76.0)		51 (19.5)	211 (80.5)		64 (24.4)	198 (75.6)		45 (17.2)	216 (82.8)	
	Higher than average	28 (33.3)	56 (66.7)		23 (27.4)	61 (72.6)		32 (38.1)	52 (61.9)		23 (27.4)	61 (72.6)	
Family quarrel	Low	26 (20.6)	100 (79.4)	0.058	21 (16.7)	105 (83.3)	0.091	27 (21.4)	99 (78.6)	0.058	20 (15.9)	106 (84.1)	0.237
	High	70 (29.9)	164 (70.1)		57 (24.4)	177 (75.6)		72 (30.8)	162 (69.2)		49 (21.0)	184 (79.0)	
Family support	Low	29 (37.7)	48 (62.3)	0.014*	23 (29.9)	54 (70.1)	0.049*	27 (35.1)	50 (64.9)	0.094	16 (20.8)	61 (79.2)	0.695
	High	67 (23.7)	216 (76.3)		55 (19.4)	288 (80.6)		72 (25.4)	211 (74.6)		53 (18.8)	229 (81.2)	
Recent mental illness	Never	12 (16.2)	62 (83.8)	0.011*	10 (13.5)	64 (86.5)	0.002*	13 (17.6)	61 (82.4)	0.084	11 (14.9)	63 (85.1)	0.444
	Moderate	53 (26.1)	150 (73.9)		39 (19.2)	164 (80.8)		59 (29.1)	144 (70.9)		39 (19.3)	163 (80.7)	
	High	31 (37.3)	52 (62.7)		29 (34.9)	54 (65.1)		27 (32.5)	55 (67.5)		19 (22.9)	64 (77.1)	
History of ASS use in the family	No	61 (21.5)	233 (78.5)	<0.001*	48 (16.9)	236 (83.1)	<0.001*	67 (23.6)	217 (76.4)	<0.001*	43 (15.1)	241 (84.9)	<0.001*
	Yes	35 (46.1)	41 (53.9)		30 (39.5)	46 (60.5)		32 (42.1)	44 (57.9)		26 (34.7)	49 (65.3)	
History of ASS use in friends	No	17 (11.3)	133 (88.7)	<0.001*	12 (8)	138 (92)	<0.001*	20 (13.3)	130 (86.7)	<0.001*	9 (6.0)	141 (94.0)	<0.001*
	Yes	79 (37.6)	131 (62.4)		66 (31.4)	144 (68.6)		79 (37.6)	131 (62.4)		60 (28.7)	149 (71.3)	
Major satisfaction	Very satisfied	35 (25.4)	103 (74.6)	0.128	31 (22.5)	107 (77.5)	0.041*	37 (26.8)	101 (73.2)	0.201	27 (19.6)	111 (80.4)	0.234
	Satisfaction on an average level	39 (23.6)	126 (76.4)		29 (17.6)	136 (82.4)		40 (24.2)	125 (75.8)		26 (15.9)	138 (84.1)	
	Partly unsatisfied	13 (35.1)	24 (64.9)		9 (24.3)	28 (75.7)		15 (40.5)	22 (59.5)		11 (29.7)	26 (70.3)	
	Completely unsatisfied	9 (45.0)	11 (55.0)		9 (45.0)	11 (55.0)		7 (35.0)	13 (65.0)		5 (25.0)	15 (75.0)	
Physical activity	Inactive	21 (26.9)	57 (73.1)	0.172	18 (23.1)	60 (76.9)	0.327	23 (29.5)	55 (70.5)	0.015*	13 (16.7)	65 (83.3)	0.009*
	Moderate	57 (24.4)	177 (75.6)		46 (19.7)	188 (80.3)		55 (23.5)	179 (76.5)		39 (16.7)	194 (83.3)	
	Active	18 (37.5)	30 (62.5)		14 (29.2)	34 (70.8)		21 (43.8)	27 (56.3)		17 (35.4)	31 (64.6)	
Sleep	Appropriate	57 (23.9)	181 (76.1)	0.103	44 (18.5)	194 (81.5)	0.041*	65 (27.3)	173 (72.7)	0.911	45 (18.9)	193 (81.1)	0.833
	Inappropriate	39 (32.0)	83 (68.0)		34 (27.9)	88 (72.1)		34 (27.9)	88 (72.1)		24 (19.8)	97 (80.2)	
Electronic device and social network use	Appropriate	47 (22.0)	167 (78.0)	0.015*	41 (19.2)	173 (80.8)	0.162	47 (22.0)	167 (78.0)	0.004*	32 (15.0)	182 (85.0)	0.013*
	Inappropriate	49 (33.6)	97 (66.4)		37 (25.3)	109 (74.7)		52 (35.6)	94 (64.4)		37 (25.5)	108 (74.5)	

*Factors that were statistically significant using Chi square test (P<0.05); ASS: Alcohol, smoking, and substance

Table 4: Logistic regression analysis of the relationship between cigarette and alcohol use during the lifetime and the past 3 months, and risk factors among medical students

Variables	Cigarette				Alcohol			
	Use during lifetime		Use during the past 3 months		Use during lifetime		Use during the past 3 months	
	Adjusted OR (95%CI)	P value	Adjusted OR (95%CI)	P value	Adjusted OR (95%CI)	P value	Adjusted OR (95%CI)	P value
Sex (male)	1.8 (1.03-3.2)	0.032*	1.5 (0.8-2.7)	0.156	1.8 (1.02-3.3)	0.026*	1.4 (0.7-2.6)	0.262
Stage of student (clinic)	1.4 (0.6-2.9)	0.088	1.7 (0.7-3.8)	0.174	3.3 (1.5-3.6)	0.002*	3.8 (1.6-9.2)	0.003*
Economic status of the family (higher than average)	1.8 (0.9-3.4)	0.053	-	-	1.9 (1.02-3.7)	0.025*	7.0 (0.8-61.9)	0.054
Family quarrel (high)	1.3 (0.7-2.4)	0.356	1.2 (0.6-2.4)	0.465	1.5 (0.8-2.8)	0.153	-	-
Family support (high)	0.6 (0.3-1.2)	0.218	0.7 (0.3-1.4)	0.384	0.8 (0.4-1.6)	0.656	-	-
Recent mental illness (high)	2.8 (1.1-7.1)	0.027*	2.2 (1.1-4.3)	0.016*	1.2 (0.6-2.4)	0.449	-	-
History of ASS use in friends (yes)	3.9 (2.0-7.8)	<0.001*	4.7 (2.2-10.1)	<0.001*	3.6 (1.9-7.0)	<0.001*	5.9 (2.6-13.4)	<0.001*
History of ASS use in family (yes)	1.8 (1.01-3.5)	0.043*	2.0 (1.02-3.8)	0.029*	1.2 (0.6-2.3)	0.491	1.4 (0.7-2.8)	0.258
Major satisfaction (completely unsatisfied)	1.9 (0.5-6.8)	0.319	3.9 (1.0-14.7)	0.042*	-	-	-	-
Physical activity (high)	1.1 (0.4-2.8)	0.731	-	-	2 (0.9-4.1)	0.060	2.2 (1.01-4.8)	0.041*
Sleep (inappropriate)	1.1 (0.6-2.1)	0.627	1.3 (0.7-2.4)	0.371	-	-	-	-
Electronic device and social network use (inappropriate)	1.4 (0.8-2.5)	0.198	1.0 (0.5-1.9)	0.907	1.8 (1.01-3.2)	0.031*	1.9 (1.02-3.7)	0.032*

*Factors that were statistically significant in logistic regression analysis (P<0.05); ASS: Alcohol, smoking, and substance

Discussion

This study found a substantial prevalence of ASS use among medical students, with approximately one in four reporting lifetime use of alcohol and cigarettes, and one in five for past 3 months use of alcohol and cigarettes. Logistic regression analyses identified several risk factors. For lifetime cigarette use, significant predictors included having a family member or friend who smokes, being male, and having a recent history of mental illness. For lifetime alcohol use, significant predictors were having a friend who uses alcohol, being male, being in the clinical stage of training, having a higher-than-average family economic status, and inappropriate use of electronic devices and social networks.

In this study, the lifetime prevalence was 27.5% for alcoholic beverages and 26.7% for tobacco products, representing the highest rates among all ASS types. Consequently, the prevalence of these specific substances was compared with findings from previous domestic and international studies. However, direct comparisons should consider variations in study design and definitions of "users".

In Iran, previous studies reported a wide range of cigarette smoking prevalence among medical students, from 10.5% to 46.7%.[18-21] Similarly, an international study by Machowicz and colleagues found that the prevalence of smoking among medical students was 14% in Warsaw, 14.4% in Strasbourg, and 3.5% in Tehran.[22] These disparities could be attributed to a variety of factors, including cultural differences, socioeconomic status, and variations in healthcare access and smoking cessation programs. These findings highlighted the need to understand the specific reasons for smoking prevalence in this population and to implement tailored interventions.

In the present study, the reported lifetime alcohol consumption was higher than the rates reported in some studies conducted in Iran.[23, 24] However, it was lower than the prevalence reported by Novin and others, who found 34%.[20] A comparison with international data showed that alcohol use prevalence was significantly higher among students outside Iran. For instance, studies by Gignon and colleagues,[25] and Merlo and colleagues,[26] reported prevalence rates of 97% and 96%, respectively. The disparity in prevalence rates inside and outside Iran might originate from Iran's religious and legal restrictions on alcohol use. This underscored the importance of further research to accurately determine the true prevalence of alcohol consumption in the region.

It is also essential to contextualize our findings within southern Iran. A study conducted about two decades ago among medical students in this region demonstrated that 6.79% of males

and 0.69% of females were smokers.[27] A comparison with our results indicated a marked increase in smoking prevalence, particularly among female students. This surge in prevalence might be attributed to evolving societal norms and heightened stress levels.

Furthermore, compared to a study among pre-university students in southern Iran, which reported a smoking prevalence of 15.3% among boys and 12.2% among girls,[28] our findings suggested a higher prevalence among university-level medical students.[28] This discrepancy might be ascribed to increased peer influence, easier access to cigarettes, and the use of smoking as a coping mechanism for stress among university students. In essence, aligning our findings with these regional studies offered valuable insights into the shifting patterns of smoking prevalence across different demographic and educational cohorts in southern Iran.

The present study found a significant association between a history of mental illnesses and ASS use among medical students. This relationship might be explained by the potential use of ASS as a maladaptive coping mechanism for managing stress, anxiety, or depression. Furthermore, individuals with emotional and psychological difficulties might exhibit a higher susceptibility to the addictive properties of nicotine, increasing the likelihood of smoking initiation and dependence.[11] These findings were consistent with previous research, which demonstrated a strong association between mental health issues and ASS use.[10]

The implications of this relationship underscore the importance of addressing mental health concerns and implementing tailored smoking cessation interventions for medical students. By integrating support for psychological well-being with substance use prevention, healthcare professionals and institutions could better protect this critical population and mitigate associated health risks.

This study identified a significant relationship between lifetime ASS use and dissatisfaction with one's major among medical students, a relationship that was particularly pronounced during the clinical stages. This association might stem from the high levels of stress and pressure inherent to medical training, which could lead students to adopt ASS use as a coping mechanism.[29] The demanding nature of medical education, characterized by long study hours and clinical responsibilities, often results in emotional exhaustion and burnout, further diminishing satisfaction with the chosen career path.[30]

Addressing these underlying issues of burnout and major dissatisfaction is crucial for mitigating the risk of ASS use. Interventions such as structured stress reduction programs, accessible career counseling, and robust peer support systems could improve student well-being and academic satisfaction. By proactively tackling these root causes, medical institutions could potentially reduce ASS use related to academic distress and foster a healthier student population.

A significant association was also found between ASS use and having friends or family members who use ASS. This association could be attributed to social networks and peer pressure, where individuals adopt the behaviors of their immediate social circles. The normalization of ASS use within these networks further lowers barriers to initiation and sustained use. These findings were consistent with previous research underscoring the powerful influence of social networks on substance use behaviors.[10]

Understanding this social dynamic is crucial for developing effective interventions. Public health initiatives should leverage this knowledge by implementing peer-led education and social network-based programs designed to modify social norms. Coupled with policies that promote healthy lifestyles, such strategies can effectively counteract the social influences that perpetuate ASS use, particularly among student populations.

The present study also identified a significant association between the use of electronic devices and social networks and ASS use among medical students. This relationship could be attributed to a variety of factors. First, extensive use of electronic devices and social media platforms could foster feelings of social isolation, anxiety, and stress, potentially leading students to adopt ASSs as a coping strategy.[31] Second, digital platforms could facilitate peer influence and normalize ASS use by increasing exposure and perceived acceptability.[32] Addressing this issue requires a multifaceted approach, including promoting digital wellness, fostering strong in-person support networks, and providing accessible mental health resources to help medical students manage stress effectively.

This investigation into the prevalence of risk factors of ASS use among medical students is particularly valuable given the inconsistent findings in previous studies. By providing detailed insights into the prevalence and associated factors, this research helps clarify this complex issue. Moreover, the substantial sample size strengthened the robustness of our findings. These contributions underscored the significance of this study in advancing knowledge and informing targeted prevention strategies for ASS use in this population.

This study had several limitations. First, the data were collected from a sample of medical students at a single university, and the use of a non-probability sampling method might limit the generalizability of the findings to other populations or geographic locations. Second, given the legal and social prohibitions on alcohol and narcotics in Iran, the fear of potential repercussions might have led to underreporting of ASS use, despite our measures to ensure anonymity. Finally, the cross-sectional design of this study precluded the establishment of causal relationships between the identified risk factors and ASS use.

Conclusion

This study revealed a concerning prevalence of ASS use among medical students. Significant associations were identified between ASS use and the student's clinical stage, family economic status, a history of mental illness, ASS use among family and friends, inappropriate use of electronic devices and social networks, and dissatisfaction with their academic major. These findings emphasized the critical need for targeted interventions to reduce and prevent ASS use within this population. Furthermore, supportive interventions must be developed for students with a recent history of mental illness and for those whose social networks involve ASS use.

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Authors' Contribution

SA.M: Study concept, data acquisition, data analysis, and drafting; A.S: Study design, data interpretation, and reviewing the manuscript; M.SA: Data gathering and reviewing the manuscript; D.Sh: Data analysis and drafting the manuscript. All authors have read and approved the final manuscript and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of AI

We made use of the artificial intelligence model Sider (Version December 2024) to ensure the grammatical correctness of the sentences.

Conflicts of Interest: None declared.

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