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The prevalence and causes of self-medication among medical university students in Iran during COVID-19 outbreak and its implications for public health and health systems: A cross-sectional study

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Abstract

Background and Aims: Self-medication is a worldwide phenomenon that brings advantages and disadvantages to public health and health systems. This study investigated the extent and causes of self-medication among medical university students and its implications for public health in Iran in 2020.

Methods: The present study was designed as a descriptive-analytical cross-sectional study that examined the knowledge, attitude, and practice of self-medication. The population of the study was the students of health sciences programs who all entered the study. The data collection tool included a questionnaire designed online and available to students. The content validity ratio of the questionnaire was 0.84, and the alpha Cronbach coefficient was calculated at 0.8936.

Results: The prevalence of self-medication among medical university students was 19%. The most common reason for self-medication was the safety of medicines (66.67%). The most usual form of medication used was the tablet (35.67%), the most common drug taken was acetaminophen (69.01%), and the most common disease to self-medicate for was headache (67.36%). Estimating the odds ratio of self-medication with demographic variables showed no relationship. However, after adjusting the variables, age and type of degree showed an association with self-medication, as the older participants and postgraduate students had positive attitudes toward self-medication.

Conclusion: Self-medication may be helpful, but it often needs proper guidance and logic and can carry various risks. Considering that medical sciences students will be influential in society in the future, it is necessary to pay more attention to correcting their drug use culture and providing access to health services for everyone. Appropriate prescription of medicines, controlling drug sales in pharmacies,

highlighting the role of pharmacists in safe self-medication, and controlling the prevalence of self-medication is necessary.

KEYWORDS

attitude, knowledge, medical students, medicine, Self-medication

1 | INTRODUCTION

Today, self-medication is rising worldwide and has become a social, health, and economic challenge for various countries, including Iran.[1] The World Health Organization defines self-medication as using medicinal products by individuals to manage symptoms or disorders that they have diagnosed themselves or the occasional or ongoing consumption of medication that a doctor has prescribed for recurring or chronic symptoms or diseases.[2]

University students frequently encounter unique health hazards such as stress, inadequate nutrition, sleep deficiency, substance utilization, and mental health concerns.[3] A grasp of their behavior and convictions allows institutions to implement preventive measures and furnish resources to mitigate these risks.[4] It is noteworthy that addressing health beliefs and behaviors can foster a healthier environment.[5] One's health and well-being are intricately linked with academic performance.[6] The health conduct of university students can have broader implications for public health.[7] For instance, understanding their attitudes towards vaccinations can be crucial during disease outbreaks.[8] Moreover, understanding students' diverse health beliefs and behaviors ensures that health initiatives are culturally sensitive and effective.[9] The health behaviors established during this period can influence their lifelong health.[10]

Self-medication, if used correctly and responsibly, can be economically beneficial and helpful in preventing and treating disease.[2] Some governments increasingly encourage self-care, including self-medication for minor illnesses.[11] Although self-medication may be beneficial, it is often without proper guidance and logic and can carry various risks.[12] The harms of irrational use of medicines include higher medicine intake, delays in treating serious illnesses, misdiagnosis, drug interactions and resistance, poisoning, drug dependence, side effects, congenital anomalies, and mortality. It has economic impacts, such as disrupting the pharmaceutical market and increasing the financial burden to the governments, insurance companies, and the public.[13]

Self-medication rates differ across countries due to cultural, political, and economic circumstances.[14] Studies showed that the majority of self-medication among health students in India was 92.7%,[15] among nursing students in Brazil was 76.0%,[16] among medical students in Kuwait was 97.8%,[17] in undergraduate medical students of Saudi Arabia was 90.5%,[18] in pharmacy students of the UAE was 86%,[19] and among university students of Oman was 94%.[20] The failure of healthcare delivery systems in providing equal distribution of facilities, the high costs of medical consultations, the lack of access to and shortage of healthcare professionals, as well as patients' wrong attitudes toward physicians, the ease of obtaining over-the-counter drugs, time-consuming clinical processes, past experiences, extensive drug advertising and the lack of health insurance are some of the critical drivers of self-medication.[21,22]

In Iran, studies showed that the number of drugs prescribed varies according to the population of the country and the epidemiology of diseases. The reason can be self-medication or irrational use of drugs.[23] As health and medical professionals play significant roles in promoting the population's health, their attitudes and behavior substantially influence many aspects of care. Therefore, knowing their health beliefs and behavior is essential.[24,25] To change the behavior, preliminary studies on the prevalence and factors affecting this phenomenon are needed; they can be the basis for future policies and interventions. For this reason, the study sought to explore the extent and causes behind self-medication among students enrolled in a medical university in Iran during the year 2020. Self-medication rates can vary depending on cultural, political, and economic factors.

2 | METHODS

This study is a cross-sectional descriptive and analytical one.

2.1 | Participants

The population of the study was the students of the Health Faculty of Mashhad University of Medical Sciences (MUMS). All the members of the population were enumerated. After obtaining the code of ethics and necessary permits, this study started.

2.2 | Instruments

A researcher-made questionnaire that proved its validity and reliability in a study at Arak University of Medical Sciences, Iran, was used to collect the data.[26] In this study, the content validity was assessed by asking eight experts in the field of clinical pharmacy. According to Lawshe's method, the content validity ratio was 0.84 in our research. Internal consistency was calculated to determine the reliability of the questionnaire. So, the questionnaire was given to 20 students of the Faculty of Health, who were selected by simple sampling method. The alpha Cronbach coefficient was calculated at 0.8936, a high-reliability score.

This questionnaire consisted of four parts as following:

First, students' demographic characteristics such as age, gender, marital status, educational level, and program (8 questions). Second, awareness of self-medication's meaning, effects, and causes (7 questions). Third, attitudes toward self-medication the questions related to attitudes consisted of four sections: (a) Perceived sensitivity (5 questions), (b) Perceived severity (5 questions), (c) Perceived benefits (5 questions), and (d) Perceived obstacles (5 questions). The questions were scored on a 5-point Likert scale (*strongly agree*, *agree*, *have no opinion*, *disagree*, and *strongly disagree*). The body of this part is designed according to the Health Belief Model. "According to this model, understanding the severity of the disease complications (perceived severity) and perceived sensitivity to these complications can lead to adopting a preventive behavior. A person's mental perception of the risk of exposure to health conditions is called perceived sensitivity, and the perceived severity refers to the extent to which the individuals take the disease seriously."[27] Fourth, the practice of self-medication: The practice of self-medication was measured by three sets of questions: the first part was about the sources of information for self-medication and the second part was on the factors that prevent self-medication, the third part was a checklist that measured self-medication practice about 14 diseases and the medicines taken.

2.3 | Procedures

The data collection method was self-reported by email in three rounds. The university email of all students of MUMS, Faculty of Health, was received from the Vice Chancellor. A web-designed questionnaire was sent to all students. By sending two times emails, they were asked to answer the questionnaire in 10 days. Non-participation after sending three times reminders was reported as nonresponse. Of 466 students, 243 participated in the study and completed the questionnaire. Relevant guidelines and regulations are carried out for all methods. Furthermore, informed consent was obtained from all subjects.

2.4 | Data analysis

Descriptive and analytical statistics, including frequency, percentage, and mean, were used to analyze the data. Univariate and multiple linear regression models-adjusted coefficients and 95% confidence intervals were applied to analyze students' self-medication practice, awareness, and attitude. The normality of data was considered using the Shapiro–Wilk test and kurtosis and skewness. Indices. Variables used in univariate and multiple-adjusted coefficient models encompassed age, gender, marital status, the habitation of students, students' field of study, type of degree, and Insurance status. To conduct this analysis, we employed a forward approach with a threshold of $p < 0.10$ for choosing a variable included in multiple analyses. Subsequently, we conducted numerous. Linear regression analyses include field study for awareness and age group, field study, and degree of education for attitude to examine the relationship between students' characteristics and their awareness and attitudes toward self-medication. In addition, we investigated self-medication in relation to various demographic characteristics. The significance level was assessed at 1%. STATA software version 14 was used for the analysis.

3 | RESULTS

Of 466 students of the Health Faculty, 243 participated in the study, and the response rate was 52.14%. Among them, 31.28% ($n = 76$) were male, and 68.72% ($n = 167$) were female. The students in the Public Health Program had the highest response rate (69.15%), and the lowest percentage was related to Epidemiology students (30.76). Regarding marital status, more single participated in the study. Most participants were in the age range <25 years and 82.23% of the students had health insurance ($n = 199$). Regarding the type of residence, most participants lived with their parents, 68.18% (Table 1).

More women had health insurance than men. Also, single people younger than 25 were more likely to have health insurance, and those 25–35 were less likely to be insured. According to most participants (59.67%), self-medication can be in the form of using prescribed drugs in similar cases, spare medications at home, or sharing prescribed drugs for one person among family members. Also, 54.17% of the participants believed that 60% of Iranians self-medicate. 18.11% believed painkillers and antibiotics are used more for self-medication in Iran. According to 70.25% of the participants in the study, the irrational use of drugs aggravates the complications, prolongs the course of the disease, and makes the disease resistant. About 74.90% of the participants stated that self-medication is wrong. Approximately 95.08% of them believed that the course of treatment should be completed, even if the disease period is extended. 84.77% thought the liver and kidneys are the most vulnerable organs to self-medication (Table S1).

According to 164 participants (49.67%), the irrational use of herbal and traditional medicines can be dangerous. One hundred fifty-four respondents (63.12%) believed self-medication disrupts the country's pharmaceutical market. One hundred ninety participants (78.51%) said that self-medication exacerbates the complications of the disease and increases treatment costs. One hundred eighty-eight people (77.37%) believed self-medication could lead to death (Table S2).

Based on 26 persons' opinions (10.74%), in most cases, self-medication does not lead to good results, while 114 people (47.11%) had the opposite view. Two hundred twenty-four respondents (92.56%) were better satisfied with the physician's prescription. One hundred forty-eight persons (61.41%) believed self-medication prevents drug waste. In addition, 87 respondents (35.8%) self-medicated because they did not have time to visit a physician. Twenty-five participants (10.33%) did not trust physicians.

TABLE 1 Demographic characteristics of the study participants.

	Variable	Number	Frequency Number	Frequency %
Marital status	Male	Single	37	49.33
		Married	38	50.67
	Female	Single	105	66.04
		Married	54	33.96
Age	Male	<25	30	41.1
		25–35	21	28.77
		>35	22	30.14
	Female	<25	107	64.07
		25–35	34	20.36
		>35	26	15.57
Health insurance	Male	Yes	49	64.47
		No	27	35.53
	Female	Yes	150	90.36
		No	16	9.64
Place of residence	Male	Dormitory	14	18.42
		Parents' house	48	63.16
		Rental	14	18.42
	Female	Dormitory	45	27.11
		Parents' house	117	70.48
		Rental	4	2.41
Grade	Male	MPH	21	27.63
		Bachelor	19	25.00
		Master	29	38.16
		PhD	7	9.21
	Female	MPH	100	59.88
		Bachelor	10	5.99
		Master	45	26.95
		PhD	12	7.19
Field of study	Male	Public health	14	19.44
		Occupational health	15	20.83
		Environmental health	14	19.44
		Health services management	20	27.74
		Health economics	1	1.39
		Epidemiology	1	1.39
		Biostatistics	4	5.56
		Health promotion and education	3	4.17
	Female	Public health	60	36.81

TABLE 1 (Continued)

	Variable	Number	Frequency Number	Frequency %
		Occupational health	20	12.27
		Environmental health	39	23.93
		Health services management	15	9.20
		Health economics	4	2.45
		Epidemiology	3	1.84
		Biostatistics	7	4.29
		Health promotion and education	15	9.20

TABLE 2 Common diseases to self-medicate as the studied population reported.

	Disease	Frequency of answers Yes Number	Yes %	No Number	No %
1	Common cold	151	62.40	91	37.60
2	Headaches	163	67.37	79	32.64
3	Anemia	52	21.40	191	78.60
4	Skin diseases	32	13.22	210	86.78
5	Digestive diseases	51	21.07	191	78.93
6	Joint diseases	14	5.76	229	94.24
7	Muscle diseases	26	10.74	216	89.26
8	Neurological diseases	13	5.35	230	94.65
9	Menstrual disorders	47	19.50	194	80.50
10	Osteoporosis	31	12.86	210	87.14
11	Depression	12	4.96	230	95.04
12	Corona	33	13.69	208	86.31
13	respiratory diseases	13	5.39	228	94.61
14	Sexual problems	8	3.32	233	96.68

One hundred twenty-eight respondents (52.67%) believed that the pain of illness is a cause of self-medication. Forty-seven persons (19.34%) believed that if they do not have access to physicians, they can self-medicate, while 119 respondents (48.98%) were against this opinion (Table S3).

According to Table 2, the most frequent illnesses reported by respondents that prompted them to self-medicate were headaches (67.36%), colds (62.40%), anemia (21.40%), and gastrointestinal diseases (21.07%), respectively. Moreover, the first source of information for self-medication was a physician's previous advice (68.03%) and then a booklet of medicine.

TABLE 3 Frequency distribution of self-treatment status in different educational levels.

Type of degree	Practicing self-medication	
	No	Yes
Bachelor	97 (81.51%)	22 (18.48%)
MPH	25 (86.20%)	4 (13.79%)
Master	58 (78.37%)	16 (21.62%)
PhD	16 (84.21%)	3 (15.78%)
Mean	49 (81.66%)	11 (18.33%)

Moreover, bachelor students had the highest rate of self-medication compared to others, and PhD students had the lowest rate. (Table 3) According to the participants, the most common reason for self-medication was that their medicine was safe (66.67%) and they knew the disease, so there was no need to visit a physician (61.48%). In addition, 91.36% believed that a physician's opinion was necessary for taking medicine at the first stage. 94.65% of participants stated that physicians did not prescribe medication, and 85.60% said that poor economic situation was a reason for self-medication. 58.09% of respondents pointed out that easy access to medicines without a physician's prescription was the cause of self-medication. 87.14% stated that living in a dormitory was a limitation that led to self-medication. For 90.53%, the lack of health insurance was the reason for self-medication (Table 4).

The most common drugs taken were acetaminophen (69.01%), analgesics (60.33%), cold medicines (54.77%), and multivitamins (50. 41%), and the most common form of drug used arbitrarily was the pill (35.67%) and then the capsule (8.78%); on the other hand, eye drops and suppositories had the lowest irrational consumption rate, respectively. Among the respondents who could not afford a physician's visit, 24 people (66.66%) had health insurance, and 12 (33.33%) did not. Among the respondents of all educational levels, a high percentage (81%) did not self-medicate.

This study calculated the relationship between awareness and attitudes about self-medication according to univariate and multiple linear regression models. The results showed that none had meaningful relationships (Table 5). After adjusting the variables, age and type of degree showed an association with self-medication, as the older participants and postgraduate students had positive attitudes toward self-medication. Moreover, among the students of Biostatistics, higher knowledge of self-medication was associated with lower self-medication, and this relationship was statistically meaningful (Table 6).

4 | DISCUSSION

This study aimed to determine the extent and causes (socioeconomic factors, attitudes, and knowledge) of self-medication among the Health School of MUMSs, Iran, students in 2022. The rate of self-medication was approximately 19%, which is relatively low compared

TABLE 4 The reasons to self-medicate from the participant's point of view.

	Reasons	Agree		Disagree	
		Number	%	Number	%
1	I do not feel the need to visit a physician when I know my illness	150	61.48	94	38.52
2	I do not have time to visit a physician for any disease.	89	36.48	155	63.52
3	The drugs I took arbitrarily are safe.	162	66.67	81	33.33
4	I am aware of the side effects of the drugs I take	131	54.36	110	45.64
5	A physician's opinion is not required for medication	21	8.64	222	91.36
6	Medications need to be taken on time, and a physician's prescription is not required	31	12.81	211	87.19
7	Some physicians do not prescribe medication, so I do not visit them	13	5.35	230	94.65
8	I do not believe that physicians	10	4.12	233	95.88
9	Medicines are available (at home or by acquaintances, etc.)	107	44.03	136	55.97
10	I cannot afford a physician's visit	35	14.40	208	85.60
11	I do not have health insurance	23	9.47	220	90.53
12	Pharmacies dispense medicine without a physician's prescription	101	41.91	140	58.09
13	I do not have proper information about the effects of drugs	50	20.66	192	79.34
14	Living in a dormitory is a limitation in visiting a physician	31	12.86	210	87.14
15	Having an acute illness forces me to take medication arbitrarily	36	14.88	206	85.12
16	I got good results from self-medication	92	38.02	150	61.98
17	I only take medicine to strengthen my body.	59	24.48	182	75.52

to similar studies. A 2020 meta-analysis revealed that 70.1% of university students globally engaged in self-medication, while in 2016, 89.6% of health sciences students at Kermanshah University of Medical Sciences, Iran, were involved in self-medication.[28,29]

TABLE 5 Associations between awareness of students with demographic variables (in univariate and multiple linear regression models).

Factors		Univariate linear regression			Multiple linear regression		
		Point estimation(95% CI)β	STZ β	p Values	Point estimation (95% CI) β	STZ β	p Values
Age	<25	Reference group			–		
	25–35	-0.052	−0.007	0.908	–	–	–
	>35	0.505	0.072	0.287	–	–	–
Gender (male/female)		−0.483	−0.080	0.218	–	–	–
Marital status (married/single)		0.599	0.105	0.115	–	–	–
Habitation	Dormitory	Reference group			–		
	Parents' house	0.214	0.036	0.617	–	–	–
	Rental	−0.680	−0.650	0.367	–	–	–
Field of study	Public health	Reference group			Reference group		
	Occupational health	−1.632	−0.205	0.005	−1.632	−0.205	0.005
	Environmental Health	0.228	0.035	0.642	0.228	0.035	0.642
	Health services management	0.081	0.010	0.886	0.081	0.010	0.886
	Health economics	−1.507	−0.080	0.230	−1.507	−0.080	0.230
	Epidemiology	0.242	0.011	0.861	0.242	0.011	0.861
	Biostatistics	−1.961	−0.152	0.026	−1.961	−0.152	0.026
	Health promotion and education	−0.229	−0.224	0.748	−0.229	−0.224	0.748
Degree	Bachelor	Reference group			–		
	MPH	0.106	0.012	0.861	–	–	–
	Master	0.053	0.008	0.897	–	–	–
	PhD	−0.217	−0.208	0.759	–	–	–
Insurance status (no/yes)		0.098	0.013	0.837	–	–	–

Abbreviations: CI, confidence interval; STZ, standardized.

*Adjusted for another variable in the table

Moreover, Sawalha et al. and Klemenc-Ketis et al. showed that self-medication was prevalent among university students.[30,31] Furthermore, a study in Zabol (a city in Iran) showed that the prevalence of self-medication was higher among university students than among other population groups.[32] A study in western Nepal showed that medical students' knowledge about self-medication was acceptable, but most practiced self-medication.[33] The difference between our results and other studies might be rooted in the methodology and study population. We asked the participants, "Would you self-medicate without access to a physician?" The other studies might not have this condition. Moreover, future medical doctors with more knowledge about medicines than students of other health-related study programs participated in other studies.

The results of this study showed that the older participants and postgraduate students had positive attitudes toward self-medication. Self-medication rates were highest among bachelor students compared to PhD students and others. Students had the lowest rate. According to some studies, self-medication among students has been associated with age, gender, study field, and course of study.[13,34–36] Shah et al. found that self-medication was a gender-neutral problem at the University of Karachi in Pakistan. Self-medication prevalence was similar among married and single students.[12,37] Self-medication did not differ significantly regarding variables such as age, insurance status, and type of residence in another study.[29] Among the reasons why the participants in the survey self-medicate, more than half of them believed their medicine was safe and stated that they knew their illness and did not need to visit a physician. Similar to Abdi, the study by Azami-Aghdash et al. showed that previous experience with similar drugs was the cause of self-medication.[29,38] The reason for the students of Iran University of Medical Sciences was having sufficient information about diseases and medications.[28] In a study in Kuwait, the prevalence of self-medication was significantly lower among health students than in other fields of study.[17] Moreover, a survey at a Portuguese University showed that the level of self-medication knowledge and the score of attitudes were low among college students; they tended to have a better positioning toward self-medication.[16]

TABLE 6 Associations between attitudes of students with demographic variables (in univariate and multiple linear regression models).

Factors		Univariate linear regression Point estimation (95% CI) β	STZ β	p Values	Multiple linear regression Point estimation (95% CI) β	STZ β	p Values
Age	<25	Reference group			Reference group		
	25–35	1.994	0.134	0.047	3.350	0.224	0.039
	>35	3.089	0.196	0.004	5.100	0.312	0.017
Gender (male/female)		−0.702	−0.052	0.424	–	–	–
Marital Status (married/single)		1.418	0.110	0.097	−0.363	−0.027	0.770
Habitation	Dormitory	Reference group					
	Parents' house	0.743	0.056	0.438	–	–	–
	Rental	1.710	0.073	0.310	–	–	–
Field of study	Public health	Reference group			Reference group		
	Occupational health	1.061	0.060	0.411	1.267	0.073	0.331
	Environmental health	−1.542	−0.103	0.176	−2.033	−0.135	0.113
	Health services management	2.423	0.134	0.069	0.360	0.002	0.987
	Health economics	1.861	0.389	0.562	−1.463	−0.031	0.694
	Epidemiology	0.861	0.018	0.789	−0.769	−0.014	0.850
	Biostatistics	1.497	0.051	0.460	−0.119	−0.004	0.963
	Health promotion and education	1.694	0.072	0.304	−0.449	−0.019	0.885
Degree	Bachelor	Reference group					
	MPH	−0.165	−0.008	0.898	−3.100	−0.164	0.053
	Master	2.010	0.147	0.033	−0.221	−0.087	0.533
	PhD	1.623	0.069	0.304	−3.293	−0.136	0.211
Insurance status (no/yes)		0.905	0.054	0.403	–	–	–

Abbreviation: CI, confidence interval.

*Adjusted for other variables in the table

Moreover, acetaminophen, analgesics, cold medicines, and multi-vitamins were the most commonly used medicines by health sciences students. At the Kermanshah University of Medical University, painkillers and antibiotics were usually taken without a physician's prescription.[29] In Iran, University of Medical Sciences, antitussives, cold medicines, analgesics, and antihistamines were commonly used for self-medication.[28] Ansari et al. indicated that 10% of students used psychotropic drugs arbitrarily.[39] Other studies showed that the most common drugs were paracetamol,[40,41] amoxicillin, and metronidazole.[42] The most frequent forms of medication used for self-medication were the pill and capsule, while eye drops and suppositories were less used. The highest rate of self-medication was for headaches, colds, anemia, and gastrointestinal diseases. Headache, cold, sore throat, fever, menstrual cramps, muscle aches, cough, heartburn, stomach pain, nausea, vomiting, allergies, and colic were the main reasons for self-medication among students at the University of Rio Grande, Brazil.[42] In Karachi, the most common symptoms were headache, fever, and the flu, which students self-medicated for.[37] In Abbottabad, Pakistan,

occasional pain, joint infections, coughs, and colds were the most common diseases treated through self-medication.[43] In the study by Mortazavi et al. in Iran, respiratory diseases, colds, and headaches were the reasons for self-medication.[35] A survey conducted in 2018 on students at Zabol University of Medical Sciences in Iran found that the common cold was frequently treated through self-medication, and antibiotics were the most used drugs.[32]

Common diseases, the experience of recovery with self-medication, and the mild and limited nature of some disorders may motivate patients not to consult a physician.[38] Simplification of diseases and their symptoms and dissatisfaction with the health system were reasons for not visiting a physician.[35] Some studies reported the lack of trust in physicians as the reason for self-medication.[44] Inadequate knowledge about the risks of self-medication and the communication gap between patients and the healthcare team might result in self-medication.[45]

Studies showed that people believed self-medication was cost-effective.[36] In the present study, more than half of those who stated

that poor economic status was the cause of self-medication had health insurance. Studies in other developing countries have cited the lack of time to visit a physician and financial problems as the main reasons for self-medication.[17,23] The study of Shah et al. at the University of Karachi, Pakistan, showed that self-medication was higher among students who did not have health insurance. However, the difference was not statistically significant.[12] In another study, the students covered by health insurance received as much self-medication as those without health insurance, which may be related to the insurance companies' programs as the insured must pay a significant portion of the doctor's visit and medication.[12] A study by Yousef et al. reported that self-medication was affected by the high costs of health care,[21] while the failure to enforce restrictive laws on the sale of antibiotics was a reason to continue self-medication.[12] In Iran, as in many countries, selling dangerous and high-risk drugs without a prescription is prohibited.[12] However, this law is ignored by many pharmacies for various reasons, such as insufficient supervision by the relevant authorities.

The high costs of physicians' visits and overcrowded health facilities have been reported as reasons for self-medication in the studies of Mortazavi et al.[35] Lack of access to health facilities has also been reported as a motive.[44] People self-medicated to save time and costs.[36] The first source of information for self-medication that most participants referred to was a physician's previous advice. This shows physicians' role in preventing drug overuse, especially antibiotics. In another study, the source was the Internet and the direction of pharmacists.[46] They might be influenced by others' advice, such as family members and friends, in practicing self-medication.[47,48]

When using the data provided by this study, it should be noted that restricting the analysis to a single university limits generalizability to the total population of students and society. In addition, because of Corona's limitations on face-to-face communication, this survey was done online, so similar to studies of its kind, the respondents may not feel encouraged to provide accurate, honest answers.

5 | CONCLUSIONS

In conclusion, the study revealed that self-medication is not commonly practiced among the Health Faculty of Mashhad University students in Iran. However, when self-medication did occur, it was mainly used for minor symptoms of mild diseases. Health insurance was found to limit students' access to healthcare services. Students in health sciences programs must know the benefits and drawbacks of self-medication. Responsible self-medication, using low-risk over-the-counter medications, can help prevent mild illnesses and reduce healthcare costs. Nevertheless, self-medication without proper knowledge can be concerning. To ensure the safe and effective use of medications, consumers must accurately identify symptoms, determine treatment goals, and use appropriate medications, dosages, and treatment durations. Close monitoring of medical history, contraindications, co-morbidities, potential side effects, and treatment response is crucial. Whether to endorse self-medication is critical, and a holistic approach is recommended to address related issues, such as raising awareness about self-medication and restricting drug advertising. Improvements in the drug distribution system through training individuals and healthcare professionals, providing cost-effective treatment access, and implementing monitoring systems are necessary. It is suggested that decision-makers implement programs to control and monitor drug sales while facilitating student access to physicians and healthcare centers to reduce self-medication effectively.

AUTHOR CONTRIBUTIONS

Fatemeh Kokabisaghi: Data curation; investigation; visualization; writing—original draft. **Mina Sadat Mousavi Emadi**: Conceptualization; investigation; resources; visualization; writing—original draft. **Amirmohammad Tajik**: Investigation; methodology; resources; software; writing—original draft. **Farshad Sharifi**: Formal analysis; methodology; supervision. **Elaheh Houshmand**: Formal analysis; software. **Mehdi Varmaghani**: Data curation; methodology; project administration; software; supervision; validation; writing—review and editing.

CONFLICT OF INTEREST STATEMENT

The authors demonstrated that we have no conflict of interest.

DATA AVAILABILITY STATEMENT

All data generated or analyzed during this study are included in this published article and its Supporting Information files.

ETHICS STATEMENT

The study has been approved by the Ethics Committee of Mashhad University of Medical Sciences with the code of IR.MUMS.-REC.1399.666. Relevant guidelines and regulations are carried out for all methods.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.