Practices and determinants of self-medication among undergraduate medical students of Peshawar, Pakistan

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Abstract---Self-medication, which often includes over-the-counter (OTC) medications, is described as a global public health issue affecting a vast number of individuals. The rate of self-medication has risen considerably among medical students, as evidenced by various published studies. Self-medication was reported to be quite common (88.4%) when 389 medical students were polled about it. The frequency were found higher in female students (66.3%) as compared

to male students (22.1%) with significant p-value (p=0.007). The most frequently used items were painkillers (77.57%), antipyretics (52.06%), cough and cold medications (48.71%), antitussives (40.20%) and antibiotics (30.92%). They primarily purchased self-medication supplies from pharmacies and extensively relied on family members and their own prior medical experiences for knowledge on the medications they used (p<0.05). However, among these medical students, the idea of self-medication is well-established because they realized that mild illnesses could be treated without visiting a doctor. High levels of education and professional success have been said to be indicators of self-medication. The results suggest that in order to prevent the rising trend of self-medication, rigorous laws should be implemented that prohibit the distribution of pharmaceuticals without a valid prescription. The risks of self-medication should be made known to young people, especially females.

Keywords---Self-medication, Students, Medical colleges, Practices, Determinants.

Introduction

Self-care is the term used to describe the acts taken by people for themselves in order to acquire and maintain health as well as stay off and prevent illness. Self-medication is considered as one component of self-care (WHO, 2009). World Health Organization (WHO) defines "self-medication as selection and use of medicine by individuals to treat the self-recognized illness and symptoms". Increase in self-medication is due to change in life style, readily access to the drugs, and greater availability of medical products (Ayalew, 2017). Commonly used drugs are analgesics, anti-allergic, anti-biotic and skin products. People use it for the treatment of any disease symptoms or minor ailments by their self-initiative (Jain et al., 2011). Self-medication is a prevalent issue among the young population, particularly among students. Media exposure and the increased advertising of medications offer a greater concern to this demographic, as it was discovered that the majority of students utilized at least one of the advertised products without consulting their physicians (Helal and Abou-ElWafa, 2017). Students self-medicate for a variety of reasons, such as past experiences, advice from friends or family members, the perception that their health issues are minor, time savings, a lack of transportation, accessibility, being able to self-manage the signs and symptoms, the urgency of the issue, a doctor who was not available, and a lack of knowledge.

Other studies cited a lack of time, inexpensive consultations, and trust in medical professionals as the primary causes (Aziz et al., 2018, Nusair et al., 2021, Rashid et al., 2020). When conducted appropriately, self-medication reduces the demand on medical services, reduces the amount of time patients must wait to see a doctor, and saves money, especially in economically underdeveloped nations with insufficient healthcare resources (Bennadi, 2013). However, if not utilized properly, it can increase the risk of undesired drug effects, irrational drug consumption, resource waste, and protracted suffering. It would be safe if those

who self-medicate had sufficient knowledge about its dose, time of administration, and side effects on overdose, but lack of information might result in major consequences such as antibiotic resistance, skin problems hypersensitivity and allergies (Khalid et al., 2021). Self-medication is a broad phrase that encompasses a wide range of behaviors, from self-care to disease prevention and management. As a result, self-medication is not confined to drug use, but also involves interventions aimed at changing one's lifestyle (Galato et al., 2009). The type of medical or psychiatric disease, the patients' social, cultural, and financial status, and country rules and regulations regarding drug use and sales are all factors that affect self-medication (Alghadeer et al., 2018, Ramay et al., 2015, Sherazi et al., 2012). The unlawful sale of drugs may also be a contributing factor to self-medication (Andaulem and Gebre-Mariam, 2004) and become serious issue for health decision-makers and policy-makers (Stosic et al., 2011).

According to WHO, the purchase of prescription-only drugs without a prescription is significantly more common than the selling of over-the-counter (OTC) drugs and is an accepted practise in developing nations (Chang and K. Trivedi, 2003).

Self-medication cannot be deemed entirely harmful. Drugs designated as "over the counter" can be acquired without a prescription and can often save patients time and money. In the majority of hill, tribal, and other difficult-to-reach regions where there is a serious shortage of health staff, patients are still vulnerable to self-medication adheres to for mild ailments (Chaturvedi et al., 2009).

Regardless of the socio-demographic features of the study participants, 27 original papers addressing self-medication behavior in Ethiopia were examined. This resulted in 9586 people being included in the pooled calculation of primary outcome measures. Since self-medication is a widespread practice in low-income nations like Ethiopia where resources are frequently in short supply. More than two out of every five patients self-medicated in Ethiopia, where the prevalence of self-medication was reported to be 44.0% (95% CI: 35.1, 52.8) The prevalence has more than doubled over the past 20 years, rising from 28.5% (before 2010) to 54.5% as evident in the researches (Sisay et al., 2018).

The prevalence of self-medication among medical or health science students as well as doctors cannot be denied. Irrational self-medication poses a serious threat to the professions of medicine and the health sciences and has the potential to damage public confidence in the sector. A survey conducted by Clavijo et al. (1995) on pregnant women self-medication indicate that one in every five pregnant women self-medicates without consulting a doctor. This will have major health effects for such a vulnerable population. It should be emphasized that drug use during pregnancy must take into account both the potential benefits to the mother and the potential risks to the embryo or fetus, and must be accompanied by important medical guidance

Similarly, a study in Kuwait found a significant frequency of self-medication among undergraduate students, which was linked to the fact that, while health services are free in Kuwait, the high level of living and the availability of a wide range of medications on the market. With age, the prevalence of self-medication decreases. Females are more likely than males to self-medicate, and the most

commonly utilized drugs are pain relievers. The main downsides of self-medication are the possibility of making an incorrect diagnosis, using inappropriate drugs, and experiencing bad drug reactions (Al-Hussaini et al., 2014).

According to Sharma et al. (2005), Self-medication was more common among respondents with less than a higher secondary education than among those with a higher secondary education. Recalling the names from previous prescriptions was determined to be the most common method of acquiring medications. This supports previous results that educated people are more likely to self-medicate. Self-medication is more common in people aged 50 to 59 than in younger people. Other studies have discovered related traits (Shankar et al., 2002, Sharma et al., 2005, Yuefeng et al., 2012).

Furthermore, between 2017 and 2018, a cross sectional study was undertaken at The Indus Hospital, Pakistan, a free tertiary care institution in Karachi, which revealed that fever was the most common symptom for which individuals self-medicate, followed by cough/cold and body aches. Analgesics and antipyretics were the most commonly utilized medications, followed by antibiotics (Dhedhi et al., 2021). A similar study on nonprescription pharmaceuticals sold by pharmacies in Punjab, Pakistan found similar results, where the community was analgesics and antipyretics (39.4%) (Grigoryan et al., 2006). This is backed by a survey conducted in Islamabad's rural and urban populations, which also revealed that analgesics are the most commonly utilized non-prescription drugs (Aziz et al., 2018). Self-medication was shown to be substantially linked with medicines stored at home and educational acquaintance with the term antibiotic. Other research reinforce this, indicating that higher education is a predictor of self-medication. The majority admitted to using drugs on themselves or their children based on prior experience, while a few admitted to utilizing past prescriptions from doctors or on the advice of friends and relatives without being informed about the time and amounts to be taken (Andaulem and Gebre-Mariam, 2004). This is in contrast to the findings of a European study on antimicrobial self-medication, which revealed that pharmacies and prescription leftovers were the primary sources of self-medication (Aqeel et al., 2014). Self-medication has resulted in increased bacterial resistance, inability to provide effective treatment, unintentional and purposeful poisonings, drug market disruption, financial loss, and an increase in the community's per capita drug usage (Hughes et al., 2001). Arbitrary medicine can also cause delays and disruptions in disease detection, exacerbate a condition, hinder treatments, increase adverse effects, and even risk life (containment, 2001, Aslam et al., 2020, Aziz et al., 2018, Chuwa et al., 2021, Nusair et al., 2021, Rashid et al., 2020). Because of the community's ongoing development of the self-medication phenomena and individuals' direct engagement in drug selection and usage, this study was done to assess the incidence of self-medication and its determinants among undergraduate medical students.

Materials and Methods

A descriptive cross-sectional study was carried out using a structured questionnaire among 389 out of 930 students from two private medical colleges

over the course of two months, from January 1st to 2nd March, 2019. The study sample consisted of students from all professional years of medical studies. Those students who were not willing or absent on the day of data collection were excluded from the study. Informed consent form on the front page of the questionnaire was obtained from participants. The questionnaire had multiple response options and assessed the socioeconomic status of the subjects, including age, sex, and education. The next section of the questionnaire assessed the practices and determinants of self-medication, including reasons, duration, information sources, methods of purchase, knowledge of risks or drug interactions and communication with the doctor, among other aspects of self-medication. Ethical clearance was obtained from ethical review committee of Medical College. A statistical significance level of 0.05 was used to determine the association between variables through chi-square test. The results were presented in absolute figures (percentages) as depicted in tables and figures.

Results

A total 389 respondents in which (48.19%) were in the age group of 18-21 and the other (51.80%) were of 22 to 25 years. Regarding gender of the respondents 292 (75%) were female and 97 (25%) were male. The frequency of self-medication is higher in 2nd year and 3rd year students while it is less in 4th and final year students (Table 1). The overall prevalence of self-medication was found to be 88.4% which varied among the different years of study. In female respondents self-medication was found more 258 (66.3%) often than male respondents 86 (22.1%) (Figure 1).

Table 1. Demographic characteristics of students of surveyed medical colleges

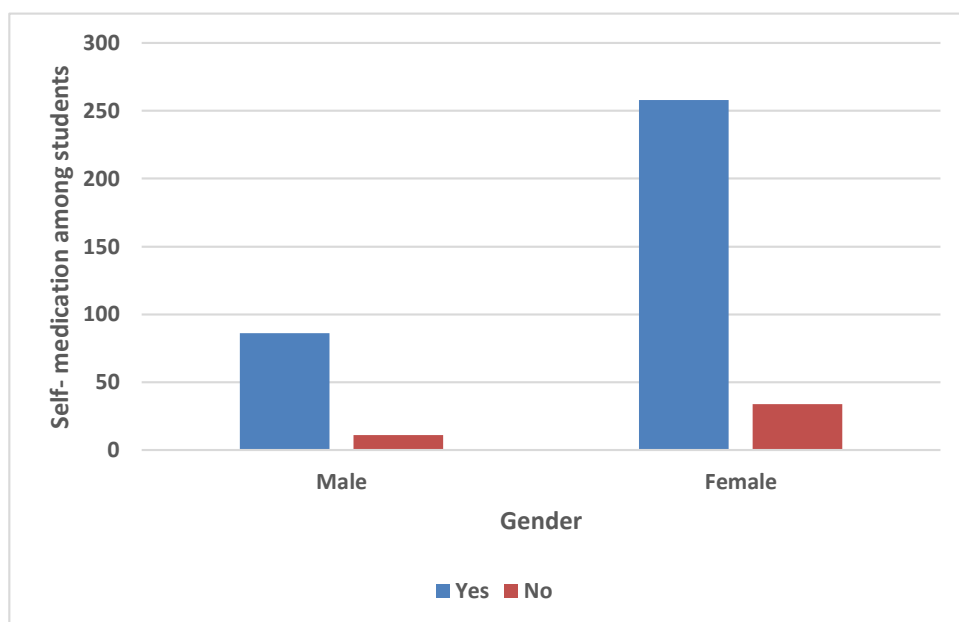| Variables	Groups	Frequency (%age)
Age		
	18-21	296 (76%)
	22-25	93 (24%)
Gender		
	Male	97(25%)
	Female	292 (75%)
Professional Year		
	2nd Year	116 (29.8%)
	3rd Year	142 (36.5%)
	4th Year	67 (17.2%)
	Final Year	64 (16.5%)

Figure 1. Self –medication practices in students of surveyed medical colleges

Table 2. Reasons for self-medication among students of surveyed medical colleges

Variables	Options	Gender of students		Chi-square	Sig.
		Male Frequency (%age)	Female Frequency (%age)		
Mildness of diseases	Yes	45 (46.4%)	187 (64.04%)		
	No	52 (53.6%)	105 (35.95%)	9.423	0.002**
Confidence on knowledge	Yes	26 (26.80%)	231 (79.10%)		
	No	71 (73.2%)	61 (35.95%)	88.85	0.000***
Relief from self- medication	Yes	87 (89.7%)	243 (83.22%)		
	No	10 (10.30%)	49 (16.78%)	2.37	0.124
Positive result of Previous self-medication	Yes	25 (25.77%)	64 (21.92%)		
	No	72 (74.23%)	228 (78.8%)	0.613	0.434
Recommendation of family/friends	Yes	40 (41.23%)	196 (67.12%)		
	No	57 (58.76%)	96 (32.87%)	20.44	0.000***
Not enough time to see a doctor	Yes	4 (4.1%)	14 (4.79%)		
	No	93 (95.87%)	278 (95.21%)	0.74	0.785
Availability of medicines from pharmacy without a prescription	Yes	72 (74.23%)	183 (62.67%)		
	No	25 (25.77%)	109 (37.32%)	4.31	0.038*
Knowledge about contradiction/ side effects of medicines	Yes	15 (15.46%)	54 (18.49%)		
	No	82 (84.53%)	238 (81.50%)	0.458	0.499
Aware about the antibiotic resistance	Yes	61 (62.88%)	226 (77.39%)		
	No	36 (37.11%)	66 22.60%)	7.93	0.005***

*indicates Significance
** indicate Most Significance

The most important reasons given by subjects for self-medication were: mildness of disease (64.04%) in female and (46.4%) in male respondents, confidence in knowledge (79.10%) in female and (26.80%) in male respondents, recommendation of family and friends (67.12%) in female and (41.23%) in male respondents; availability of medicines from pharmacy without a prescription (62.67%) in female and (74.23%) in male respondents; and awareness about antibiotic resistance (77.39%) in female and (62.88%) in male respondents while relief from self-medication with significant p-value (<0.05), while a positive result from previous self-medication, insufficient time to consult a doctor, and awareness of drug contraindications had the lowest incidence (Table 2).

The most frequently self-prescribed medications were painkillers 301(77.57%) among which 69 (22.92%) were male and 232 (77.07%) were female. This is followed by antipyretics (52.06%), medications for cold/flu (48.71%), antitussives (40.20%) and antibiotics (30.92%). The prevalence for other group of medications is relatively lower. These include antacids (29.82%), antiemetics (22.42%), skin products (12.37%), anti-depressants (9.27%), and sleeping pills (8.76%). Self-medication is more commonly practiced in females as compared to males which is evident by the data given in the figure (2).
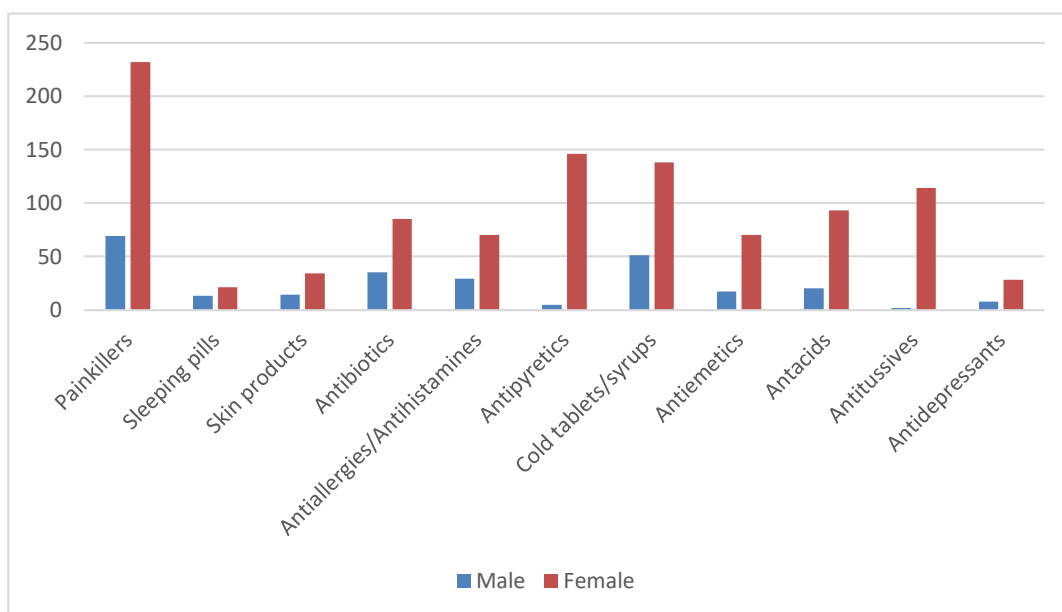

Figure 2. Medicines used for self in the past 6 months among students of surveyed medical colleges

Discussion

Self-medication offers both advantages and disadvantages, depending on who and what one chooses to self-medicate. The purpose of this study was to assess the practises and determinants of self-medication among undergraduate medical students. The prevalence of self-medication was determined to be 88.4% in the current study. The frequency was 88% in a similar study done at Islamabad

Medical and Dental College (Azad et al., 2013). Other studies conducted in Pakistan revealed the prevalence of self-medication in medical vs non-medical students in a total of 308 students, 123 (79.9%) medical and 101 (66.2%) non-medical students, with a significant difference in understanding the term self-medication between the two groups. Similarly, Shah et al. (2014) discovered that 80% of medical and non-medical students self-medicate in another study conducted in Karachi in 2008. Furthermore, different parts of the world have reported a highly variable frequency of self-medication, such as 25.4% and 43.2% in Ethiopia (Abay and Amelo, 2010, Gutema et al., 2011), 51% in Slovenia (Smogavec et al., 2010), 55% in Egypt (El Ezz and Ez-Elarab, 2011), 56.9% in Nigeria (Fadare and Tamuno, 2011), 80.9% in Malaysia (Ali et al., 2010) 47.8% in Southern China, 48% (Pan et al., 2012) in Iran to 79.5% (Abdi et al., 2018) in Sudan(Awad et al., 2005). In India, the prevalence of self-medication among the medical students was shown to be ranging between 57.1% and 92% (Banerjee and Bhadury, 2012, Sontakke et al., 2011, Badiger et al., 2012).

According to the current study, 84.57% of the participants found relief from self-medication. Another study also showed that the majority expressed that self-medication helped them alleviate their symptoms (Abdelwahed et al., 2022). The effectiveness of self-medication was also noted in a study held in China with 94.5% of the participants noticing an improvement (Lei et al., 2018). This might encourage the action of practicing self-medication as beneficial outcomes are oftentimes gained (Abdelwahed et al., 2022). In a research estimating the incidence of self-medication among medical and non-medical students, 97 (63%) of medical students and 92 (59.7%) of non-medical students said they "occasionally" used self-medication to cure their symptoms effectively (Ali et al., 2015).

In addition, the most commonly used drugs among students with symptoms of body aches, cold/flu, fever, and exhaustion were pain relievers, antipyretics, and cold tablets/ syrup. They were practicing for a variety of conditions, and the majority of them were using OTC NSAIDs, most commonly paracetamol. The increased use of paracetamol corresponds with findings from Saudi nursing undergraduates (Faqihi and Sayed, 2021) and from the Peru adult population (Quispe-Cañari et al., 2021) where it was also the most consumed drug. Paracetamol use has been widely reported in research including medical students as a frequently utilized first-line pharmacotherapy analgesic for treating pain problems and other pyrexia, and medical students in Iran were also regular consumers of this drug (Abdi et al., 2018). Similar results were reported in a study conducted in India (Foucault and Brouqui, 2007) showing that OTC drug usage was more in medical students for the conditions like cough and fever (Kanwal et al., 2018).

The second most commonly utilized medicine in the study population was antibiotics. Additionally, it is consistent with earlier research findings that indicate Azithromycin was a common antibiotic used for self-medication in Pakistan (Aslam et al., 2020) and have also been an alternative for self-medication in other countries such as Saudi Arabia and Peru (Faqihi and Sayed, 2021, Quispe-Cañari et al., 2021). In the current study, antacids and antihistamines were the third-most commonly used medication. Other studies conducted in India

found that the most prevalent illness for which antihistamines were used was allergic rhinitis, and 90% of these students did not have a prescription (Jindal et al., 2019). Antidepressants, tranquillizers and skin products were also discovered to be consumed in low amounts as shown in the table (3).

Table 3. Medicines used for self and comparison with other studies on students

Medicines	Present study	Previous studies	Reference
Painkillers, Antipyretics and Cold tablets/syrups	Commonly used	Commonly used	(El Ezz and Ez-Elarab, 2011, Kumar et al., 2013, Chindhalore et al., 2020, Abdi et al., 2018, Foucault and Brouqui, 2007, Kanwal et al., 2018, Quispe-Cañari et al., 2021)
Antibiotics	Commonly used	Commonly used	(Eticha and Mesfin, 2014, Aslam et al., 2020, Faqihi and Sayed, 2021, Quispe-Cañari et al., 2021, Fadare and Tamuno, 2011, Olayemi et al., 2010)
Anti-allergies/Antihistamines and Antacids	Commonly used	Commonly used	(Sawalha, 2008, Jindal et al., 2019)
Antitussives, Antiemetics Sleeping pills, Anti-depressants and Skin products	Oftenly used	Commonly used	(Abdi et al., 2018, Faqihi and Sayed, 2021, Quispe-Cañari et al., 2021, Kumar et al., 2013, El Ezz and Ez-Elarab, 2011, Eticha and Mesfin, 2014)

Other studies suggest that among Indian undergraduate medical and paramedical students, the use of analgesics for muscular pain at any place was also very prevalent (Chindhalore et al., 2020) and this result reflects a similar picture in the development of the United States, where a significant proportion of college students use antidepressants and psychoactive stimulants to either avoid episodes of social anxiety, cope with the additional load of studies, amplify their performance, concentration, and simply for recreational purposes (Kadison, 2005, Teter et al., 2010). About 65.72% of the participants reported that the existence of a previous prescription was the reason for self-medication. According to a Syrian study, the mildness of the sickness and the high expense of medical consultations were the most common reasons for self-medication, followed by prior knowledge or experience with the illness (Abdelwahed et al., 2022). Previous prescriptions could have served as the ground for future self-medication in (25.2%) of patients (Balbuena et al., 2009). This change in the pattern of self-medication practice is probably due to the fact that along with the increase in knowledge, students' confidence in their ability to identify the illness and choose the right therapy without consulting a physician grows as well.

The belief that the health issue is not significant and does not call for seeing a doctor was listed as one of the main causes of self-medication practice in the current study (69.2%). According to other studies, the causes are a minor illness (40%) and a lack of time to see a doctor (32%). According to the findings of our

survey, 384 out of 389 students (98.7%) admitted to self-medicating since they believed their condition was moderate and they could recover without seeking medical attention. All participants stated that self-medication was a result of their field of study and that their training education had made them knowledgeable about ailments and medications (Janatolmakan et al., 2022).

Today, there is an information explosion in many sectors, including medical knowledge. A simple Google search can produce a wealth of information about various diseases and their therapies. All participants stated that they have easy access to medical information via the media, particularly the Internet (Janatolmakan et al., 2022). Furthermore, fourth and fifth professional medical students practiced self-medication more than first, second, and third professional year students because they have a better understanding of the drugs and how to use them because it is part of their curriculum (Kanwal et al., 2018).

According to research on self-medication, a number of factors, including exposure to marketing, education, family, and society, have an impact on it. It is necessary to undertake numerous studies in medical institutions across the nation to assess the knowledge viewpoint, self-medication practices, and frequency. The findings of such investigations will serve as a guide for how to incorporate ideas and tenets of trustworthy self-medication into the medical curriculum.

Conclusion

Students with a previous experience and with mild illness were more likely to practice self-medication. This has implications, because many diseases have similar symptoms and a person using previous experience may be exposed to the dangers of misdiagnosis and consequently wrong treatment. At the student level, the main benefits of self-medication included immediate alleviation, the absence of the requirement for a doctor's prescription for mild illnesses, time savings, educational opportunities, and cost savings. The majority of respondents had a favorable attitude towards treating minor illnesses by themselves. Mild disease and prior experience managing a comparable ailment are among the justifications for self-medication ($p < 0.05$). The most frequently used items were painkillers (77.57%), antipyretics (52.06%), cough and cold medications (48.71%), antitussives (40.20%) and antibiotics (30.92%). Study on self-medication reveals that it is influenced by a variety of variables, including exposure to marketing, education, family, and society. It has been suggested that a high degree of education and professional success is a predictor of self-medication. According to the findings, strict regulations should be put in place that forbid the distribution of medications without a valid prescription in order to combat the rising tendency of self-medication. The youth, particularly the females, should be informed about the dangers of self-medication. The study conclusions are based on a single center study at Peshawar's medical colleges that was surveyed, hence they cannot be generalized in and of themselves. To comprehend the numerous elements impacting the practice of self-medication, more multi-centric studies involving medical students and the general people must be conducted.

Limitation of Study

The limitations of the present study included, the lack of a comparison group, such as students from a different field, the small sample size, and the dearth of interventions, such as providing information about the hazards of self-medication, were among the study's weaknesses. Since we are in a medical school, it was simpler to approach the participants, who were primarily from the medical area. Because we only looked at one university, we cannot generalize the findings to other general universities. Because it was a cross-sectional study, it did not investigate how self-medication patterns varied according to the season. Due to financial curbs, it may be argued that the practical sampling method and limited sample size are limitations.

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