



## **Prevalence and Practice of Self-medication among University Students in Pakistan through Online Resources**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author AM designed the study, collected the data and performed the statistical analysis. Author SA managed literature searches and analyses. Authors MK and KK wrote the first draft of the manuscript. The final draft, review and editing was done by author FKA. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Background:** Self-medication or self-care is regarded as an unhealthy practice. However, it is widely accepted and practiced in the low and middle-income countries (LMICs) due to scarcity of health resources.

**Objectives:** To assess the prevalence and practice of self-medication among university students in Pakistan through online resources.

**Methodology:** A descriptive cross-sectional study was conducted between May 2017 and August 2017 by involving 991 university students. A questionnaire was administered to obtain data.

**Results:** The majority 85.9% (852/991) of the respondents knew about online medicines and their uses of self-medication. Overall, 68% (674/991) of them have to travel long-distances to access essential health services. Nearly half (41.7%) of the respondents procured drugs through the online sources, while only 15.6% of them obtained through pharmacies.

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**Conclusions:** The rampant irrational use of drugs without medical guidance could contribute to adverse consequences viz.; the emergence of multi-drug resistance, adverse drug reactions, drug interactions etc. Strict regulations must be enforced to limit public access to online-drugs by the law-enforcement agencies.

*Keywords: Online resources; Pakistan; prevalence; self-medication; University students.*

## 1. INTRODUCTION

Self-medication (SM) is defined as the 'selection and use of medicines by individuals (or a member of the individuals' family) to treat self-recognized or self-diagnosed conditions or symptoms' [1]. It is not only unsafe but also irresponsible as well as unethical practice too [2]. This paternalistic approach to medicine, supported by health systems designed to treat sickness to minimize the health system burden in the majority of the tropical countries, where infectious diseases like malaria [3], onchocerciasis, HIV/AIDS [4] and schistosomiasis are endemic and causing enormous morbidity and mortality.

The practice of SM started to appear in medical research since the 1970s when clinicians observed that heroin addicts were using SM to overcome illnesses i.e. stress and loneliness [5]. Indeed, most of the people are hesitated to consult with the qualified physician, whenever they feel not well. They often consult with families, friends, neighbors and the pharmacist, or self-care by previous prescribed drug, or suggestions from an advertisement in newspapers, scientific journals and magazines are common sources of self-medication [6].

Perhaps, in recent years almost everybody is under the illusion that he/she has adequate medical knowledge [7] to practice self-care. It is important to note that the dose greatly varies from person-to-person. Therefore, ill-advised medication is extremely dangerous which could lead to negative consequences. Currently, though, many countries have adopted free treatment policy, the people, those are living in remote areas have to walk/travel a long distance to access quality healthcare (8). Eventually, they approach neighbors or drug-vendors to seek medical advice and therapeutic agents, which contributes to the genesis of resistance, treatment-failure and prolonging illnesses because of sub-therapeutic dosage [8].

The recent information communication technology revolution led to the widespread

usage of the internet, through smartphone by young-adults, particularly university students. Now, almost all the information is readily available on internet/websites. However, it is extremely difficult to authenticate the credibility of the existing information [9] on the websites. It is just like an authorless environment as there is a limited mechanism in cyberspace [10].

It is important to note that the number of health-conscious people keeps increasing every day and several reports are indicating about counterfeiting of life-saving drugs [8]. It is a crime against humanity and this persistent threat has torn society by imposing severe menace in all spheres of human life viz, clinical, socioeconomic, and public health [8]. In online self-medication, anyone can visit the relevant website and he/she can place their orders. However, it is important to note that the ingredients and the credibility of information and the location of the online shop are quite unknown. Unfortunately, most of the controlled medicines are freely available, and this kind of freedom could lead to addiction/dependence of certain medicine [11].

The recent Pakistan census report (2016) indicated that the total population is 207.774 million, EMRO-WHO report (2007) showed that in Pakistan there are 1167-Hospitals, 5695-government rural dispensaries (GRDs), 5464-Basic Health Units (BHUs) sub-health centers, 675-Rural Health Centre (RHC), 339-Tuberculosis Centers, and 733-Maternity and Child Health Centers (MCHCs). Around 118 869 total beds are available and the ratio of population per bed is 1613. Pakistan Health Profile Data (2015) was indicating that the health facilities are overburdened to meet the people expectations in terms of providing quality health services.

Self-medication practices among university students have been surveyed in various parts of the world; in Slovenia, (94.1%) [12] in Ethiopia (38.5%) [13] and in Palestine (98/0%) [14] were found to be self-medicating. However, the rampant irrational use of SM without proper

medical guidance may result; [1] missed diagnosis, [2] undue therapy, [3] delays apt treatment, [4] wastage of resources, [5] emergence of multi-drug resistance and particularly [6] causes serious health hazards like increased morbidity and mortality [6]. SM is influenced by several confounding factors i.e. education, gender, socio-economic status and availability of medicines. In this context, this survey was conducted to assess the prevalence self-medication by using online sources among Pakistan University students. We strongly believe that it could pave the way for the policy-makers to design appropriate mitigation strategies to regulate this unhealthy risky behavior shortly.

## 2. MATERIALS AND METHODS

### 2.1 Study Settings and Study Design

A cross-sectional survey was conducted in two Pakistan Universities, i.e. University of Lahore, Hajvery University and a Police Training Academy at Choung, Lahore, Pakistan. The survey conducted between May 2017 and August 2017. A stratified, systematic random sampling was adopted for selection of a total of 991 respondents from the chosen academic institutions. The sample size was estimated by employing a 95% confidence interval formula to estimate a population proportion.

### 2.2 Interview

The interview was carried out by involving selected 991 respondents. To improve the quality of the data, the Pilot study was done on 10% of the study sample to test the clarity and applicability of the study tools. The students were interviewed on the knowledge, usage of self-medication patterns and trends particularly those obtained through online resources, using a pre-tested questionnaire specifically designed for this purpose. Both male and female respondents were included. To avoid biased information and variables, the questionnaire has been prepared in English language and has been translated into the native local language (Urdu) to make it easy

to understand and to administer by interviewers and interviewees.

### 2.3 Data Management and Analysis

In the field, data was collected in a standardized questionnaire and data collection forms checked for errors and completeness. Data was then counterchecked before entry into DbaseV (Borland International, Scotts Valley, California, USA) using the double-entry system. Summary statistics were performed using STATA version 10 (STATA Corp., Texas and USA). Range and mean were analyzed and appropriate tables, graphs and percentage details were displayed.

## 3. RESULTS

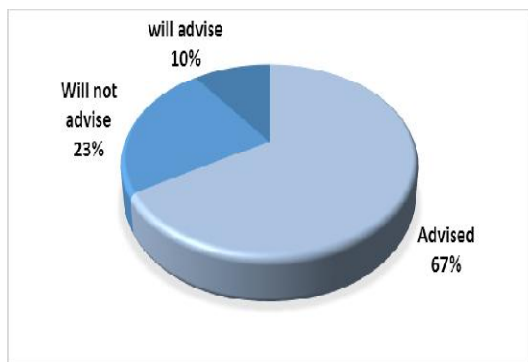
The survey was conducted by involving all the selected respondents. Among them, 58.1% were male, (Table 1). About half of them [48.9%; (male 26.2% and female 22.7%)] belongs to between 21 and 25 years of old (Table 1). Also, it was found that 58.5%, 20.7% and 20.8% of the respondents from the pharmacy, computer engineering and police training academy, respectively. Overall, 63.7% and 36.3% of them were residing in urban and rural areas, respectively. Since all the participants are well-educated they were having ample awareness about self-care. Among the 991 respondents, 852(85.9%) of them knew about online therapeutic-agents and their uses for self-medication and 356(41.7%) of them have bought drugs online previously.

Interestingly, 23.3% of the students mentioned that they never advise anyone to purchase online medicine, while 66.5% of them have already advised their relatives or friends (Fig. 1). Out of 66.5%, only 18.7% of them may have some kind of knowledge about drugs because of their specialty (pharmacy) and rest of them (37.5%) have referred drugs because of their previous practices and 10.3% of them learned through the medicaljournals/magazines and advertisements.

**Table 1. Age group and gender-wise distribution of study participants**

Age group	Total respondents		Male		Female	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
15-20	170	17.1	110	11.2	60	06.1
21-25	485	49.0	260	26.2	225	22.7
26-30	336	34.0	207	20.8	129	13.1
Total	991	100	577	58.1	414	41.9

Fig. 2 shows the distance of the nearest health facilities from the residence to acquire treatment. Overall, 32% of them were living within five-to-ten minutes walkable distance (21.6% 5 minutes; 10.4% 10 minutes), while others needed to travel a long distance to access necessary health services; While 14% of them have witnessed the absence of physicians when they visited for medical assistance.



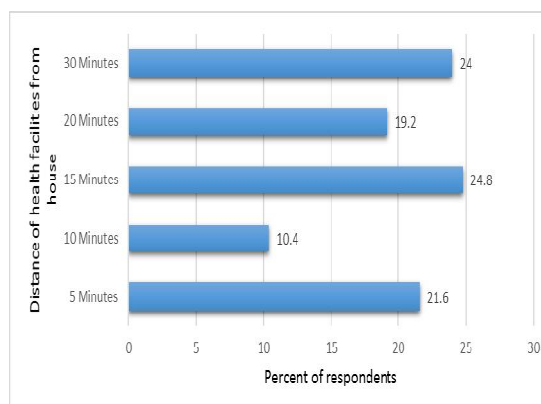
**Fig. 1. Percent of respondents advise others to procure online drugs for self-medication**

It is important to note that nearly half of the respondents (41.7%) procured drugs online, while only 15.6% of them obtained from the pharmacists. Besides, 21.8% of them borrowed from their friends/relatives (Fig. 3). Interestingly, 258/72.4% of the participants, those who have purchased via online sources claimed that the dosage-regimen, duration and the possible side-

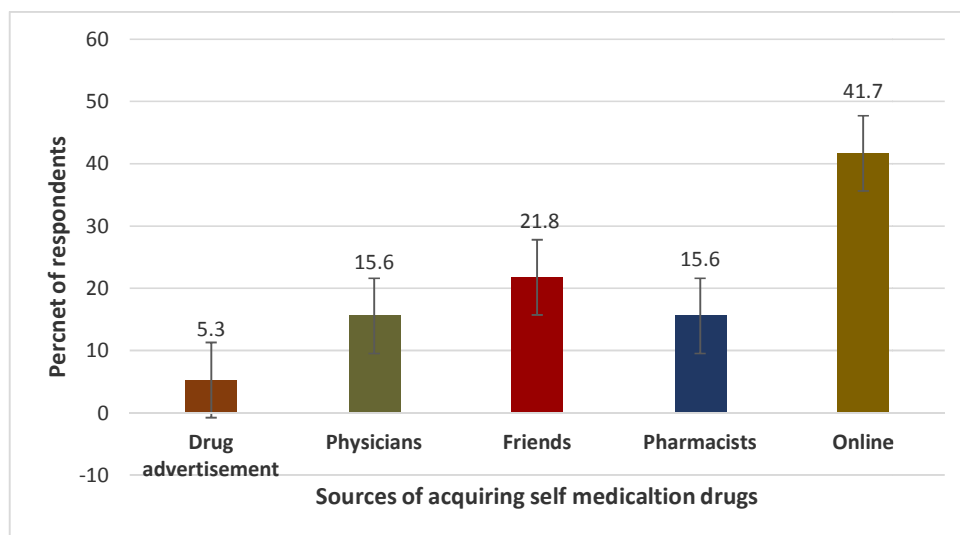
effects were not mentioned in the instruction labels. Fig. 4 clearly shows that nearly half of the respondents (43.4%) are using antacids and antipyretics for the self-medication (Fig. 4).

The most common cited illnesses or symptoms that led students to procure self-medication, were headache (33.6%), fever (30.4%) and throat infection/soreness (14.8%) (Fig. 5).

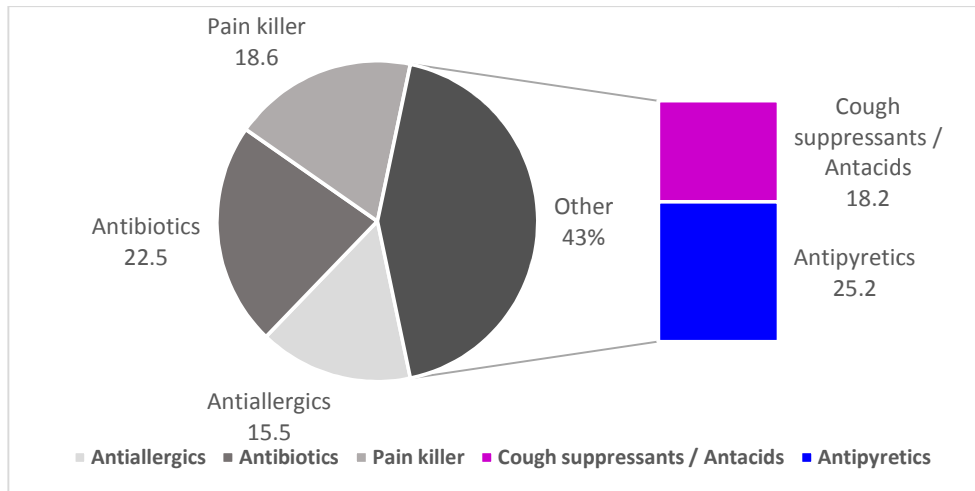
The respondents cited the following reasons for the self-medication; (a) mild illness, (b) previous illness with similar kinds of symptoms, (c) absence of physicians, (d) expensive treatment and (e) long waiting-time (Fig. 6).



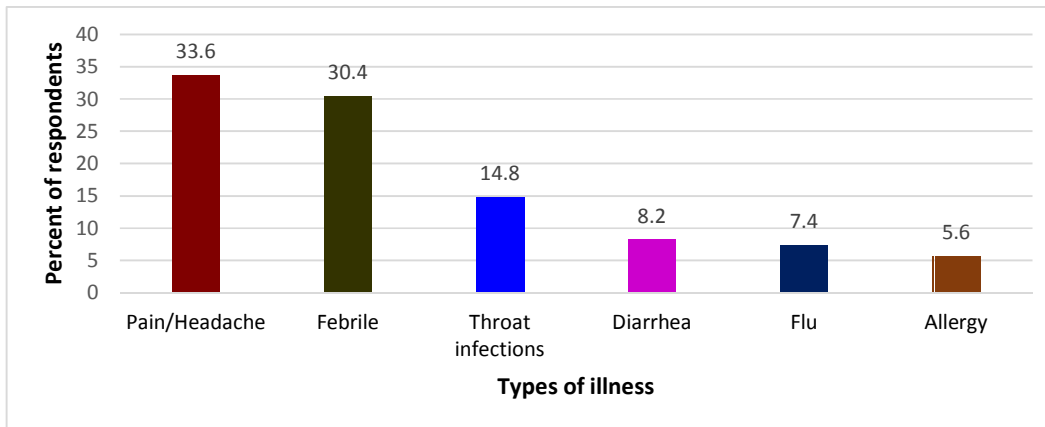
**Fig. 2. Distance of respondent's houses from the nearest health facility**



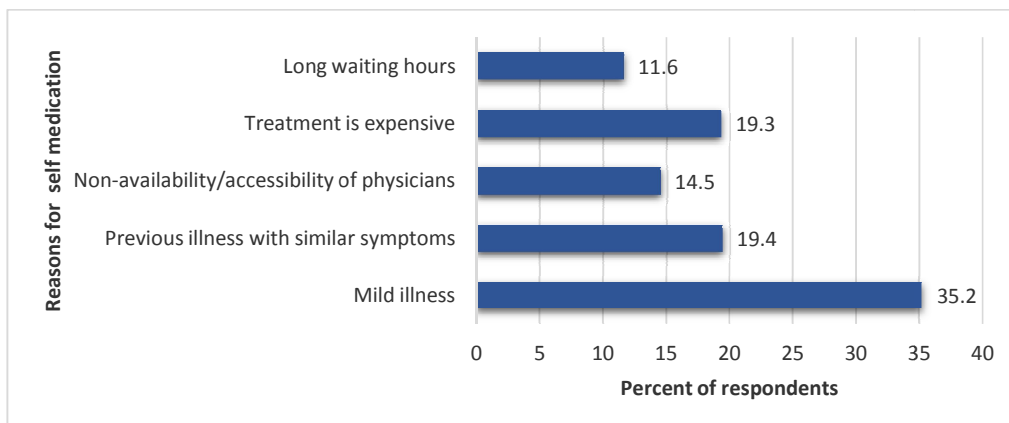
**Fig. 3. Sources of acquiring drugs for self-medication**



**Fig. 4. The most commonly used drugs by the respondents for self-medication purpose**



**Fig. 5. The most common illness or symptoms that led students to administer self-medication**



**Fig. 6. The respondents cited reasons for the self-medication**

#### 4. DISCUSSION

According to the World Health Organization (WHO), SM is the use and selection of different

medication by a person to treat self-identified symptoms or illness [15]. The recent Pakistan Medical Statistical Report (2017) reported that there are 230 613 physicians [41 994 Surgeons;

while 188 619 with basic medical degree] are working in various health facilities across Pakistan. WHO Global Health Statistical Report (2014) indicated physician density ratio to the population in Pakistan that was only 0.806 per 1000 that is very low as compared with developed countries.

Therefore, the purpose of this survey is to shed limelight on the trend of prevalence, practice and its associated risk-factors on self-medication via online resources among the university students. Overall, 58.1% and 41.9% male and female students were involved in this survey (Table 1). More than half of the participants were from Pharmacy, one fifth from computer engineering, and one third from the Police training academy. The main determinants of self-medication include educational status, age, gender, past successful usage, the severity of illness and economic level. Reported negative outcomes of antimicrobial self-medication included allergies (2/34:5.9%), lack of cure (4/34:11.8%) and causing death (2/34:5.9%). The commonly reported positive outcome was recovery from illness (4/34:11.8%) [16].

The current study found that more than two-thirds of the respondents were advised by others to procure medicines via online outlets (Fig 1.) but only 41.7% of them procured drugs online (Fig 3.). The major sources of drugs included pharmacies (65.5%), leftover drugs from friends and relatives (50%) and drug shops (37.5%) [16]. However, the authenticity of these online outlets is a major concern. If someone has no adequate knowledge of medicines and their right dosage, then it can be the highest risk for their lives. The results are quite comparable with a study that was performed to ensure the validity of online pharmacies and websites and they found that the accuracy of information was quite inadequate. Besides, the quality of the delivered drugs was quite substandard and it was delivered without proper information regarding the potential side-effects and interactions [15].

The present study indicates that, although 18.7% of the respondents were shown to have an awareness of medicines (Fig. 1), they lacked knowledge of right dosage and interactions. Still, they self-administer these drugs due to prior experience. However, because of lack of information, it can cause adverse side-effects such as antibiotic resistance, skin problem, hypersensitivity and allergy [6,8]. The distance of the nearest health facilities, mild illness, prior illnesses, absence of physicians and long waiting

hours are also some of the key factors to lead the people to the practices of self-medication (Figs. 2 and 6). Some health agencies are encouraging self-care for mild-illnesses, to minimize the cost, travelling time as well as physicians consultation time [17].

Majority of the respondents (85.9%) claim that self-medication is timesaving as well as economical, besides they believe that it is quite convenient and easy to choose their medicine by themselves for the minor illness for the quick relief rather than go to nearby healthcare facilities (Fig. 2). The results are quite comparable with a previous study, which reported that self-medication can be a low-cost and convenient alternative to treat minor-illnesses [5]. Most of the respondents (85%) were practicing self-medication (Fig. 2), the results are quite consistent with a few studies within Pakistan among the university students that about 76% of university students used to self-medicate [18] in Karachi with prevalence rate of 80% [19], in Ethiopia (39.2%) [20]; in Oman (94%) and Pakistan (40%) [21]. A study was conducted in Sudan which reported 73% prevalence of self-medication with antibiotics /anti-malarials [22].

Overall, 43.4% are using antacids and antipyretics for self-medication (Fig. 4) and 22.4% of students were self-administering antibiotics. A recent systematic review [16] reported that the overall prevalence of antimicrobial self-medication was 38.8%. The respondents were administering various drugs for the self-medication against headache (33.6%), fever (30.4%) and throat infection/soreness (14.8%) (Fig. 5). The results comparable with several studies as reported [16] in a systematic review. The common disease symptoms managed were, respiratory (50%), fever (47%) and gastrointestinal (45%) (16). Another study also reported similar kinds of findings that reported the most frequent health complaint that led to SM. Other common complaints included fever, allergies, cold and cough-related symptoms, insomnia, skin problems, and menstruation disorders [23].

Nearly half of the respondents (41.7%) used online resources to procure medicines and interestingly among those, 72.4% of the participants argued about the instructions given on the label were not satisfactory. It is noted that the participants of this study belong to well-educated category of society and if the practice

of self-medication is so high in people who are well aware of its dangers, then this practice in rest of the population may be even more serious, but according to another study, the practice of self-medication is highly prevalent in rural and urban areas ranging from 32.5% to 81.5% [24]. Although self-medication can indeed help by treating the minor illness that does not require medical consultation and hence can reduce the pressure on medical services particularly in the developing countries with limited health care resources.

Nearly, 22.5% and 18.6% of the participants use the antibiotics 22.5% and painkillers, respectively (Fig. 4). The results are quite consistent with several studies in several countries; in Yemen, (87.1%) [25], Saudi Arabia (30%) [26] and (32%) (among university students)[27], Spain (41%) and Croatia (38%) respondents were administering antibiotics as self-medication. Another study also reported consistent findings [28] where, the most frequently self-prescribed medications were analgesics (55.4%), vitamin supplements (45.7%) and antipyretics (41.5%). This was also observed in another study conducted among University students of Turkey where 89% of students knew that it is a wrong practice to take antibiotics without consulting a doctor but still 45% of them were involved in this activity [29].

In Pakistan only 4.1% and 12% pharmacies comply with regulatory requirements and pharmacies are running under the direct supervision of pharmacists, respectively [30]. The practice of self-medication often has many adverse effects that can lead to many problems, including multi-drug resistant pathogens, drug dependence and addiction, the hazard of misdiagnosis, problems relating to over and under-dosing, drug interactions and tragedies relating to the side effect profile of specific drugs. The majority of victims of counterfeit drugs often belong to underprivileged sections of society. They primarily prefer self-medication from informal, private, pharmaceutical sectors owing to the inaccessibility and unaffordability of quality healthcare medicines [8]. Therefore, pharmacies and health facilities must provide better services within a shorter span to minimize the prevalence of self-medication [3].

In recent years, counterfeiting of life-saving drugs is a matter of grave concern and it is regarded as an attack on global public health. The counterfeiters produce fake drugs and distribute

in resource-poor settings [8] as well as through online sources. Therefore, an urgent and intensified effort is imperative in terms of multi-layered approaches and multi-disciplinary scientific research and policies to avert and combat this public health disaster. Besides, adequate efforts must be made to generate awareness regarding the harmful effects of self-medication among the health-conscious people as well as health-seekers to avert the prolonged morbidity and avoidable death. Also, it could prevent and shrink the emergence/spread of multidrug-resistant strains.

## 5. CONCLUSION

The online 'non-prescription' or 'over the counter' (OTC) practice was assessed among the university students to understand the prevalence and patterns of this risky behavior among elite society in Pakistan. The survey findings revealed that the majority of them were practicing self-diagnosis and treatment for common illnesses. However, a lacuna of knowledge was observed towards the potential risks of using drugs without proper supervision and consultation. The educational status does not affect self-medication practices. Indeed, there are several cultural, socio-economic barriers exist for the growing trend of self-medication like (1) financial constraints, (2) distance, (3) absentees of physicians, (4) lack of time, (5) long-waiting hours, (6) mild-illnesses and (7) extensive advertisement. Therefore, most of the students acquiring information through online resources on the symptoms, self-diagnosis and treatment. However, the credibility of existing online information is a matter of grave concern.

Indeed, self-diagnosis and self-care is not only a harmful practice, but it also creates many complications/side-effects when it is not properly performed or practiced. Besides, it is quite evident that irrational use of medicines may lead to increased morbidity, mortality and prevalence of resistance to chemotherapeutics besides wasting time, efforts and resources. Therefore, appropriate communication strategies needed to be devised by involving all the pertinent stakeholders like policymakers, healthcare professionals, and the people to generate public awareness about the adverse impact of self-medication via printed and electronic media. Strict regulation policies must be enacted to limit public access to online drugs through regulatory authorities and law-enforcement agencies. Besides, strengthening the healthcare services in

the underserved areas could significantly curtail this risky behavior shortly.

### CONSENT AND ETHICAL APPROVAL

The study was approved by the ethical clearance committee of the Lahore University, Pakistan. Before the commencement of the survey, meetings with the students, class representatives, leaders and members of the student associations were held in which the objectives of the survey were clearly explained. Written consent was obtained from each study participant. Every participant was assured to withdraw the interview at any phase if they wish to do so. However, all the informants actively involved, and no one declined to finish the interview.

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### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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