DOI: https://doi.org/10.54393/pjhs.v6i6.2893

PAKISTAN JOURNAL OF HEALTH SCIENCES
(LAHORE)
https://thejas.com.pk/index.php/pjhs
ISSN (E): 2790-9352, (P): 2790-9344
Volume 6, Issue 06 (June 2025)

Original Article

OPEN ACCESS

Prevalence and Effects of Self-Medication Practice among Pharmacy Students: A Cross-Sectional Study in Karachi

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ARTICLE INFO

Keywords:
Self-Medication, Medical Students, Adverse Effects, Prevalence

How to Cite:
Anjum, L., Fraz, T. R., Islam, F., Iftikhar, L., & Khalid, A. (2025). Prevalence and Effects of Self-Medication Practice among Pharmacy Students: A Cross-Sectional Study in Karachi: Prevalence and Effects of Self-Medication Practice among Pharmacy Students . Pakistan Journal of Health Sciences, 6(6), 26-32. https://doi.org/10.54393/pjhs.v6i6.2893

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Received Date: 31st January, 2025
Revised Date: 26th May, 2025
Acceptance Date: 6th June, 2025
Published Date: 30th June, 2025

ABSTRACT

The prevalence of self-medication is notably high among medical students compared to the general population, which is primarily attributed to advanced knowledge of pharmacology and easier access to pharmaceuticals either through educational resources or hospital attachments, potentially underestimating the risks involved. **Objectives:** To determine the prevalence and effects of self-medication practice among pharmacy students: a cross-sectional study in Karachi. **Methods:** The study employed a cross-sectional descriptive design conducted on 283 pharmacy students using a structured, self-administered questionnaire developed specifically. The collected data were analyzed by SPSS-21 software. **Results:** The outcomes revealed the response rate of 92.93%, with the largest group of participants (23%) being first-year students, comprised mainly female respondents (72.24%), between the ages of 21-23. The relationship between both age and year of study with the usage of self-medication without consulting a doctor is found to be significant. Students were engaged in the use of self-medication occasionally. The commonly reported symptoms and conditions practiced were headaches (55.1%). However, a statistically significant relationship was observed between certain medical conditions, particularly fever, diarrhea, and nausea/vomiting, and gender. Further evaluated perceptions of the safety of self-medication, with statistical analysis highlighting significant associations with both age (p=0.036) and year of study (p=0.014). **Conclusions:** The Prevalence of self-medication among pharmacy students is high. It is needed to focus on developing and implementing programmes about the risks of self-medication, and to ensure self-practices along with a control system and monitoring of drug sales by health decision-makers and policymakers.

INTRODUCTION

Self-medication, or SM, is used for conditions diagnosed by the patient without professional healthcare guidance. Such practice involves procuring medications without a prescription, recycling leftover medications, and consultation from non-professional sources like family or the web [1-3]. Self-medication may seem the best convenience for many ailments, but it has its major health hazards, including misdiagnosis, inappropriate drug choices, and adverse reactions to the drugs taken [4]. Prevalence of SM varies in medical students from different countries in studies undertaken to ascertain the SM practice among medical students [5-7]. The practice is especially more prevalent among medical students due to their advanced knowledge of pharmacology and easy access to medicines through educational resources [8, 9]. It is important to know the nature and the extent of self-medication practices among medical students because their habits become models for future patient care and public health [10, 11]. In Kermanshah, Iran, the prevalence is 89.6% due to easy access to medications and high stress [12]. In addition, peer influence, easy access to medications, and social factors have also been shown to serve as initiators of self-medication behaviour among the students [13, 14]. Medical students mostly possess

DOI: https://doi.org/10.54393/pjhs.v6i6.2893

confidence in self-diagnosis, which can be dangerous as it results in underestimation of health risks due to their lack of proper medication use [9, 15]. Although numerous studies have been carried out on self-medication practices, very few studies investigate the long-term effects of self-medication practices and how to intervene in bringing such behaviours to an end among medical students. There are also a few studies comparing the self-medication practices of students through the various medical years and across cultures [16].

This study aims to fill those gaps by exploring prevalence and motivation, most used drugs, and adverse effects of self-medication in pharmacy students in a public sector university in Karachi. By studying this subgroup of pharmacy students, the purpose is to provide insight into the determinants of professional training and influencing self-medication behaviour. The findings can be useful in designing interventions for responsible self-care and medication use among future healthcare providers. In addition, empowering pharmacy students with the right attitude toward medication practices will help to promote safe and efficient use of medicines at home and in the workplace.

METHODS

A cross-sectional descriptive method to assess the prevalence and adverse consequences of self-medication among pharmacy students participating in a public sector university in Karachi was designed, which allows the collection of data from a defined population at a particular point in time for analysis of trends and patterns in self-medication. Participants for the study were students of the Department of Pharmacy of a Public sector University in Karachi. Students were selected using convenience sampling methodology, students (from first to final year) who were available promptly and willing to participate during the study period. Concerning the prevalence rate 89.6% for self-medication [12], a total 144 is sample size calculated at a 95% confidence level and ±5% margin of error, using the Open Epi sample size calculator, Version 3. Although the calculated sample size was 144 but the data was collected, almost double respondents. Sample size n = [DEFF*Np(1-p)]/[(d^2/Z$^2_{1-a/2}$*(N-1)+p*(1-p)](Table 1).

Table 1: Sample Size for Frequency in a Population

Variables	Values
Population size (for finite population correction factor or fpc)(N):	1000000
Hypothesized % frequency of outcome factors in the population (p):	89.6%+/-5
Confidence limits as % of 100(absolute +/- %)(d):	5%
Design effect (for cluster surveys-DEFF):	1
Confidence	**Sample Size**
95%	144
99%	248

The data were collected using a structured, self-administered questionnaire developed specifically for this study The instrument consisted of three major components: demographic information (age, gender, academic year) and information on self-medication practices (type of drugs, frequency, reasons, sources of information and illnesses treated), and adverse effects (type, severity, and response). An objective pilot test of the questionnaire (as well as the feedback from the pilot test) was conducted with a small group of students (grades 6, 8, 9, 10, 11, 12, 14, 15), and subsequently revised and improved. A final version of the questionnaire was distributed both in the classroom during class sessions and online using Google Forms between July and September 2024, with instructions explaining that answers to the questionnaire must be honest and confidential. All responses were analyzed through SPSS version 21. Demographic characteristics, such as total number of students, gender, and self-medication frequency, were summarized by means and squared of the mean and standard deviations. To examine associations between demographic variables and self-medication patterns, inferential statistics were performed (chi-square test with $p \leq 0.05$ was considered statistically significant).

RESULTS

The study recruited 263 questionnaires out of 283 students approached, yielding a response rate of 92.93%, Most participants were first-year students (23%), and respondents were female (72.24%), between 21 and 23 years (54.7%), while male students accounted for 27% of the total respondents. Demographics, frequency and percentiles are mentioned. Participants used medication without consulting a doctor, 205 responded positively. The statistical analysis indicated a significant relationship between age, year of study and the usage of self-medication without consulting a doctor (Table 2).

Table 2: Detailed Demographics of Participants

Characteristics	n (%)
Age Group	
18-20	91 (34.6%)
21-23	144 (54.7%)
24-26	28 (10.6%)
Gender	
Female	190 (72.24%)
Male	73 (27%)
Marital Status	
Single	249 (94.6%)
Married	14 (5.3%)
Year of Study	
First Year	62 (23%)
Second Year	55 (20.9%)
Third Year	54 (20%)

DOI: https://doi.org/10.54393/pjhs.v6i6.2893

Fourth Year	34 (12%)
Final Year	58 (22%)

The majority (n=106, 40.3%) indicated that they did so occasionally, a few times a year, while a substantial number (n=64, 24.3%) reported that they engaged in self-medication frequently, several times a month. In addition, few (n=78) reported self-medication used rarely once or twice a year (Figure 1).

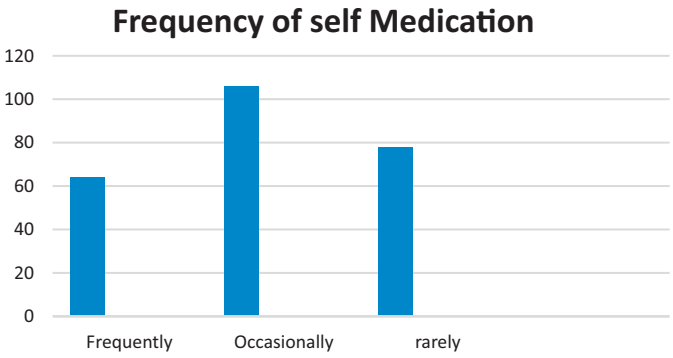

Figure 1: Self-medication Frequency Distribution

The commonly reported symptoms and conditions were headaches (55.1%, n=145), fever (36.1%, n=95), sore throat/cough (25.1%, n=66), diarrhea (12.2%, n=32), nausea and vomiting (15.6%, n=41), and allergies (20.2%, n=53). A statistically significant relationship was observed between certain medical conditions, particularly fever, diarrhea, and nausea/vomiting, and gender. Self-medication for these conditions was more prevalent among women, while the prevalence was significantly lower in men. Regarding age, none of the conditions showed a statistically significant association with self-medication. For gender, however, there was a significant relationship with fever (χ^2=7.623, p=0.006), diarrhea (χ^2=6.641, p=0.010), and nausea/vomiting (χ^2=10.706, p=0.001), indicating higher self-medication rates for these conditions among women. In terms of year of study, fever (χ^2=10.934, p=0.027), diarrhea (χ^2=11.271, p=0.024), and nausea/vomiting (χ^2=11.491, p=0.022) showed significant associations. Lastly, analysis by known illness did not reveal any statistically significant relationship with self-medication for headache, fever, sore throat/cough, diarrhea, nausea/vomiting, or allergies, suggesting that prior illness status did not influence the decision to self-medicate for these symptoms (Table 3).

Table 3: Statistical Relationship of Symptomatic Treatment Against Different Factors

Self-Medication Prevalence	Chi-Square Value	p-value	Decision
Age			
Fever	2.949	0.229	Non-Significant
Sore Throat/Cough	0.887	0.642	Non-Significant
Diarrhea	2.835	0.242	Non-Significant
Nausea and Vomiting	5.119	0.077	Non-Significant
Allergies	0.776	0.678	Non-Significant
Gender			
Headache	1.08	0.299	Non-Significant
Fever	7.623	0.006	Significant
Sore Throat/Cough	3.255	0.071	Non-Significant
Diarrhea	6.641	0.010	Significant
Nausea and Vomiting	10.706	0.001	Significant
Allergies	2.168	0.141	Non-Significant
Year of study			
Headache	7.361	0.118	Non-Significant
Fever	10.934	0.027	Significant
Sore Throat/Cough	8.839	0.065	Non-Significant
Diarrhea	11.271	0.024	Significant
Nausea and Vomiting	11.491	0.022	Significant
Allergies	3.741	0.442	Non-Significant
Known illness			
Headache	0.744	0.388	Non-Significant
Fever	0.262	0.609	Non-Significant
Sore Throat/Cough	0.486	0.486	Non-Significant
Diarrhea	0.099	0.753	Non-Significant
Nausea and Vomiting	0.301	0.583	Non-Significant
Allergies	0.16	0.689	Non-Significant

*p≤0.05 is statistically significant

The most commonly used medications were painkillers (n=171), fever reducers (n=71), cough syrups (n=61), antibiotics (n=38), multivitamins (n=44), herbal remedies (n=5), sleeping pills (n=8), antidepressants (n=54), and antiallergy medications (n=9). Statistical analysis revealed significant associations between certain types of medications and demographic factors, particularly age and year of study. For age, a statistically significant relationship was found with the usage of cough syrups (χ^2=7.046, p=0.030), antibiotics (χ^2=6.858, p=0.032), and sleeping pills (χ^2=6.104, p=0.047), indicating that participants' age influenced their choice of these medications. Other medications did not show a significant relationship with age. Regarding gender, the only significant association was with the use of cough syrups (χ^2=3.920, p=0.048). In terms of year of study, significant associations were observed for cough syrups (χ^2=13.780, p=0.008), antibiotics (χ^2=12.191, p=0.016), multivitamins (χ^2=14.955, p=0.005), and sleeping pills (χ^2=12.083, p=0.017), indicating that students' academic year influenced their self-medication choices for these drugs (Table 4).

Table 4: Association of Age, Gender and Year of Study with Different Classes of Drugs

Medications Commonly Used for SM	Chi-Square Value	p-value	Decision
Age			
Pain Killers	1.118	0.572	Non-Significant
Fever Reducers	1.356	0.508	Non-Significant
Cough Syrups	7.046	0.030	Significant
Antibiotics	6.858	0.032	Significant
Multivitamins	4.605	0.100	Non-Significant

DOI: https://doi.org/10.54393/pjhs.v6i6.2893

Herbal Remedies	0.664	0.717	Non-Significant
Sleeping Pills	6.104	0.047	Significant
Anti-Depressants	1.858	0.395	Non-Significant
Anti-Allergy	2.356	0.308	Non-Significant
Gender			
Pain Killers	0.506	0.477	Non-Significant
Fever Reducers	17.001	0.000	Significant
Cough Syrups	3.920	0.048	Significant
Antibiotics	0.324	0.569	Non-Significant
Multivitamins	0.435	0.510	Non-Significant
Herbal Remedies	2.643	0.104	Non-Significant
Sleeping Pills	2.036	0.154	Non-Significant
Anti-Depressants	2.919	0.088	Non-Significant
Anti-Allergy	1.294	0.255	Non-Significant
Year of Study			
Pain Killers	5.847	0.211	Non-Significant
Fever Reducers	6.450	0.168	Non-Significant
Cough Syrups	13.780	0.008	Significant
Antibiotics	12.191	0.016	Significant
Multivitamins	14.955	0.005	Significant
Herbal Remedies	3.639	0.457	Non-Significant
Sleeping Pills	12.083	0.017	Significant
Anti-Depressants	4.713	0.318	Non-Significant
Anti-Allergy	1.997	0.736	Non-Significant

*p≤ 0.05 is statistically significant

The most common reasons cited for engaging in self-medication were the convenience of treating minor ailments themselves (n=138) and the desire to avoid unnecessary tests or doctor visits (n=112). Other reasons included the urgency to save time (n=79) and cost-effectiveness(n=54)(Figure 2).

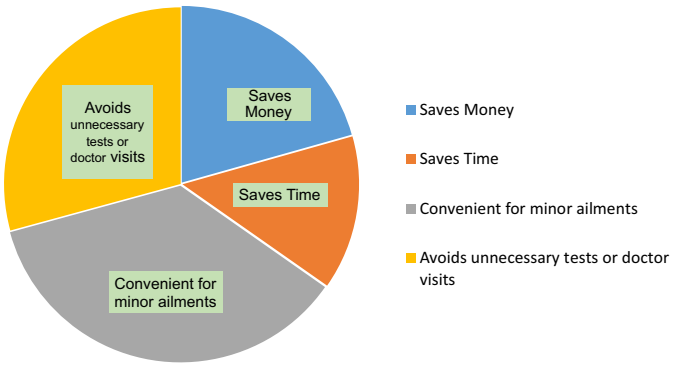

Figure 2: Dominant Features Attributed to Students Towards Self-Medication

Most commonly used dosage form was tablet (n=232), which is more prevalent in females (n=168) as compared to male (n=64), then syrups, which was (n=19) prevalent, along with a few using capsules (n=09) and ointment (n=02), as shown(Figure 3).

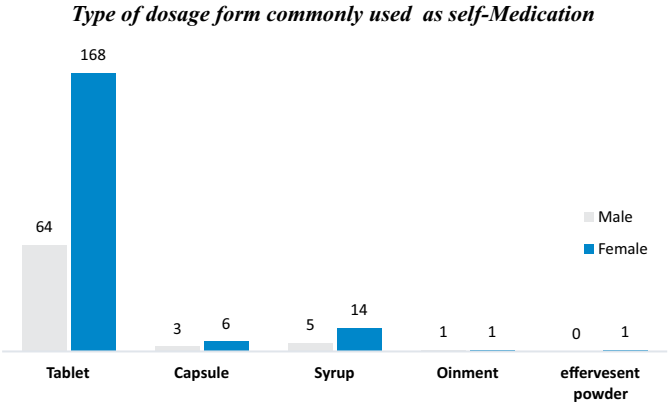

Figure 3: Commonly Used Formulations

Participants' understanding of self-medication, varied by age, gender, and year of study, showed that gender (p=0.008) and year of study (p=0.022) were significantly associated with understanding of self-medication. However, age did not show a statistically significant relationship with understanding SM. Perceptions of the safety of self-medication, highlighting significant associations with both age (p=0.036) and year of study (p=0.014). However, gender (p=0.422) was not significantly related to perceptions of self-medication safety. The side effects from self-medication were significantly associated with gender (p=0.008) and year of study (p=0.008). These results suggest that both gender and academic progression are linked to the likelihood of experiencing side effects from self-medication. However, age (p=0.365) did not show a significant association with the occurrence of side effects. Participants recommended self-medication to others, finding significant associations with gender (p=0.611) and year of study (p=0.241), while age (p=0.466) did not show a significant relationship. The awareness of the risks associated with self-medication includes the potential for incorrect diagnosis, adverse reactions, drug interactions, masking symptoms, incorrect dosage, dependence and abuse, resistance development, and worsening health conditions. The statistical analysis indicated a significant relationship only between age and awareness of adverse reactions, suggesting that age plays a role in participants' understanding of adverse reactions as a risk of self-medication. No other significant associations were found with age for the remaining risks. Additionally, there were no significant associations between gender and year of study with awareness of any specific risk(Table 5).

Table 5: Assessment of Possible Uncertainties with Self-Medications

Risks of Self-Medication	Chi-Square Value	p-value	Decision
Age			
Incorrect Diagnosis	1.799	0.407	Non-Significant
Adverse Reactions	7.173	0.028	Significant

DOI: https://doi.org/10.54393/pjhs.v6i6.2893

Drug Interactions	0.861	0.650	Non-Significant
Masking Symptoms	0.428	0.807	Non-Significant
Incorrect Dosage	0.827	0.661	Non-Significant
Dependence And Abuse	0.124	0.940	Non-Significant
Resistance Development	0.805	0.668	Non-Significant
Worsening of Health Conditions	2.601	0.272	Non-Significant
Gender			
Incorrect Diagnosis	1.138	0.286	Non-Significant
Adverse Reactions	0.190	0.663	Non-Significant
Drug Interactions	0.037	0.848	Non-Significant
Masking Symptoms	0.062	0.804	Non-Significant
Incorrect Dosage	0.397	0.592	Non-Significant
Dependence And Abuse	1.451	0.228	Non-Significant
Resistance Development	0.219	0.640	Non-Significant
Worsening of Health Conditions	0.920	0.337	Non-Significant
Year of Study			
Incorrect Diagnosis	1.214	0.876	Non-Significant
Adverse Reactions	2.343	0.673	Non-Significant
Drug Interactions	5.051	0.282	Non-Significant
Masking Symptoms	2.185	0.702	Non-Significant
Incorrect Dosage	3.893	0.421	Non-Significant
Dependence And Abuse	2.132	0.711	Non-Significant
Resistance Development	1.610	0.807	Non-Significant
Worsening of Health Conditions	7.395	0.116	Non-Significant

*p≤0.05 is statistically significant

DISCUSSION

The current study on self-medication among pharmacy students brings significant findings that warrant attention for the implications that hold in healthcare contexts. With a high response rate from students, the study provides robust insights into the self-medication behaviours in the student population. The results indicate that a substantial majority, over 92.93%, engaged in self-medication to varying frequencies, reflecting a normalization of this practice among students who are future healthcare professionals [9]. This behaviour, while often rooted in convenience and perceived knowledge, carries implications for both patient care and public health , which might positive impact in their field. Key factors affecting self-medicine rehearses include age and year of study, with measurably huge connections noted. More youthful students and those in prior years could self-cure out of a longing to rapidly address medical problems without influencing their scholarly obligations [17]. On the other hand, the tendency to self-cure among more seasoned students and those in cutting-edge years probably comes from a developing trust in their clinical information, created through long stretches of study. These perceptions propose a developing pattern of independence as students progress through their scholastic process, possibly underrating the dangers implied by unaided medication use. Among the circumstances treated with self-drug, migraines and fevers were prevalent, repeating discoveries from comparable investigations that distinguish these side effects as much of the time self-analyzed and treated without proficient discussion [18]. Alarmingly, the utilization of anti-microbials [19] without remedy was noticeable, with a huge relationship to specific age groups and study years. This abuse features the basic general wellbeing worry of anti-infection obstruction, accentuating the pressing requirement for training on the proper utilization of antimicrobials. The variety in prescription use, from pain relievers to antidepressants, highlights the expansive range of conditions students feel sure to treat autonomously, further reflecting holes in their ability to evaluate risks concerning tranquilizer associations and side effects. This hole in understanding mirrors an instructive setback, proposing that educational program improvements are important to foster a more thorough way to deal with pharmacological schooling [10]. A huge relationship between the time of study and mindfulness levels further shows that instructive meditations could be custom-fitted to various phases of clinical preparation, guaranteeing that students gain a more profound comprehension of safe prescription practices. Moreover, the cultural and monetary facilitators affecting self-medicine, for example, the accommodation and cost-adequacy of staying away from clinical interviews, align with the normal reasons referred to across writing [20]. This discernment presents possible dangers, as monetary considerations and the craving for convenience might eclipse the significance of expert medical services guidance. Accordingly, the discoveries from this study highlight the inescapable idea of self-medicine rehearses among pharmacy students, complementing both the dangers implied and the chance for educational change [16]. By tending to the distinguished instructional holes and emphasizing mindful prescription practices, colleges can more readily prepare students for jobs as promoters for safe medication use. This approach shields the singular strength of students as well as upgrades general wellbeing results by shortening the development of dangerous self-drug ways of behaving into future expert practices.

CONCLUSIONS

The prevalence of self-medication practices in medical students is high which could lead to serious effects on health. It is urged to divert attention towards awareness and education regarding the strategies for easy accessibility implications of self medication, developing counter of medicines without prescription by pharmacies and strict policies over pharmaceutical advertising. Our research will provide a clear direction towards future research on self-medication usage in medical students.

DOI: https://doi.org/10.54393/pjhs.v6i6.2893

Authors Contribution

Conceptualization: LA
Methodology: LA, TRF, FI,
Formal analysis: TRF
Writing review and editing: LI, AK

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

Source of Funding

The author received no financial support for the research, authorship and/or publication of this article.

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