



PREVALENCE AND PERCEPTION OF SELF-MEDICATION AMONG PRECLINICAL AND CLINICAL MEDICAL STUDENTS IN A PRIVATE MEDICAL COLLEGE OF LAHORE

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Abstract

Background: Self-medication is common among medical students because of their medical knowledge and easy access to medicines. Although responsible self-medication may contribute to self-care, inappropriate use can lead to adverse drug reactions, delayed diagnosis, and antimicrobial resistance. This study assessed the prevalence, perceptions, and determinants of self-medication among pre-clinical and clinical medical students in a private medical college in Lahore.

Methods: A cross-sectional study was conducted among 268 undergraduate MBBS students, equally divided into pre-clinical (n=134) and clinical (n=134) groups. Data were collected using a structured questionnaire on self-medication practices, perceptions, herbal medicine use, and sociodemographic characteristics. Data were analyzed using descriptive statistics, Chi-square tests, and Poisson regression. Statistical significance was set at $p < 0.05$.

Results: Self-medication was highly prevalent among the participants. The most common reasons for self-medication were perceiving symptoms as mild (33.2%) and previous positive experience with the same medication (32.4%). Books (20.0%) and media (17.6%) were the leading sources of medication-related information, while medicines were most frequently obtained from friends (22.8%) and the internet (20.0%). Nearly half of the students (44.4%) reported combining herbal and conventional medicines. Perceptions regarding the safety of herbal medicines differed significantly between pre-clinical and clinical students ($p = 0.016$). Multivariable Poisson regression identified residence in a student dormitory as the only independent predictor of self-medication (adjusted PR=1.944, 95% CI: 1.138–3.323; $p = 0.015$).

Conclusion: Self-medication is highly prevalent among undergraduate medical students and is primarily driven by perceived minor illness and previous treatment experience. Educational interventions promoting rational medicine use and stricter regulation of over-the-counter drug dispensing are needed to encourage safe self-medication practices.

Keywords: Self-medication; medical students; prevalence; herbal medicine; Pakistan.

Introduction

World Health Organization (WHO) has defined self-medication as the use of drugs to treat self-diagnosed disorders or symptoms or, the intermittent or continued use of prescribed drugs for chronic or recurrent disease or symptoms.¹ Globally, self-medication is increasingly being regarded as a component of self-care. It's common practice among developed and developing countries. Advances in medicine have paved the way for more people to have access to self-medication.² Previous studies have identified several factors that influence the frequency of self-medication, including age, educational level, family attitudes, drug manufacturer advertising, legislation regulating the dispensing and sale of pharmaceuticals. The respondents' finances, prescription medications, and home pharmaceuticals make medical students self-medicate ^{1,3}. Self-medication without proper understanding can lead to misuse of medication, resulting in serious health issues and increased costs. Irrational drug use without medical supervision raises the risk of inappropriate treatments, missed diagnoses, delays in cure, and drug resistance.⁶ Self-medication is a major public health concern generally, with prevalence rates ranging from 11.7% to 92%.⁷⁻¹² Worldwide, self-medication is one of the most common causes of antimicrobial resistance. Over the counter, 50% of antibiotics are purchased without a prescription. In Uganda, self-medication with antibiotics among university students was 63%.¹³ A cross-sectional, questionnaire-based study was conducted in 2015. Students reported using self-medication (71.7%) in the previous year, final-year students showing a higher incidence.¹⁴ Analgesics are readily available unprescribed, and many medical students frequently use them for pain—both chronic and acute—without seeking medical advice. Despite their understanding of illnesses and treatments, undergraduate medical students are not legally allowed to do self-medications. Recent research indicates that self-medication is common in medical students, particularly in South Indian medical colleges, 60% affected with.¹⁵ 81% medical students of Karachi, Pakistan, use self-medication.¹⁶

Methodology

Study design and study period

This investigation was conducted as a cross-sectional survey aimed at describing self-medication practices and related perceptions among undergraduate students. Data were collected during [Month–Month, Year] at Rahbar Medical and Dental College, Lahore.

Study population and eligibility

Undergraduate students enrolled in the MBBS program here at Rahbar Medical and Dental college, Lahore were approached for participation via online google form. Students were included if they provided consent and completed the questionnaire. Forms with substantial missing data and duplicate submissions were excluded prior to analysis.

For analysis, participants were classified into pre-clinical and clinical groups according to academic phase. The final dataset contained 268 students, divided equally into pre-clinical ($n = 134$) and clinical ($n = 134$).

Data collection tool and study variables

Information was gathered using a structured questionnaire titled “Self-Medication Perceptions and Practice”¹⁷ The instrument captured:

Self-medication practice (including self-medication in the previous 12 months), and reasons for using or avoiding self-medication.

Patterns of use, including the usual way medicines were obtained and the main sources used to decide which drug to take (for example, prior medical advice, social circle, pharmacists, online sources).

Herbal product-related practices and beliefs, including views on combining herbal products with conventional medicines, preferences if only one treatment type could be continued, perceived effectiveness and safety, and whether pharmacists warned about possible risks.

Background characteristics such as age, gender, residence, smoking and alcohol habits, presence of a chosen general practitioner, and history of chronic illness and chronic medication use.

The primary outcome for inferential analysis was self-medication practice. Sociodemographic and lifestyle factors were assessed as potential correlates.

Data collection procedure

Participants received a brief explanation of the study objectives and confidentiality measures. Questionnaires were completed anonymously using online google form. Completed responses were checked for completeness before being entered for statistical analysis.

Statistical analysis

Analyses were carried out using SPSS version 26. Categorical variables are presented as frequencies and percentages. Comparisons between pre-clinical and clinical students were tested using the Chi-square test. Statistical significance was set at $p < 0.05$; p -values recorded as 0.000 in output tables were interpreted as $p < 0.001$.

To explore factors linked with self-medication, regression analysis was conducted and results were reported as prevalence ratios (PR) with 95% confidence intervals (CI), first in unadjusted (univariable) models and then in an adjusted (multivariable) model.

Ethical considerations

Ethical approval was obtained from Concerned Ethical Review Board. Participation was voluntary, and no personally identifying information was collected.

Results

Participant Characteristics

A total of 268 undergraduate medical students participated in the study, comprising 134 (50.0%) pre-clinical and 134 (50.0%) clinical students. Overall, 151 (56.3%) participants were male, while 117 (43.6%) were female. Nearly half of the respondents (49.6%) were living with their parents, followed by 37.3% residing in student dormitories. Only 6.7% lived in leased apartments and 6.3% reported other housing arrangements.

The majority of students were non-smokers (93.2%) and did not consume alcohol (98.5%). Only 22.3% reported having a chosen general practitioner, while 77.6% did not. Chronic illness was reported by 18

(6.7%) participants, and approximately 92.1% were not taking medications for chronic diseases. The demographic characteristics of the study participants are summarized in Table 1.

Table 1: Sociodemographic Profile and Living Habits of Respondents (n=268)

	Pre-clinical N (%)	Clinical N (%)	Total N (%)
GENDER			
Male	73(54.5%)	78(58.2%)	151(56.3%)
Female	61(45.5%)	56(41.8%)	117(43.6%)
Housing Conditions			
In a leased apartment	9(6.7%)	9(6.7%)	18(6.7%)
In a student dormitory	59(44%)	41(30.6%)	100(37.3%)
Living with parents	57(42.5%)	76(56.7%)	133(49.6%)
Others	9(6.7%)	8(6.0%)	17(6.3%)
Cigarette consumption			
Yes	9(6.7%)	9(6.7%)	18(6.7%)
No	125(93.3%)	125(93.3%)	250(93.2%)
Alcohol Consumption			
Yes	2(1.5%)	2(1.5%)	4(1.5%)
No	132(98.5%)	132(98.5%)	264(98.5%)
Chosen General Practitioner			
Yes	31(23.1%)	29(21.6%)	60(22.3%)
No	103(76.9%)	105(78.4%)	208(77.6%)
Chronic Illness			
Yes	9(6.7%)	9(6.7%)	18(6.71%)
No	125(93.3%)	125(93.3%)	250(93.3%)
Taking Medication for Chronic Disease			
Yes	12(9%)	9(6.7%)	18(6.71%)
No	122(91.0%)	125(93.3%)	247(92.1%)
Total	134	134	268

Reasons for Practicing or Avoiding Self-Medication

Among students who practiced self-medication, the most commonly reported reason was that their symptoms were perceived as mild and did not warrant a physician visit (33.2%), followed closely by having had a positive previous experience with the same medication (32.4%). Distance from a doctor's office accounted for 16.4% of responses, while 17.2% of pre-clinical students cited lack of free time as the primary reason for self-medication; this reason was not reported among clinical students.

Among respondents who did not practice self-medication, the overwhelming majority (80.5%) stated that there was simply no need to self-medicate, whereas 19.4% avoided self-medication because of safety concerns.

These findings are presented in Table 2.

Table 2: Reasons for choosing or avoiding self-medication

Attributes about Self-Medication	Pre-clinical n (%)	Clinical n (%)	Total n (%)
Reasons for Practicing self-medication			
Lack of free time	23(17.2%)	0(0%)	23(17.2%)
Mild symptoms (perceived as unnecessary for a visit to a doctor)	62 (46.3%)	27 (20.1%)	89(33.2%)
Distance to a doctor's office	7(5.2%)	37(27.6%)	44(16.4%)
Having a positive experience with the same medicine	17(12.7.7%)	70(52.2%)	87(32.4%)
Reasons against practicing self-medication			
There was no need	107(79.8%)	109(81.3%)	216(80.5%)
Due to safety concerns	27(20.1%)	25(18.6%)	52(19.4%)

Sources of Information and Procurement of Medicines

Among students who practiced self-medication, books were the most frequently reported source of information (20.0%), followed by media (17.6%), the internet (16.8%), friends (16.4%), pharmacists (15.6%), and doctors (13.6%). There was no statistically significant difference between pre-clinical and clinical students regarding the sources of information used for selecting medicines ($p = 0.547$).

Regarding procurement of medicines, the most common sources were friends (22.8%) and the internet (20.0%), followed by pharmacies (16.4%), healers (16.0%), health stores (13.6%), and leftover medicines (11.2%). No significant difference was observed between the two academic groups regarding medicine procurement ($p = 0.675$).

The distribution of information sources and medicine procurement methods is shown in Table 3.

Table 3: Sources of medicines used for self-medication and information regarding the choice and proper use

Category	Clinical	Preclinical	p-value	Total
Source of Information				
Books	28 (18.8%)	22 (21.8%)	0.547	50 (20.0%)
Doctor	19 (12.8%)	15 (14.9%)	0.547	34 (13.6%)
Friends	30 (20.1%)	11 (10.9%)	0.547	41 (16.4%)

Internet	23 (15.4%)	19 (18.8%)	0.547	42 (16.8%)
Media	26 (17.4%)	18 (17.8%)	0.547	44 (17.6%)
Pharmacist	23 (15.4%)	16 (15.8%)	0.547	39 (15.6%)
Total	149 (100.0%)	101 (100.0%)	0.547	250 (100.0%)
Obtained from				
Friends	33 (22.1%)	24 (23.8%)	0.675	57 (22.8%)
Healer	25 (16.8%)	15 (14.9%)	0.675	40 (16.0%)
Health store	21 (14.1%)	13 (12.9%)	0.675	34 (13.6%)
Internet	33 (22.1%)	17 (16.8%)	0.675	50 (20.0%)
Leftovers	13 (8.7%)	15 (14.9%)	0.675	28 (11.2%)
Pharmacy	24 (16.1%)	17 (16.8%)	0.675	41 (16.4%)
Total	149 (100.0%)	101 (100.0%)	0.675	250 (100.0%)

Use of Herbal Medicines and Perceptions Regarding Their Safety

Overall, 44.4% of respondents reported combining herbal medicines with conventional medications, while 55.6% did not. This practice did not differ significantly between pre-clinical and clinical students ($p = 0.827$).

Among students who reported combining herbal and conventional medicines, the most common reason was the belief that the combination produced a stronger therapeutic effect (26.4%), followed by the perception that both therapies served different purposes (25.2%) and that the combination provided better outcomes (26.0%). Approximately 22.4% believed that combining both therapies was not harmful. These differences were not statistically significant ($p = 0.623$).

When asked to choose only one treatment modality, 51.2% preferred herbal medicines whereas 48.8% preferred conventional medicines ($p = 0.854$). Regarding perceived efficacy, 28.0% believed herbal medicines were more effective, 24.8% were uncertain, 24.4% believed both were equally effective, and 22.8% considered conventional medicines more effective. These differences were not statistically significant ($p = 0.299$).

However, perceptions regarding safety differed significantly between academic groups ($p = 0.016$). Overall, 26.8% believed herbal medicines were safer, 23.6% considered conventional medicines safer, another 23.6% believed both were equally safe, and 26.0% were uncertain.

Regarding pharmacist counselling, 35.6% reported never purchasing herbal medicines from pharmacies, 34.0% had received counselling from pharmacists, and 30.4% had not been warned about potential interactions. No significant difference was observed between pre-clinical and clinical students ($p = 0.836$).

These findings are summarized in Table 4.

Table 4: Prevalence of self-medication practice with herbal medicines in combination with conventional drugs and students' view about their safety.

Variable / Category	Clinical n (%)	Preclinical n (%)	p-value	Total n (%)
Combination o herbal with conventional drugs			.827	
No	82 (55.0%)	57 (56.4%)		139 (55.6%)
Yes	67 (45.0%)	44 (43.6%)		111 (44.4%)
Total	149 (100.0%)	101 (100.0%)	.827	250 (100.0%)
Reason for using combination			.623	
Better combo	35 (23.5%)	30 (29.7%)		65 (26.0%)
Different use	38 (25.5%)	25 (24.8%)		63 (25.2%)
Not harmful	33 (22.1%)	23 (22.8%)		56 (22.4%)
Stronger effect	43 (28.9%)	23 (22.8%)		66 (26.4%)
Total	149 (100.0%)	101 (100.0%)	.623	250 (100.0%)
Preferred treatment			.854	
Conventional	72 (48.3%)	50 (49.5%)		122 (48.8%)
Herbal	77 (51.7%)	51 (50.5%)		128 (51.2%)
Total	149 (100.0%)	101 (100.0%)	.854	250 (100.0%)
Belief about efficacy			.299	
Conventional better	28 (18.8%)	29 (28.7%)		57 (22.8%)
Equal	40 (26.8%)	21 (20.8%)		61 (24.4%)
Herbal better	43 (28.9%)	27 (26.7%)		70 (28.0%)
Not sure	38 (25.5%)	24 (23.8%)		62 (24.8%)
Total	149 (100.0%)	101 (100.0%)	.299	250 (100.0%)
Belief about safety			.016	
Conventional safer	44 (29.5%)	15 (14.9%)		59 (23.6%)
Equal	32 (21.5%)	27 (26.7%)		59 (23.6%)
Herbal safer	42 (28.2%)	25 (24.8%)		67 (26.8%)
Not sure	31 (20.8%)	34 (33.7%)		65 (26.0%)
Total	149 (100.0%)	101 (100.0%)	.016	250 (100.0%)
Warned from pharmacist			.836	
No	47 (31.5%)	29 (28.7%)		76 (30.4%)
Not bought	51 (34.2%)	38 (37.6%)		89 (35.6%)
Yes	51 (34.2%)	34 (33.7%)		85 (34.0%)
Total	149 (100.0%)	101 (100.0%)	.836	250 (100.0%)

Factors Associated with Self-Medication

Poisson regression analysis was performed to identify factors associated with self-medication practice. In the univariable analysis, age was significantly associated with self-medication (PR = 1.104; 95% CI: 1.009–1.209; $p = 0.030$), indicating that increasing age was associated with a higher likelihood of self-medication. Similarly, being a third-year student was significantly associated with self-medication compared with the reference category (PR = 1.70; 95% CI: 1.064–2.714; $p = 0.026$).

After adjustment for potential confounders, neither age nor study year remained statistically significant. However, living in a student dormitory emerged as the only independent predictor of self-medication (Adjusted PR = 1.944; 95% CI: 1.138–3.323; $p = 0.015$), suggesting that students residing in dormitories had approximately 1.9 times higher prevalence of self-medication than the reference group.

Gender, alcohol consumption, having a chosen general practitioner, chronic illness, and taking medications for chronic illnesses were not significantly associated with self-medication in either the univariable or multivariable analyses (all $p > 0.05$).

The results of the Poisson regression analysis are presented in Table 5.

Table 5: Poisson regression using self-medication as a dependent variable.

Independent variable	Univariable		Multivariable	
	PR (95% CI)	p-value	PR (95% CI)	p-value
Gender	0.96 (0.697-1.32)	0.811	0.872 (0.626-1.214)	0.695
Age	1.1044 (1.009-1.209)	0.03	1.149 (0.993-1.329)	0.872
Study year				
2nd year	1.59375 (0.946-2.684)	0.079	1.447 (0.793-2.641)	0.22862
3rd year	1.7 (1.064-2.714)	0.026	1.495 (0.808-2.767)	0.200503
4th year	1.268 (0.783-2.053)	0.332		0.763166
5th year	1.457143 (0.787-2.698)	0.230		
Housing conditions				
Living with parents	0.678 (0.371-1.238)	0.206	0.649 (0.357-1.181)	0.157
In leased apartment/room	1.202 (0.682-2.11)	0.523	1.362 (0.735-2.521)	0.325417
Others	1.318 (0.66-2.63)	0.432	1.401 (0.723-2.711)	0.317131
In a student dormitory	0.972 (0.539-1.751)	0.924	1.944 (1.138-3.323)	0.015
Alcohol consumption	0.846 (0.169-4.226)	0.839	0.762 (0.081-7.224)	0.813
Chosen general practitioner	1.176 (0.827-1.673)	0.366	1.207 (0.853-1.708)	0.287
Chronic illness	1.202 (0.682-2.118)	0.523	0.979 (0.375-2.559)	0.966
Taking medication for chronic illnesses	1.216 (0.715-2.068)	0.47	1.047 (0.422-2.599)	0.921

Conclusion

Self-medication is a common practice among undergraduate medical students and is largely motivated by the perception that illnesses are minor and can be managed independently using previously successful medications. Although most students demonstrated awareness regarding medication use, misconceptions regarding herbal medicines and unsupervised medication practices remain prevalent. Residence in student dormitories was identified as the only independent predictor of self-medication after adjustment for potential confounders. These findings highlight the need for structured educational programs on rational drug use, improved counselling by healthcare professionals, stricter regulation of over-the-counter medicine dispensing, and greater emphasis on responsible self-medication within undergraduate medical education. Such interventions may help reduce inappropriate medication use and minimize the long-term consequences associated with irrational self-medication.

Discussion

The present study explored the prevalence, perceptions, and determinants of self-medication among pre-clinical and clinical medical students in a private medical college in Lahore. The findings indicate that self-medication remains a common practice among medical students and is primarily influenced by the perceived mild nature of illnesses, previous successful experiences with medications, and easy accessibility of medicines. These findings are consistent with the growing body of evidence demonstrating that self-medication is highly prevalent among university students worldwide, particularly those studying medicine because of their increased medical knowledge and easier access to pharmaceutical products.^{2 3 14 16}

The most frequently reported reason for practicing self-medication was the perception that symptoms were mild and did not require medical consultation, followed by previous positive experiences with the same medication. Similar observations have been reported by James et al., who found that medical students commonly self-medicate because they believe they possess sufficient knowledge to diagnose and manage minor illnesses independently.³ Likewise, Kasulkar and Gupta reported that previous experience with medicines and confidence in managing common ailments were among the leading reasons for self-medication among Indian medical students.¹⁴ Rahimisadeh et al. also demonstrated that convenience, time-saving, and previous successful treatment experiences were major contributors to self-medication practices among university students.² These findings suggest that perceived familiarity with illnesses and medications often outweighs the perceived need for professional consultation.

Among students who did not practice self-medication, the majority reported that they simply did not perceive any need to self-medicate, while a smaller proportion cited concerns regarding medication safety. This reflects an encouraging level of awareness among a subset of medical students regarding the potential risks associated with irrational drug use. The World Health Organization emphasizes that responsible self-medication should only occur when individuals possess adequate knowledge regarding drug indications, dosage, contraindications, and adverse effects.¹ Bennadi further highlighted that inappropriate self-medication may contribute to delayed diagnosis, adverse drug reactions, drug dependence, polypharmacy, and antimicrobial resistance.⁶

The present study found no statistically significant differences between pre-clinical and clinical students regarding their preferred sources of information or methods of obtaining medicines. Students most commonly relied on books, media, the internet, friends, pharmacists, and doctors when selecting medicines, while medicines were frequently obtained through friends, internet sources, pharmacies, and

health stores. Similar findings have been reported by Petrović et al., who observed that medical students frequently rely on previous medical advice, pharmacists, family members, and online resources when making decisions regarding self-medication.¹⁷ Likewise, Alduraibi and Altowayan reported that medical and pharmacy students commonly utilize healthcare professionals, digital resources, and personal experience as important sources of medication-related information.¹⁶ Although these sources may improve access to healthcare information, reliance on informal advice and non-validated internet resources may contribute to inappropriate medication practices.

An important aspect of the present study was the evaluation of herbal medicine use. Nearly half of the respondents reported combining herbal products with conventional medicines. Although no significant differences were observed between academic groups regarding combination practices, students demonstrated diverse opinions regarding the efficacy and safety of herbal medicines. Interestingly, significant differences were observed only in perceptions regarding safety, suggesting that clinical exposure may influence students' understanding of potential adverse effects and herb–drug interactions. Similar concerns have been highlighted in previous studies indicating that many individuals incorrectly perceive herbal medicines as inherently safe because of their natural origin, despite evidence showing that herbal products may produce clinically significant interactions with conventional medications.^{2 17} These findings emphasize the need for greater education regarding evidence-based use of complementary and alternative medicines within undergraduate medical curricula.

Regression analysis identified student dormitory residence as the only independent predictor of self-medication after adjustment for confounding variables. Students residing in hostels had almost twice the prevalence of self-medication compared with students living elsewhere. This finding may reflect greater independence, easier sharing of medications among peers, reduced parental supervision, and easier access to medicines within hostel environments. Although increasing age and being a third-year student were associated with self-medication in unadjusted analysis, these relationships disappeared after multivariable adjustment, suggesting that residence may exert a stronger influence than academic progression alone. Similar associations between demographic and environmental factors and self-medication have been reported by Pan et al., who identified older age as a significant predictor of self-medication among university students.⁴ Likewise, Klemenc-Ketis and Kersnik demonstrated that availability of medicines within households and environmental accessibility significantly influence self-medication behavior.⁵

The findings of this study have important public health implications. Irrational self-medication contributes to inappropriate drug use, adverse drug reactions, delayed diagnosis, unnecessary healthcare expenditure, and the growing problem of antimicrobial resistance.⁶ Worldwide, self-medication with antibiotics remains a major contributor to antimicrobial resistance, with studies from Europe, India, Uganda, and other countries consistently highlighting this concern.^{7–13} Although the present study was not limited to antibiotic use, the observed patterns of unsupervised medicine acquisition and use emphasize the need for stronger educational interventions, improved counselling by pharmacists, and stricter regulation of medicine dispensing practices.

The present study possesses several strengths, including equal representation of pre-clinical and clinical students, evaluation of both conventional and herbal medicine practices, and use of multivariable Poisson regression to identify independent predictors of self-medication. Nevertheless, certain limitations should be acknowledged. The cross-sectional design precludes causal inference, while the use of self-reported questionnaires may introduce recall and social desirability bias. Furthermore, the study was conducted in

a single private medical college, which may limit the generalizability of the findings to other medical institutions in Pakistan. Future multicenter studies involving both public and private medical colleges are recommended to provide nationally representative estimates and to evaluate interventions aimed at promoting responsible self-medication practices.

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