

Silent Drivers of Resistance: Over-the-Counter Antibiotic Use among Medical and Non-Medical Students

Qurrat ul Ain Naqvi¹, Fizza Anwar¹, Shaza Shahid¹, Seerat Saeed¹, Fahad Saleem¹, Afshan Shahid¹

¹Department of Community Medicine, Services Institute of Medical Sciences, Lahore-Pakistan

Correspondence to: Qurrat ul Ain Naqvi, Email: qurratnaqvi@hotmail.com

ABSTRACT

Background: Over-the-counter antibiotic use is a growing public health concern, contributing to antimicrobial resistance, particularly in low- and middle-income countries. This practice is common among students, who often access antibiotics without medical consultation. This study determined the frequency, knowledge, and practices of over-the-counter use of antibiotics among medical and non-medical students.

Methods: A descriptive cross-sectional study was conducted at Services Institute of Medical Sciences, Lahore, over a 6-month period. A total of 400 participants were recruited, including 200 medical students from a tertiary care hospital and 200 non-medical students from a nearby college selected by non-probability convenience sampling. Students who were on regular prescribed medication were excluded. Data were collected through face-to-face interviews using a questionnaire. SPSS version 23 was used to enter and analyze data.

Results: Over-the-counter antibiotic use was reported by 26.8% of medical students and 43.5% of non-medical students. Common reasons included cold and fever. Analgesics and antipyretics were the most often utilized medications, followed by antibiotics and antidepressants. Pharmacies were the main source. Awareness of side effects was higher in medical students (64.5%), and 57.5% of medical students and 28.5% of non-medical students recommended drugs to others, while 16% of medical students and 8% of non-medical students reported side effects.

Conclusion: The findings show that while non-medical students also self-medicate, medical students do so more frequently and with greater awareness of potential negative effects—There is also an urgent need to raise awareness regarding over-the-counter use of antibiotics.

Keywords: Over-the-counter; Antibiotics; Medical; Students

INTRODUCTION

The practice of people treating their own illnesses without seeking medical advice from a professional is common. It entails managing minor ailments or reducing symptoms by using over-the-counter antibiotics, herbal treatments, or other alternative therapies.¹

Despite concerns about drug abuse and irrational use, the prevalence of use of over-the-counter antibiotics is extremely high, especially in low- and middle-income countries. All over the world, the prevalence of over-the-counter use of antibiotics is very high: 68% in Europe and

much higher in developing countries; 92% in Kuwait, 42.5% in Jordan, 60% in India, and 78% in Nepal.^{2,3} Studies in Pakistan have shown a high prevalence of 68.8%.⁴

The severity of the illness, the medications used, the patient's financial status, and cultural factors can all impact over-the-counter antibiotic use practices.⁵ The most frequently treated conditions by over-the-counter use of antibiotics among respondents in Karachi are fever, allergy, and cough.⁴

Previous studies observed that the prevalence of over-the-counter antibiotic use among medical students was higher than among non-medical students. In India, 92.7% of health science students and 88.24% of nursing students in northern India, respectively, used non-prescribed antibiotics.⁶ On the other hand, 48% of non-medical students used non-prescribed antibiotics.⁷

Non-prescription antibiotic drugs have their potential risks, including incorrect self-diagnosis, delay in seeking medical advice, adverse reactions, drug interactions, incorrect dosage, incorrect choice of therapy, and masking of a severe disease.⁸

For these reasons, it is imperative to investigate over-the-counter use of antibiotics among medical and non-medical students. It will help ascertain the frequency and patterns of over-the-counter antibiotic use and be-

ARTICLE INFO

Article History: Received: 8-07-2025 | Accepted: 26-12-2025

Conflict of Interest: The authors declared no conflict of interest exists.

Funding: None.

Copyright: © 2026 Naqvi et al. This article is licensed under the Creative Commons Attribution–NonCommercial 4.0 International License (CC BY-NC 4.0), which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are properly credited.

Citation: Naqvi QA, Anwar F, Shahid S, Saeed S, Saleem F, Shahid A. Silent drivers of resistance: over-the-counter antibiotic use among medical and non-medical students. J Fatima Jinnah Med Univ. 2026; 20(1):3-7.

DOI: <http://doi.org/10.37018/LYBH7480>

haviors, which can provide significant insights into the health needs and routines of these students, especially the role of educational background. This understanding forms the basis for assessing potential risks and knowledge gaps. Hence, this study aims to determine the frequency, knowledge, and practices regarding over-the-counter antibiotic use among medical and non-medical students.

PATIENTS AND METHODS

This cross-sectional study was conducted at the Services Institute of Medical Sciences, Lahore, to explore how often medical and non-medical students use antibiotics over the counter. A total of 400 students took part in the study, with equal representation from medical and non-medical colleges. The sample size was calculated using WHO guidelines, with a 95% confidence interval, a relative precision of 0.01, and an anticipated population proportion of 66%.⁹ The participants were selected through convenience sampling. Students currently enrolled in medical and non-medical colleges, aged 18–25 years, who were present during the study period and provided informed consent were included. Students with close family members in the medical profession, those on long-term prescribed medications, those with chronic illnesses requiring frequent healthcare interactions, and those who declined participation or submitted incomplete questionnaires were excluded.

Information was gathered through face-to-face interviews using a structured questionnaire. The questionnaire was divided into two parts: the first collected basic demographic details, while the second focused on how frequently students self-medicated and the reasons behind this behavior. Medical students were interviewed at a tertiary care medical college and hospital, whereas non-medical students were recruited from a nearby degree-awarding college. Over-the-counter use of antibiotics was defined as taking any medicine without a

doctor's prescription, and its frequency was grouped as frequent, occasional, or rare based on use over a six-month period.

All data were entered and analyzed using SPSS version 23. Numerical data were summarized using averages and standard deviations, while categorical data were presented as frequencies and percentages to clearly describe the findings.

RESULTS

The demographic characteristics of the participants are shown in Table 1. About a quarter, 26.5% (53) of the medical students and 43.5% (87) of the non-medical students were using over-the-counter antibiotics. Among medical students, 39% (78) used older prescriptions for their current disease, while among non-medical students, 43.5% (87) did so. Analgesics and antipyretics were the second most commonly used medications among medical and non-medical students (26.3% vs. 43.5%), symptomatic medications such as anti-emetics, anti-diarrheal, and anti-histamines (8.3% vs. 8.5%), and antidepressants (4.3% vs. 4.5%). The most commonly used antibiotics are listed in Table 2.

The most common ailments for which medical students used over-the-counter antibiotics were fever and the common cold (75% vs. 58%). The same ailments were most frequently self-medicated in non-medical students with percentages of 72% (fever) and 44.5% (common cold). The reasons for over-the-counter antibiotic use are shown in Table 3.

Both medical and non-medical students most frequently obtained their medications from pharmacies (82% vs. 89%), friends and relatives (11% vs. 8%), and sample medications (7% vs. 3%), respectively. Only 64.5% of medical students were aware of the negative effects of over-the-counter antibiotic use, compared with 61.5% of non-medical students.

Table 1: Frequency distribution of demographic characteristics of medical and non-medical students (n = 400)

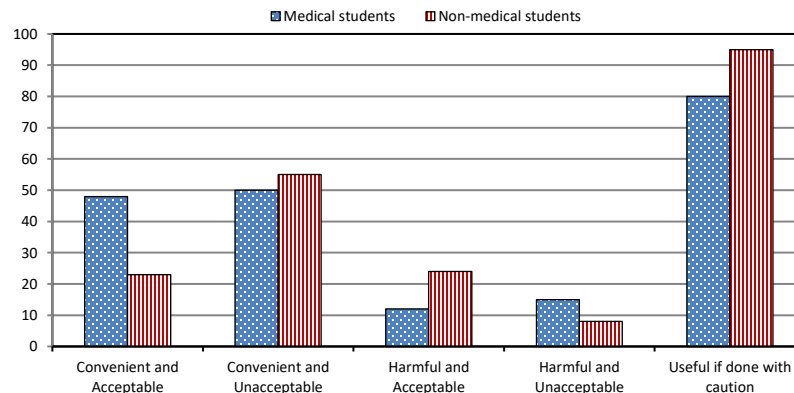
Characteristics	Medical Students (n=200)	Non-Medical Students (n=200)
Age in years (mean, SD)	21.7 (1.63)	20.28 (1.45)
Gender		
Male	124 (62%)	78 (39%)
Female	76 (38%)	121 (60.5%)
Residence		
Days scholar	70 (35%)	90 (45%)
Hostelite	130 (65%)	110 (55%)

Table 2: Frequency distribution of commonly used antibiotics among medical and non-medical students (n = 400)

Commonly used antibiotics	Medical Students (n=200)	Non-Medical Students (n=200)
Amoxicillin (± clavulanic acid)	120 (60.0%)	130 (65.0%)
Azithromycin	100 (50.0%)	80 (40.0%)
Ciprofloxacin	70 (35.0%)	110 (55.0%)
Metronidazole	60 (30.0%)	100 (50.0%)
Cephalosporins (e.g., cefixime)	90 (45.0%)	50 (25.0%)

Table 3: Frequency distribution of reasons for use of over the counter use of antibiotics (n=400)

Reasons for use	Medical students	Non-medical students
Convenience	151 (75.5%)	163 (81.5%)
Cost saving	21 (10.5%)	12 (6%)
Lack of trust in doctor	14 (7%)	8 (4%)
Privacy	14 (7%)	17 (8.5%)

**Figure 1: Bar chart showing perception of students regarding over-the-counter use of antibiotics**

Only 8% of respondents who were not medical students reported experiencing negative medication effects, compared to 16% of respondents who were medical students. About 28.5% of non-medical students and 57.5% of medical students, respectively, suggested these medications to their friends and family.

DISCUSSION

The present study highlights a concerning pattern of over the counter use of antibiotics among both medical and non-medical students, with a notably high prevalence observed among non-medical students (43.5%), compared to their medical counterparts (26.5%) despite differences in academic back ground, the use of antibiotics without prescription is fairly common, most commonly driven by the need to manage minor ailments like fever and common cold. These conditions, which are largely viral in origin, were the leading indications for antibiotic use, reflecting a significant gap in proper understanding and application of antibiotic therapy. The most commonly used antibiotics were: Amoxicillin ($\pm$ clavulanic acid), Azithromycin, and Ciprofloxacin.

In addition to antibiotics, students reported using other medications, such as analgesics, antipyretics, and symptomatic treatments. This indicates an overall trend of self-directed self-care among students. Pharmacies emerged as the primary source of antibiotics, highlighting the easy access and lack of regulatory control. Nearly half of the non-medical (43.5%) and 39% of the medical students used older prescriptions to treat their present ailment. Although a reasonable proportion of students (64.5% of medical and 61.5% of non-medical students)

were aware of the potential side effects of antibiotics, this awareness was insufficient to curb the use of unpre-scribed antibiotics. The most common reasons for using over-the-counter antibiotics were convenience and cost savings, which emphasize the importance of easy access to and affordability of healthcare in the community.

Over-the-counter antibiotic use practices vary among medical and non-medical students due to differences in healthcare availability and medical skill. Globally, 67.5% of medical students and 59.4% of non-medical students reported using over-the-counter antibiotics; this finding is in line with the results of this study.¹⁰

Medical and non-medical students approach over-the-counter use of antibiotics differently because of their level of medical knowledge and access to healthcare. Medical students tend to use medicines more carefully, relying on what they have learned and getting drugs from pharmacies for minor problems. In contrast, non-medical students often depend on advice from friends or family and may not fully understand the risks, showing a need for better health education.

Another study in Pakistan indicates that over-the-counter use of antibiotics was very common among medical students. Particularly, since the start of the pandemic, 316 out of 374 medical students (84.5%) and 90 out of 115 non-medical students (78.3%) reported taking medication on their own. Over-the-counter antibiotic use rates are substantial, indicating a noteworthy trend among students, both medical and non-medical.¹¹

Analgesics, antipyretics, and antibiotics were the most commonly used medications by participants in a recent study on this trend, with utilization percentages of

55.7%, 15.3%, and 11.1%, respectively. Coughs or flu symptoms (16%) and general body pain (14%) were the main reasons for over-the-counter antibiotic use.

Pharmacists were the primary source of information about the medications used; 35.2% of participants obtained prescriptions from them, and 22.8% relied on their own past knowledge or personal experience with similar ailments. In this study, 39% of medical and 43.5% of non-medical students used older prescriptions to treat current ailments. This finding is consistent with another study conducted in Nepal, in which 30.8% of students used older prescriptions.¹² This suggests that although community pharmacies are a major source of non-prescription medications. Highlighting the role of professional advice and self-awareness in over-the-counter antibiotic use practices in both groups.⁹

Symptomatic treatments were utilized by 8.3% of medical students and 8.5% of non-medical students. These other drugs included anti-emetics, anti-diarrheal, and anti-histamines. Antidepressants were the least used medications in our study, reported by 4.3% of medical students and 4.5% of non-medical students, showing that students are less likely to use non-prescribed drugs affecting mental health. Similarly, other studies have observed that students rely more on medications that provide quick relief for everyday problems. For example, anti-histamines and anti-emetics were used by many students, showing that issues like allergies, nausea, and vomiting are often managed without consulting a doctor. Although these medicines are used less than painkillers, their use still shows a wide tendency among students to deal with minor health problems. Overall, this shows that self-medication is not limited to pain relief and antibiotics but also plays a role in the routine management of common conditions.

Another study showed that in 47.5% of the cases, community pharmacies were shown to be the most common source for non-prescription antibiotics. This implies that people regularly go to these stores to get antibiotics without a doctor's prescription. Closely behind, directly referred doctors accounted for 46.1% of participants' medication purchases, making them the second-most-popular source.²

Among medical students and non-medical counterparts, analgesics and antipyretics had the highest prevalence, 60.8% and 43.5%, respectively. Non-medical students used antibiotics more frequently, showing a 43.5% usage rate compared to medical students at 26.8%. Symptomatic treatments, which include anti-emetics, anti-diarrheal medications, and antihistamines, were reported by 8.3% of medical students and 8.5% of non-medical students. The usage of antidepressants was quite low; only 4.3% of medical students and 4.5% of non-

medical students reported using them. The results point to analgesics and antipyretics as medications of choice, showcasing specific other areas of divergence.

A study conducted in Sudan showed that in 47.5% of the cases, community pharmacies were shown to be the most common source for non-prescription antibiotics. This implies that people regularly go to these stores to get antibiotics without a doctor's prescription. Closely behind, directly referred doctors accounted for 46.1% of participants' medication purchases, making them the second-most-popular source.²

This highlights the pivotal role of pharmacies in facilitating access to medications without prescription. Such practices raised concerns regarding potential misuse of medicines such as antibiotics and antidepressants. Easy access to medicine encourages individuals to bypass medical consultation.

Pharmacies were the main source of medicines (82% of medical students and 89% of non-medical students). A dependence on personal networks was evident as 11% of medical students and 8% of non-medical students received their medication from friends and family. Less often, sample medications were obtained by 7% of medical students and 3% of non-medical students. These medications were typically provided by pharmaceutical representatives or during medical visits. This pattern emphasizes the importance of pharmacies as the primary source for medicine access, with personal and sample-based sources coming in second.

Another finding is that students who are better informed about the side effects of over-the-counter antibiotic use are less likely to engage in this practice. The logistic and stepwise logistic regression models are comparable in this regard.¹¹ According to a study conducted in Bangladesh, pharmacy students are more cautious about the over-the-counter use of antibiotics because they have greater knowledge of medications.¹⁴ Therefore, increasing students' knowledge through various approaches may help lower the rate of over-the-counter antibiotic use.

We observed that only 64.5% of medical students were aware of the side effects of over-the-counter antibiotic use, and only 61.5% of non-medical students were aware of these effects. In a similar study of medical and non-medical students in Saudi Arabia, 22.5% of participants reported experiencing a side effect after over-the-counter antibiotic use. Of them, about 69% reported experiencing adverse medication reactions. The vast majority of responders (77.8%) were from a study conducted in India.¹⁵

They said they were comfortable with over-the-counter use of antibiotics. 6.1% of respondents experienced adverse effects as reported.

Its cross-sectional design, possible recall bias, and restricted generalizability as a result of sampling from specific institutions are some of the main limitations of this study. Nonetheless, the comparative method and sufficient sample size are its strong points.

CONCLUSION

Non-prescription antibiotic use is common among both groups, with a higher prevalence in non-medical students. Despite better awareness among medical students, inappropriate use persists, particularly for minor illnesses. Easy access through pharmacies highlights regulatory gaps. Strengthening enforcement and targeted educational interventions are essential to promote rational antibiotic use.

Author Contributions

QAN: Conception and design, analysis and interpretation of data, drafting the article, critical revision for important intellectual content, and final approval.

FA: Conception and design, analysis and interpretation of data.

SS: Analysis and interpretation of data, drafting the article.

SS: Acquisition of data, conception and design, analysis and interpretation.

FS: Conception and design, analysis and interpretation of data.

AS: Conception and design, analysis and interpretation of data.

REFERENCES

1. Doomra R, Goyal A, Bhardwaj A, Khan A. Self-medication practices among dental students in a private dental college in North India. *Int J Pharm Sci Res.* 2024;15(6):1796-1800.
2. Elmahi OKO, Musa RAE, Shareef AAH, Omer MEA, Elmahi MAM, Altamih RAA, et al. Perception and practice of self-medication with antibiotics among medical students in Sudanese universities: A cross-sectional study. *PLoS One.* 2022;17(1):e0263067.
3. Ghimire P, Pant P, Khatiwada S, Ranjit S, Malla S, Pandey S. Self-medication practice in Kathmandu Metropolitan City: A cross-sectional study. *SAGE Open Med.* 2023;11:20503121231158966.
4. Faeooqi UG, Khan FA, Iqbal J, Khalid AY, Saleem MA, Mustafa G. A cross-sectional survey to evaluate self-medication among medical students in Karachi, Pakistan. *J Posit Sch Psychol.* 2023;7:1178-1182.
5. Alam N, Saffoon N, Uddin R. Self-medication among medical and pharmacy students in Bangladesh. *BMC Res Notes.* 2015;8(1):763.
6. Behzadifar M, Behzadifar M, Aryankhesal A, Ravaghi H, Baradaran HR, Sajadi HS, et al. Prevalence of self-medication in university students: A systematic review and meta-analysis. *East Mediterr Health J.* 2020;26(7):846-857.
7. Fetensa G, Tolossa T, Etafa W, Fekadu G. Prevalence and predictors of self-medication among university students in Ethiopia: A systematic review and meta-analysis. *J Pharm Policy Pract.* 2021;14(1):107.
8. Ruiz ME. Risks of self-medication practices. *Curr Drug Saf.* 2010;5(4):315-323.
9. Rehman S, Sarfraz MR, Bano S, Ismail A, Naveed A, Malik A. Assessing the impact of self-medication with antibiotics among medical students. *Pak J Health Sci.* 2024;5(2):35-39.
10. Abdelwahed RNK, Jassem M, Alyousbashi A. Self-medication practices, prevalence, and associated factors among Syrian adult patients: A cross-sectional study. *J Environ Public Health.* 2022;2022: 9274610.
11. Niroomand N, Bayati M, Seif M, Delavari S, Delavari S. Self-medication pattern and prevalence among Iranian medical sciences students. *Curr Drug Saf.* 2020;15(1):45-52.
12. Shrestha D, Barakoti A, Gurung RS, Paudel R, Sapkota J, Deo S. Antibiotics self-medication practice among medical students. *J Nepal Health Res Counc.* 2021;19(3):613-617.
13. Shitindi L, Issa O, Poyongo BP, Horumpende PG, Kagashe GA, Sangeda RZ. Comparison of knowledge, attitude, practice and predictors of self-medication with antibiotics among medical and non-medical students in Tanzania. *Front Pharmacol.* 2023;14: 1301561.
14. Tohan MM, Ahmed F, Juie IJ, Kabir A, Howlader MH, Rahman MA. Knowledge, attitude and convenience regarding self-medication practices among university students in Bangladesh: Exploration using a structural equation modeling approach. *Sci Rep.* 2024;14(1):10837.
15. Honnekeri A, Bhavshaikh N, Shah M, Nayak U. Over-the-counter use of antibiotics among medical students in urban India: Exploring the extent of this dangerous practice. *J Fam Med Prim Care.* 2024;13(8):3381-3387.