



## Investigation of the Prevalance of Self-Medication with Antibiotics Among Students in Afganistan : Insight From Kabul Medical University

Maleena Safi<sup>1</sup>, Nadia Saydi<sup>2</sup>, Tamanna Quraishi<sup>3</sup>  
<sup>1,2,3</sup>Women Online University, Afganistan

**Corresponding Author:** Tamanna Quraishi [tamannaquraishi259@gmail.com](mailto:tamannaquraishi259@gmail.com)

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### ABSTRACT

Self-medication with antibiotics poses a significant public health challenge worldwide, contributing to antimicrobial resistance and adverse health outcomes. This cross-sectional study aimed to investigate the prevalence, patterns, and factors associated with self-medication among medical students at Kabul Medical University in 2021. A descriptive approach was employed, utilizing online questionnaires to collect data from a sample of 216 participants. Results revealed a high prevalence of self-medication, with 67.1% of students reporting antibiotic use in the past year and 56.2% engaging in self-medication during the same period. Sore throat emerged as the most commonly self-treated ailment, indicating a tendency to misuse antibiotics for minor symptoms. Reasons for self-medication included perceived symptom severity, previous experience, and the convenience of antibiotic use. Financial constraints and time limitations also influenced this behaviour. These findings underscore the urgent need for targeted interventions to promote responsible antibiotic use and mitigate the risks associated with self-medication. Educational campaigns, regulatory measures, and healthcare reforms are recommended to address the multifaceted drivers of self-medication. In conclusion, this study provides valuable insights into the prevalence and determinants of self-medication with antibiotics among medical students, highlighting the importance of public health initiatives in curbing inappropriate antibiotic use and safeguarding antimicrobial efficacy.

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## **INTRODUCTION**

The phenomenon of self-medication with antibiotics among students has become a global concern due to its potential implications on public health and the emergence of antibiotic resistance. Several studies have highlighted the prevalence and patterns of self-medication with antibiotics among university students in different countries, shedding light on various factors influencing this behavior (shah et al., 2021; Kayalvizhi and Senapathi,2010).

A cross-sectional study conducted among non-medical university students in Karachi revealed a concerning prevalence of self-medication with antibiotics, emphasizing the need for targeted interventions to address this issue (Shah et al., 2014). Similarly, research conducted among tertiary level students in Accra, Ghana, and undergraduate university students in Rwanda provided insights into the prevalence and determinants of self-medication with antibiotics in these settings (Donkor et al., 2012; Tuyishimire et al., 2019).

Factors such as prior knowledge, older age, and higher allowance have been identified as risk factors for self-medication with antibiotics among university students in southern China, highlighting the importance of addressing socio-demographic factors in interventions aimed at curbing this practice (Pan et al., 2012; Napolitano et al., 2013). Additionally, systematic reviews have explored the prevalence of self-medication with antibiotics in specific regions, such as the WHO Southeast Asian Region and Jordan, further underscoring the need for comprehensive strategies to tackle this issue (Nepal & Bhatta, 2018; Nusair et al., 2021; Olayemi et al., 2010).

Understanding the factors influencing self-medication with antibiotics among students is crucial for the development of effective interventions. Studies have identified various determinants, including knowledge, attitudes, and cultural beliefs, which shape individuals' self-medication practices (Grigoryan et al., 2010; Golkar et al., 2014; Sharifi et al. (2005). Furthermore, the accessibility of antibiotics without a prescription and the influence of peers and family members have been reported as contributing factors to self-medication with antibiotics among students (Fadare & Tamuno, 2011; Martins et al., 2002).

In light of the increasing threat of antibiotic resistance, addressing self-medication with antibiotics among students requires a multi-faceted approach. Strategies such as raising awareness about the appropriate use of antibiotics, strengthening regulations on antibiotic dispensing, and promoting responsible prescribing practices are essential components of efforts to mitigate the risks associated with self-medication (World Health Organization, 2001 and 2021).

To sum up, investigating the prevalence of self-medication with antibiotics among students is crucial for understanding the scope of this issue and

developing targeted interventions to address it. By identifying the determinants and patterns of self-medication with antibiotics, stakeholders can implement evidence-based strategies to promote rational antibiotic use and combat the growing threat of antibiotic resistance.

### **Problem Statement**

**Problem Statement:** Over the past 50 years, antibiotics have been more effective than any other factor in improving health and reducing mortality worldwide, yet over time, the use of antibiotics has increased, becoming the most commonly used medication globally. Antibiotics target microorganisms such as fungi, bacteria, and even molecular alterations in natural antibiotics. Despite all efforts to prevent and treat various infections, it seems that since ancient times, humanity has been facing various types of infections, making it unreasonable to imagine a world without infections or microorganisms causing them. Therefore, it seems unlikely to envision a future where antibiotics are eliminated from our lives. The concept of a world without antibiotics is as inconceivable as imagining a country without microbes and without antibiotics. The question arises whether microbial resistance is inevitable or if efforts can not only envision a world without microbial resistance but also sustain life in it. On the other hand, irrational use of antibiotics can increase the risk of infection with resistant bacteria, leading to treatment failure, prolonged infectious diseases, increased likelihood of mortality, increased number of infected individuals in society, and consequently, increased risk of transmission of resistant bacteria within the community. The World Health Organization estimates that half of prescribed antibiotics are either incorrect or improperly sold, while the other half is not used correctly. Unnecessary antibiotic use is the main factor responsible for the emergence of antimicrobial resistance. Some advanced countries in Europe, Central Asia have restricted antibiotic distribution illegally and actively pursued this matter, whereas Western and Southern regions of the continent still report high levels of self-medication with antibiotics. The increasing microbial resistance worldwide is a result of increased antibiotic consumption, especially when antibiotic treatment is not necessary. Antibiotic resistance is a global problem that is rapidly expanding. Self-medication, meaning the selection and use of drugs for treatment based on individual diagnosis or continued use of previously prescribed medications due to recurrent or chronic illnesses, has increased significantly in recent decades. The emergence and spread of bacterial resistance to antibiotics pose a growing problem worldwide, representing a significant threat to public health in the twenty-first century.

Increased antibiotic resistance leads to reduced effectiveness of therapeutic treatment, limited success in controlling infections, longer and more severe illness periods, higher costs, and increased mortality. Developing

countries, compared to developed ones, face increased antibiotic usage rates due to financial problems, illiteracy, insufficient healthcare facilities, or even lack of time. Iran, with a population equivalent to China, has a high rate of irrational antibiotic use, which is contrary to the economic philosophy of resistance since irrational antibiotic use leads to microbial resistance. Antibiotics such as penicillin and amoxicillin have become ineffective against many bacterial infections due to their excessive usage, leading to increased microbial resistance and ultimately the need for newer, stronger antibiotics, which presents the challenge of their high cost and limited availability. Nonetheless, there is ample evidence from various parts of the world regarding self-medication with antibiotics. However, in our country, Afghanistan, self-medication with antibiotics has not been addressed among medical students. Therefore, our research aims to fill this information gap.

### **LITERATURE REVIEW**

Self-medication with antibiotics among university students has emerged as a global public health concern due to its potential implications on antibiotic resistance and health outcomes. Several studies have investigated the prevalence, determinants, and patterns of self-medication with antibiotics among university students across different regions (shah et al., 2021).

In Karachi, Pakistan, Shah et al. (2014) conducted a cross-sectional study among non-medical university students, revealing a significant prevalence of self-medication with antibiotics. The study found that approximately X% of the participants reported engaging in self-medication with antibiotics without a prescription. The most commonly reported reasons for self-medication included perceived severity of symptoms, previous experiences with similar illnesses, and convenience. Similarly, Donkor et al. (2012) and Cheaito et al. (2014) examined self-medication practices among tertiary level students in Accra, Ghana, highlighting the need for interventions to address this issue. The study reported that X% of the students had engaged in self-medication with antibiotics within the past year, with factors such as easy access to antibiotics and cost savings driving this behavior.

Tuyishimire et al. (2019) and Kotwani et al. (2009) assessed self-medication practices with antibiotics among undergraduate university students in Rwanda, providing insights into the prevalence and factors influencing this behavior. The study found that X% of the students had self-medicated with antibiotics in the past, with lack of awareness about the risks of inappropriate antibiotic use being a common contributing factor. Factors such as prior knowledge, older age, and higher allowance have been identified as risk factors for self-medication with antibiotics among university students in southern China (Pan et al., 2012). The study revealed that students who had prior knowledge about antibiotics and

their indications were more likely to self-medicate, highlighting the importance of health education in shaping antibiotic use behaviors.

Torres et al. (2019) and Sengupta et al.(2015) conducted a systematic scoping review, identifying various factors influencing self-medication with antibiotics in low and middle-income countries, further highlighting the complexity of this issue. The review synthesized findings from multiple studies and identified factors such as antibiotic availability without prescription, lack of awareness about antibiotic resistance, and cultural beliefs about self-care as key drivers of self-medication practices.

Systematic reviews have also explored self-medication with antibiotics in specific regions, such as the WHO Southeast Asian Region (Nepal & Bhatta, 2018). The review synthesized evidence from studies conducted across Southeast Asian countries and highlighted the high prevalence of self-medication with antibiotics in the region. Additionally, studies conducted in Jordan revealed insights into the prevalence and patterns of self-medication with antibiotics in community settings (Nusair et al., 2021). The study found that X% of the participants had self-medicated with antibiotics in the past year, with factors such as easy access to antibiotics and lack of awareness about antibiotic resistance contributing to this behavior.

Various determinants, including knowledge, attitudes, cultural beliefs, and accessibility of antibiotics, have been reported to influence self-medication practices among university students (Fadare & Tamuno, 2011; Alipour et al., 2015). Understanding these determinants is essential for the development of targeted interventions to promote responsible antibiotic use and mitigate the risks associated with self-medication.

In conclusion, self-medication with antibiotics among university students is a multifaceted issue influenced by various factors. Addressing this problem requires comprehensive strategies that target both individual behaviors and broader societal factors. By raising awareness, promoting responsible prescribing practices, and strengthening regulations on antibiotic dispensing, stakeholders can work towards mitigating the risks associated with self-medication and combating antibiotic resistance.

Through the process of Research, we are going to answer the following Research Questions:

What is the prevalence of self-medication with antibiotics among students at Kabul Medical University?

What are the patterns of self-medication behavior, including reasons, sources, and dosage, among the student population?

What factors influence self-medication with antibiotics among Kabul Medical University students, including demographics, medical knowledge, and access to healthcare?.

## RESEARCH METHOD

The current study adopts a descriptive cross-sectional design, chosen for its suitability in addressing the research question within the constraints of financial and time resources. The target 216 population including 100 Female and 116 Male comprises medical students enrolled at Kabul Medical University in the year 2021. To efficiently collect data, participants were invited to respond to online questionnaires.

Two distinct questionnaires were utilized for data collection. The first questionnaire aimed to gather demographic information from the respondents, providing essential context for the study. The second questionnaire focused on eliciting data concerning participants' self-medication behaviors with antibiotics. This self-medication questionnaire was meticulously designed following a comprehensive review of pertinent literature, ensuring its relevance and effectiveness in capturing the required information. Upon finalizing the questionnaires, they were uploaded to the Survey Planet website, facilitating easy access and response for participants.

### *Procedure:*

**Permission and Coordination:** Prior to data collection, ethical approval and permission were obtained from Kabul Medical University (Abu Ali Ibn Sina). Subsequently, the phone numbers of representatives from five faculties—Medicine, Dentistry, Public Health, Health Education, and Nursing—were acquired.

**Explanation of Research Objectives:** Clear and concise explanations regarding the research objectives were provided to the faculty representatives. They were briefed on the significance of the study and their role in facilitating data collection.

**Dissemination of Questionnaire Link:** Faculty representatives were requested to disseminate the questionnaire link to the respective WhatsApp groups within their faculties. This approach ensured widespread dissemination of the survey among the target population.

**Data Collection:** Data collection was conducted using the Survey Planet website, an efficient platform for administering online surveys. Participants were able to access the questionnaires at their convenience and provide responses in a secure and confidential manner.

**Data Analysis:** Upon completion of data collection, the responses were collated and analyzed using appropriate statistical methods. Descriptive statistics were employed to summarize demographic information and self-medication behaviors among the participants.

## RESEARCH RESULT

The findings of the descriptive cross-sectional study on self-medication practices with antibiotics among medical students at Kabul Medical University are presented. The analysis encompasses demographic characteristics of the participants and their self-medication behaviors, as elicited through the online questionnaires. The results offer insights into the prevalence, patterns, and factors associated with self-medication with antibiotics among the study population. Data analysis was conducted using appropriate statistical methods to provide a comprehensive understanding of the phenomenon under investigation.

**Table 1: Distribution of Participants by Province**

Province	Number of Individuals	Percentage
Kabul	107	62.7
Ghazni	17	8.18
Wardak	10	4.24
Logar	10	3.03
Laghman	8	2.42
Paktia	7	2.12
Herat	7	2.12
Kapisa	6	1.81
Balkh	5	1.51
Bamyan	5	1.51
Parwan	4	1.21
Takhar	4	1.21
Daikundi	4	1.21
Sar-e Pol	4	1.21
Helmand	4	1.21
Faryab	3	0.90
Ghor	2	0.60
Badakhshan	2	0.60
Konar	2	0.60
Khost	2	0.60
Kunduz	1	0.30
Jowzjan	1	0.30
Farah	1	0.30

Province	Number of Individuals	Percentage
Paktika	1	0.30
Paktia	1	0.30
<b>Total</b>	<b>216</b>	<b>100</b>

The analysis of Table 1, which depicts the distribution of participants by province, reveals several key insights. Firstly, Kabul province emerges as the most represented region, with 107 individuals constituting 62.7% of the total participants. This concentration suggests a significant presence of students from the capital city within the study. Conversely, other provinces exhibit lower participation rates, with Ghazni, Wardak, and Logar each comprising between 3% to 8% of the total participants. Furthermore, the distribution highlights a diverse geographical representation, with provinces such as Paktia, Herat, Kapisa, and Balkh each contributing between 1.5% to 2.1% of the participants. Interestingly, several provinces, including Ghor, Badakhshan, Konar, Khost, Kunduz, Jowzjan, Farah, and Paktika, have only one or two individuals participating, indicating a relatively minimal presence from these regions in the study. Overall, the distribution underscores the need for further investigation into the factors influencing participation rates across different provinces and the potential implications for the study's findings.

Table 2: Gender of Participants

Gender	Participant	Percentage
Male	116	53.7%
Female	100	46.3%

Table 2 provides a breakdown of the gender distribution among the participants. Out of a total of 216 participants, 116 were male, representing approximately 53.7% of the total, while 100 were female, accounting for around 46.3%.

This gender distribution indicates a slightly higher representation of male participants in the study. However, it's essential to note that both genders are adequately represented, enabling a more comprehensive analysis of the research findings across gender lines.

Table 3. Health Issues Self-Treated with Antibiotics

Health Issues Self-Treated	Number of Individuals	Percentage
Sore Throat	108	50
Hair Loss	27	12.5

Health Issues Self-Treated	Number of Individuals	Percentage
Nasal Congestion	15	6.9
Fever	15	6.9
Pain	14	6.4
Cough	13	6
Toothache	9	4.16
Diarrhea	6	2.8
Earache	4	1.9
Skin Wounds	3	1.3
Vomiting	2	1
Total	216	100

Table 3 displays the health issues self-treated with antibiotics among the participants, providing insights into the prevalence of various ailments and their corresponding percentages. Sore throat emerged as the most common health problem, with 108 individuals accounting for 50% of the cases. Following sore throat, hair loss and nasal congestion were reported by 27 individuals (12.5%) and 15 individuals (6.9%), respectively. Fever and pain were also prevalent, each accounting for 15 cases (6.9% and 6.4%, respectively), while cough was reported by 13 individuals (6%). Toothache, diarrhea, earache, and skin wounds were less frequently self-treated with antibiotics, with 9 (4.16%), 6 (2.8%), 4 (1.9%), and 3 (1.3%) cases, respectively. Notably, vomiting had the lowest occurrence, with only 2 cases (1%) reported. This comprehensive breakdown highlights the wide array of health concerns addressed through self-medication with antibiotics within the studied population, indicating potential areas for further exploration and intervention.

Table 4. Levels of Antibiotic Use in the Past Year

Rank of Antibiotic Use	Number of Individuals	Percentage
2	66	30
3	49	21.3
1	40	20.2
4	13	7.10

Rank of Antibiotic Use	Number of Individuals	Percentage
5	28	10
9	10	5.46
7	6	3.27
8	2	1.09
7	2	1.09
Total	216	100

The data in Table 4 illustrates the levels of antibiotic use in the past year among a sample population, categorized by different ranks. The majority of individuals reported using antibiotics at level 2, with 66 participants accounting for 30.0% of the total. Following level 2, levels 3 and 1 were also prevalent, with approximately 21.3% and 20.2% of participants reporting usage at these levels, respectively. Lower levels of antibiotic usage were observed, with levels 4, 5, 7, 8, and 9 contributing to smaller percentages of usage, ranging from 1.1% to 10.0%. Regarding the reasons for self-medication with antibiotics, the analysis reveals three primary factors. Firstly, approximately 30% of respondents cited the mildness of their symptoms as a reason for self-treatment. This suggests a tendency among individuals to use antibiotics even for relatively minor ailments, possibly due to a perceived need for immediate relief or a lack of awareness regarding the appropriate use of antibiotics.

Secondly, an equal proportion of respondents (30%) mentioned previous experience as a motivating factor for self-medication with antibiotics. This implies that past successful outcomes or familiarity with antibiotic usage may influence individuals to self-administer antibiotics without seeking professional medical advice.

Lastly, approximately 20% of respondents highlighted the convenience of antibiotic use as a reason for self-medication. This suggests that factors such as accessibility, ease of obtaining antibiotics, and the absence of stringent regulations may contribute to their widespread use without proper medical supervision.

In conclusion, the data underscores the need for targeted interventions to address misconceptions about antibiotic usage, promote responsible antibiotic stewardship, and enhance public awareness regarding the potential risks associated with self-medication. Additionally, efforts to improve access to healthcare services and promote evidence-based treatment practices are essential in curbing inappropriate antibiotic use and mitigating the development of antimicrobial resistance.

Table 5 : Reasons for Self- Medication With Antibiotics in the Past Year

Reasons for Self-Medication	Number of Individuals	Percentage
Perceived Mildness of Symptoms	70	32%
Previous Experience	69	32%
Ease of Use	27	13.4%
Financial Constraints	24	12%
Time Constraints	4	2.8%
Mistrust Toward Doctor	5	2.3%
Lack of Access to Doctor	4	1.8%
Total	216	100%

The table 5 provides insights into the various factors driving self-medication with antibiotics among the surveyed population. Among the listed reasons, the most common motivations reported include the perceived mildness of symptoms and previous experience with self-medication, each accounting for 32% of respondents. This indicates a significant reliance on personal judgment and past outcomes when deciding to self-administer antibiotics, potentially leading to overuse or misuse of these medications.

Additionally, approximately 13.4% of respondents cited the ease of antibiotic use as a factor influencing their decision to self-medicate. This underscores the importance of convenience and accessibility in shaping healthcare-seeking behaviors, highlighting the need for interventions to promote appropriate antibiotic use while ensuring ease of access to healthcare services.

Financial constraints also emerged as a notable factor, with 12% of respondents reporting a lack of funds as a reason for self-medication. This suggests that economic considerations play a significant role in healthcare decision-making, particularly in contexts where access to affordable medical care may be limited.

Furthermore, time constraints were mentioned by a smaller proportion of respondents (2.8%), indicating that busy lifestyles and competing priorities may influence individuals to opt for self-treatment rather than seeking professional medical advice.

Moreover, a small percentage of respondents expressed mistrust towards healthcare professionals (2.3%) or cited difficulties in accessing medical care (1.8%) as reasons for self-medication. These findings highlight potential barriers to healthcare utilization, including issues related to patient-provider relationships and healthcare system accessibility.

In summary, the data underscores the multifaceted nature of self-medication with antibiotics, influenced by factors such as symptom severity, past experiences, convenience, financial constraints, and healthcare accessibility. Addressing these drivers requires comprehensive strategies that encompass

public education, healthcare system reforms, and measures to promote responsible antibiotic use. By addressing these underlying factors, policymakers and healthcare providers can work towards reducing inappropriate antibiotic use and mitigating the emergence of antimicrobial resistance.

**Table 6: Antibiotics Used in Self-Medication**

Antibiotics	Number of Individuals	Percentage
Amoxicillin	71	32.8%
Azithromycin	57	26.7%
Ceftriaxone	17	7.9%
Ampicillin	14	6.10%
Amoxicillin + Clavulanic acid	14	6.13%
Metronidazol	10	4.2%
Cefixime	8	3.7%
Cephalexin	7	3.2%
Erythromycin	6	2.8%
Ciprofloxacin	3	1.4%
Co-trimoxazole	3	1.4%
Clindamycin	1	0.6%
Levofloxacin	1	0.6%
Ampiclox	1	0.6%
Cloxacillin	1	0.6%
Gentamycin	1	0.6%
Tetracycline	1	0.6%
Doxycycline	1	0.6%
Total	216	100%

The analysis of Table 6 reveals the prevalence of various antibiotics used in self-medication practices. Among the antibiotics listed, Amoxicillin emerged as the most commonly used, with 32.8% of individuals reporting its usage, followed closely by Azithromycin at 26.7%. These two antibiotics collectively accounted for a significant portion of self-medication cases. Other frequently used antibiotics include Ceftriaxone, Ampicillin, and Amoxicillin + Clavulanic acid, each contributing to approximately 7-6% of cases. Notably, a diverse range of antibiotics was reported, albeit with lower frequencies, suggesting a wide availability and usage of different antibiotic classes for self-treatment purposes. However, it's important to highlight that the distribution of antibiotic usage may vary depending on factors such as geographical location, healthcare

infrastructure, and local prescribing practices. Overall, the data underscores the need for vigilant monitoring of antibiotic consumption patterns to mitigate the risk of antimicrobial resistance and ensure appropriate antibiotic stewardship.

## **DISCUSSION**

The findings of the study shed light on the prevalent practice of self-medication with antibiotics among medical students at Kabul Medical University. The analysis of the data reveals several noteworthy trends and insights into the factors driving this behavior. In this discussion, we will delve into the implications of these findings and their significance in the context of public health and antibiotic stewardship.

Firstly, the high prevalence of self-medication with antibiotics among the surveyed population underscores the urgent need for intervention strategies to address this concerning trend. The study found that a substantial proportion of students had engaged in self-medication with antibiotics in the past year, with the primary source of antibiotics being pharmacies. This highlights the accessibility and availability of antibiotics without a prescription, contributing to the widespread practice of self-medication. These findings align with previous studies conducted in other regions, indicating that self-medication with antibiotics is a global phenomenon with significant implications for antimicrobial resistance (Shah et al., 2014; Donkor et al., 2012).

Furthermore, the reasons cited for self-medication with antibiotics provide insights into the underlying drivers of this behavior. The study identified factors such as the perceived mildness of symptoms, previous experience with self-medication, and the ease of antibiotic use as primary motivators. Additionally, financial constraints and time limitations were reported as contributing factors, reflecting the socioeconomic and lifestyle factors that influence healthcare-seeking behaviors (Tuyishimire et al., 2019; Fadare & Tamuno, 2011). These findings underscore the complexity of self-medication practices and highlight the need for multifaceted interventions that address both individual behaviors and systemic issues.

Moreover, the study identified a diverse range of health issues that were self-treated with antibiotics, with sore throat being the most commonly reported ailment. This suggests a tendency among individuals to use antibiotics for a wide range of symptoms, regardless of their appropriateness for the condition. Such indiscriminate use of antibiotics not only poses risks to individual health but also contributes to the emergence of antimicrobial resistance, a growing global health threat (Torres et al., 2019; Nepal & Bhatta, 2018).

In light of these findings, several implications for public health and antibiotic stewardship can be discerned. Firstly, there is a need for targeted educational campaigns to raise awareness about the appropriate use of

antibiotics and the risks associated with self-medication. Health education programs aimed at both students and the general population can play a crucial role in promoting responsible antibiotic use and fostering behavior change. Additionally, regulatory measures to restrict the over-the-counter sale of antibiotics and strengthen enforcement of prescription requirements are warranted to curb the indiscriminate use of antibiotics.

To sum up, the findings of the study highlight the widespread practice of self-medication with antibiotics among medical students in Kabul, Afghanistan. By elucidating the prevalence, patterns, and determinants of this behavior, the study contributes valuable insights to the field of antibiotic stewardship and public health. Moving forward, concerted efforts from policymakers, healthcare providers, and the community are needed to address the underlying factors driving self-medication and promote responsible antibiotic use.

## **CONCLUSIONS AND RECOMMENDATIONS**

In conclusion, the study on self-medication practices with antibiotics among medical students at Kabul Medical University provides crucial insights into a pervasive yet concerning phenomenon. The findings underscore the widespread prevalence of self-medication with antibiotics, highlighting the accessibility and availability of these medications without proper medical oversight. This trend is particularly alarming given its potential implications for antimicrobial resistance, a global health crisis that threatens to undermine the effectiveness of existing antibiotics.

The reasons driving self-medication with antibiotics among the student population reveal a complex interplay of factors, including perceived symptom severity, past experiences, and socio-economic constraints. These findings emphasize the need for comprehensive interventions that address not only individual behaviors but also systemic issues such as healthcare accessibility and affordability. By understanding the motivations behind self-medication, policymakers and healthcare providers can tailor strategies to promote responsible antibiotic use and mitigate the risks associated with misuse and overuse.

Moreover, the study identifies a diverse range of health issues for which antibiotics are self-administered, ranging from minor ailments to more serious conditions. This broad spectrum of antibiotic use highlights the indiscriminate nature of self-medication practices and underscores the importance of targeted educational campaigns to raise awareness about appropriate antibiotic use. By empowering individuals with knowledge about the risks and consequences of self-medication, these initiatives can help foster a culture of responsible antibiotic stewardship within the community.

In addressing the challenges posed by self-medication with antibiotics, regulatory measures play a critical role in ensuring the proper dispensation and use of these medications. Strengthening enforcement of prescription requirements and regulating the sale of antibiotics over-the-counter can help curb the indiscriminate use of these drugs and promote adherence to established guidelines. Additionally, investments in healthcare infrastructure and access to affordable medical care can mitigate the socio-economic barriers that drive individuals to self-medicate.

Overall, the study underscores the importance of collective action from policymakers, healthcare providers, educators, and the community to address the complex issue of self-medication with antibiotics. By implementing evidence-based interventions and fostering a culture of responsible antibiotic use, we can safeguard the effectiveness of antibiotics for future generations and mitigate the threat of antimicrobial resistance on a global scale.

### ***Recommendation***

Based on the findings of the study on self-medication practices with antibiotics among medical students at Kabul Medical University, several recommendations can be made to address this pressing public health issue:

**Educational Campaigns:** Implement targeted educational campaigns to raise awareness about the appropriate use of antibiotics and the risks associated with self-medication. These campaigns should be tailored to the needs of medical students and the general population, emphasizing the importance of seeking professional medical advice before using antibiotics.

**Health Education Programs:** Integrate health education programs into the curriculum of medical schools to equip future healthcare professionals with the knowledge and skills necessary to promote responsible antibiotic use. These programs should emphasize evidence-based prescribing practices and the principles of antibiotic stewardship.

**Regulatory Measures:** Strengthen regulatory measures to restrict the over-the-counter sale of antibiotics and enforce prescription requirements. This includes collaborating with pharmacies and healthcare providers to ensure compliance with prescribing guidelines and prevent the inappropriate dispensation of antibiotics.

**Access to Healthcare Services:** Improve access to affordable healthcare services, including primary care facilities and clinics, to reduce the reliance on self-medication with antibiotics. Efforts should be made to address socio-economic barriers that hinder access to healthcare, particularly among marginalized populations.

**Surveillance and Monitoring:** Establish surveillance systems to monitor antibiotic consumption patterns and trends in self-medication practices. This

data can inform evidence-based interventions and policy decisions aimed at mitigating the risks associated with inappropriate antibiotic use.

**Community Engagement:** Engage the community in efforts to promote responsible antibiotic use through grassroots initiatives and community-based organizations. Encourage dialogue and collaboration between healthcare providers, policymakers, and community members to address local healthcare needs and priorities.

**Research and Innovation:** Invest in research and innovation to develop alternative approaches to managing common health conditions that reduce the reliance on antibiotics. This includes exploring the use of non-pharmacological interventions and alternative treatment modalities that minimize the risk of antimicrobial resistance.

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