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**Prevalence and Factors Associated with Self-Medication Among
University Students in Shendi, Sudan – 2026**

*A Thesis Submitted in Partial Fulfillment for The Requirements of the
Bachelor of Medicine, Bachelor of Surgery MBBS*

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Abstract

Background: Self-medication is a common global habit, especially in regions where professional healthcare is hard to reach. For university students, the decision to treat themselves is usually a matter of saving time and money, or a feeling of confidence in their own medical knowledge. However, this convenience comes with a cost, including the risk of wrong diagnoses, unexpected side effects, and the growing threat of antibiotic resistance.

Objectives: This study aimed to find out how common self-medication is among students in Shendi, Sudan, and to understand the specific reasons why they choose to skip the doctor's office.

Methods: We conducted a cross-sectional study with undergraduate students in Shendi using a structured online survey. By reaching out through social media, we gathered information on the students' backgrounds, their medication habits, where they get their drugs, and their general understanding of how medicines work. We then organized this data to identify the most significant trends in their behavior.

Results: The results were striking: every single one of the 177 students who participated reported self-medicating, showing that the practice is universal in this community. Students most often reached for painkillers and antibiotics to treat routine issues like headaches, fevers, and colds. Most bought their medicine directly from local pharmacies, often relying on a pharmacist's advice rather than a doctor's prescription. The biggest "push" factors were the belief that an illness wasn't serious enough for a clinic visit, a reliance on past experience, the high cost of formal care, and the frustration of long wait times. While students had a decent grasp of the risks—especially regarding antibiotics—dangerous misconceptions still exist, and many reported experiencing actual side effects from self-treating.

Conclusion: Self-medication has become the standard for students in Shendi, driven by both personal habits and a healthcare system that feels difficult to navigate. While it offers a quick fix, the widespread use of antibiotics without oversight is a serious public health concern. To address this, we need more than just classroom education; we need better access to affordable care and tighter rules on how medications are handed out at pharmacies.

Keywords: Self-medication, University Students, Sudan, Prevalence

المستخلص:-

الخلفية: يُعد التداوي الذاتي ظاهرة عالمية شائعة، لا سيما في المناطق التي يصعب فيها الحصول على الرعاية الصحية المهنية. وبالنسبة لطلاب الجامعات، غالباً ما يكون قرار علاج أنفسهم وسيلة لتوفير الوقت والمال، أو نابعاً من الشعور بالثقة في معرفتهم الطبية الخاصة. ومع ذلك، فإن هذه الراحة تأتي بتكلفة، بما في ذلك خطر التشخيص الخاطئ، والآثار الجانبية غير المتوقعة، والتهديد المتزايد لمقاومة المضادات الحيوية.

الأهداف: هدفت هذه الدراسة إلى معرفة مدى انتشار التداوي الذاتي بين الطلاب في مدينة شندي بالسودان، وفهم الأسباب الكامنة وراء اختيارهم الاستغناء عن زيارة الطبيب.

المنهجية :

أجرينا دراسة مقطعية (Cross-sectional study) شملت طلاباً جامعيين في شندي باستخدام استبيان مهيكل عبر الإنترنت. ومن خلال التواصل عبر وسائل التواصل الاجتماعي، جمعنا معلومات حول خلفيات الطلاب، وعاداتهم الدوائية، ومصادر حصولهم على الأدوية، وفهمهم العام لكيفية عملها. بعد ذلك، قمنا بتنظيم هذه البيانات لتحديد الاتجاهات الأكثر أهمية في سلوكهم.

النتائج: كانت النتائج لافتة للنظر؛ حيث أفاد جميع الطلاب المشاركين (177) طالباً (بممارسة التداوي الذاتي، مما يظهر أن هذه الممارسة تكاد تكون عامة في هذا المجتمع الطلابي. وكان الطلاب يلجأون في الغالب إلى مسكنات الألم والمضادات الحيوية لعلاج مشكلات روتينية مثل الصداع والحمى ونزلات البرد. واشترى معظمهم الأدوية مباشرة من الصيدليات المحلية، معتمدين في كثير من الأحيان على نصيحة الصيدلي بدلاً من الوصفة الطبية. وتمثلت أكبر الدوافع في الاعتقاد بأن المرض ليس خطيراً بما يكفي لزيارة العيادة، والاعتماد على الخبرات السابقة، وارتفاع تكلفة الرعاية الرسمية، والإحباط من فترات الانتظار الطويلة. ورغم أن الطلاب لديهم إدراك جيد للمخاطر - خاصة فيما يتعلق بالمضادات الحيوية - إلا أن المفاهيم الخاطئة والخطيرة لا تزال قائمة، كما أبلغ الكثيرون عن تعرضهم لآثار جانبية فعلية جراء العلاج الذاتي.

الخلاصة: أصبح التداوي الذاتي هو المعيار السائد لطلاب شندي، مدفوعاً بكل من العادات الشخصية ونظام الرعاية الصحية الذي يبدو من الصعب التعامل معه. وبينما يوفر التداوي الذاتي حلاً سريعاً، فإن الاستخدام الواسع للمضادات الحيوية دون إشراف يمثل مصدر قلق جدي للصحة العامة. وللمعالجة ذلك، نحتاج إلى ما هو أكثر من مجرد التثقيف الدراسي؛ فنحن بحاجة إلى تحسين الوصول إلى رعاية ميسورة التكلفة، ووضع قواعد أكثر صرامة بشأن كيفية صرف الأدوية في الصيدليات.

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List of Abbreviations

ABX – Antibiotics	
ADR – Adverse Drug Reaction	
AH – Antihistamines	
AMR – Antimicrobial Resistance	
CI – Confidence Interval	
CS – Cross-sectional	
DV – Dependent Variable	
HCF – Healthcare Facility	
HCW – Healthcare Worker	
IV – Independent Variable	
LS – Likert Scale	
MBBS – Bachelor of Medicine, Bachelor of Surgery	
MCQ – Multiple Choice Question	
n – Sample Size	
N – Total Population Size	
NSAIDs – Non-Steroidal Anti-Inflammatory Drugs	
OTC – Over-The-Counter	
PCM – Paracetamol	
POM – Prescription-Only Medicine	
RCT – Randomized Controlled Trial	
SDG – Sudanese Pound	
SES – Socioeconomic Status	
SM – Self-Medication	
SPSS – Statistical Package for the Social Sciences	
WHO – World Health Organization	
YOS – Year of Study	

Chapter One: Introduction

1. Introduction

1.1 Background

Self medication is defined by the World Health Organization (WHO) as the use of medicines by individuals to treat illnesses or symptoms they identify by themselves (1). However, inappropriate self-medication may lead to misdiagnosis, delayed treatment, adverse drug reactions, and drug interactions (2).

In developing countries, self medication has become common due to the high cost of medical consultations, limited access to healthcare facilities, and the easy availability of over the counter and prescription only medicines without strict regulation (3). The escalating reliance on self medication trend is particularly concerning given the high prevalence of self-prescribed antibiotics and analgesics among educated youth, which while addressing immediate symptoms contributes to the broader national crisis of antimicrobial resistance and chronic drug dependency (4,5).

In addition, self medication is not only a clinical issue but also a public health problem. When individuals repeatedly depend on self-treatment without proper guidance, minor symptoms may mask serious underlying conditions, leading to delayed diagnosis and poorer health outcomes. At the community level, widespread unsupervised use of medicines increases the risk of drug resistance, medication dependency, and unnecessary financial burden on families. For university students, who are in a transitional stage between adolescence and full independence, patterns of medicine use established during these years may persist into adulthood. Therefore, understanding and addressing self-medication at this stage is critical for promoting safer health behaviors in the long term.

In 2025, the situation in Sudan is further complicated by internal displacement and strain on healthcare infrastructure, which increase dependence on informal treatment options. Within this context, understanding self-medication behaviors among university students in Shendi is particularly important, as this group represents a large and active segment of the population with increasing autonomy in health-related decision-making.

1.2 Problem Statement:

The World Health Organization identifies irrational self-medication as a major public health concern due to risks such as misdiagnosis, adverse drug reactions, and

improper drug use (6). Evidence shows it is widespread globally, especially among university students, with prevalence ranging from 38% to 92% (7). In Africa, rates often exceed 70% (8), while in the Middle East and other developing regions, easy drug access and weak regulation contribute to high misuse, particularly of antibiotics (9). In low- and middle-income countries, about 38.8% of students self-medicate with antibiotics, fueling antimicrobial resistance (10). In Sudan, factors such as high healthcare costs, long waiting times, and easy access to medications without prescriptions drive this practice. Ongoing economic and humanitarian challenges have further limited access to formal healthcare, increasing reliance on self-medication. Without better awareness and regulation, this trend may lead to serious consequences, including antimicrobial resistance, delayed diagnosis, and increased adverse drug reactions.

1.3 Justification:

This study is important because it addresses a growing health problem among university students: the habit of treating themselves with drugs like antibiotics and painkillers without a doctor's advice. In the current 2025 context, Shendi has become a crowded hub due to people fleeing conflict elsewhere in Sudan. This has put massive pressure on local hospitals and pharmacies, making it harder and more expensive for students to get professional care. By looking into why students are skipping the doctor and reaching for "leftover" or unprescribed meds, this research helps tackle the dangerous rise of drug resistance and addiction before they become lifelong problems.

1.4 Research Question

What is the prevalence of self-medication among university students in Shendi, Sudan, and what factors are associated with this practice?

1.5 Research Hypotheses

There is a significant relationship between self-medication practices (dependent variable) and factors such as socio-demographic characteristics, access to healthcare, and sources of information (independent variables) among university students in Shendi, Sudan.

1.6 General Objective:

To study the Prevalence and Factors Associated with Self-Medication Among University Students in Shendi, Sudan, 2026

1.7 Specific Objectives:

- 1.To estimate the prevalence of self-medication practices among university students in Shendi, Sudan, within the last six months.
2. To identify the most common types of medications used (e.g., antibiotics, analgesics, or herbal remedies) and the specific causes for which students seek self treatment.
3. To examine the primary sources of information for using these medications, such as community pharmacies, family recommendations, or social media.
4. To determine the underlying motivations and barriers to seeking professional medical consultation, such as high healthcare costs or perceived lack of time

Chapter two : Literature review

1. Literature review

Definition of Self-Medication

The high prevalence of self-medication in low-income countries is a multifaceted phenomenon deeply rooted in systemic resource limitations and socio-economic disparities. . In these settings, the practice is frequently a pragmatic response to "catastrophic health expenditure," where the direct costs of medical consultations and diagnostic tests exceed the financial capacity of households (11). The trend is self-treatment particularly dangerous in regions endemic with infectious diseases, as the misuse of antimalarials and antibiotics contributes to a rising trajectory of therapeutic failure and regional drug resistance (3). Consequently, in low-resource environments, self-medication is not merely a choice of convenience but is often the only accessible form of care for vulnerable populations facing long hospital wait times and inadequate healthcare infrastructure (12).

Despite its widespread occurrence, inappropriate self-medication can lead to several negative health outcomes. These include incorrect diagnosis, delay in seeking appropriate medical care, adverse drug reactions, drug interactions, and masking of serious diseases (13). Furthermore, irrational use of medications—particularly antibiotics—contributes significantly to the development of antimicrobial resistance, which represents a major global public health challenge (14). For these reasons, unsupervised self-medication has become an important concern in public health research, especially among university students who often have easy access to medications and may rely on their own judgment when treating minor illnesses.

Risk factors

The costs of private medical consultations and the frequent shortages of essential medicines in public hospitals have forced many individuals to bypass formal diagnostic channels (11). Furthermore, the regulatory framework governing the sale of medications in Sudan faces significant challenges; studies have indicated that community pharmacies often serve as the primary point of clinical advice, where prescription-only medicines (POMs), including antibiotics and steroidal anti-inflammatory drugs, are frequently dispensed without a valid medical prescription (11). This accessibility, while providing a temporary solution to healthcare gaps, significantly increases the risk of drug-drug interactions and the mismanagement of chronic conditions (15,8). In the current 2025 context, the impact of internal displacement and the disruption of pharmaceutical supply chains has further exacerbated the reliance on informal medicine networks and "leftover" medications stored within households.

The propensity for self-medication is influenced by a complex of individual, environmental, and psychological risk factors. At the individual level, socio-demographic variables such as age, gender, and the specific field of study—particularly among students in health-related disciplines—have been consistently identified as significant predictors (16,9). Environmentally, the primary drivers in low-resource settings like Shendi include the high cost of medical consultations, long waiting times in public hospitals, and the proximity of community pharmacies that may dispense medications without a prescription (3). Furthermore, psychological and behavioral factors, such as a perceived lack of severity regarding the illness, the desire for immediate relief from academic-related stress, and the influence of peer recommendations, significantly lower the threshold for self-treatment (5). In the digital age of 2025, the proliferation of unverified health information on social media platforms also serves as a critical external risk factor, providing students with a false sense of diagnostic confidence (20,13).

University students represent a special demographic within the healthcare landscape, characterized by a high propensity for self medication driven by academic, social, and developmental factors. Research indicates that this population often experiences significant academic stress, sleep deprivation, and time constraints, which frequently lead to the self administration of stimulants, analgesics, and cognitive enhancers to maintain performance (17,10). Furthermore, university students—particularly those in medical and health science programs—possess a perceived "pharmacological literacy" that may lead to overconfidence in self-diagnosis and the subsequent bypassing of professional medical consultation (18,11). . Studies conducted in similar African university settings have shown that students often resort to self-medication due to the perceived "minor" nature of their ailments and the convenience of avoiding long wait times at university clinics (19,12).

Sources of Information in Self-Medication

When people decide to self-medicate, they're not just guessing—they're getting information from a few key places. Topping the list, and often the easiest to reach, is the local pharmacist. One study among university students found that a solid 51.7% turned to their pharmacist for advice on what to take, which really shows how important these community chemists are in guiding how people actually use drugs (21). This pattern holds up beyond just students; a study with patients in Jordan found much the same, with about 52% saying they'd consult a pharmacist before using a medication without a prescription (22).

But pharmacists aren't the only source. Friends and family are a huge part of the equation. Research suggests that around 46% of students get advice from people they know, usually based on what worked when that person had similar symptoms last time (23). Then there's the medicine cabinet. It turns out many of us are our own doctors based on history—approximately 38% of students admitted to reusing an old prescription without ever checking back with a doctor (21).

Of course, we can't ignore the digital world. With everyone online these days, the internet and social media have become a major go-to for health info. Studies show that

about 34% of students now rely on websites and online platforms to decide what medication to take. This is a bit of a worry, as it can easily lead to the wrong choices if the information is shaky or not backed by real evidence (24). A broader look at self-medication trends globally confirms this, pointing out that media, ads, and online content are playing a bigger and bigger role in pushing people towards self-treatment (25).

So, to sum it up, the main players here are pharmacists, family and friends, old prescriptions, and the internet. The real concern is that leaning heavily on these sources—especially the informal ones like family or the web—can lead to some pretty risky health decisions. It really drives home the point that we need better health education and stronger rules around how medicines are accessed and advertised (26).

Commonly Used Drugs in Self-Medication

Research looking into self-medication among university students paints a clear picture of which medicines are most popular. As you might expect, the go-to options are usually for those everyday problems—headaches, fevers, and minor aches. Topping the list are painkillers and fever reducers. A study from Pakistan, for instance, found that a huge 88.3% of students had used things like panadol or paracetamol, mainly for headaches, fever, and general body pain (21). And it's not just basic painkillers; non-steroidal anti-inflammatory drugs (NSAIDs), like ibuprofen, are also widely used without ever seeing a doctor (26).

Now, here's where it gets more concerning. Even though you're supposed to have a prescription, antibiotics are also commonly self-prescribed. A study across the Middle East found that nearly 39% of university students had used antibiotics without a prescription, often for things like respiratory infections, sore throats, or fevers (27). This is a big red flag because misusing antibiotics in this way is a major driver of antimicrobial resistance—basically, making these critical drugs less effective for everyone.

Beyond pain and infections, students frequently turn to other medications on their own. Antihistamines for allergies and drugs for stomach issues are very common. For

example, a study in Ethiopia found that almost half of the students (46.5%) had used some kind of gastrointestinal medication without professional advice, and over a third (36.8%) did the same with antihistamines for allergies (28). Then there are the vitamins and supplements, which many students take hoping to boost their general health or fight off fatigue.

So, what it all boils down to is this: the meds students are most likely to use without a doctor's input are the ones for everyday complaints—pain, fever, infections, allergies, and tummy troubles. While all of this is worth noting, the widespread use of antibiotics without a prescription really stands out as the most worrying trend, given how it fuels the growing global problem of antimicrobial resistance.

Previous Studies

Self-medication among university students has been studied pretty extensively around the world, and the research consistently shows two things: it's incredibly common, and there are a few key reasons why. Take a study from Gujarat, India, for example. They found that 78% of college students were self-medicating, with males being significantly more likely to do it than females. The usual go to's were painkillers and fever reducers for things like headaches, fevers, and colds. The big reasons? It's just easy to grab medications from a pharmacy, and most students had dealt with the same illness before (29).

Another study, this time with 440 students, looked at what people actually know about the medications they take. About 74% admitted to self-medicating, and they found that students in higher academic years were more likely to do it probably because they've picked up more health info along the way. Again, painkillers and antibiotics were the top choices, with most students relying on advice from pharmacists or an old prescription they had lying around (30).

Trying to figure out the "why" behind it all, another piece of research found that 76% of students self-medicated. The main factors seemed to be how easy it is to get to a pharmacy, and whether the illness felt minor enough to handle on their own. Students

also pointed to not having enough time, the pressure of schoolwork, and just using what worked for them before as big reasons for skipping the doctor (31).

Over at Delhi University's North Campus, a smaller study of 250 students found even higher numbers, with 85% saying they self-medicated. Interestingly, students studying medicine or health-related fields were more likely to do it than others—probably because they're more familiar with the drugs. The most common medications were painkillers, antibiotics, and fever reducers, often used for respiratory stuff like colds, sore throats, and fevers (32).

Move over to the Middle East, and the picture is pretty similar, especially with antibiotics. One big review of studies from the region found that antibiotic self-medication ranged from 19% all the way up to 82%, depending on the country. That's a huge range, but it shows just how widespread getting antibiotics without a prescription really is. The same review pointed to young adults and university students as one of the highest-risk groups, mainly because antibiotics are easy to buy and the rules just aren't strict enough (33).

In the UAE, researchers at the University of Sharjah asked 287 non-medical students about their habits. A massive 86% said they self-medicated, with painkillers being the most popular. Interestingly, women reported slightly higher rates than men. For most of them, it was simply seen as a normal and acceptable way to handle minor stuff like headaches, fevers, and coughs (34).

Another deep dive into the Middle East confirmed all this, especially among young adults and university students. The research highlighted that not enough people are aware of the potential side effects, and weak pharmacy regulations make it way too easy to misuse medications. Across the region, antibiotics and painkillers were the most frequently misused (35).

Saudi Arabia tells a similar story. One study with about 500 university students found that 75% had used medications without seeing a doctor. Males and students in higher academic levels were more likely to do it, with many seeing it as a convenient and cheaper way to handle minor health issues (36).

Head down to Africa, and the trend continues. In Nigeria, a study of 440 private university students found that a huge 81.8% were self-medicating. Here, women were more likely to do it, especially if the illness seemed mild. The top choices were again painkillers and antibiotics, and the main reasons were familiar: they'd had similar symptoms before, and meds were easy to get (37).

Another Nigerian study, this time with 300 students in the southwest, found the prevalence was over 70%. They also noticed that students living on their own, away from family, were more likely to self-medicate. The driving factors here included the high cost of healthcare, long waits at hospitals, and the sheer ease of just buying something from a local pharmacy (38).

Finally, looking at the bigger picture, a recent global analysis focused on low- and middle-income countries. By pulling together data from many studies, they estimated that on average, nearly 39% of university students self-medicate with antibiotics. The study also found that students who'd used antibiotics before and had easy access to pharmacies were much more likely to do it again—a pattern that's a major contributor to the growing global crisis of antimicrobial resistance (10).

So, when you look at all this research together, one thing is crystal clear: self-medication is a widespread problem among university students everywhere. And it's not just one thing driving it, it's a mix of factors. Things like gender differences, being in a higher academic year, how easy it is to get medications, past experiences with illness, and the simple fact that seeing a doctor can be expensive and time-consuming all play a part in why this practice is so common among students.

The Risks of Inappropriate Self-Medication

Inappropriate self-medication has grown into a major public health worry because using medicine without supervision often leads to poor health outcomes. One of the biggest risks is misdiagnosis or delaying the discovery of a serious illness. When people treat their own symptoms instead of getting a professional opinion, underlying conditions can go unnoticed, allowing diseases to progress and cause further complications.

Research shows that self-medicating often masks symptoms of infections or chronic issues, which keeps people from getting the medical help they actually need (39).

Another serious issue is the higher risk of adverse drug reactions (ADRs). Most people don't have the specialized knowledge to understand correct dosages, contraindications, or how long a treatment should last. This leads to taking the wrong amount or mixing drugs that shouldn't go together, which spikes the chance of harmful side effects. Evidence suggests these reactions are far more common in those who lean heavily on over-the-counter medication without a doctor's guidance (40).

Self-medication is also a primary fuel for antimicrobial resistance (AMR). Misusing antibiotics whether that's taking them without a prescription, using the wrong dose, or stopping the course too early helps antimicrobial resistance (AMR) develop. Studies point to antibiotic self-medication as a global driver of resistance, especially in regions where these drugs are easily accessible without a script (41).

Beyond that, there is the danger of drug dependence. Routinely using analgesics, sedatives, or even certain cough syrups without supervision can lead to tolerance and addiction, eventually causing chronic misuse and toxicity (42). Long-term use of common drugs like NSAIDs (painkillers) is also linked to serious complications, significantly increases risks of serious gastrointestinal bleeding, kidney failure, cardiovascular events (heart attacks, stroke), and high blood pressure

Finally, this habit places a heavy economic burden on the healthcare system. When self-medication goes wrong, it leads to more doctor visits, hospitalizations, and longer recovery times. This strains medical resources, particularly in developing countries where healthcare is already stretched thin (43).

Ultimately, self-medication carries a heavy price : delayed diagnoses, drug reactions, resistance, and addiction. Solving this requires a mix of better public awareness, tighter rules on how drugs are sold, and making it easier for people to see a professional in the first place.

Chapter three :Methodology

3. Methodology

3.1 Study Design:

This is descriptive cross sectional facility based study.

3.2 Study population:

This study was conducted from male and female undergraduate students who live in Shendi state

3.3 Study area:

This study was conducted in **Shendi**, a major urban center located in the River Nile State in northern Sudan. Shendi serves as a vital educational hub, hosting a diverse range of higher education institutions that attract students from across the country.

The study targeted a broad cross-section of the university student population in the area. Participants were drawn from the following institutions:

1. Shendi University (including the Faculty of Medicine and other disciplines)
2. Napata College
3. Al-Ghad College
4. Sudan University of Science and Technology
5. University of Khartoum
6. Ahfad University for Women
7. National University
8. Al-Mughtaribeen University
9. Omdurman Islamic University
10. Al-Neelain University
11. Ibn Sina University
12. Garden City University College
13. Emirates College of Science and Technology
14. Al-Fajr College

Within these institutions, the study ensured a diverse academic representation by including students from various faculties. While there was a significant focus on the **Faculty of Medicine**, the data also encompasses students from **Pharmacy, Nursing, Medical Laboratory Sciences, Engineering, Education, Economics, and Administrative Sciences**. This multi-disciplinary approach allows for a comprehensive comparison between students with formal health-related training and those from non-health-related backgrounds regarding their self-medication habits.

3.4 Study Duration

The study was conducted over a period of three months, from February 2026 to April 2026. During this time, all phases of the research—including data collection, data analysis, and thesis writing—were completed.

3.5 Inclusion criteria:

Currently registered university students in Shendi

Both male and female students across all faculties and academic years.

Students who voluntarily agree to participate and provide informed consent.

3.6 Exclusion criteria:

Students who do not provide informed consent.

3.7 Sampling design:

This study employs a stratified random sampling method, ensuring that every individual in the population has an equal opportunity to be selected for the smaller sample. Random sampling strategies are considered the gold standard in research as they aim to obtain a representative sample of the population.

3.8 Sampling Technique

A stratified random sampling technique was used to ensure adequate representation of students from different academic levels and faculties.

3.9 Sample size :

The sample size was calculated using the finite population correction formula

$$n = N / (1 + Ne^2)$$

at a 95% confidence level and a precision (margin of error) of 0.06. Considering that the total population of the study was 1000 students, the calculated minimum sample size was 218 students.

3.10 Data collection :

Data for this study was collected through an online questionnaire developed using Google Forms. The survey was shared electronically via social media platforms, email groups, and academic networks to ensure wide accessibility. Participation are volunteers, and respondents was informed about the anonymity and confidentiality of their responses through a consent statement at the beginning of the form. By submitting the completed form, participants consented to the use of their responses for academic and research purposes.

The questionnaire included several sections covering:

Section A: Introduction and Consent

This section included the study title, a brief explanation of the study purpose, and an informed consent statement. Only participants who agreed were allowed to proceed.

Section B: Socio-demographic Characteristics

This section collected data on participants' age, gender, university, faculty, year of study, and monthly personal income.

Section C: Self-Medication Practices

This section assessed whether participants practiced self-medication, frequency of use, types of medications used (e.g., antibiotics, analgesics), and the symptoms or conditions that led to self-medication.

Section D: (Sources of Information and Medication)

This section explored where participants obtained medications (e.g., pharmacies, family, leftover drugs) and the sources of recommendations (e.g., pharmacist, friends, social media).

Section E: Motivations and Barriers

This section examined reasons for self-medication, such as cost, time constraints, previous experience, and access to healthcare, as well as any experienced side effects.

Section F: Access to Healthcare

This section assessed participants' access to healthcare facilities, including distance, cost influence, and waiting times.

Section G: Knowledge Assessment

This section evaluated participants' knowledge regarding appropriate medication use, particularly antibiotics and their role in antimicrobial resistance.

3.11 Data analysis plan

The collected data were exported from Google Forms, then organised and cleaned in Microsoft Excel. Statistical analysis was performed using IBM SPSS Statistics (version 26).

We used descriptive statistics to summarise the data. Categorical variables (like gender or faculty) are presented as frequencies and percentages, while continuous variables (like age) are summarised using measures of central tendency and spread.

3.12 Dependent Variables

1. Self-Medication Practice
2. Patterns of Use This includes the frequency of use, the type of drug

3.13 Independent Variables

1. Year of Study College/Faculty.
2. Access to Healthcare:
2. Socio-demographic (Control) Variables
3. Source of Information

3.14 Ethical Considerations

Ethical approval for this study was obtained from the appropriate institutional authority prior to data collection. Participation in the study was entirely voluntary, and all participants were informed about the purpose and objectives of the research before taking part.

Informed consent was obtained electronically from all participants at the beginning of the questionnaire. Only students who agreed to participate were allowed to proceed with the survey. Participants were assured that their responses would remain anonymous and confidential, and no personally identifiable information was collected. All data were used strictly for academic and research purposes. The collected information was stored securely and accessed only by the research team. Participants were also informed of their right to withdraw from the study at any stage without any consequences

Chapter Four: Results

4. Results

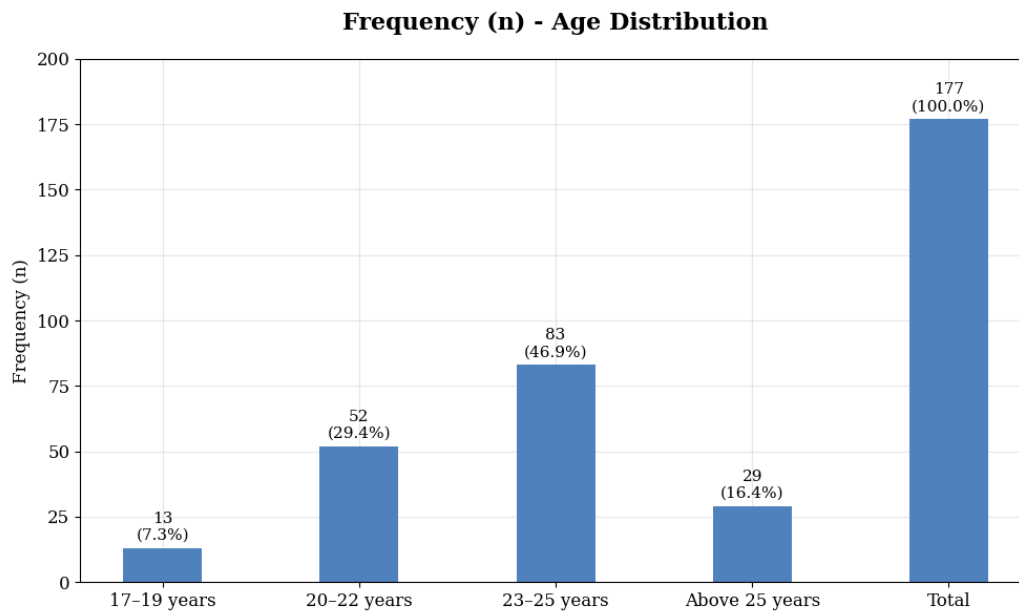


Figure 1. Age Distribution of University Students in Shendi (n=177)

The age distribution shows that the largest cohort of participants (46.9%) falls within the 23–25 years category. This indicates that the study primarily captures the behaviors of senior or mature university students.

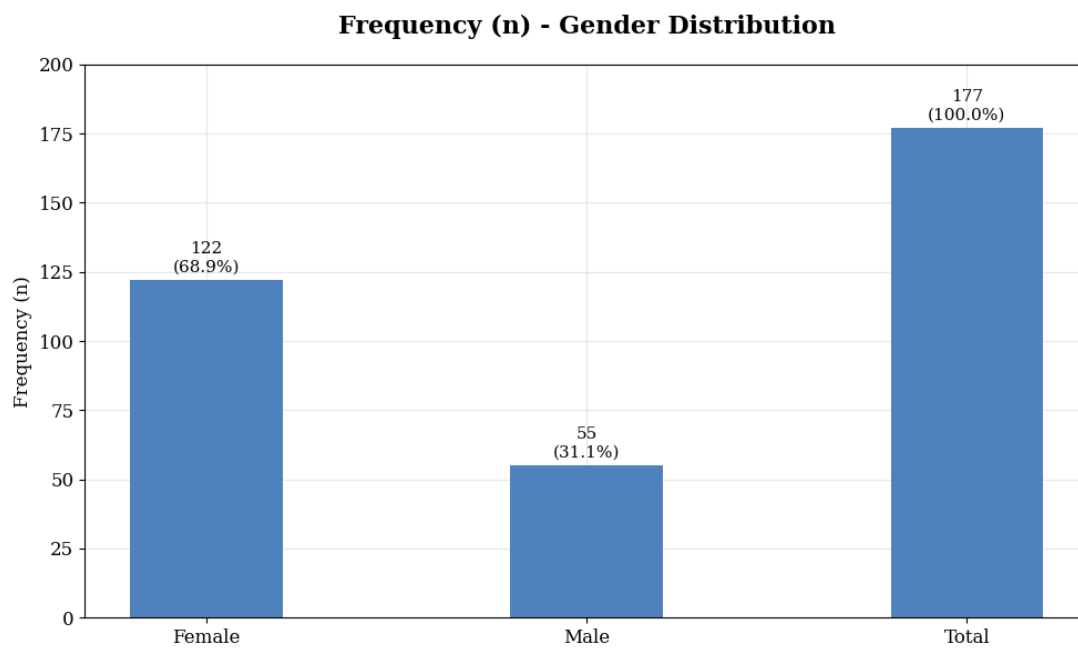


Figure 2. Gender Distribution of the Study Population (n=177)

There is a clear female predominance in the study, with women accounting for 68.9% of the total participants compared to 31.1% for men.

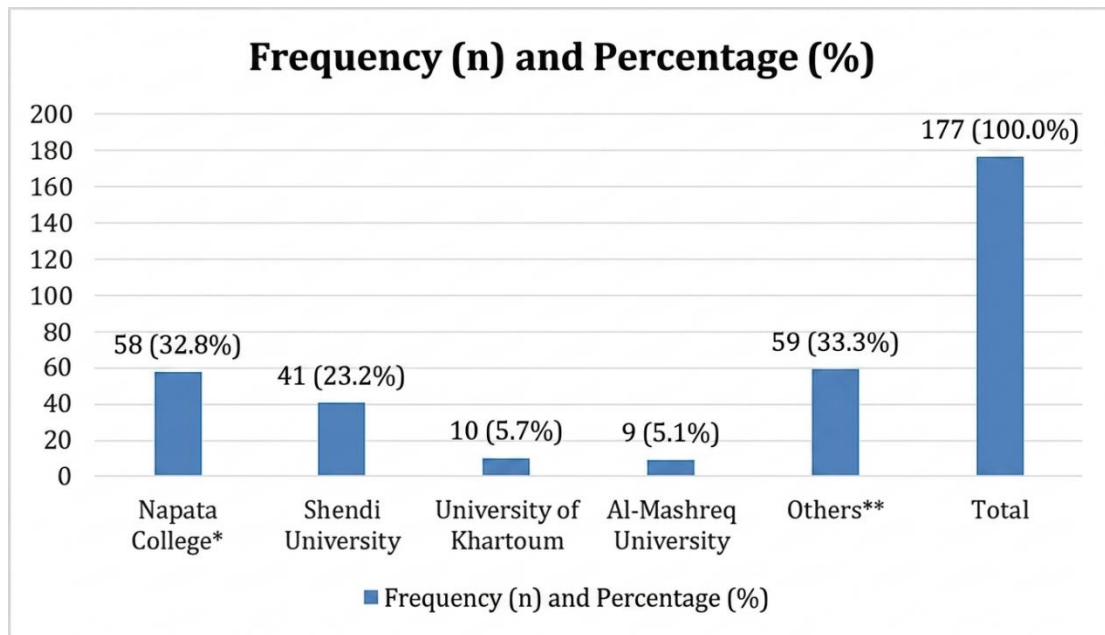
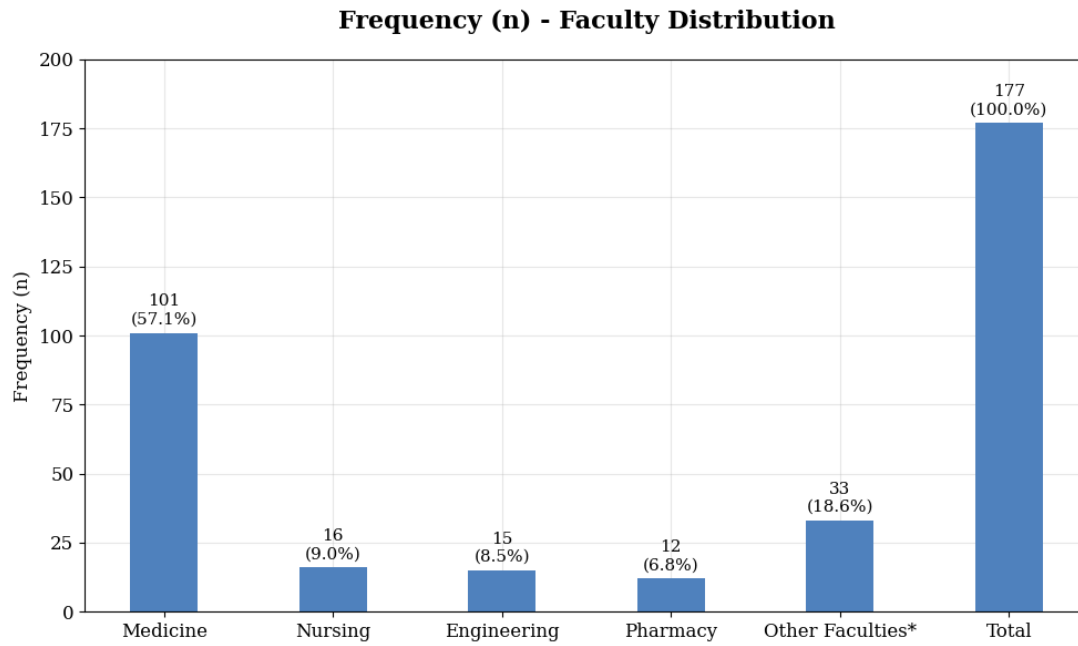


Figure 3. University Affiliation of Participants (n=177)

* Consolidates all variations of Napata College.

** Includes universities with a representation of less than 5% each.

The sample is distributed across multiple institutions, with Napata College (32.8%) and Shendi University (23.2%) being the most represented.



* Includes Education, Economics, Dentistry, and Medical Laboratories.

Figure 4. Distribution of Participants by Faculty/College (n=177)

More than half of the participants (57.1%) are enrolled in the Faculty of Medicine. This suggests that a significant portion of the sample has a formal background in health sciences.

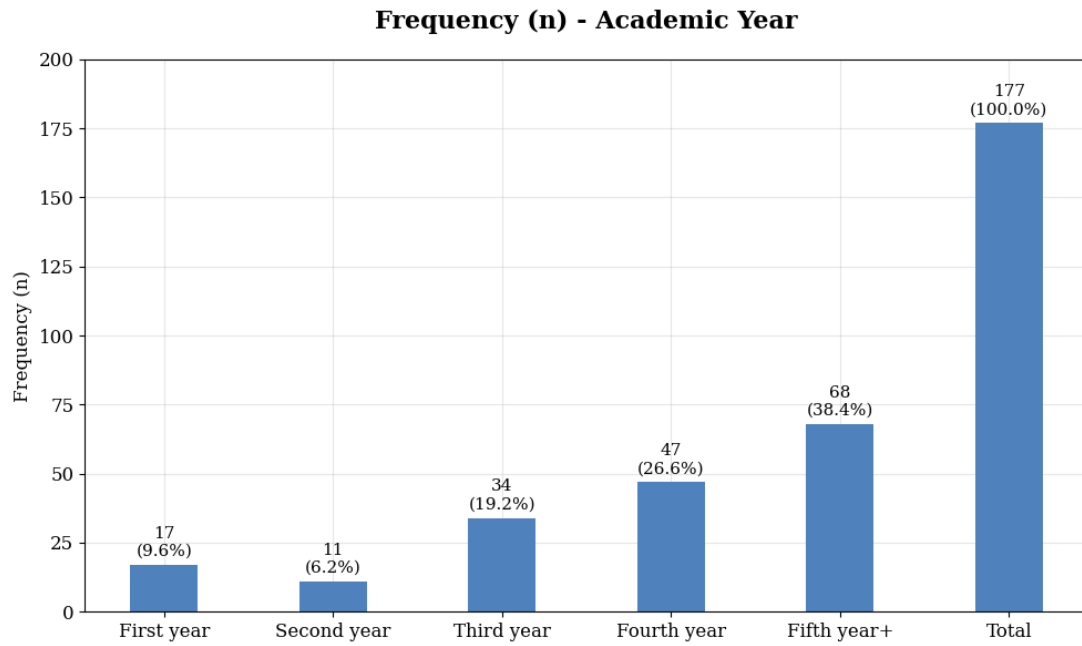


Figure 5. Academic Level (Year of Study) of Participants (n=177)

The majority of respondents are in the latter stages of their degree programs, with 38.4% of the students being in their fifth year or above.

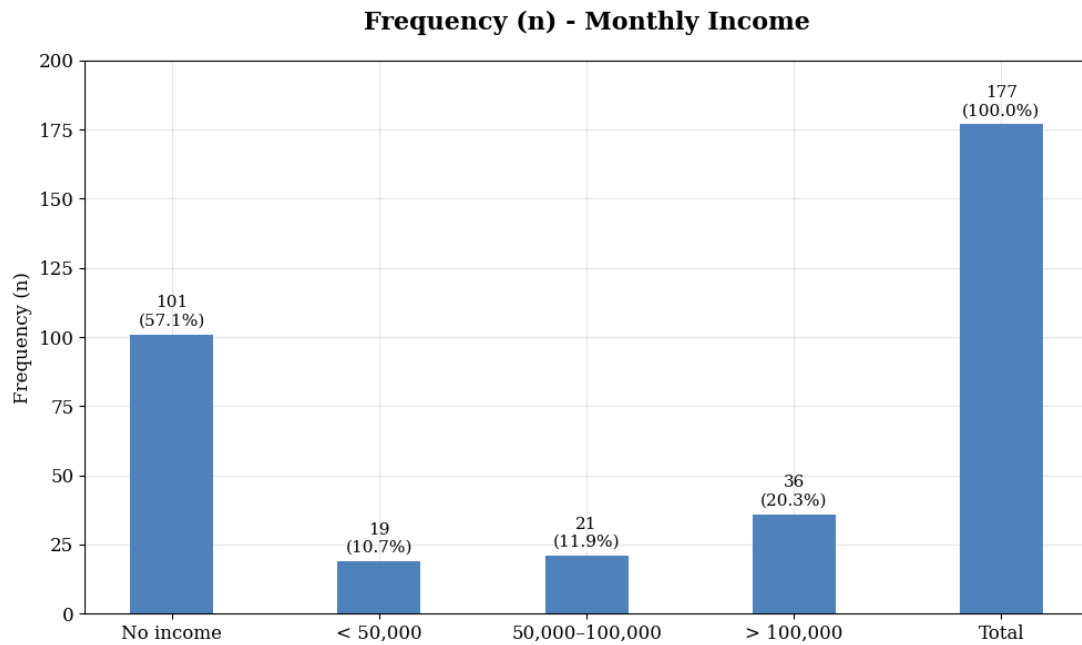


Figure 6. Monthly Personal Income of University Students (n=177)

Financial dependency is high among the study population, as 57.1% of participants reported having no personal monthly income.

Table 1. Prevalence of Self-Medication within the Last 6 Months (n=177)

Used Medication Without Prescription	Frequency (n)	Percent (%)
Yes	177	100.0%
No	0	0.0%
Total	177	100.0%

The study found a 100% prevalence rate of self-medication among the sampled students within the six months preceding the survey.

Table 2. Frequency of Self-Medication Practices (n=177)

Frequency of Practice	Frequency (n)	Percent (%)
Rarely (1–2 times)	91	51.4%
Occasionally (3–5 times)	63	35.6%
Frequently (>5 times)	23	13.0%

Total	177	100.0%
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While all students admitted to self-medicating, the majority (51.4%) do so rarely. However, 13.0% of the sample reports practicing it frequently.

Table 3. Types of Medications Used for Self-Medication (n=177)

Medication Type	Frequency (n)*	Percent (%)
Painkillers/Analgesics	126	71.2%
Antibiotics	100	56.5%
Vitamins/Supplements	56	31.6%
Anti-allergy drugs	31	17.5%
Anti-malarials	27	15.3%
Cough syrups	26	14.7%
Herbal remedies	21	11.9%

* Multi-response variable; totals exceed 177.

Analgesics (71.2%) and antibiotics (56.5%) are the most commonly utilized drug classes in the context of self-medication.

Table 4. Symptoms and Conditions Leading to Self-Medication (n=177)

Symptoms/Conditions	Frequency (n)*	Percent (%)
Headache	129	72.9%
Fever	71	40.1%
Cough/Cold	59	33.3%
Menstrual pain	39	22.0%
Stomach pain	36	20.3%
Malaria symptoms	32	18.1%
Stress/Insomnia	15	8.5%

* Multi-response variable; totals exceed 177.

Headache is the primary clinical driver for self-medication (72.9%), followed by fever (40.1%) and respiratory symptoms (33.3%).

Table 5. Primary Source for Obtaining Medications (n=177)

Source of Medication	Frequency (n)*	Percent (%)
Community pharmacy	114	64.4%
Drug shop	45	25.4%
Leftover medication at home	30	16.9%
Family member	26	14.7%
Friend	21	11.9%
Informal market	6	3.4%

* Multi-response variable; totals exceed 177.

The most common point of access for students was the community pharmacy (64.4%), while drug shops accounted for 25.4% of sources.

Table 6. Sources of Recommendation for Self-Medication (n=177)

Recommended By	Frequency (n)	Percent (%)
Pharmacist	61	34.5%
Self-decision	55	31.1%
Family member	22	12.4%
Friend	16	9.0%
Previous prescription	15	8.5%
Social media/Internet	8	4.5%
Total	177	100.0%

Pharmacists were the leading source of advice (34.5%), closely followed by personal decision-making (31.1%).

Table 7. Pharmacy Practice Regarding Prescription Requests (n=177)

Do pharmacies ask for a prescription?	Frequency (n)	Percent (%)
Yes	70	39.5%
Sometimes	61	34.5%
No	46	26.0%
Total	177	100.0%

Regulation of antibiotic sales appears inconsistent, with only 39.5% of students reporting that pharmacies consistently ask for a prescription.

Table 8. Behavioral Reasons for Preferring Self-Medication (n=177)

Reason for Preference	Frequency (n)*	Percent (%)
Perceived illness as minor	94	53.1%
Previous experience with the illness	78	44.1%
Lack of time to visit a facility	57	32.2%
High consultation costs	44	24.9%
Long hospital waiting times	40	22.6%
Easy access to medications	34	19.2%
Academic stress	26	14.7%

* Multi-response variable; totals exceed 177.

The primary motivation for self-medication was the perception that the condition was not serious enough for formal care (53.1%).

Table 9. Prevalence of Side Effects from Self-Medication (n=177)

Experienced Side Effects?	Frequency (n)	Percent (%)
No	112	63.3%
Yes	65	36.7%
Total	177	100.0%

More than one-third of the participants (36.7%) reported experiencing at least one adverse effect as a result of practicing self-medication.

Table 10. Types of Side Effects Reported by Students (n=177)

Type of Side Effect	Frequency (n)*	Percent (%)
Allergy	31	47.7%
Stomach upset	26	40.0%
Dizziness	22	33.8%
Worsening of symptoms	16	24.6%

* Multi-response variable.

Among those who experienced adverse effects, allergic reactions (47.7%) and gastrointestinal issues (40.0%) were the most prevalent.

Table 11. Distance to the Nearest Healthcare Facility (n=177)

Distance to Facility	Frequency (n)	Percent (%)
Less than 1 km	69	39.0%
1–5 km	73	41.2%
More than 5 km	35	19.8%
Total	177	100.0%

Physical access to healthcare is generally high, with 80.2% of the study population living within 5 km of a healthcare facility.

Table 12. Influence of Healthcare Costs on Decision-Making (n=177)

Costs influenced decision?	Frequency (n)	Percent (%)
Yes	113	63.8%
No	64	36.2%
Total	177	100.0%

Financial barriers are significant, with 63.8% of students stating that the cost of formal healthcare influenced their decision to self-medicate.

Table 13. Avoidance of Hospitals due to Waiting Times (n=177)

Avoided hospital due to wait times?	Frequency (n)	Percent (%)
Yes	125	70.6%
No	52	29.4%
Total	177	100.0%

Systemic barriers such as long waiting times were a major deterrent, causing 70.6% of participants to avoid seeking formal hospital care.

Table 14. Knowledge of Antibiotic Efficacy (n=177)

Antibiotics are effective for:	Frequency (n)	Percent (%)
Bacterial infections (Correct)	104	58.8%
Both (Bacterial & Viral)	36	20.3%
Not sure	29	16.4%
Viral infections	8	4.5%
Total	177	100.0%

While a majority (58.8%) correctly identified the purpose of antibiotics, a significant knowledge gap exists regarding their effectiveness against viral infections.

Table 15. Student Beliefs Regarding Antibiotic Resistance (n=177)

Can self-medication lead to resistance?	Frequency (n)	Percent (%)
Yes	114	64.4%
Not sure	48	27.1%
No	15	8.5%
Total	177	100.0%

A majority of the students (64.4%) recognized the link between self-medication and the development of antibiotic resistance.

Table 16. Perception of Self-Medication Safety (n=177)

Do you think self-medication is safe?	Frequency (n)	Percent (%)
Depends on the condition	94	53.1%
No	43	24.3%
Yes	40	22.6%
Total	177	100.0%

Attitudes toward safety were cautious; more than half of the participants (53.1%) believed that the safety of self-medication is conditional.

Table 17. Knowledge of Consequences of Incomplete Antibiotic Courses (n=177)

Incomplete courses can cause:	Frequency (n)	Percent (%)
Drug resistance (Correct)	107	60.5%
Not sure	32	18.1%
Faster recovery	21	11.9%
No effect	17	9.6%
Total	177	100.0%

Regarding treatment adherence, 60.5% of students correctly identified that failing to complete a course of antibiotics can lead to drug resistance.

Chapter Five : Discussion, Conclusion,Recommendations and Limitations

5.1 Discussion

Our findings reveal a remarkably high prevalence of self-medication among university students in Shendi. In fact, 100% of our participants reported self-medicating within the last six months (Table 1), a figure that significantly exceeds global and regional averages, which typically fluctuate between 38% and 92% (7, 8). This total prevalence likely reflects the difficult realities in Sudan during 2025; a combination of a disrupted healthcare system and economic pressure has made informal care a necessity rather than a choice for many students (11, 12).

The demographic data shows a higher participation rate among females (68.9%) and students in their final years of study (Figures 2, 5). While the literature is divided on how gender and academic seniority impact self-medication, the high concentration of medical students in our sample (57.1%) is noteworthy (Figure 4). Previous studies suggest that students in health-related fields often feel more confident—perhaps sometimes overconfident—in managing their own treatments (18, 11).

Interestingly, even though every student in the study had self-medicated, they didn't all do so habitually. Over half (51.4%) described their use as rare or infrequent (Table 2). This aligns with the idea that most students view self-medication as a temporary fix for minor ailments (31).

However, the 13% of students who self-medicate frequently are a cause for concern, as they face the highest risk of long-term health complications.

The choice of drugs follows a predictable pattern: analgesics (71.2%) and antibiotics (56.5%) were the most common (Table 3). While using painkillers for headaches and fevers is standard practice globally, the high rate of unprescribed antibiotic use is alarming. This mirrors trends seen throughout the Middle East and other developing regions, where the misuse of these drugs is a primary driver of the global antimicrobial resistance crisis (14, 41).

When it comes to sourcing these drugs, community pharmacies remain the go-to option (64.4%), with pharmacists often acting as the primary advisors (34.5%). While pharmacists play a vital role in healthcare, our study highlights a lack of regulatory oversight: only 39.5% of students reported that a prescription was actually required to buy medicine (Table 7). This confirms a broader issue in many regions where "prescription-only" laws are not strictly enforced (11, 15).

The motivations behind these choices are a mix of personal judgment and systemic frustration. Students cited the perceived mildness of their illness (53.1%) and prior experience (44.1%) as top reasons for bypassing a doctor (Table 8). However, the data also points to clear structural barriers: 63.8% cited financial constraints and 70.6% blamed long waiting times at clinics (Tables 12, 13). It is telling that while 80% of students live within 5 km of a clinic, they still choose to self-treat. This suggests that geographic proximity matters far less than whether a student can actually afford or wait for professional care.

The risks of this practice are not merely theoretical. Roughly 36.7% of participants experienced adverse effects, ranging from allergic reactions to stomach issues (Tables 9, 10). These incidents highlight the clinical dangers of using potent medications without professional oversight.

Finally, we found a troubling gap in student knowledge. Although many understood the basics of antibiotic resistance, several still believed antibiotics could treat viral infections. Only 60.5% recognized the importance of finishing a full course of treatment (Table 17). This "partial knowledge" can be dangerous, as it gives students enough confidence to self-treat but not enough to do so safely.

5.2 Conclusion

Our study shows that self-medication is remarkably common among university students in Shendi, Sudan—so much so that it has become a normalized part of their daily lives. While students typically reach for self-care to treat minor issues like headaches, fevers, or colds, this widespread habit points to deeper gaps in both student behavior and the local healthcare system.

Analgesics and antibiotics were the most frequently used treatments. The use of antibiotics is especially worrying, as it directly contributes to the global threat of antimicrobial resistance. The fact that these medications are easily available at community pharmacies, often without the necessary oversight of a prescription, makes it far too easy for this practice to continue unchecked.

The decision to skip a doctor's visit is rarely a simple choice. Instead, students are often pushed toward self-medication by the belief that their illness is "mild enough," their own past experiences, tight budgets, or the frustration of long wait times at clinics. These findings suggest that self-medication isn't just a personal preference; it is a practical response to the systemic barriers that make formal healthcare difficult to access.

While most students have a fair understanding of how to use medication and the risks of antibiotic resistance, significant gaps in knowledge remain. The fact that many participants reported experiencing side effects is a clear reminder of the dangers that come with using medication without professional guidance.

Ultimately, self-medication in Shendi's student community is fueled by a mix of personal habits, economic pressure, and structural flaws in the health system. While it offers a quick fix for a busy student, its long-term impact poses a serious risk to individual well-being and public health—particularly as we face the growing challenge of antibiotic-resistant bacteria

5.3 Recommendations

- ✓ **Implement Targeted Health Education:** Develop programs specifically for university students to raise awareness about the risks of self-medication, the dangers of antibiotic misuse, and the critical importance of completing prescribed treatments. These can be integrated into curricula, seminars, and social media campaigns.
- ✓ **Strengthen Pharmaceutical Regulations:** Enforce stricter oversight to ensure that prescription-only medications—particularly antibiotics—are not dispensed without a valid medical prescription. This should include regular monitoring and supervision of community pharmacies.
- ✓ **Enhance Healthcare Accessibility:** Improve access to formal medical care by reducing consultation costs, minimizing waiting times, and expanding the capacity of university and public health facilities to better accommodate the student population.
- ✓ **Empower Pharmacists as Educators:** Engage pharmacists as a primary line of defense by reinforcing their role in providing accurate medical guidance and discouraging the inappropriate sale of medications. Specialized training can help ensure more responsible dispensing practices.
- ✓ **Launch Antimicrobial Resistance (AMR) Campaigns:** Integrate awareness initiatives regarding antimicrobial resistance at both the institutional and community levels to correct common misconceptions and promote the responsible use of antibiotics.
- ✓ **Expand Research Efforts:** Conduct further studies across different regions and populations in Sudan to better understand the national scope of self-medication and to evaluate the effectiveness of interventions designed to curb this behavior.

5.4 Limitations:

This study has several limitations that should be considered when interpreting the findings. First, the use of a cross-sectional study design limits the ability to establish causal relationships between self-medication practices and associated factors, as data were collected at a single point in time.

Second, data collection was conducted using an online self-administered questionnaire, which makes the study subject to information bias, including recall bias and social desirability bias. Participants may have underreported or overreported their self-medication behaviors.

Third, although a simple random sampling method was intended, the distribution of the questionnaire through social media platforms may have introduced selection bias, as only students with internet access and willingness to participate were included.

Additionally, the study was limited to university students in Shendi, which may affect the generalizability of the findings to other regions in Sudan or to non-student populations.

References:

1. World Health Organization. WHO guideline on self-care interventions for health and well-being, 2022 revision. World Health Organization; 2022 Jun 17.
2. Rather IA, Kim BC, Bajpai VK, Park YH. Self-medication and antibiotic resistance: Crisis, current challenges, and prevention. *Saudi journal of biological sciences*. 2017 May 1;24(4):808-12.
3. Shafie M, Eyasu M, Muzeyin K, Worku Y, Martín-Aragón S. Prevalence and determinants of self-medication practice among selected households in Addis Ababa community. *PloS one*. 2018 Mar 26;13(3):e0194122.
4. Bustanji Y, Taneera J, Bargooth A, Abuhelwa A, Issa A, El-Huneidi W, Abu-Gharbieh E, Alzoubi K, Alqudah MA, Alhusban A, Hamad I. Exploring the global landscape of self-medication among students: Trends, risks, and recommendations for safe and responsible practices. *Pharmacy Practice*. 2024 Mar 6;22(1):1-4.
5. Alsulami E, Alsaedi K, Hothan K, Alsulami A, Aljohany A, Belal A, Mazi A. Self-medication practice, motivation, and risks among Saudi medical students. *Saudi Journal of Internal Medicine*. 2025 Jul 1;14(2):155-64.
6. World Health Organization. Guidelines for the regulatory assessment of medicinal products for use in self-medication. Geneva: WHO; 2000.
7. Wajantri P, Angadi M, Masali K, ShashankK J, Bhat S, Jose A. A study on knowledge, attitude and practice about self-medication among college students. *Int J Community Med Public Health*. 2019.
8. Esan DT, Fasoro AA, Odesanya OE, Esan TO, Ojo EF, Faeji CO. Assessment of self-medication practices and its associated factors among undergraduates of a private university in Nigeria. *J Environ Public Health*. 2018;2018:1-7.
9. Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud F. Self-medication and self-prescription with antibiotics in the Middle East: a systematic review of the prevalence, possible reasons, and outcomes. *Int J Infect Dis*. 2017;57:3-12.
10. Xu R, Mu TY, Wang G, Shi J, Wang X, Ni X. Self-medication with antibiotics among university students in low- and middle-income countries: a systematic review and meta-analysis. *Antibiotics (Basel)*. 2023;12:1010.

11. Hussain AH, Alahmed AY, Patni MA, Hossain A, Elamin AA. Epidemiological Insights into Self-Medication Practices: A Study Among Residents in Selected Emirates of the UAE. *National Journal of Community Medicine*. 2025 Jun 1;16(06):635-41.
12. Venkatesan P. WHO world malaria report 2024. *The Lancet Microbe*. 2025 Apr 1;6(4).
13. Ruiz ME. Risks of self-medication practices. *Open Public Health J*. 2010;3:1-6.
14. Rather IA, Kim BC, Bajpai VK, Park YH. Self-medication and antibiotic resistance: Crisis, current challenges, and prevention. *Saudi J Biol Sci*. 2017;24(4):808-812
15. Gabriel DC, Balakrishna BB, Coll M, Brugada R, Parisi P, Striano P. Knowledge and practices of self-medication among adolescents. *Ann Clin Translat Neurol*. 2021 Sep;8(9):1557-65.
16. Zafar U, Suleman M, Iqbal A, Ansar F, Basit A, Khan AM. Inappropriate antibiotic use in upper respiratory tract infections: prevalence and predictors from an outpatient cohort. *Open Health*. 2025 Jan 7;6(1):20250083.
17. Muhammad F, Zafar S, Riaz N, Sultana T, Riffat B, Polous S. The Student, The Symptom, and The Saving: Unpacking Self-Medication in Abbottabad Pakistan Healthcare Education. *Journal of Health, Wellness and Community Research*. 2025 Sep 22:e785-.
18. Montgomery AJ, Bradley C, Rochfort A, Panagopoulou E. A review of self-medication in physicians and medical students. *Occupational medicine*. 2011 Oct 1;61(7):490-7.
19. Almasdy D, Sharraf A. Self-Medication Practice with Nonprescription Medication among University Students: a review of the literature. *Archives of Pharmacy Practice*. 2011;2(3-2011):95-100.
20. World Health Organization. Compendium of WHO and other UN guidance in health and environment, 2024 update. World Health Organization; 2024 Jul 2.
21. Zafar SN, Syed R, Waqar S, Zubairi AJ, Waqar T, Shaikh M, et al. Self-medication amongst university students of Karachi: prevalence, knowledge and attitudes. *J Pak Med Assoc*. 2008;58(4):214-217.

22. Al-Qerem W, Bargooth A, Jarab A, Akour A, Abu Heshmeh SA. Information sources, attitudes, and practices of self-medication by Jordanian patients: A cross-sectional study. *Patient Prefer Adherence*. 2023;17:201-210.
23. Tesfamariam S, Anand IS, Kaleab G, et al. Self-medication with over-the-counter drugs and complementary medications among university students in Eritrea. *BMC Public Health*. 2019;19:726.
24. Albusalih FA, Naqvi AA, Ahmad R, Ahmad N. Prevalence of self-medication among university students in the Middle East: a systematic review. *Pharm Pract (Granada)*. 2017;15(4):1136.
25. Kulkarni P, Garg A, Ajmera A, Mahajan AP, Gadekar SS. Global scenario of self-medication: A review of literature. *J Pharm Res Int*. 2020;32(22):1-10.
26. Bennadi D. Self-medication: A current challenge. *J Basic Clin Pharm*. 2014;5(1):19-23
27. Albusalih FA, Naqvi AA, Ahmad R, Ahmad N. Prevalence of self-medication among university students in the Middle East: a systematic review. *Pharm Pract (Granada)*. 2017;15(4):1136.
28. Tesfamariam S, Anand IS, Kaleab G, et al. Self-medication with over-the-counter drugs and complementary medications among university students in Eritrea. *BMC Public Health*. 2019;19:726.
29. Uppal D, Agarwal M, Roy V. Self-medication practices among college students: A cross-sectional study in Gujarat. *Int J Med Sci Public Health*. 2018.
30. Wajantri P, Angadi M, Masali K, ShashankK J, Bhat S, Jose A. A study on knowledge, attitude and practice about self-medication among college students. *Int J Community Med Public Health*. 2019.
31. Shamshad S, Shamshad H. A cross-sectional study on self-medication practices among college students: Patterns and risk factors. *J Pharm Res*. 2020.
32. Adhikary M, Tiwari P, Singh S, Karoo C. Study of self-medication practices and its determinants among college students of Delhi University North Campus, New Delhi, India. *Int J Med Sci Public Health*. 2017.
33. Alhomoud F, Aljamea Z, Almahasnah R, Alkhalifah K, Basalelah L, Alhomoud F. Self-medication and self-prescription with antibiotics in the Middle East: A systematic review of the prevalence, possible reasons, and outcomes. *Int J Infect Dis*. 2017;57:3-12.

34. Sharif SI, Sharif RS. Self-medication among non-healthcare students of the University of Sharjah, United Arab Emirates. *J Environ Public Health*. 2017;2017:1-7.
35. Khalifeh M, Moore N, Salameh P. Self-medication misuse in the Middle East: A systematic literature review. *Pharmacol Res Perspect*. 2017;5(4):e00323.
36. Saeed MS, Alkhoshaiban A, Al-Worafi YM, Long C. Perception of self-medication among university students in Saudi Arabia. *Arch Pharm Pract*. 2019.
37. Esan DT, Fasoro AA, Odesanya OE, Esan TO, Ojo EF, Faeji CO. Assessment of self-medication practices and its associated factors among undergraduates of a private university in Nigeria. *J Environ Public Health*. 2018;2018:1-7.
38. Osemene KP, Lamikanra A. A study of the prevalence of self-medication practice among university students in southwestern Nigeria. *Trop J Pharm Res*. 2012;11(4):683-689.
39. Ayalew MB. Self-medication practice in Ethiopia: A systematic review. *Patient Prefer Adherence*. 2017;11:401-413.
40. Shehnaz SI, Agarwal AK, Khan N. A systematic review of self-medication practices among adolescents. *J Adolesc Health*. 2014;55(4):467-483.
41. Torres NF, Solomon VP, Middleton LE. Patterns of self-medication with antibiotics in low- and middle-income countries: A systematic review. *Int J Infect Dis*. 2020;93:74-83.
42. Hughes CM, McElnay JC, Fleming GF. Benefits and risks of self-medication. *Drug Saf*. 2001;24(14):1027-1037.
43. World Health Organization. The role of the pharmacist in self-care and self-medication. Geneva: WHO; 2011.

Index :

1. QUESTIONNAIRE

Section A: Introduction & Consent

Title:

Self-Medication Practices Among University Students in Shendi, Sudan – 2025

Consent Statement:

You are invited to participate in a research study assessing self-medication practices among university students in Shendi. Participation is voluntary. Your responses will remain anonymous and confidential and will be used for academic purposes only.

Do you agree to participate in this study?

☐ Yes, I agree to participate

☐ No, I do not agree (End survey)

Section B: Socio-Demographic Information

Age:

☐ 17–19 years

☐ 20–22 years

☐ 23–25 years

☐ Above 25 years

Gender:

☐ Male

☐ Female

University:

☐ Shendi University

☐ Other (Specify): _____

Faculty/College:

☐ Medicine

☐ Pharmacy

☐ Nursing

☐ Engineering

☐ Education

☐ Economics

☐ Other (Specify): _____

Year of Study:

☐ First year

☐ Second year

☐ Third year

☐ Fourth year

☐ Fifth year or above

Monthly personal income (if any):

☐ No income

☐ Less than 50,000 SDG

☐ 50,000–100,000 SDG

☐ More than 100,000 SDG

Section C: Self-Medication Practice (Dependent Variable)

Have you used any medication without a doctor's prescription in the last 6 months?

☐ Yes

☐ No

(If No → Skip to Section F)

How often do you practice self-medication?

☐ Rarely (1–2 times)

☐ Occasionally (3–5 times)

☐ Frequently (>5 times)

What types of medications have you used without prescription? (Select all that apply)

☐ Antibiotics

☐ Painkillers/Analgesics

☐ Anti-malarials

☐ Anti-allergy drugs

☐ Cough syrups

☐ Herbal remedies

☐ Vitamins/Supplements

☐ Others (Specify): _____

What symptoms/conditions led you to self-medicate? (Select all that apply)

☐ Headache

☐ Fever

☐ Malaria symptoms

☐ Cough/Cold

☐ Stomach pain

☐ Menstrual pain

☐ Stress/Insomnia

☐ Other: _____

Section D: Source of Medication & Information

Where did you obtain the medication?

☐ Community pharmacy

☐ Drug shop

☐ Family member

☐ Friend

☐ Leftover medication at home

☐ Informal market

☐ Other: _____

Who recommended the medication?

☐ Pharmacist

☐ Family member

☐ Friend

☐ Social media/Internet

☐ Previous prescription

☐ Self-decision

Do pharmacies usually ask for a prescription when selling antibiotics?

☐ Yes

☐ No

☐ Sometimes

Section E: Motivations & Barriers

Why do you prefer self-medication? (Select all that apply)

☐ Illness was minor

☐ Lack of time

☐ High consultation cost

☐ Long hospital waiting time

☐ Previous experience with same illness

☐ Easy access to drugs

☐ Academic stress

☐ Other: _____

Have you ever experienced side effects from self-medication?

☐ Yes

☐ No

If yes, what type of side effects?

☐ Allergy

☐ Stomach upset

☐ Dizziness

☐ Worsening symptoms

☐ Other: _____

Do you believe self-medication can lead to antibiotic resistance?

☐ Yes

☐ No

☐ Not sure

Do you think self-medication is safe?

☐ Yes

☐ No

☐ Depends on the condition

Section F: Access to Healthcare

How far is the nearest healthcare facility from where you live?

☐ Less than 1 km

☐ 1–5 km

☐ More than 5 km

Have healthcare costs influenced your decision to self-medicate?

☐ Yes

☐ No

Have you ever avoided visiting a hospital due to long waiting times?

☐ Yes

☐ No

Section G: Knowledge Assessment (Optional Scoring Section)

Antibiotics are effective for:

☐ Bacterial infections

☐ Viral infections

☐ Both

☐ Not sure

Incomplete antibiotic courses can cause:

☐ Drug resistance

☐ Faster recovery

☐ No effect

☐ Not sure