ASSESSMENT OF THE USE OF ANTIBIOTICS FOR THE TREATMENT OF UPPER RESPIRATORY TRACT INFECTION (URTI) BY UNDERGRADUATE STUDENTS OF THE UNIVERSITY OF BENIN

BY

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BENIN CITY

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A PROJECT SUBMITTED TO THE DEPARTMENT OF CLINICAL PHARMACY AND PHARMACY PRACTICE, FACULTY OF PHARMACY, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE. IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DOCTOR OF PHARMACY (PHARM.D) DEGREE.

NOVEMBER, 2025.

CERTIFICATION

This is to certify that this project work was carried out by **OSUNDE CHOICE** with matriculation number **PHA1810557** in the Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin-City, Edo state, Nigeria.

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DR. MI OSARENMWINDA DATE

HEAD OF DEPARTMENT

DEDICATION

This project work is dedicated to God Almighty for His guidance, mercies, direction and provision throughout the course of this study and to my family for their love, support, and encouragement throughout this academic journey. And also to my friends, I really appreciate it.

ACKNOWLEDGEMENT

I sincerely express my gratitude to God Almighty for His mercies throughout Pharmacy school.To my project supervisor Pharm. Ayanbueze Egonmwan, I highly treasure the time spent working under your supervision. Thank you for you invaluable assistance and unceasing corrections throughout the period of this project work. I extend my heartfelt appreciation to other lecturers in the Faculty of Pharmacy who have in one way or the other been impactful to me. Most importantly I appreciate my Parents Mr and Mrs. OSUNDE, my siblings Osas, Blessed, Osanon, Best and Ella Osunde, and my beloved friends Osaode, I.k, Harry, Simon, Moses, Efe, Francess, Yomi, Valerie, Onyeka, Prince, kangchul and in loving memory of Nicholas Adoroh, You all have contributed in making me the person I am today, thank you for being there for me, I'm really glad we crossed paths.

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ABSTRACT

BACKGROUND: Upper Respiratory Tract Infections (URTIs), including conditions like the common cold, pharyngitis, and sinusitis, are predominantly viral in origin and often do not require antibiotics. However, antibiotics are frequently misused for URTIs due to patient demand, diagnostic uncertainty, or lack of awareness. This practice

contributes to the global crisis of antimicrobial resistance (AMR), a major public health threat.University students, particularly in densely populated settings like the University of Benin, are vulnerable to URTIs due to close-contact living conditions, stress, and poor health-seeking behaviors. Studies suggest that due to factors such as academic pressure, easy of access to drugs, and limited health literacy students often resort to self-medication with antibiotics obtained without prescriptions, exacerbating resistance risks.

OBJECTIVE : This project seeks to evaluate the knowledge, attitudes, and practices regarding antibiotic use for URTIs among University of Benin students. By identifying gaps in awareness and inappropriate usage trends, the study will inform targeted interventions, such as educational campaigns and stricter medication dispensing policies, to curb antibiotic misuse in this population.

METHODS : After obtaining ethical approval from the Faculty of Pharmacy Ethics Committee, a cross sectional study was employed. The study employed the use of a structured questionnaire as the major instrument of data collection. The questionnaire was carefully developed to address the objectives of the study and distributed to students of four faculties including two medical oriented faculties (Pharmacy and Basic Medical Sciences) and two non medical oriented faculties (Education and Engineering). The data obtained was analyzed using IBM Statistical Package for social sciences, SPSS version 29.

RESULTS: 54.2% of the respondents were male, while 45.8% were female, indicating a fairly balanced gender representation. The majority of the respondents (49.0%) were between the ages of 21 and 25 years. The majority of the respondents (68.3%) reported having experienced a cold, sore throat, or cough within the past six months, Most of the respondents (78.4%) admitted to having used antibiotics to treat URTI, while 46.9% did not complete the course, indicates a tendency toward incomplete antibiotic adherence among some participants. Majority (87.9%) obtained them from pharmacies and 64.5% of the respondents reported that they could purchase antibiotics without a prescription. Out of the total respondents, 275 (62.6%) demonstrated good knowledge, while 164 (37.4%) exhibited poor knowledge of antibiotic use. A majority (58.3%) reported that they keep leftover antibiotics for future use. Most respondents (72.9%) admitted to using antibiotics given by friends or family.

CONCLUSION

The study results showed that although most students had experienced one or more URTI episodes, many engaged in improper antibiotic use, frequently self-medicating without valid prescriptions. The widespread misuse of antibiotics identified in this study represents a serious public health issue. While many students had a basic understanding of antibiotic use, misconceptions were common especially the false belief that antibiotics are effective against viral infections. Contributing factors included easy access to antibiotics without prescriptions, peer influence, prior antibiotic use, and limited awareness of antimicrobial resistance (AMR). Coordinated educational, clinical, and policy interventions are vital to promote the rational use of antibiotics and preserve their effectiveness for future generations

KEYWORDS: ANTIBIOTICS, UPPER RESPIRATORY TRACT INFECTIONS, MISUSE, RESISTANCE, CONSEQUENCES, STUDENTS

CHAPTER ONE

1.0 INTRODUCTION

BACKGROUND OF THE STUDY

Antibiotics are drugs designed to combat bacterial infections by either destroying bacteria (bactericidal) or preventing their multiplication (bacteriostatic). They act on particular bacterial structures, like the cell wall or protein production mechanisms, while generally sparing human cells (WHO, 2023). It is important to recognize that antibiotics do not work against viral infections, including illnesses like the common cold, flu, or many instances of sore throats and bronchitis (Ventola, C. L., 2015).

CLASSIFICATION AND TYPES OF ANTIBIOTICS

Antibiotics are categorized according to their chemical makeup, how they work, or the range of bacteria they affect (Wikipedia, 2025). They are grouped into bactericidal agents, which kill bacteria, and bacteriostatic agents, which prevent bacterial growth (LibreTexts, 2023). Narrow-spectrum antibiotics are aimed at specific bacteria, whereas broad-spectrum antibiotics act against a wide variety of bacterial types (Vinmec Medical System, 2025).

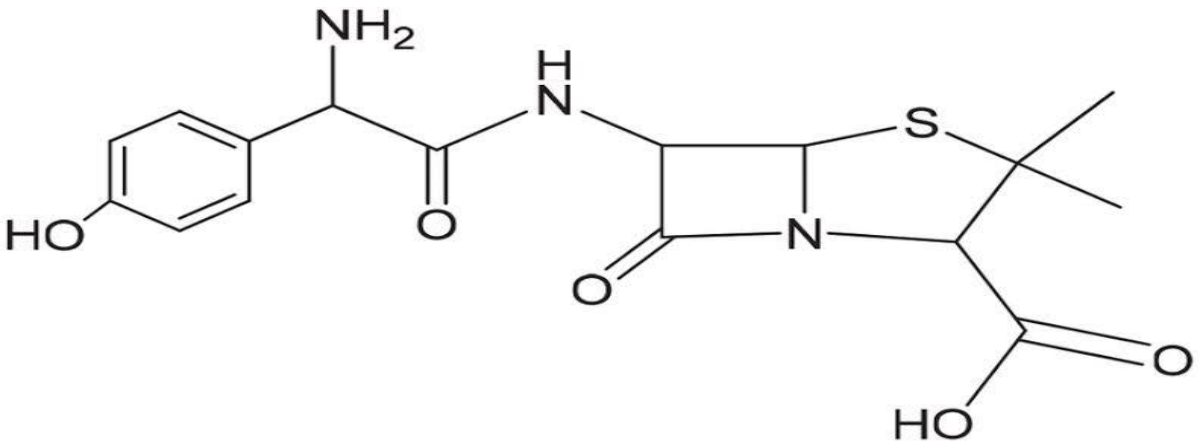
Common classes include:

Beta-Lactam Antibiotics which Includes penicillin, cephalosporins, carbapenems, and monobactams. Tetracyclines Comprise of drugs like tetracycline, doxycycline, and minocycline. Macrolides include drugs such as erythromycin, azithromycin, and clarithromycin. Aminoglycosides like gentamicin and amikacin. Quinolones or Fluoroquinolones Including ciprofloxacin, levofloxacin, and moxifloxacin. Sulphonamides examples are sulfamethoxazole and trimethoprim-sulfamethoxazole (Co-trimoxazole). Glycopeptides Consist of vancomycin, teicoplanin, and telavancin. Glycylcyclines exemplified by tigecycline. Folate Antagonists such as trimethoprim (blocks dihydrofolate

reductase) and sulfadoxine (blocks dihydropteroate synthase) and many others. These categories encompass various antibiotics, each with its unique chemical structure and mode of action. (IGBINADUWA. P, 2025) LECTURE NOTES ON PHARMACEUTICAL CHEMISTRY, UNIBEN.

Of all the mentioned classes the most frequently used antibiotics for upper respiratory tract infection in the university of benin area as a single agent is the Penicillin Amoxicillin which belongs to the beta-lactam antibiotic class. This class of antibiotics are the most widely used empirically and self purchased.(VALENTINE U ODILI, 2010)

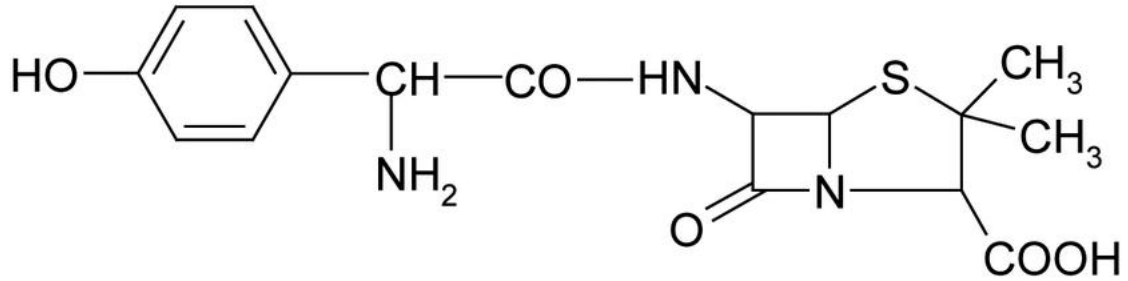
Amoxicillin is part of the beta-lactam antimicrobial class. Beta-lactams target penicillin-binding proteins, blocking transpeptidation, which is essential for cross-linking during cell wall synthesis. This inhibition triggers autolytic enzymes within the bacterial cell wall,



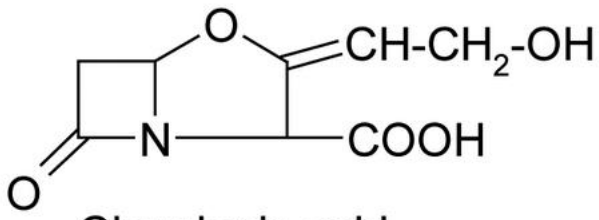
causing it to break down and leading to the destruction of the bacterial cell. This process is called bactericidal killing.(Bobak J NLM, 2023)

The most often used antibiotic combination agent among the students of university of benin according to data gotten from health center and hospital practice is a combination of Amoxicillin and Clavulanic acid. (VALENTINE U ODILI, 2010). Amoxicillin can be administered together with a beta-lactamase inhibitor like clavulanic acid. These inhibitors

work by irreversibly attaching to the active site of the pathogen's beta-lactamase enzyme, thereby blocking the enzyme and preventing resistance against amoxicillin's beta-lactam ring. While the inhibitors themselves do not have bactericidal effects, their combination with amoxicillin can extend its effectiveness to target bacteria that produce beta-lactamase. (Bobak



Amoxicillin



Clavulanic acid

J NLM, 2023)

Antibiotic resistance develops when bacteria acquire ways to withstand antibiotic effects, making treatments ineffective (WHO, 2023). This resistance arises either through spontaneous gene mutations or by obtaining mobile genetic elements from other bacteria. Mutations occur randomly at a rate of about 10^-9 to 10^-10 per gene and can alter drug targets, lead to the production of enzymes like beta-lactamases that deactivate antibiotics, increase efflux pump activity, or decrease drug uptake. In Gram-positive bacteria, resistance to beta-lactams mainly results from alterations in penicillin-binding proteins (PBPs), with enzymatic degradation playing a smaller role (Sarah S. Tang, 2014).

In the University of Benin area, the most commonly used antibiotics for upper respiratory tract infections (URTIs) by students include cephalosporins (20.2%), macrolides (13.1%), quinolones (10.1%), sulphonamides (9.1%), and metronidazoles (2.0%) (Valentine U Odili et al., 2010).

The inappropriate and widespread use of antibiotics for viral URTIs remains a significant public health issue. This misuse accelerates the global increase in antimicrobial resistance (AMR), a condition where bacteria survive antibiotic treatment, causing diminished effectiveness, prolonged illness, greater healthcare costs, and increased mortality (Llor and Bjerrum, 2014).

URTIs, including the common cold, pharyngitis, sinusitis, and laryngitis, are among the most frequent illnesses worldwide, especially impacting young adults and students. These infections are predominantly viral in origin (Thomas, M. R., 2023), but antibiotics are often wrongly prescribed or self-administered for their treatment (Llor & Bjerrum, 2014).

The inappropriate use of antibiotics significantly contributes to rising antibiotic resistance globally (WHO, 2021). In Nigeria and many developing countries, self-medication with antibiotics is common due to easy access without prescriptions, lack of awareness about misuse risks, and the perception that antibiotics provide quick remedies. Among university students, factors such as close living conditions, stress, and limited access to proper healthcare encourage self-medication and misuse (Auta et al., 2019).

Understanding how students at the University of Benin use antibiotics for URTIs is essential to measure misuse levels and develop strategies to promote proper antibiotic use. URTIs affect the upper respiratory tract—nose, sinuses, pharynx, larynx, and sometimes the middle ear—and are primarily caused by viruses, though secondary bacterial infections occasionally

occur (Friedman & Attia, 2022). They are very common, especially in young adults and school children, and represent a large portion of outpatient visits worldwide (Monto, 2002).

Common viral causes of URTIs include rhinoviruses (30–50% of cases), coronaviruses (10–15%), influenza viruses (5–15%), respiratory syncytial virus (RSV, 5%), and adenoviruses (5%) (Heikkinen & Järvinen, 2003). Bacterial agents such as Streptococcus pneumoniae, Haemophilus influenzae, and Streptococcus pyogenes account for only 5–10% of URTIs (Worrall, 2011).

URTIs cover several clinical conditions:

•Common Cold (Acute Viral Rhinitis): The most prevalent URTI, primarily caused by rhinoviruses, with symptoms like nasal congestion, sneezing, sore throat, cough, mild fever, and usually resolves within 7–10 days (Eccles, 2005).

•Acute Pharyngitis (Sore Throat): Mostly viral (e.g., adenovirus, Epstein-Barr virus), with bacterial cases mainly from Streptococcus pyogenes (Group A Strep), affecting 15–30% of children and 5–10% of adults. Symptoms include throat pain, difficulty swallowing, fever, and swollen lymph nodes (Shulman et al., 2012).

University students are a key group to study antibiotic use because of their independence, frequent infections, and easy antibiotic access. Assessing their knowledge, attitudes, and practices regarding antibiotics is vital for creating targeted interventions that encourage rational use and help reduce AMR.

This study aims to explore antibiotic use patterns for URTIs among University of Benin undergraduates. By examining their understanding and behaviors, the research will support public health efforts to reduce antibiotic misuse in this population.

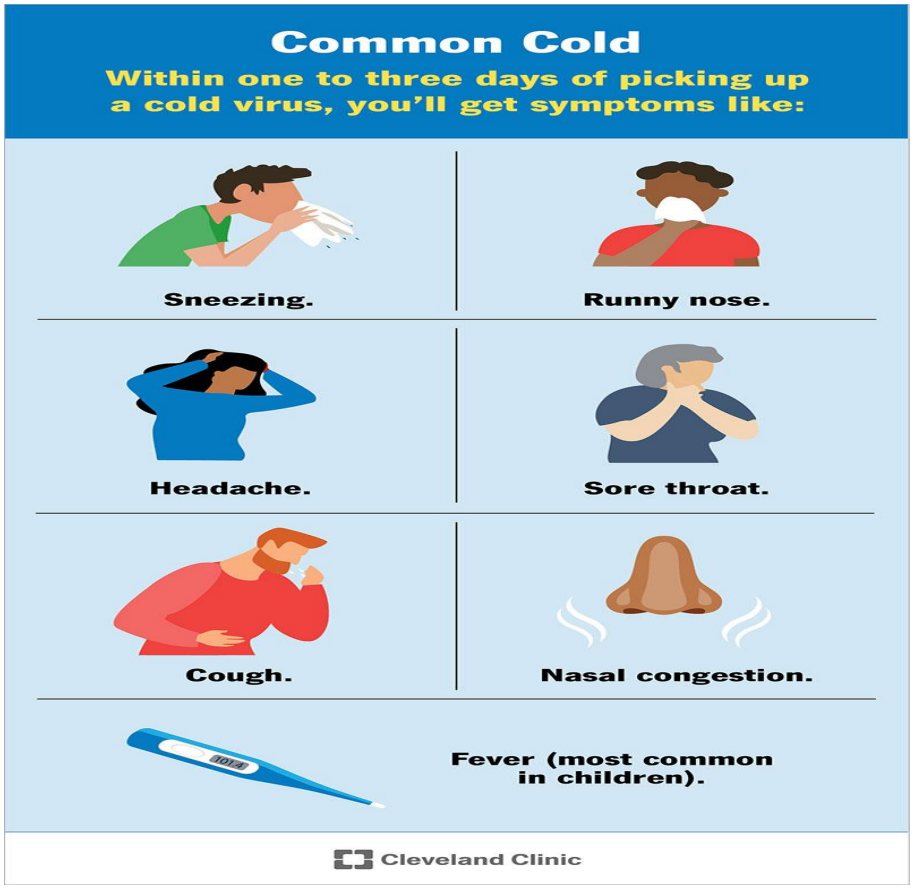
1.1 THE SYNOPSIS OF UPPER RESPIRATORY TRACT INFECTION (URTI)

DEFINITION AND CLASSIFICATION

Upper respiratory tract infections (URTIs) involve infections of the nose, sinuses, throat, and larynx, with several common forms (Cleveland Clinic, 2023).

The common cold

The common cold, an upper respiratory tract infection, is primarily caused by a variety of viruses rather than a single one. Over 200 different viruses can lead to this illness, usually entering the body through the nose, mouth, or eyes, and causing symptoms like a stuffy nose, sore throat, cough, and mild fever (Cleveland Clinic, 2023).

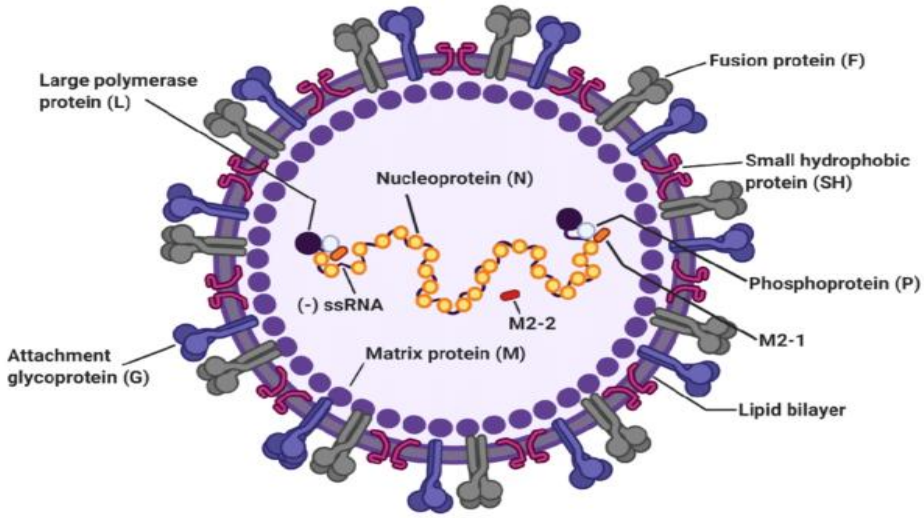


Some of the causative viruses for common cold include

RESPIRATORY SYNCYTIAL VIRUS

Often involved especially in children and during certain seasons, these viruses cause cold-like symptoms and can sometimes impact the lower respiratory tract (WebMD, 2024).

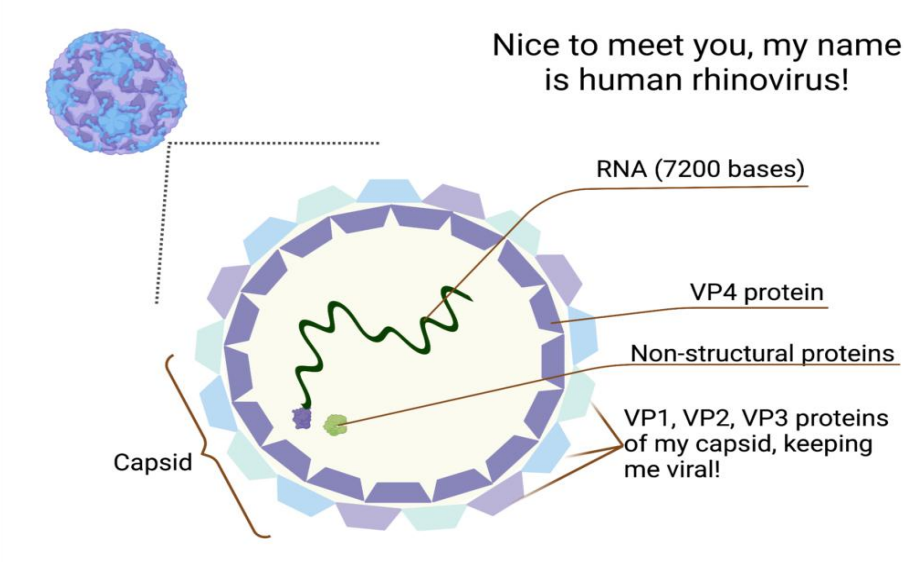
RESPIRATORY SYNCYTIAL VIRUS STRUCTURE



RHINOVIRUSES

Rhinoviruses (RVs) are the primary cause of the common cold, responsible for up to 50% of cases in the United States, with over 100 different types identified. These viruses mainly infect the upper respiratory tract and are highly contagious. While they predominantly affect the upper airway, they can also involve the lower respiratory tract. Complications from rhinovirus infections may include ear infections (otitis media), sinusitis, chronic bronchitis, and aggravation of reactive airway diseases like asthma. Although rhinovirus infections occur year-round, their incidence peaks during the cold and rainy seasons (Joseph Adrian, Medscape, 2023).

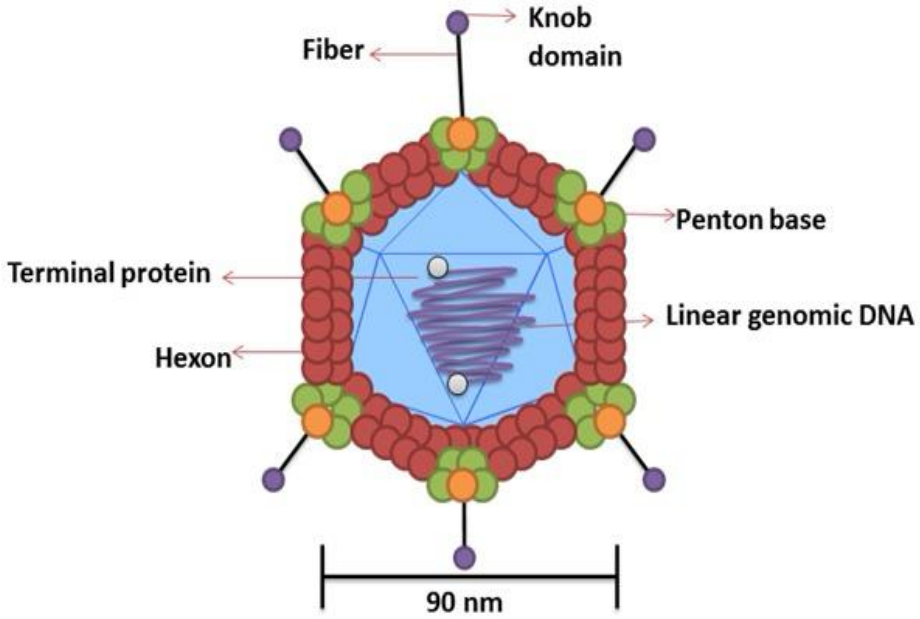
RHINOVIRUS STRUCTURE



ADENOVIRUSES

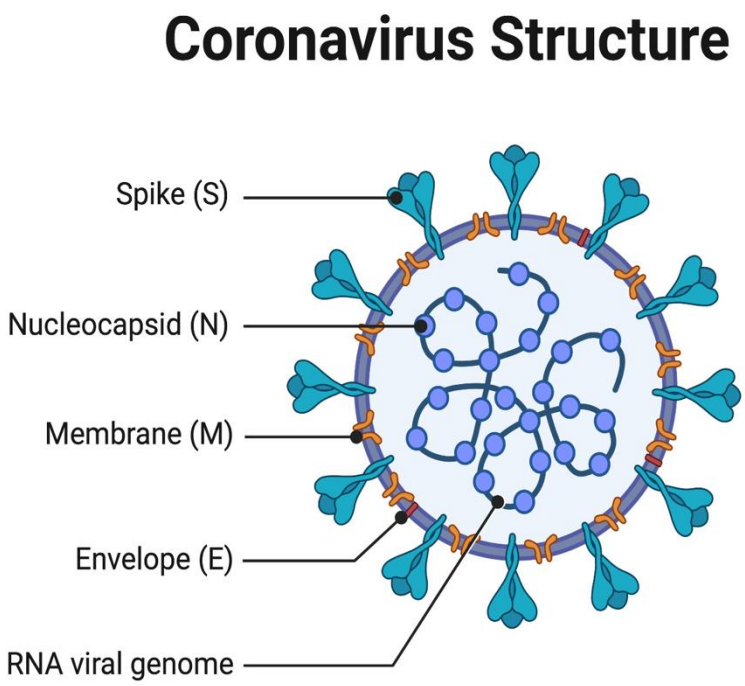
Adenovirus can cause cold-like symptoms that often last longer than those caused by rhinovirus, sometimes persisting for weeks or even months. This virus is most prevalent in early spring and winter but can occur year-round. Adenovirus easily spreads in settings such as daycares, hospitals, military facilities, and schools. In addition to causing colds, it can lead to conjunctivitis (pink eye), bladder infections, and diarrhea marked by frequent, watery stools. More severe illnesses like bronchitis, inflammation of the airways that carry air to the lungs, may also result, causing symptoms such as coughing, chest pain, and difficulty breathing (Brandi Jones, 2024).

ADENOVIRUS STRUCTURE



CORONA VIRUS (NON SARS COMMON COLD TYPE)

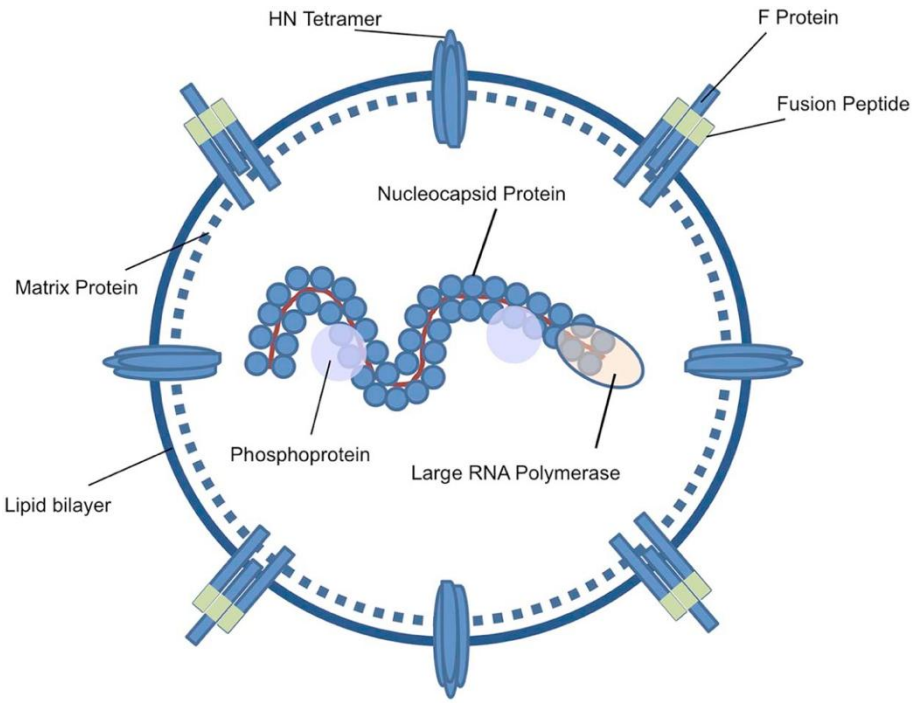
Before the emergence of COVID-19, coronaviruses were recognized as a common cause of colds, accounting for approximately15% of seasonal cold cases. These infections typically peak in winter but can occur at any time of year. Coronaviruses usually cause mild symptoms that last about a week, though in people with weakened immune systems, they may progress to more serious conditions like pneumonia. It is important to differentiate between common cold coronaviruses and COVID-19. While both are caused by coronaviruses, colds generally do not require testing and can be managed at home. However, if someone has been exposed to COVID-19 or develops symptoms, testing is advised, and severe cases may require hospitalization (Brandi Jones,2024).



HUMAN PARAINFLUENZA VIRUS

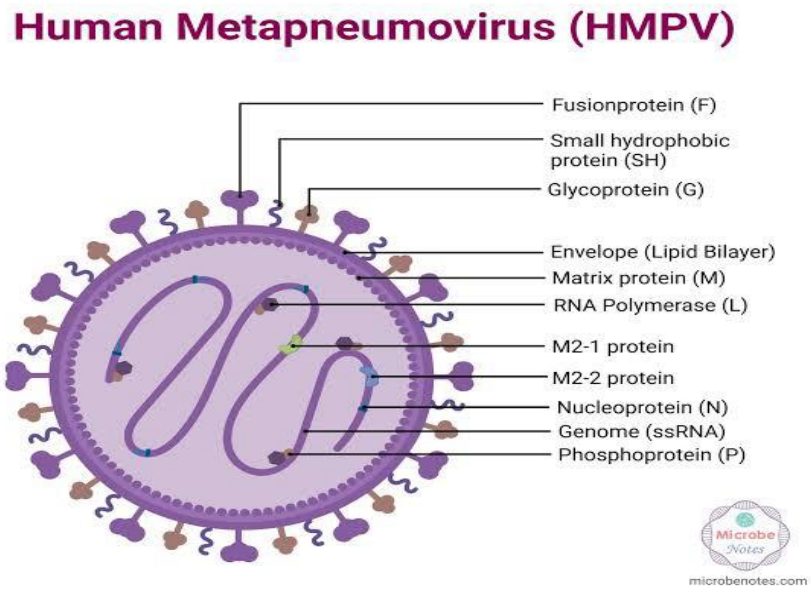
Human parainfluenza virus (HPIV) can lead to infections in both the upper and lower respiratory tracts, particularly affecting young children under five, immunocompromised adults, and the elderly. There are four types of HPIV: types1 and2 are most common in the fall, type3 circulates throughout the year with peaks in spring and early summer, and type4 is present year-round. Types1 and3 are more likely to cause severe conditions such as croup, bronchiolitis, or pneumonia, with symptoms varying in severity (Brandi Jones,2024).

HUMAN PARAINFLUENZA VIRUS STRUCTURE



HUMAN METAPNEUMOVIRUS

Human metapneumovirus (HMPV) primarily affects children under2 years old, with most infections occurring around22 months of age. Studies show that90–100% of children are infected with HMPV by ages5 to10. The virus is most widespread during late winter and early summer. Healthy adults may also contract HMPV but typically experience mild symptoms. However, infants under6 months and individuals with chronic conditions such as asthma are at higher risk for severe illness or complications, including bronchiolitis and pneumonia. Infants younger than6 months have a threefold increased risk of hospitalization due to HMPV compared to older children.



Other common Upper Respiratory Tract Infections (URTI) include

SINUSITIS/SINUS INFLAMMATION

Sinusitis, or rhinosinusitis, is an acute inflammatory condition affecting one or more of the paranasal sinuses, which include the frontal, maxillary, ethmoid, and sphenoid sinuses. It is usually caused by viruses, though bacterial infections can sometimes occur. The term rhinosinusitis is preferred because the nasal passages are often involved alongside the sinuses. Inflammation can block the sinus openings, causing mucus to accumulate and creating an environment favorable for bacterial growth (NCBI,2024; Mayo Clinic,2024).

Classification

Sinusitis is classified based on the duration and pattern of symptoms:

Type	Duration	Common Features
Acute sinusitis	Up to 4 weeks	Usually follows a viral upper respiratory infection and may

Type	Duration	Common Features
		become bacterial if symptoms persist.
Subacute sinusitis	4–12 weeks	Intermediate stage between acute and chronic.
Chronic sinusitis	12 weeks or longer	Persistent inflammation, often due to allergies or anatomical obstruction.
Recurrent acute sinusitis	≥ 4 episodes per year	Each episode resolves completely but recurs frequently.

(Cleveland clinic, 2024)

Causes and Risk Factors

Sinusitis can result from both infectious and non-infectious causes. Viral infections, particularly those caused by rhinoviruses and adenoviruses, are the most common triggers. Bacterial infections may develop secondarily, often involving pathogens like Streptococcus pneumoniae, Haemophilus influenzae, or Moraxella catarrhalis (Mayo Clinic,2024). Fungal infections are rare and typically affect individuals with weakened immune systems. Additional risk factors for sinusitis include allergies, anatomical abnormalities such as a deviated septum or nasal polyps, smoking, and exposure to air pollution (American College of Allergy, Asthma and Immunology,2024).

Symptoms

Common symptoms of sinusitis include:

Nasal congestion or obstruction, Thick nasal discharge (yellowish or green), Facial pain, tenderness, or pressure (worse when bending forward),Headache and fever,Post-nasal drip and cough,Fatigue and reduced sense of smell (CDC, 2024)

Pathophysiology

Under normal conditions, the lining of the sinuses produces mucus that drains through small openings called ostia into the nasal cavity. When infection or allergies cause inflammation, these openings can become blocked. This obstruction leads to mucus accumulation, which encourages bacterial growth and intensifies inflammation (NCBI,2024). In chronic cases, this process may result in structural changes, persistent thickening of the mucosal lining, and the formation of nasal polyps (Wikipedia,2024).

Diagnosis

Diagnosis is mainly clinical, based on history and physical findings such as nasal obstruction and facial tenderness.

Nasal endoscopy may reveal pus or polyps.

CT scan is used in chronic or recurrent cases.

Culture tests may help identify pathogens in resistant cases.(NHS, 2024)

Treatment and Management

Acute Sinusitis

The majority of acute sinusitis cases clear up within 10 days without the need for antibiotics. Treatment typically involves:

Saline nasal rinses

Nasal corticosteroid sprays

Inhalation of steam

Pain relievers and short-term use of decongestants

Antibiotics like amoxicillin or amoxicillin-clavulanate are reserved for situations where a bacterial infection is strongly suspected, such as when symptoms persist beyond 10 days, worsen after initial improvement, or present with high fever and thick nasal discharge (Cleveland Clinic, 2024).

Chronic Sinusitis

Chronic cases may require:

Long-term intranasal corticosteroids

Regular saline irrigation

Management of allergies

Endoscopic sinus surgery when medical therapy fails. (Mayo Clinic, 2024)

Sinusitis, a common upper respiratory tract infection, frequently leads to antibiotic use even though most cases are viral in origin. Among university students, including those at the University of Benin (UNIBEN), self-medication with antibiotics such as amoxicillin, azithromycin, and ciprofloxacin is widespread due to easy access, peer influence, and limited health knowledge (Chukwu et al., 2019). This inappropriate use of antibiotics fosters antimicrobial resistance and diminishes drug effectiveness. Therefore, focusing on sinusitis as a typical URTI highlights the need to encourage responsible antibiotic use and strengthen public health awareness within the university environment.

Pharyngitis

Pharyngitis is the inflammation of the pharynx, located at the back of the throat, and is commonly referred to as a sore throat. It typically involves swelling of the lymphoid tissues on the sides and back of the throat and is often caused by viruses such as adenovirus or bacteria like Streptococcus pyogenes. Most cases are viral and occur as part of an upper respiratory tract infection. According to the Mayo Clinic, viral infections, including those responsible for colds and influenza, are the most frequent cause of sore throat (pharyngitis) (Mayo Clinic,2024).

Causes

Most cases of pharyngitis, or sore throat, are caused by viral infections, including those responsible for the common cold and influenza. Bacterial infections, particularly those due to Group A Streptococcus (GAS), commonly known as strep throat, are a significant bacterial cause of pharyngitis (Mayo Clinic,2024).

Classification

Acute pharyngitis typically lasts between3 to10 days and is the most common form of sore throat. Chronic (or persistent) pharyngitis occurs when symptoms last longer than10 days or keep recurring, often due to ongoing irritation, acid reflux, or a long-standing infection (Cleveland Clinic,2024). Additional contributing factors include allergies, exposure to irritants like smoke and chemicals, acid reflux (GERD), excessive voice strain, and, rarely, fungal infections in people with weakened immune systems (Mayo Clinic,2024).

Symptoms

Typical signs and symptoms of pharyngitis include throat pain, scratchiness, or irritation, especially when swallowing along with redness or swelling of the throat and tonsils. White

spots or pus on the tonsils are more commonly seen in bacterial infections. Other symptoms may include fever, headache, and fatigue. Enlarged lymph nodes, particularly in the neck, are also frequent. Additional symptoms associated with viral infections often include a runny nose, cough, and nasal congestion (Cleveland Clinic,2024).

Diagnosis

Clinical evaluation of pharyngitis involves taking a detailed patient history and performing a physical examination, focusing on the throat, tonsils, and lymph nodes. If strep throat is suspected, a rapid antigen detection test (RADT) or throat swab culture is conducted to confirm Group A Streptococcus. For chronic cases, additional tests may be performed less frequently to rule out irritants, allergies, or acid reflux disease (Cleveland Clinic,2024).

Treatment

Most cases of viral pharyngitis are managed with supportive care and do not require antibiotics. Recommendations include rest, drinking plenty of fluids, using throat lozenges or warm beverages, gargling with salt water, and using humidified air to soothe symptoms. Over-the-counter pain medications such as NSAIDs or acetaminophen can help relieve discomfort. For bacterial pharyngitis, especially strep throat, antibiotics like penicillin or amoxicillin are prescribed for about10 days. Antibiotic treatment helps slightly shorten illness duration and prevents complications such as rheumatic fever. In chronic or recurrent cases, management focuses on addressing underlying causes like acid reflux, allergies, or irritants (Mayo Clinic,2024).

Laryngitis

Laryngitis is an inflammation of the voice box (larynx), usually caused by a viral infection (Lancet Infectious Disease,2005). It involves swelling of the vocal cords, which disrupts their

normal vibration and results in symptoms like hoarseness, a weak voice, or temporary loss of voice. This condition can arise from infections, irritation, or excessive voice use. Laryngitis is typically acute (short-term), but it can become chronic if symptoms persist for more than three weeks or recur frequently (Mayo Clinic,2024).

Causes

Laryngitis is most commonly caused by viral infections, such as those responsible for colds and influenza (Nicole L,2023). Bacterial or fungal infections occur less frequently (Gunjan G,2022). Non-infectious and irritative causes include excessive or intense voice use (such as shouting or loud singing), exposure to irritants like cigarette smoke, chemical vapors, or allergens, gastroesophageal reflux disease (GERD), and persistent sinus infections that lead to postnasal drip irritating the voice box (Mayo Clinic,2024).

Symptoms

Common signs of laryngitis include changes in the voice such as hoarseness, a weak voice, or complete loss of voice (aphonia), along with throat discomfort, soreness, or irritation. Other symptoms may include a dry or tickling sensation in the throat, occasional coughing, slight fever (especially if infection-related), and a feeling of fullness in the throat or frequent need to clear it (Mayo Clinic,2024). Additional risk factors for laryngitis include repeated respiratory infections, tobacco use, alcohol consumption, and ongoing exposure to irritants (Cleveland Clinic,2024).

Diagjosis

The primary method of clinical assessment for laryngitis involves reviewing the patient's medical history, voice changes, symptom duration, and possible exposures. If symptoms persist or a structural or serious condition is suspected, laryngoscopy can be performed to visually inspect the vocal cords. For chronic or persistent cases,

additional investigations may be required to identify underlying causes such as GERD, allergies, or other less common factors (Mayo Clinic,2024).

Treatment

Most cases of laryngitis resolve on their own within about a week. Treatment mainly focuses on supportive and symptom-relieving measures, such as resting the voice by minimizing talking or whispering, staying hydrated to keep the throat moist, using humidifiers or inhaling steam, and avoiding irritants like smoking, alcohol, and strong fumes. Addressing underlying causes, such as controlling acid reflux or avoiding allergens, is also important. Antibiotics are generally not recommended unless there is clear evidence of a bacterial infection. For chronic or persistent laryngitis, treatment targets root causes, including quitting smoking, limiting irritant exposure, managing gastroesophageal reflux with dietary changes and medications like proton pump inhibitors, undergoing voice therapy with a speech specialist, and evaluating or treating structural issues such as vocal nodules or polyps if present (Mayo Clinic,2024)

Upper respiratory tract infections (URTIs) are characterized by inflammation of the mucous membranes in the nose, throat, or sinuses, commonly causing symptoms like nasal congestion, sore throat, and cough. URTIs are broadly classified as viral or bacterial, with viral causes being most common. According to the World Health Organization, most URTIs are viral and do not require antibiotics, yet inappropriate prescribing remains widespread (WHO,2020). Globally, an estimated 17.2 billion URTIs occurred, with approximately 3,000 deaths attributed to these infections by 2016, a decrease from 4,000 deaths in 1990 (Wikipedia,2016).

1.2 ETIOLOGY

Several respiratory viruses can cause symptoms of the common cold, with rhinoviruses responsible for 50% to 80% of cases. Other viral agents include coronaviruses, adenoviruses, parainfluenza viruses, influenza viruses, respiratory syncytial virus, human metapneumovirus, and bocavirus. Viruses such as measles and enteroviruses also sometimes cause cold-like symptoms. Bacteria like Group A beta-hemolytic Streptococcus (Streptococcus pyogenes), Group C and G beta-hemolytic streptococci, Mycoplasma pneumoniae, Moraxella catarrhalis, Haemophilus influenzae, and Streptococcus pneumoniae can also cause upper respiratory tract infection (URTI) symptoms. In Nigeria, distinguishing between viral and bacterial URTIs is often challenging due to limited diagnostic tools like throat cultures and rapid antigen tests. This challenge contributes to the excessive use of antibiotics among students, who frequently self-medicate or receive prescriptions for typically viral illnesses. URTIs spread through respiratory droplets from coughing and sneezing, as well as via contact with contaminated surfaces (PubMed, 2024).

Viruses cause the majority of URTIs, with rhinoviruses accounting for 30-50% of cases and coronaviruses for 10-15%, while other viruses such as bocavirus and enteroviruses also play a role. Bacterial infections, such as those caused by Streptococcus pyogenes, represent only 5-10% of cases. URTIs make up 31.8% of clinical visits at Nigerian teaching hospitals, emphasizing the significant impact of these infections on student populations (Yaguo Ide, L., 2015).

1.3 EPIDEMIOLOGY

Upper respiratory infections (URIs) represented a major global health challenge in 2021, with about 12.8 billion cases reported worldwide, rising from 9.68 billion in 1990. This corresponds to an incidence rate of approximately 162,485 cases per 100,000 people,

highlighting the extensive reach of URIs. A broad study covering 1990 to 2019 found that URIs accounted for 17.2 billion cases in 2019, making up nearly 43% of the total disease cases recorded in the global burden of disease survey, with incidence rates remaining mostly stable during this time (PubMed, 2024).

The 2019 Global Burden of Disease (GBD) study reported that URTIs affected over 17 billion individuals worldwide across sexes, age groups, and regions, representing about 43% of all disease and injury cases in the database. These infections, caused by the replication and transmission of over 200 viral strains, pose a significant public health issue that requires serious attention (Wang et al., 2021).

In the United States, a study among college students revealed that 91% experienced at least one URTI episode per season, which often led to inappropriate antibiotic use. Of the 3,249 participants (average age 22.7 years; 68% female), 91% had at least one URTI, including 83% with common colds and 36.7% with influenza-like illness. These infections resulted in a major burden with over 6,000 bed-days, 4,263 missed school days, 3,175 missed workdays, and 45,219 days of illness reported. Healthcare was sought by 22.2% of participants, and 15.8% used antibiotics for URTIs. Academic performance was also affected, with 27.8% reporting poor test results and 46.3% poor assignment performance due to illness (Nichol et al., 2005).

In Nigeria, self-medication is notably high among graduates, with a prevalence of 47.7%. This is substantially greater than the 23% rate reported by the World Health Organization in 2015 and higher than the 31.1% found in another Nigerian study by Chukwu et al. Those prior studies examined mixed populations with and without tertiary education (Popoola et al., 2024).

1.4 EPIDEMIOLOGY IN UNIVERSITY STUDENTS

University students, including those at the University of Benin, are especially vulnerable to upper respiratory tract infections (URTIs) because of factors like crowded living conditions in hostels and lecture halls, academic stress, poor hygiene (such as not washing hands), self-medication habits, and frequent exposure to various pathogens in communal settings. URTIs are a primary reason for outpatient visits, with a large number of cases occurring among young adults aged 18–30, which is the typical age group for university students (Kehinde F. Sekoni et al., 2022).

In sub-Saharan Africa, including Nigeria, URTIs are a significant public health issue due to their high occurrence and frequent misuse of antibiotics. Research at a Nigerian university health facility found that URTIs made up a considerable share of antibiotic prescriptions, often given without confirming a bacterial cause. About 60% of university students misused antibiotics for URTIs, largely due to misunderstandings about their effectiveness against viral infections (Al-Naggar & Ismail, 2018).

1.5 INCIDENCE/PREVALENCE

Upper Respiratory Tract Infections (URTIs) are among the most frequent acute illnesses globally, encompassing conditions such as the common cold, pharyngitis, sinusitis, and otitis media. Viruses like rhinoviruses, coronaviruses, and influenza viruses are the main causes, although bacterial infections can occasionally follow. URTIs contribute substantially to global health burdens due to their high occurrence and the economic consequences from lost productivity and healthcare costs. The Global Burden of Disease (GBD) Study 2019 estimated around 17.2 billion new URTI cases, with an age-standardized incidence rate of 225,505.7 per100,000 people, about 2.25 episodes per person each year. This rate reflects a

modest 1.39% decline since 1990, attributed to improvements in hygiene, vaccination, and public health efforts (Wang X. et al.,2021).

By 2021, the global incidence rate had dropped further to 162,484.8 per 100,000 population, a 10.5% decrease from 2019, likely influenced by measures like masking and social distancing during the COVID-19 pandemic (The Lancet Infectious Diseases,2025). Prevalence data indicate that adults typically experience 2 to4 URTI episodes annually, while children may have up to 6 to 8. Although global mortality from URTIs is low (0.1 per100,000 in2019), complications can pose greater risks for vulnerable populations. The Disability-Adjusted Life Years (DALYs) associated with URTIs were 84.4 per 100,000 in 2019, highlighting the impact of symptoms like cough, sore throat, and nasal congestion on daily life (Xuting Jin et al.,2021).

In Nigeria, URTIs constitute a large proportion of outpatient visits, making up 82.8% of respiratory cases seen at healthcare facilities and 7.4% of all consultations. A five-year retrospective study in southwest Nigeria recorded 4,719 URTI cases out of 5,701 respiratory diagnoses, with respiratory diseases overall accounting for 7.4% of 77,553 outpatient visits. Among young adults aged 16–30, mainly university students, 65.7% of respiratory cases occurred in this group, with males having higher odds than females (Oyewumi O. et al.,2025). At the University of Port Harcourt Teaching Hospital, URTIs were the most frequent diagnosis, with a prevalence of 31.8% among new consultations, underscoring their recurrence in Nigerian healthcare settings (Lucy Ide,2015).

URTIs are especially prevalent among university students due to factors such as communal living, stress, and close contact in shared environments. International surveys reveal high rates, with 91% of U.S. college students reporting at least one URTI episode in a six-month period (November–April), including83% experiencing colds and 36.7% suffering from

influenza-like illnesses (Kristin Nichol et al.,2005). In Nigeria, a retrospective study at Ahmadu Bello University, Zaria, found a seasonal pattern, with incidence peaking at 24% in January and dropping to 1.3% in July. Most patients (40.3%) were aged 22–25, with a higher prevalence among males (Adamu Dalhatu et al.,2025). Similar findings at Covenant University showed URTIs were the most common respiratory diagnosis among those aged 16–30, with an increased risk (odds ratio1.373) compared to older adults (Oyewumi O. et al.,2025).

These findings highlight the susceptibility of undergraduate populations, including those at the University of Benin (UNIBEN), where environmental and lifestyle factors promote transmission. This often leads to frequent self-medication with antibiotics, contributing to antimicrobial resistance.

1.6 CLINICAL PRESENTATION

The clinical presentation of URTIs varies depending on the specific condition and etiology. An uncomplicated upper respiratory tract infection (URTI) typically causes cough, sore throat, runny nose or nasal congestion, facial pain or pressure, sneezing, headache, and low-grade fever. In children, symptoms usually last 7 to 10 days. In adults, coughing and nasal discharge may continue for 14 days or more, even after other symptoms resolve. (Jamie crawford,2024) Some types may also lead to bad breath, body aches, loss of smell, and itchy eyes (clevaland clinic,2025)

GAS pharyngitis, also known as Group A Streptococcus pharyngitis or strep throat, is a bacterial infection of the throat caused by Streptococcus pyogenes (Group A Streptococcus). It commonly affects the pharynx and tonsils and typically causes a sudden sore throat, fever, tender lymph nodes in the front of the neck, tonsillar exudates, and no cough, as outlined in the Centor/McIsaac decision rules. (National Library of medicine, 2023)

1.7 DIAGNOSIS

Laboratory testing, such as rapid antigen detection tests (RADT) or throat cultures, is recommended when there is a strong clinical suspicion of Group A Streptococcus (GAS) pharyngitis. Acute bacterial rhinosinusitis is suspected when symptoms persist for more than 10 days without improvement, when there is a severe onset with high fever and purulent nasal discharge or facial pain lasting over 3–4 days, or when symptoms worsen after initial improvement ("double-worsening" pattern) (National Library of Medicine,2025).

For uncomplicated viral upper respiratory tract infections (URTIs), diagnosis is typically clinical, and routine laboratory testing is not required for simple colds. In cases of suspected GAS pharyngitis, clinicians should use a clinical scoring system, such as the Centor or McIsaac scoring system, to assess the likelihood of bacterial infection and decide whether RADT or throat culture is necessary. Only confirmed cases should be treated with antibiotics. The McIsaac Score (a modified version of the Centor Criteria) is a clinical tool used to estimate the probability that a sore throat is caused by Group A β-hemolytic Streptococcus (GAS), the bacteria responsible for strep throat. This score improves on the original Centor Criteria by including patient age as a factor, since GAS pharyngitis is more common in children and less frequent in older adults. Points are assigned based on five clinical features to calculate the score.

Tonsillar exudates (pus on tonsils) has +1

Tender anterior cervical lymphadenopathy (painful lymph nodes in the front of the neck) has +1

Fever (history of temperature >38°C / 100.4°F) has +1

Absence of cough (cough suggests viral cause, not bacterial) has +1

Age adjustment:

3–14 years has +1

15–44 years has 0

≥45 years has −1

The total score ranges from −1 to +5.

Here's what it means:

Score	Risk of GAS(%)	Recommended Action
<0	<1	No testing
1	5-10	No testing, symptomatic treatment only
2	11-17	Consider RADT or Throat culture
3	28-35	Test with RADT or Throat culture
4-5	51-53	Consider empiric antibiotics or confirmatory testing

(Warren J. McIsaac et al 2007))

RADT stands for Rapid Antigen Detection Test. It is a quick diagnostic test used to detect Group A β-hemolytic Streptococcus (GAS), the bacteria that causes strep throat. It works by identifying antigens (proteins) from the bacteria in a throat swab sample. RADT is a rapid

test for diagnosing strep throat by detecting bacterial antigens from a throat swab. Positive results are very reliable; negative results may need confirmation (especially in kids). Imaging is not advised for uncomplicated acute rhinosinusitis; it should be considered only for complications or atypical symptoms. (Infectious disease society of Nigeria, 2012)

1.8 ANTIBIOTICS STEWARDSHIP AMONG STUDENTS

Self-diagnosis of upper respiratory tract infections (URTIs), especially mild illnesses such as the common cold, is widespread among students. Research among university students in China found that many incorrectly assume URTI symptoms require antibiotics, which encourages self-medication. In that study, 33.4% had used self-medication for URTIs, 48.8% relied on leftover antibiotics, and 67.3% misinterpreted symptoms as needing antibiotic therapy (Xiaomin Wang et al., 2015). Proper diagnosis, supported by clinical guidelines or appropriate tests, is essential to ensure correct treatment and reduce unnecessary antibiotic use.

Most URTIs are viral and resolve without antibiotics, requiring only supportive measures such as rest, hydration, antipyretics, and symptomatic treatment (WHO, 2024). Antibiotics are ineffective against viral URTIs but are indicated for confirmed or strongly suspected bacterial infections, including streptococcal pharyngitis, bacterial sinusitis, or otitis media. Overprescribing remains a major global challenge and contributes significantly to antimicrobial resistance. According to the WHO Global Antimicrobial Resistance Report (2021), around 50% of antibiotics prescribed for URTIs are unnecessary.

Guidelines consistently advise against antibiotic use for the common cold, viral pharyngitis, uncomplicated acute bronchitis, and most other viral URTIs, as evidence shows no clinical benefit and potential harm (American Family Physician, 2022). Antibiotics should be reserved for confirmed group A streptococcal pharyngitis, based on positive rapid tests or

throat culture, and for acute bacterial rhinosinusitis that meets diagnostic criteria. Recommended practice includes using narrow-spectrum, first-line agents and the shortest effective course (e.g., 5–7 days for many adult sinusitis cases). Outpatient stewardship stresses the importance of explaining that antibiotics do not treat viral infections and that even some mild bacterial cases may resolve without them, messages especially valuable on university campuses where peer advice and self-medication are common (JAMA Internal Medicine, 2018).

University students frequently self-medicate with antibiotics for cough, colds, and sore throat, often without proper prescriptions, contributing to resistance and avoidable adverse effects. Studies from Nigerian universities, including non-medical students, show widespread misuse, such as keeping leftover antibiotics, taking them irregularly, and using them for likely viral illnesses. These trends underscore the need for a focused survey at UNIBEN, making such research timely and relevant (Titilayo et al., 2013). At the University of Benin, URTIs are common due to the large and diverse student population living in close proximity. The University Health Centre is the primary care provider and often prescribes or dispenses antibiotics for URTI symptoms (Upe Babaiwa et al., 2019). In addition, nearby pharmacies make access to antibiotics easy, further encouraging self-medication (Titilayo et al., 2013). This study focuses on URTIs because of their high frequency and strong association with inappropriate antibiotic use, aiming to generate evidence for targeted interventions to strengthen antibiotic stewardship.

1.9 MISUSE OF ANTIBIOTICS BY UNDERGRADUATE STUDENTS

The inappropriate use of antibiotics has emerged as a growing public health concern, particularly among university students who commonly self-medicate when experiencing upper respiratory tract infections (URTIs) (WHO, 2025). In many low- and middle-income

countries, including China, a large proportion of students obtain antibiotics without medical supervision, either purchasing them directly from pharmacies, receiving them from relatives, or using previously prescribed leftovers. For instance, 63% of Chinese university students reportedly store antibiotics at home, while 66% acquire them without a prescription, significantly contributing to irrational use (Wang et al., 2016).

Similar patterns are observed in Nigeria. Studies have shown that 74.5% of Nigerian students either keep unused antibiotics for future use or dispose of them improperly, and 72.3% sometimes forget to take their doses as prescribed (Titilayo et al., 2013). Across African and other low- and middle-income settings, self-medication rates among university students range between 46% and 88%, largely due to easy over-the-counter availability and misunderstandings about the viral nature of most respiratory illnesses (Ocan, 2014; Ocan et al., 2015). In Nigeria, a recent nationwide survey reported that 47.7% of tertiary-level graduates engage in antibiotic self-medication, more than double the WHO's 2015 estimate of 23% for the general population, highlighting the critical role students play in driving antimicrobial resistance (Popoola et al., 2024).

Poor adherence to treatment regimens is another major issue. Many students discontinue antibiotics as soon as symptoms improve, rather than completing the full course, which fosters resistance (WHO, 2020). Among Nigerian undergraduates, only 43.8% consistently finish their prescribed antibiotics, while 45.5% do so intermittently and 10.8% never complete treatment. Additionally, one-quarter of students retain leftover medication, and 16.8% share it with family or friends (Onukansi et al., 2025). Globally, approximately 25% of university students admit to sharing antibiotics, further increasing the risk of inappropriate dosing and resistance development (Grigoryan et al., 2006).

Despite the predominantly viral etiology of URTIs, many students mistakenly believe antibiotics are effective against colds and sore throats. This misconception stems from limited understanding of viral versus bacterial infections and insufficient health education, even though knowledge tends to improve with advancing academic years (Zoorob et al., 2001). At the University of Benin Health Centre, upper respiratory tract infections account for 28.0% of cases prompting antibiotic prescriptions, one of the leading indications among the top ten reasons for antibiotic use (Babaiwa et al., 2019).

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1.10 THE CONSEQUENCES OF THE MISUSE OF ANTIBIOTICS BY UNDERGRADUATE STUDENTS

INCREASE IN RESISTANCE RATES

The global rise in antibiotic resistance may be a significant threat, diminishing the efficacy of common antibiotics against widespread bacterial infections. Alarming resistance rates among prevalent bacterial pathogens was reported in 76 countries of 42% for third-generation cephalosporin-resistant E. coli and 35% for methicillin-resistant Staphylococcus aureus are a major concern. For urinary tract infections caused by E. coli, 1 in 5 cases exhibited reduced susceptibility to standard antibiotics like ampicillin, co-trimoxazole, and fluoroquinolone in 2020. This makes it harder to treat the common infections most effectively. Klebsiella pneumoniae, a common bacteria of the intestine, also demonstrated resistance levels against common and critical antibiotics. Increased levels of resistance would lead to more utilization of the last-resort drugs like carbapenems, for which its resistance is being observed across

multiple regions. As the effectiveness of these last-resort drugs is compromised, there would be a risk of increase in infections that cannot be treated effectively (Global Antimicrobial Resistance and Use Surveillance System (GLASS), 2022).

ACCELERATE ANTIMICROBIAL RESISTANCE(AMR) ON A NATIONAL SCALE

In Nigeria, where self-medication contributes significantly to inappropriate antibiotic use, this practice undermines the country's AMR National Action Plan, which aims to reduce resistance through surveillance and education. (National Action Plan for Antimicrobial Resistance, 2022). Globally, AMR is projected to cause economic losses exceeding US$1 trillion in healthcare costs by 2050, with student populations in densely populated settings like universities serving as hotspots for transmission and resistance development.(WHO, 2023)

ECONOMIC COST FROM RESISTANCE

In addition to death and disability, AMR has significant economic costs. The World Bank estimates that AMR could result in US$1 trillion additional healthcare costs by 2050, and US$1 trillion to US$3.4 trillion gross domestic product (GDP) losses per year by 2030 (WHO, 2022).

INCREASED HEALTHCARE COST

Antibiotic misuse contributes to increased healthcare costs through prolonged illness, reliance on more expensive medications, and the need for additional medical services to manage resistant infections. In developing countries such as Nigeria, this financial strain further worsens existing challenges in healthcare access and quality. (Olajide J. Olagunju)

TREATMENT FAILURE AND HEALTH COMPLICATIONS

The misuse of antibiotics can result in treatment failure, where infections are not effectively cleared. This not only worsens the patient's condition but may also lead to complications that require more intensive medical care(TE Sanya 2013). For instance, prescribing antibiotics for viral infections such as the common cold or influenza is ineffective and unnecessarily exposes patients to potential side effects, including diarrhea and allergic reactions.(Amy Lunn, 2018)

SIDE EFFECTS AND ADVERSE DRUG REACTIONS

At the individual level, the inappropriate use of antibiotics for URTIs places students at risk of preventable side effects and health complications. Frequently reported reactions include rashes, dizziness, nausea, diarrhea, and yeast infections, all of which can interfere with daily functioning and negatively impact academic performance. Centers for Disease Control and Prevention (CDC) (2024)

PREDISPOSITION TO SUPRA-INFECTION

The human body hosts a delicate ecosystem of microorganisms, disrupted by the reckless use of antibiotics (Lessa, F. C, *et al*, 2015). This disruption causing imbalance can trigger conditions like Clostridium difficile infection, a severe, antibiotic-associated illness and For students, such disruptions weaken immunity, heightening vulnerability to infections and undermining academic performance in the high-pressure environment of university life (New england journal of medicine, 2015).

DECLINE IN ACADEMIC EFFICIENCY

For University of Benin students, often reliant on limited funds, resistant infections may force choices between treatment and basic needs, perpetuating cycles of poverty and ill health that will ultimately affect academic efficiency of students.(Olayemi *et al*, 2010)

1.11 ROLES OF COMMUNITY PHARMACISTS IN MANAGING ANTIBIOTIC MISUSE FOR URTI

Community pharmacists play a pivotal role in mitigating antibiotic misuse for URTIs by providing patient education, screening for appropriate use, and refusing sales for viral infections. In Qatar, pharmacists demonstrated good knowledge in advising on NSAID risks, a model adaptable to antibiotics, where they assess renal and gastrointestinal effects to ensure safe dispensing.(Owusu *et al,* 2022). According to WHO guidelines, pharmacists' functions include promoting healthy lifestyles, monitoring therapy, and collaborating with other professionals to evaluate drug effectiveness. Sub-subsection 1.3.1: The Model Community Pharmacist - A model pharmacist acts as an accessible advisor, ensuring rational antibiotic use in university settings. Sub-subsection 1.3.2: Functions in Healthcare - These include dispensing with counseling, disposing of unused medications, and referring high-risk cases.(WHO 2018)

Community pharmacists serve as primary healthcare providers uniquely positioned to reduce antibiotic misuse in upper respiratory tract infections (URTIs), which are mostly viral and frequently treated inappropriately with antibiotics. They achieve this through patient education, active intervention, and antibiotic stewardship. The following outlines several essential roles supported by research from peer-reviewed studies.

PATIENT EDUCATION AND COUNSELING

Pharmacists educate patients on the viral etiology of most URTIs, explaining why antibiotics are ineffective and promoting supportive care like hydration and rest to reduce self-medication demands. This role empowers patients to avoid misuse, fostering rational use and awareness of resistance risks.(Balea LB, 2025)

SCREENING AND SYMPTOM ASSESSMENT

By assessing URTI symptoms (e.g., via structured questioning), pharmacists differentiate viral from potential bacterial cases, recommending diagnostic tests or referrals instead of automatic antibiotic dispensing. This helps curb over-the-counter sales for self-diagnosed "colds."(Zawahir, 2019)

REFUSING INAPPROPRIATE DISPENSING

Pharmacists act as gatekeepers by declining to dispense antibiotics for non-bacterial URTIs, such as the common cold, and offering non-antibiotic alternatives like analgesics or decongestants. This intervention directly addresses misuse in community settings where prescriptions are bypassed. (Rusic D, 2021)

PROMOTING ANTIMICROBIAL STEWARDSHIP

As leaders in stewardship, pharmacists implement local programs to monitor antibiotic requests for URTIs, integrating guidelines like those from WHO to ensure evidence-based dispensing. Their accessibility makes them ideal for containing resistance threats. (Essack S,2018)

REPORTING AND SURVEILLANCE OF MISUSE

Pharmacists track and report antibiotic sales data, flagging suspected inappropriate uses for URTIs to public health authorities, contributing to national surveillance systems. This role enhances data-driven policies to reduce overuse. (Raju R, 2024)

COLLABORATING WITH HEALTHCARE TEAMS

Pharmacists partner with physicians and nurses to align on URTI management protocols, providing feedback on prescription patterns and co-developing patient education materials. Such teamwork optimizes outpatient care and minimizes misuse.(Klepser, *et al*. 2019)

ADVOCACY FOR RATIONAL THERAPY

In outpatient settings, pharmacists advocate for guideline-adherent prescribing, educating prescribers on URTI evidence to prevent unnecessary antibiotic scripts for respiratory infections. This proactive stance supports broader resistance containment. (Saha, S. K. *et al*, 2021)

COMMUNITY AWARENESS INITIATIVES

Pharmacists lead campaigns in pharmacies to raise awareness about antibiotic misuse for URTIs, using point-of-sale materials and consultations to shift public behaviors. These efforts improve overall adherence to stewardship goals. (WHO 2021)

1.12 STATEMENT OF THE PROBLEM

Upper respiratory tract infections (URTIs) such as the common cold, pharyngitis and sinusitis are among the most prevalent illnesses worldwide, with especially high occurrence in densely populated environments like universities (WHO, 2021). Since most URTIs are caused by viruses, antibiotics provide no therapeutic benefit and are therefore not recommended as routine treatment (CDC, 2021).

In Nigeria, the practice of self-medicating with antibiotics is strikingly common among university students, with rates between 46.5% and 63.7%; this typically includes medications such as amoxicillin, ciprofloxacin, and ampiclox to treat symptoms like cough and sore throat linked to upper respiratory tract infections (URTIs) (Chidinma Amuzie *et al*)

A nationwide survey indicated a 47.7% rate of antibiotic self-medication, exceeding the World Health Organization's 2015 estimate of 23% for Nigeria's general population and underscoring students' contribution to worsening this trend (Olanrewaju Olamide Popoola *et al*. 2024)

University students are especially vulnerable to inappropriate antibiotic use, as the crowded conditions of hostels and lecture halls increase their risk of URTIs. Coupled with academic pressure to resume activities quickly and the widespread availability of antibiotics without prescription in Nigerian community pharmacies, many students resort to self-medication.

This often involves using leftover drugs or sharing antibiotics with peers, frequently without professional medical guidance (Fadare *et al*, 2019).

Research in Nigeria has consistently shown a high prevalence of antibiotic self-medication among university students, particularly for symptoms such as fever and URTIs, highlighting a worrying trend of misuse (Ocan *et al*, 2015).

This practice is often driven by limited awareness of antimicrobial resistance and poor understanding of the differences between viral and bacterial infections (Awad *et al*, 2015).

A cross-sectional survey of randomly selected final year students of the University of Benin was conducted, approximately 86.9% of respondents had used at least one antibiotic in the past three months, with over 40% reporting the use of two or more antibiotics. Self-medication accounted for 35% of antibiotic use. Penicillins were the most commonly used antibiotics, both for prescribed treatments and self-medication. The primary reason for adherence to therapy was the determination to recover fully, while the most common cause of non-adherence was the perception of improvement after initial treatment. A considerable number of undergraduates used both prescription and non-prescription antibiotics, with penicillins drugs already associated with high resistance levels being the most frequently used. (Obehi, A. 2010)

At present, there is limited up-to-date evidence on the knowledge, attitudes, and practices of undergraduate students at the University of Benin (UNIBEN) concerning antibiotic use for URTIs. This lack of context-specific data hampers efforts to accurately gauge the scale of the problem and to develop tailored interventions, such as university-based health programs and educational campaigns, aimed at promoting responsible antibiotic use and addressing antimicrobial resistance within the student population.

To address this issue, targeted training programs, feedback on Antibiotic usage, and adequate resources and infrastructure to support adequate antibiotic stewardship are necessary. This insight into the knowledge, attitudes, and practices of undergraduate students in the university of benin in Benin City, Nigeria, regarding the use of antibiotics for treating upper resporatory tract infection is crucial for developing effective solutions. Through this investigation, we seek to uncover the underlying challenges and obstacles that promote antibiotic misuse, ultimately informing the creation of tailored interventions that improve antibiotic stewardship and prioritize patient safety.

1.13 JUSTIFICATION OF THE STUDY

Upper respiratory tract infections (URTI) are a major public health concern, particularly among young adults in congregate settings like universities, where close contact facilitates disease transmission. In Nigeria, URTI accounts for a significant proportion of respiratory illnesses, with studies reporting that they constitute up to 82.8% of respiratory disease cases in tertiary healthcare facilities. (Arikpo I *et al*, 2025).

Among undergraduate students in Nigerian universities, URTI prevalence is high, influenced by seasonal and epidemiological factors, as demonstrated in studies at institutions like Ahmadu Bello University (Abdullahi M. 2025)

These infections are primarily viral, rendering antibiotics ineffective in most cases, yet inappropriate antibiotic use remains widespread (Patricia U. 2023).

In Nigeria, the misuse of antibiotics for URTI is driven by factors such as self-medication, inadequate regulation, and limited awareness of appropriate treatment protocols. National surveys indicate that inappropriate antibiotic use for viral URTI, such as colds and sore throats, occurs in up to 50.2% of cases(Nwankwo C, 2023).

Among pediatric and general populations, unprescribed antibiotic use for URTI is reported as high as 75.9%, with higher rates among those with greater access to over-the-counter medications or higher education levels (Akpan R *et al*, 2025).

Among university students, self-medication with antibiotics is prevalent, with studies reporting rates between 46.5% and 88.3% across Nigerian institutions(Ncube N *et al,* 2025)

Commonly used antibiotics include Ampiclox (71.25%), Amoxicillin (64.0%), and Ciprofloxacin (45.5%), often taken without professional consultation(Sapkota S *et al*, 2018)

At the University of Benin (UNIBEN), surveys among final-year undergraduates reveal that 86.9% had used antibiotics in the preceding three months, highlighting a significant reliance on self-medication (Akoria, O. & Tudjegbe, 2010)

Key drivers include convenience, prior experience, peer influence, and insufficient knowledge of antibiotic stewardship, with 47.7% of Nigerians engaging in self-medication, exceeding global averages reported by the World Health Organization (WHO, 2023)(Nwankwo C *et al*, 2020)

This widespread misuse contributes significantly to antimicrobial resistance (AMR), a global health crisis. In developing countries like Nigeria, poorly regulated antibiotic access accelerates AMR, with overuse identified as a primary driver (Okeke I *et al,* 1999)

Globally, bacterial AMR caused 1.27 million direct deaths in 2019 and contributed to 4.95 million associated deaths, with projections estimating over 39 million deaths from resistant infections by 2050 if unaddressed (WHO, 2023)

In low- and middle-income countries (LMICs) like Nigeria, AMR increases morbidity, prolongs hospital stays, escalates treatment costs, and reduces the efficacy of essential drugs,

placing a disproportionate burden on healthcare systems with limited surveillance and enforcement (Ayukekbong JA *et al*, 2017)

Despite existing research on antibiotic use in Nigerian healthcare settings, there is a lack of comprehensive data specifically addressing URTI-related antibiotic practices among UNIBEN undergraduates. While studies have explored antimicrobial utilization at UNIBEN's health center (Babaiwa *et al* 2019) targeted surveys on self-medication for URTI in this population are scarce, limiting the ability to design effective interventions

This study is justified as it seeks to address this gap by quantifying the prevalence, patterns, and knowledge deficits surrounding antibiotic use for URTI among UNIBEN undergraduates. The findings will inform targeted educational campaigns, guide policy development for campus health services, and contribute to national strategies for combating Antimicrobial resistance, ultimately promoting rational antibiotic use and reducing resistance risks in this vulnerable population.

1.14 AIM OF STUDY

The aim of this study is to assess the knowledge, attitudes, and practices (KAP) of undergraduate students from the University of Benin, Benin city in the use of antibiotics for the treatment of upper respiratory tract infection.

1.15 OBJECTIVES OF STUDY

1. To assess the prevalence and experience of URTI among University of Benin undergraduate students.

2. To evaluate the extent and pattern of antibiotic use for the treatment of URTI among undergraduate students.

3. To assess students' knowledge about antibiotic use in the treatment of URTI.

4. To determine the attitude of students toward antibiotic use for URTI.

5. To identify the relationship between demographic factors and students' knowledge of antibiotic use for URTI.

6. To provide intervention recommendations regarding the misuse of antibiotics among University of Benin undergraduate students.

These objectives seek to comprehensively understand antibiotic use for URTIs among University of Benin undergraduates, improving health outcomes, reducing AMR risks, and supporting national and global antibiotic stewardship efforts.

CHAPTER TWO

METHODOLOGY

2.0 Study settings

The study was conducted in the University of Benin Benin city, Edo state among undergraduate students. These population criteria selected was used because they are located in a well accessible place and attends to a good number of patients who consumes this antibiotics for upper respiratory tract infections. This would help in my research and will ease data collection

2.1 Study design

The research employed a cross- sectional study to gather data from the University of Benin Benin-city. This was done using a data collection form. Data collected was used to know the dosage patterns and the frequency of purchase and usage of antibiotics for the treatment of upper respiratory tract infections. The study design was a cross- sectional study to which use existing data for investigation and analysis.

2.2 Study population

This research was targeted at students from different departments across different ages, who used antibiotics for treatment of upper respiratory tract infection and the rate at which the purchase of the drugs inside and around the University of Benin Benin City

2.3 Inclusion criteria

Male and female undergraduate students aged 16years and above.

2.4 Exclusion criteria

Male and female 15years and below

Female patients who are pregnant and lactating.

2.5 Sampling technique and sample size

A convenient sampling technique was employed to select eligible students that shall be enrolled in the study. Systematic sampling was used to select students from the University of Benin Benin City.

2.6 Sample size

Convinient sampling technique will be used for selecting a representative sample from the population. The sample size for this study will be calculated using the Slovin formula (Mabunda et al…,2020) from the sample population as stated below:

N=n/1+N(e)^2

Total population of undergraduate students used as at 2025 were selected from four Faculties representing both health science and non science groups of which include Pharmacy (1225) and Basic Medical Sciences (4161) for health science while Education (5517) and Engineering (5388) for non science groups with a total of 16,291

Where,

N=total population N=sample size

e=Error of margin at specified confidence level using confidence level of 95% and percentage

error of 5%(0.05) n=16,291/1+16291(0.05^2) n=16,291 /1+16,291(0.0025) n=390

Therefore sample size is 390

With attrition rate of 10%

10%=10/100=0.1

Sample attrition 390 x 0.1 = 39

Total same with attrition : 390 + 39 = 439

Therefore the sample size is 439 plus attrition error margin

2.7 Study instrument

A questionnaire was structured into distinct sections to address the objectives of the study which was adapted from (Suleiman Mehboob et al…,2022) and modified to suit current study.The questionnaire was divided into four sections(A,B,C,D) with a total of 26 questions. Section A contains questions on social demographics which includes questions on sex ,age, faculty in University of benin and level of study.. Section B contains questions on the experience with Upper Respiratory Tract Infections (URTI). Section C contains questions on the knowledge of antibiotics. Section D contains questions which assesses the attitude towards antibiotic use in the treatment of URTI. Each questions has various opinions and the participants are to tick which of the options where appropriate to them.

2.8 Validation of study instrument

A pretest of 20 questionnaires was done to determine those questions that students are finding difficult to understand. After which a Cronbach's alpha was determined to ensure that the questionnaire met the required standards.

2.9 Data collection

Data was collected by the use of structured questionnaire which will be developed based on study objectives and information obtained from the internet. The questionnaire was distributed to students of the university of benin for assessment of their use of medical history regarding upper respiratory tract infection

2.10 Method of data analysis

The collected was coded and inputted into an excel spreadsheet and analyzed using the statistical package for the social sciences (SPSS). Descriptive statistics was performed to summarize the data collected and the information was presented in the form of tables, percentages.

2.11 Question types

A closed-ended question was used to capture quantitative and qualitative data. Closed-ended questions were employed for demographic information and knowledge assessment.

2.12 Ethical consideration

Ethical approval for this study was obtained from the Ethics Committee of the Faculty of Pharmacy, University of Benin. Participants were fully informed about the purpose of the study, their rights to confidentiality and anonymity, and their freedom to withdraw at any stage without repercussions. Informed consent was obtained from all participants before they engage in the study, ensuring that their involvement is voluntary and based on a clear understanding of the research objectives. Data collected was securely stored and accessible only to me, the researcher, with results reported in aggregate to protect individual identities. Additionally, this study was ensured to avoid any form of coercion, ensuring that participants feel comfortable and respected throughout the research process.

CHAPTER THREE

3.1 RESULT

A total of Four hundred and thirty nine (439) questionnaires were distributed to the participants, eight (8) questionnaires were not properly filled while four hundred and thirty one (431) questionnaires were properly answered and was used for the analysis. This results in the response rate of 97%.

Table 3.1: socio – demographic characteristics

Variables	Frequency (n = 439)	Percentage (%)
Age		
16 - 20 years	169	38.5
21 - 25 years	215	49.0
26 - 30 years	54	12.3
30 years and above	1	0.2
Gender		
Male	238	54.2
Female	201	45.8
Faculty		
Pharmacy	169	38.5
Basic medical science	63	14.4
Education	108	24.6
Engineering	99	22.6
Level of study		
100l	86	19.6

200l	69	15.7
300l	82	18.7
400l	64	14.6
500l	44	10.0
600l	94	21.4

Table 1.1 presents the socio-demographic characteristics of the 439 respondents. The majority of the respondents (49.0%) were between the ages of 21 and 25 years, while 38.5% were aged 16 - 20 years. A smaller proportion (12.3%) were within the 26 - 30 years age group, and only 0.2% were 30 years and above. In terms of gender distribution, 54.2% of the respondents were male, while 45.8% were female, indicating a fairly balanced gender representation.

Regarding faculty, most respondents (38.5%) were from the Faculty of Pharmacy, followed by Education (24.6%), Engineering (22.6%), and Basic Medical Sciences (14.4%). As for the level of study, 600 level students formed the largest proportion (21.4%), followed by those in 100 level (19.6%), 300 level (18.7%), 200 level (15.7%), 400 level (14.6%), and 500 level (10.0%).

In summary, the data indicate that the majority of respondents were young adults, predominantly between 21 and 25 years old, with a nearly equal gender distribution and substantial representation from the faculty of pharmacy.

Table 3.2: Participant's experience with Upper Respiratory Tract Infection (URTI)

Questions	Frequency (n = 439)	Percentage (%)
Have you had a cold; sore throat; or cough (URTI) in the past 6 months?		
No	139	31.7
Yes	300	68.3
How often do you experience URTI?		
Rarely	207	47.2
Once or twice a year	131	29.8
Every few months	82	18.7
Frequently	19	4.3
Have you ever used antibiotics to treat URTI?		
No	95	21.6
Yes	344	78.4
If yes, how often do you use antibiotics for URTI (If no then skip)		
Rarely	144	32.8
Sometimes	220	50.1
Often	51	11.6
Always	24	5.5
Did you complete the last antibiotics prescribed to you?		
No	206	46.9
Yes	233	53.1

Where do you get antibiotics from?		
Pharmacy	386	87.9
Hospital	79	18.0
Friends or family	47	10.7
Leftover medication	45	10.3
Do you need a prescription to get antibiotics where you usually buy them?		
No	283	64.5
Yes	156	35.5

Table 1.2 presents information on respondents' experience with upper respiratory tract infections (URTI) and their use of antibiotics. The majority of the respondents (68.3%) reported having experienced a cold, sore throat, or cough within the past six months, while 31.7% had not. In terms of frequency, 47.2% of respondents indicated that they rarely experience URTI, 29.8% experience it once or twice a year, 18.7% experience it every few months, and 4.3% reported having it frequently.

Most of the respondents (78.4%) admitted to having used antibiotics to treat URTI, while 21.6% had not. Among those who used antibiotics, half (50.1%) reported using them sometimes, 32.8% rarely, 11.6% often, and 5.5% always. When asked whether they completed their last prescribed antibiotic dose, 53.1% stated yes, while 46.9% did not complete the course, indicating a tendency toward incomplete antibiotic adherence among some participants.

Regarding sources of antibiotics, the majority (87.9%) obtained them from pharmacies, followed by hospitals (18.0%), friends or family (10.7%), and leftover medication

(10.3%). Finally, 64.5% of the respondents reported that they could purchase antibiotics without a prescription, while 35.5% indicated that a prescription was required.

Table 3.3: Participant's response to knowledge question

Questions	NO	YES	NOT SURE
Are antibiotics effective for treating viral infections like sore throat?	211(48.1%)	95(21.6%)	133(30.3%)
Is it okay to stop taking antibiotics when you feel better?	104(23.7%)	272(62.0%)	63(14.4%)
Can antibiotics be used for prevention of URTI?	213(48.5)	78(17.8%)	148(33.7%)
Can antibiotics be used to treat URTI?	356(81.1%)	23(5.2%)	60(13.7%)
Must antibiotic dosage always be completed?	27(6.2%)	326(74.3%)	86(19.6%)
Are antibiotics prescribed for URTI as first choice treatment?	179(40.8%)	85(19.4%)	175(39.9%)
Can the body fight off URTI on its own without antibiotics?	89(20.3%)	206(46.9%)	144(32.8%)
Would taking less than the prescribed dose led to resistance	57(13.0%)	244(55.6%)	138(31.4%)
Can antibiotics cause side effects?	19(4.3%)	307(69.9%)	133(25.7%)

Table 3.3 presents participants' responses assessing their knowledge of antibiotic use in the management of upper respiratory tract infections (URTI). A larger proportion of respondents

(48.1%) correctly stated that antibiotics are not effective for treating viral infections such as sore throat, while 21.6% believed they are effective and 30.3% were not sure.When asked whether it is acceptable to stop taking antibiotics once they feel better, the majority (62.0%) responded Yes, 23.7% said No, and 14.4% were unsure. Regarding the use of antibiotics for the prevention of URTI, 48.5% of participants answered Yes, while 17.8% said No and 33.7% were not sure.

Most respondents (81.1%) answered Yes when asked if antibiotics can be used to treat URTI, while 5.2% said No and 13.7% were unsure. On whether antibiotic dosage must always be completed, a majority of respondents (74.3%) answered Yes, while 6.2% said No and 19.6% were not sure. When asked whether antibiotics are prescribed as the first-choice treatment for URTI, 40.8% responded No, 19.4% said Yes, and 39.9% were unsure.

Concerning whether the body can fight off URTI on its own without antibiotics, 46.9% of respondents answered Yes, 20.3% said No, and 32.8% were not sure. More than half of the participants (55.6%) indicated Yes when asked if taking less than the prescribed antibiotic dose could lead to resistance, while 13.0% said No and 31.4% were not sure. Finally, when asked whether antibiotics can cause side effects, 69.9% responded Yes, 4.3% said No, and 25.7% were not sure.

Table 3.4: summary of the knowledge level

Variables	Frequency (n = 439)	Percentage (%)
Poor knowledge	164	37.4
Good knowledge	275	62.6

Table 3.4 presents the overall knowledge level of participants regarding antibiotic use for upper respiratory tract infections (URTI). Out of the total respondents, 275 (62.6%) demonstrated good knowledge, while 164 (37.4%) exhibited poor knowledge of antibiotic use. This distribution shows that a higher proportion of participants had an adequate understanding of appropriate antibiotic use compared to those with limited knowledge.

Table 3.5: Participant's response to Attitude questions

Questions	NO	YES	NOT SURE
Do you prefer to use antibiotics for URTI rather than wait for it to resolve?	117(26.7%)	252(57.4%)	70(15.9%)
Do you keep antibiotics left over for future use?	162(36.9%)	256(58.3%)	21(4.8%)
Have you ever used antibiotics given by friends and family?	102(23.2%)	320(72.9%)	17(3.8%)
Will you get antibiotics from another pharmacy if the pharmacists insist on not using?	268(61.0%)	109(24.8%)	62(14.1%)
Do educational campaigns help reduce antibiotics misuse?	30(6.8%)	352(80.2%)	57(13.0%)

Table 3.5 presents participants' attitudes toward antibiotic use for upper respiratory tract infections (URTI). More than half of the respondents (57.4%) indicated that they prefer to use antibiotics for URTI rather than wait for it to resolve on its own, while 26.7% said No and 15.9% were not sure.

A majority (58.3%) reported that they keep leftover antibiotics for future use, whereas 36.9% said No and 4.8% were not sure.Most respondents (72.9%) admitted to using antibiotics given by friends or family, while 23.2% denied doing so and 3.8% were unsure. When asked

whether they would obtain antibiotics from another pharmacy if a pharmacist refused to sell, 61.0% said No, 24.8% said Yes, and 14.1% were not sure. Lastly, a large proportion of respondents (80.2%) agreed that educational campaigns can help reduce antibiotic misuse, while 6.8% disagreed and 13.0% were uncertain.

Table 3.6: Relationship between socio – demographic factors and knowledge of URTI

Variables	**Poor Knowledge**	**Good Knowledge**	**P – Value**
	N (%)	**N (%)**	
Age			0.004
16 - 20 years	79(17.9)	90(20.5)	
21 - 25 years	70(15.9)	145(33.0)	
26 - 30 years	14(3.2)	40(9.1)	
30 years and above	1(0.2)	0(0)	
Gender			0.018
Male	77(17.5)	161(36.7)	
Female	87(19.8)	114(25.9)	
Faculty			< 0.001
Pharmacy	43(9.8)	126(28.7)	
Basic medical science	20(4.6)	43(9.7)	
Education	48(10.9)	60(13.6)	
Engineering	53(12.1)	46(10.5)	
Level of study			< 0.001
100l	56(12.7)	30(6.8)	
200l	24(5.4)	45(10.3)	

300l	33(7.5)	49(11.2)
400l	19(4.3)	45(10.3)
500l	26(5.9)	18(4.1)
600l	6(1.4)	88(20.0)

Table 3.6 shows the relationship between participants' socio-demographic characteristics and their level of knowledge regarding upper respiratory tract infections (URTI). With respect to age, the majority of respondents with good knowledge were between 21 - 25 years (33.0%), followed by those aged 16 - 20 years (20.5%), and 26 - 30 years (9.1%), while only 0.2% of those aged 30 years and above had poor knowledge. The association between age and knowledge level was statistically significant ($p = 0.004$).

In terms of gender, males (36.7%) demonstrated a higher proportion of good knowledge compared to females (25.9%), while 19.8% of females had poor knowledge. This difference was statistically significant ($p = 0.018$). Regarding faculty, participants from the Faculty of Pharmacy (28.7%) and Basic Medical Sciences (9.7%) showed higher levels of good knowledge compared to those from Education (13.6%) and Engineering (10.5%) faculties. The difference across faculties was statistically significant ($p < 0.001$). For level of study, respondents in 600 level (20.0%) and 400 level (10.3%) had the highest proportions of good knowledge, while poor knowledge was more common among those in 100 level (12.7%). This relationship between level of study and knowledge of URTI was also statistically significant ($p < 0.001$).

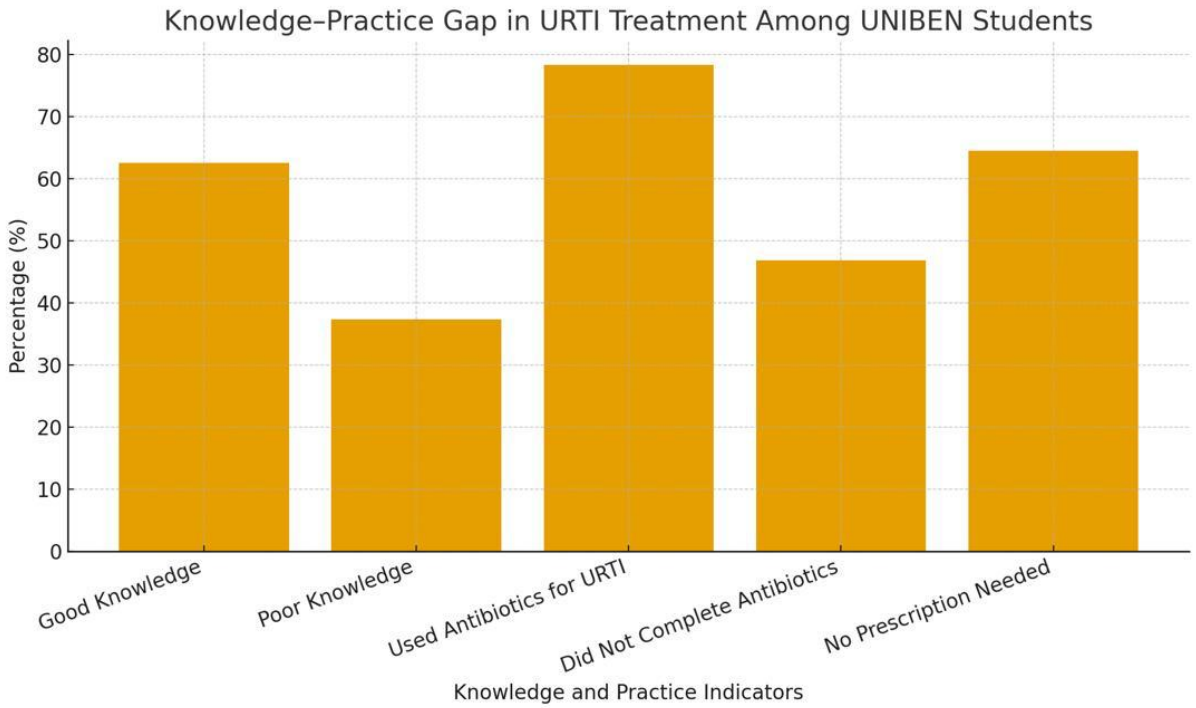

Table 3.7 knowledge-Practice Gap in URTI treatment Among UNIBEN students

3.2 SUMMARY OF RESULT

Table 3.7 shows the bar chart illustrating the knowledge–practice gap in the treatment of upper respiratory tract infections (URTI) among University of Benin students.

It highlights how, despite 62.6% having good knowledge, a much higher percentage (78.4%) still use antibiotics for URTI, 46.9% do not complete their antibiotic course, and 64.5% obtain antibiotics without prescriptions indicating a clear gap between knowledge and practice.

CHAPTER FOUR

DISCUSSION

The questionnaire results comprised the demographic profile of respondents and the responses to each of the statements in the questionnaire were assessed. Most participants (49.0%) were aged 21 to 25 years, with the next largest group (38.5%) aged 16 to 20 years. This age range indicates a predominantly young population, characteristic of university students. Regarding gender, 54.2% were male and 45.8% were female, indicating a relatively even gender balance. The majority of participants came from the Faculty of Pharmacy (38.5%), with the next largest groups from Education (24.6%), Engineering (22.6%), and Basic Medical Sciences (14.4%). This variety indicates a wide range of awareness and differing knowledge levels about URTIs and antibiotics among students from various fields of study.

4.1 Demographic Characteristics and Their Influence

The study found that respondents had different degrees of awareness about antibiotic use. Students enrolled in health-related faculties like Pharmacy and Basic Medical Sciences showed a greater understanding of appropriate antibiotic use than those in non-health faculties. Participants from the Faculty of Pharmacy (28.7%) and Basic Medical Sciences (9.7%) showed higher levels of good knowledge compared to those from Education (13.6%) and Engineering (10.5%) faculties. Respondents in 600 level (20.0%) and 400 level (10.3%) had the highest proportions of good knowledge, while poor knowledge was more common among those in 100 level (12.7%). With respect to age, the majority of respondents with good knowledge were between 21 – 25 years (33.0%), followed by those aged 16 - 20 years

(20.5%), and 26 - 30 years (9.1%), while only 0.2% of those aged 30 years and above had poor knowledge. This highlights that younger adults, especially those between 21 and 25, were more knowledgeable about appropriate antibiotic use for URTI compared to older age groups.

4.2 Experience with Upper Respiratory Tract Infections (URTI)

The results of this study showed that a large number of participants had encountered at least one instance of an upper respiratory tract infection (including symptoms like cough, sore throat, or common cold) in the past six months. This elevated rate is consistent with findings from other research conducted in university settings, where URTIs were commonly reported as one of the most prevalent illnesses among students. The notable frequency could be linked to factors such as crowded accommodations, stress, communal facilities, and exposure to environmental risks typical of university environments.(Valentine U *et al 2010)*

Numerous studies have shown that the frequent use of medications by these respondents, often without a valid reason or a doctor's approval, may be due to inadequate knowledge about correct drug usage and the ready availability of these medicines without requiring a prescription. (Esan *et al,* 2019)

4.3 Use of Antibiotics for (URTI)

The study findings revealed that a significant portion of respondents misused antibiotics for URTIs. This outcome differs from the study by Llor and Bjerrum (2014). However, it is consistent with the research by (Valentine U Odili 2010), which indicated that approximately one-third of respondents used antibiotics to alleviate symptoms such as sore throat, cough, and nasal congestion.

The majority of the respondents (68.3%) reported having experienced a cold, sore throat, or cough within the past six months, as for frequency, 47.2% experienced URTI rarely, 29.8% once or twice a year, 18.7% every few months, and 4.3% frequently. URTIs were therefore common among students. Many respondents who had suffered from upper respiratory tract infections reported using antibiotics during their illness(78.4%), while 50.1% used them "sometimes," 32.8% "rarely," 11.6% "often," and 5.5% "always." 53.1% completed their last antibiotic course, while 46.9% did not, showing poor adherence. 64.5% could purchase antibiotics without prescriptions, indicating high self-medication. even though the majority of URTIs are caused by viruses and typically resolve without treatment. This observation aligns with Nigerian studies that reveal widespread antibiotic misuse for viral respiratory infections, such as findings from a national survey on antibiotic self-medication in Nigeria.(Popoola *et al, 2024)*

The misuse of antibiotics in upper respiratory tract infections continues to be a key factor contributing to antimicrobial resistance, a concern that is gaining growing attention from both international and national health organizations. The study reveals that 46.9% did not complete the course of their last antibiotic usage, indicating a tendency toward incomplete antibiotic adherence among some participants. Regarding sources of antibiotics, the majority (87.9%) obtained them from pharmacies, followed by hospitals (18.0%), friends or family (10.7%), and leftover medication (10.3%). This result can be attributed to several factors. Primarily, pharmacists, being the final healthcare professionals which patients encounter, have a crucial role in advising on prescription and non-prescription medications (Ventola, 2015).

The research also showed that a significant number of respondents engaged in self-medicating with antibiotics. Approximately 64.5% of the respondents reported that they could

purchase antibiotics without a prescription, while 35.5% indicated that a prescription was required.

This aligns with observations in Nigeria, where antibiotics are frequently dispensed without a prescription at community pharmacies, fueling misuse.(Gladys et al,2025)

The reasons cited by respondents for using antibiotics were the need for rapid recovery, previous positive experiences, and influence from peers. More than half of the respondents (57.4%) indicated that they prefer to use antibiotics for URTI rather than wait for it to resolve on its own. A majority (58.3%) reported that they keep leftover antibiotics for future use, most respondents (72.9%) admitted to using antibiotics given by friends or family while the presence of leftover antibiotics from earlier prescriptions promotes self-medication and failure to complete treatment courses, when asked whether they would obtain antibiotics from another pharmacy if a pharmacist refused to sell, while 61.0% said No, 24.8% said Yes. This behavior has been reported in reviews on antibiotic self-medication, which highlight that respiratory symptoms are commonly one of the main reasons for this practice.(Sachdev 2022)

4.4 Knowledge of Antibiotic Use

The study found that respondents demonstrated different degrees of understanding about antibiotic use. Among all respondents, 275 (62.6%) showed a strong understanding of antibiotic use, whereas 164 (37.4%) displayed poor knowledge. 48.1% correctly recognized that antibiotics are not effective for viral infections. This indicates that most participants possessed sufficient awareness of proper antibiotic use, surpassing those with inadequate knowledge. This pattern aligns with results from community KAP (knowledge, attitude, practice) research in Nigeria. For instance, a study conducted in Ikeja, Lagos found that while a majority of participants possessed good knowledge about antibiotics, deficiencies were still

observed in their attitudes and behaviors, including failure to complete antibiotic courses. (Abiola O, 2023).

Many respondents also stop taking their medication as soon as they experience symptom relief instead of finishing the full prescribed course. When asked whether it is acceptable to stop taking antibiotics once they feel better, the majority (62.0%) responded Yes. This pattern is frequently observed in Nigeria, for instance, in the article "Curbing the Menace of Antimicrobial Resistance in Nigeria," (Imade E, 2024) some participants confessed to halting antibiotics once their symptoms improved. This behavior is a known factor in the development of antibiotic resistance and the recurrence of infections.

Many students also believe educational campaigns would help reduce misuse of antibiotics for the treatment of upper respiratory tract infections(80.2%). This finding is is par with that of studies carried out for Nigerian pre- and post-intervention study which demonstrated that an educational campaign significantly improved students knowledge of antimicrobial resistance (AMR) and appropriate antibiotic use. After the campaign, participants showed enhanced awareness, reduced misconceptions, and better attitudes toward antibiotic stewardship. The authors concluded that educational interventions are effective tools in promoting responsible antibiotic practices and combating AMR among students.(Orok E. *et al*. 2025)

4.5 IMPLICATIONS FOR PRACTICE

Student-targeted antibiotic stewardship education

Universities need to develop customized educational initiatives, such as workshops and course modules, to enhance students understanding of antibiotic use, with a specific focus on

differentiating between viral and bacterial infections. Research conducted at a Nigerian university revealed that just 8% of students had “good” knowledge about antibiotics, and misuse was widespread. (Onukansi, 2025)

Strengthening Pharmacy Dispensing Regulations

Given that majority (87.9%) obtained antibiotic medications for URTI from pharmacies, greater enforcement of laws restricting antibiotic sales to prescription-only is vital. Pharmacists in the community should receive support and training to deny sales without prescriptions and to counsel patients on distinguishing viral from bacterial infections.

It is important to promote and equip pharmacists and patent medicine vendors with the skills to comply with prescription-only antibiotic policies, educate patients effectively, and discourage the practice of self-medication. Research conducted in community pharmacies in Southwest Nigeria revealed a significant prevalence of antibiotic requests and sales occurring without proper prescriptions.(Akande-Sholabi, 2023)

Integration of Point-of-Care Diagnostics and Culture Testing Support

To reduce antibiotic misuse caused by diagnostic uncertainty, universities and local clinics should implement rapid viral diagnostic technologies, such as multiplex Polymerase Chain Reaction for respiratory pathogens, alongside symptom-based tools like the Centor or McIsaac scoring systems to decide when to use rapid antigen detection tests or throat cultures for pharyngitis. Healthcare centers, including university health services, need to expand access to microbiological testing and symptom based algorithms to support targeted antibiotic use instead of relying on empirical treatment for upper respiratory tract infections.

Evidence from a review in Nigeria showed that only about 23% of secondary healthcare facilities had operational microbiology laboratories, while approximately 87% of respiratory

tract infection cases were treated with empirical antibiotic prescribing.(Esther *et al.* Discover Public Health, 2025)

4.6 IMPLICATION FOR POLICY

Stricter enforcement of Antibiotic Prescription Regulations And Public Health Campaigns on Antibiotic Use Targeting Youth

Peer influence (10.7%) significantly impact antibiotic recommendations, emphasizing the importance of awareness programs led by peers and digital media. Utilizing social media and student organizations to spread accurate information about URTI treatment and the dangers of antimicrobial resistance is essential. Additionally, policymakers need to enforce the sale of antibiotics strictly through prescriptions by licensed healthcare providers and regulate informal distribution networks. Campaigns recommended by WHO that utilize infographics and brief videos have effectively changed public behavior in resource-limited environments (WHO, 2023). In Nigeria, the enforcement of regulations is poor, allowing antibiotics to be easily accessed without prescriptions, which contributes to their misuse and the rise of antimicrobial resistance.(Olagunju J *et al.* 2025)

Strengthening National Action Plans on Antimicrobial Resistance With University-Based Interventions, Surveillance and Research Expansion

This research's limited focus highlights the need for a nationwide monitoring system to track antibiotic usage trends in tertiary institutions. Creating an AMR research center led by UNIBEN, in partnership with the NCDC(National Center of Disease Cobtrol), would provide continuous data to support evidence-based policymaking. Health authorities should

incorporate university health services into the national AMR strategies by monitoring antibiotic use among students, conducting prescription reviews, and fostering connections between universities and local communities. Collaborative research conducted across Nigeria has identified differences in resistance patterns by region, which are essential for developing targeted intervention strategies.(Howard JC, 2020) A review of Nigeria's healthcare system highlights significant policy deficiencies and inadequate infrastructure that hinder effective AMR control, emphasizing the importance of including institutions like universities in the response efforts.(Esther *et al.* 2025)

4.7 LIMITATIONS OF THE STUDY

Although this study offers important insights into the knowledge, attitudes, and practices related to antibiotic use for upper respiratory tract infections (URTIs) among university students, it is important to recognize certain limitations

Self Reported Data

The study used self-administered questionnaires, which means the data depended on participants' own reports and was therefore vulnerable to recall bias and social desirability bias. Some respondents might have downplayed their self-medication habits or exaggerated their understanding of antibiotic use to present themselves as more health-aware or compliant.

Cross Sectional Design

The study employed a cross-sectional design, collecting data at one particular moment. Consequently, it could not determine cause-and-effect links between factors like knowledge

and antibiotic use behavior. To observe changes in behavior over time, longitudinal research would be necessary.

Limited Generalizability

The results were drawn from students at the University of Benin and might not accurately reflect the knowledge, attitudes, and practices of students from other Nigerian universities or different groups like non-students or rural populations. Variations in education, socio-economic factors, and healthcare access could lead to different outcomes in other settings.

Sampling and Response Bias

Despite achieving a high response rate, participation was voluntary, which may have resulted in a sample biased toward individuals more engaged with health topics. This possible selection bias could have caused an overestimation of awareness and attitudes regarding responsible antibiotic use.

Lack of Clinical Verification

The study did not include laboratory or clinical confirmation of URTI diagnoses or antibiotic prescriptions. Consequently, reported antibiotic use and infection history were based solely on participant self-report, which may not always align with medical records or diagnostic standards.

Limited Scope of Variables

Some important factors like economic status, healthcare access, and the impact of online health information were not thoroughly examined. Considering these variables might have offered a more comprehensive insight into the causes of antibiotic misuse among students.

Exclusion of Prescribers Perspective

The study concentrated solely on the students' knowledge and behaviors, leaving out the perspectives of prescribers and pharmacists in the university setting. Incorporating views from these professionals could provide a more comprehensive understanding of antibiotic prescribing and dispensing patterns.

Sample Size and Representation

While sufficient for the study location, the sample might not comprehensively reflect all faculties, academic years, or living arrangements (on-campus versus off-campus), which could bias the results toward more accessible or health-aware groups.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

This study evaluated the knowledge, attitudes, and practices related to antibiotic use for treating Upper Respiratory Tract Infections (URTIs) among students at the University of Benin. Results showed that although most students had experienced one or more URTI episodes, many engaged in improper antibiotic use, frequently self-medicating without valid prescriptions. The widespread misuse of antibiotics identified in this study represents a serious public health issue. While many students had a basic understanding of antibiotic use, misconceptions were common especially the false belief that antibiotics are effective against viral infections. Contributing factors included easy access to antibiotics without prescriptions, peer influence, prior antibiotic use, and limited awareness of antimicrobial resistance (AMR). These outcomes highlight the critical need for focused health education and awareness initiatives within the university to encourage responsible antibiotic use. Pharmacists and healthcare providers play a key role in guiding students on proper antibiotic indications and discouraging self-medication. Additionally, university health authorities should enhance antibiotic stewardship efforts, enforce strict prescription policies for dispensing antibiotics, and incorporate AMR education into academic programs across all faculties. In summary, URTIs remain prevalent among university students, but inappropriate antibiotic use for these infections significantly fuels the growing problem of antimicrobial resistance. Coordinated educational, clinical, and policy interventions are vital to promote the rational use of antibiotics and preserve their effectiveness for future generations

5.1 RECOMMENDATIONS

Promote Antibiotic Stewardship Programs in University Health Centers And Integrate Antimicrobial Stewardship into University Curricula

The university medical center should create an antibiotic stewardship team composed of pharmacists, physicians, and microbiologists to ensure proper antibiotic use and to track prescription trends. WHO recommends antibiotic stewardship programs as an effective strategy to reduce inappropriate antibiotic use and resistance (WHO, 2023).

Strengthen Health Education and Awareness Campaigns

Ongoing educational initiatives are essential to enhance students' knowledge about the causes of URTIs, the function of antibiotics, and the risks of improper use. Regular health talks, posters, and workshops should be conducted throughout various faculties, with particular focus on non-medical students. Educational interventions have been shown to improve antibiotic use behavior among university students (BMC Medical Education, 2025)

Enforce Prescription-Only Dispensing of Antibiotics

Community pharmacies and patent medicine stores in and around the university must strictly follow prescription rules. The Pharmacists Council of Nigeria (PCN) and the National Agency for Food and Drug Administration and Control (NAFDAC) should strengthen enforcement efforts to stop the sale of antibiotics without prescriptions. A nationwide study in Nigeria found that more than 60% of antibiotics are distributed without a prescription (Journal of Pharmaceutical Policy and Practice, 2023).

Improve Access to Diagnostic and Laboratory Testing

The UNIBEN Health Centre should be provided with rapid diagnostic tools such as CRP tests and streptococcal antigen tests to assist in managing URTIs. Healthcare personnel should

receive training to apply clinical algorithms like the Centor criteria prior to prescribing antibiotics. Research conducted in Nigeria indicated that insufficient diagnostic capabilities play a major role in the overuse of antibiotics (Antimicrobial Resistance & Infection Control, 2025).

Establish Monitoring and Research Programs on Antibiotic Use in Universities

Regular surveillance studies should be carried out at the university to track trends in URTI cases, antibiotic usage, and the emergence of resistance. The information gathered will help shape policies and inform health interventions. The Global AMR Surveillance System (GLASS) highlights the importance of collecting local data as a fundamental element for shaping national antibiotic policies (WHO GLASS Report, 2024).

Promote Public Health Campaigns Beyond the Campus

Health education initiatives should go beyond the university and target the surrounding community, such as local markets, hostels, and pharmacies. This approach can contribute to lowering antibiotic misuse among the general population. Community outreach campaigns in Nigeria have notably increased antibiotic resistance awareness and decreased instances of self-medication (PLOS ONE, 2023).

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APPENDIX

QUESTIONNAIRE

I am a 600-level pharmacy student, university of Benin, Benin city, Edo state. This questionnaire is designed to survey the use of antibiotics in Upper Respiratory Tract Infection among undergraduate students of the university of Benin in partial fulfillment of the requirements for the award of a Doctor of Pharmacy Degree in the Faculty of Pharmacy. This is strictly for research purposes and information provided will be treated with utmost confidentiality. Please tick the correct box and do not leave any questions unanswered. For multiple-choice questions, please tick the option that best describes your answer. If you have any questions, please contact the researcher at [09016121030]

Socio-Demographic Information (please fill and tick accordingly)

Age: _____

Sex: ☐ Male ☐ Female

Faculty: _____

Level of study: ☐ 100 ☐ 200 ☐ 300 ☐ 400 ☐ 500 ☐ 600

Experience with Upper Respiratory Tract Infection (URTI) (please tick accordingly) 5. Have you had a cold, sore throat, or cough (URTI) in the last 6 months? ☐ Yes ☐ No

How often do you experience URTI?

☐ Rarely ☐ Once or twice a year ☐ Every few months ☐ Frequently

Use of Antibiotics

Have you ever used antibiotics to treat URTI☐ Yes ☐ No

If yes, how often do you use antibiotics for URTI?

☐ Always ☐ Often ☐ Sometimes ☐ Rarely

Did you complete the last antibiotics prescribed to you? ☐ Yes ☐ No

Where do you get antibiotics from? (You may select more than one)

☐ Pharmacy ☐ Hospital ☐ Friends or family ☐ Leftover medication

Do you need a prescription to get antibiotics where you usually buy them? ☐ Yes

☐ No

Knowledge About Antibiotics (please tick accordingly)

	YES	NO	NOT SURE
Are antibiotics effective for treating viral infections like sore throat?			
Is it okay to stop taking antibiotics once you feel better?			
Can antibiotics be used for the prevention of URTI			
Can antibiotics cause side effects?			
Must antibiotics dosage be completed always?			
Are antibiotics prescribed for URTI as first choice drug?			
Can the body fight off URTI on its own without anyibiotics?			
Would taking less than the prescribed dose lead to resistence			
Can antibiotics be used to treat URTI			

Attitudes Toward Antibiotic Use (please tick accordingly)

	YES	NO	NOT SURE
Do you prefer to use antibiotics rather than wait for a URTI to resolve?			
Do you keep antibiotics left over for future use			
Have you ever used antibiotics given by friends and family?			
Will you get antibiotics from another pharmacy if the pharmacist insist on not using			
Do educational campaigns help reduce antibiotics misuse?			