

# Unveiling Awareness: Exploring Antibiotic Hypersensitivity among International Islamic University Malaysia (IIUM) Undergraduates in Kuantan, Pahang

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## ABSTRACT

**Background:** The condition known as antibiotic hypersensitivity, or antibiotic allergy, poses serious problems for the medical field. Despite its importance, little is known about the awareness of antibiotic hypersensitivity, particularly among undergraduate students in Malaysia. The purpose of this study is to assess the awareness of antibiotic hypersensitivity among IIUM Kuantan undergraduate students to improve drug allergy education and healthcare practices.

**Methods:** A general qualitative design was used to conduct the study. Semi-structured interviews were used to gather information about the awareness of antibiotic hypersensitivity. Due to their similar prevalence of antibiotic hypersensitivity, medical students served as a representative sample of Malaysia's adult population among undergraduate students from a variety of faculties. Thematic analysis was used to analyse the data.

**Results:** Six people in all were enlisted to take part in the study. Most of the participants were female Malay students at International Islamic University Malaysia (IIUM) Kuantan Campus, Pahang, Malaysia. Two primary themes emerged from the study: (1) Antibiotic hypersensitivity awareness and (2) Factors contributing to antibiotic hypersensitivity. This finding indicated that students' knowledge of antibiotic hypersensitivity is still lacking.

**Conclusion:** The research found evidence to suggest that additional intervention is necessary to raise awareness within the current community. Putting skill training into practice could be a good way to raise students' awareness in this area. On the other hand, more information is needed to determine the precise kind of skill training that Malaysia should adopt.

**Keywords:** Antibiotic hypersensitivity; Awareness; Undergraduate students; Drug allergy; Antibiotic stewardship

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## INTRODUCTION

Antibiotic hypersensitivity, often referred to as antibiotic allergy, poses significant challenges in healthcare due to potential adverse reactions and the unnecessary use of alternative antibiotics. Despite its importance, research on the awareness of antibiotic hypersensitivity, particularly among Malaysian undergraduate students, is limited. Drug hypersensitivity refers to symptoms triggered by a normally tolerated drug dose, while drug allergy, as defined by the World Allergy Organization, is an immune-mediated reaction (1). Allergic reactions can be immediate or non-immediate, ranging from mild symptoms like rashes to severe conditions such as anaphylaxis (2,3).

Antibiotics, especially penicillin, are the most common causes of life-threatening allergic reactions, making it crucial for healthcare providers to inquire about drug allergies before prescribing medications (4). In Malaysia, about 10% of individuals report penicillin allergies, although true allergies are less common (5). This study focuses on undergraduate students at International Islamic University Malaysia (IIUM) Kuantan Campus, Pahang, Malaysia to assess their awareness of antibiotic hypersensitivity, aiming to improve educational efforts and healthcare practices regarding drug allergies. The research aims to understand the level of awareness, experiences of allergic reactions, and factors influencing awareness among these students. The findings will help guide healthcare providers in educating patients about allergy symptoms and management, ultimately enhancing public health awareness.

## LITERATURE REVIEW

A systematic search was conducted across reputable academic databases to obtain comprehensive and relevant information on undergraduate students' knowledge of antibiotic allergy. The databases utilized will include PubMed, ScienceDirect, and Scopus. The search -focused on peer-reviewed articles published within the last five years to ensure the inclusion of recent research findings. The search was employed keywords such as 'assessing,' 'awareness,' 'knowledge,' 'antibiotic allergy,' and 'student.' Additionally, relevant synonyms and subject headings was used to broaden the scope of the search. This approach

aims to capture a wide range of studies related to the topic.

Antibiotics are designed to treat bacterial infections, but there is widespread misuse for viral infections, such as colds and flu, due to misconceptions held by about 80% of people (6). This misunderstanding persists across various demographics, with many adults in developing countries unable to distinguish between bacterial and viral infections (7). While medical students generally show high knowledge regarding antibiotics for bacterial infections (91.8%), a smaller percentage (35.7%) recognize that antibiotics are ineffective against viral infections (8). Moreover, awareness of the ineffectiveness of antibiotics for viral infections and the correct understanding of their usage still needs improvement (9).

Regarding antibiotic allergies, knowledge is generally satisfactory but varies significantly. Around 75.8% of students are (5)aware that antibiotics can cause allergies (6). Still, specific knowledge of adverse effects, like diarrhoea and rashes, is less common (10). Various studies have documented adverse reactions, with cutaneous responses being the most prevalent. However, awareness of these reactions is inconsistent, with only 54.5% of participants in a Saudi Arabian study identifying allergies caused by antibiotics (9). Understanding antibiotic allergies is also limited among healthcare professionals, compounded by factors such as insufficient patient knowledge and inadequate reporting of adverse drug reactions (11). Detailed patient histories and thorough examinations are crucial to improving awareness and preventing medical errors. In contrast, age, gender, family history, and other allergies influence self-reported drug hypersensitivity reactions (12).

## METHODS

The study utilizes a general qualitative design to explore knowledge of antibiotic hypersensitivity. The research employs flexible sample sizes and data collection methods, such as semi-structured interviews, to enable participants to express themselves comfortably. The IIUM Kuantan Campus is chosen as the setting due to its medical-centric focus. The target population consists of undergraduate students from various faculties, with medical students representing the general adult population in Malaysia, as they have a similar

prevalence of antibiotic hypersensitivity. Purposive sampling will select participants based on specific inclusion and exclusion criteria, ensuring the collection of relevant data. Eligible participants must be 18 to 40, fluent in Malay or English, and easily accessible. The sample size will be determined by achieving data saturation, where no new information is obtained, to ensure sufficient but not excessive sample sizes for maintaining research quality. The data was analysed using thematic analysis using NVivo. The study obtained ethical approval from Kulliyah of Nursing Postgraduate Research Committee (KNPGRC) and IIUM Research Ethical Committee (IREC).

## FINDINGS

Most participants were female and Malay. The distribution across faculties was as follows: Nursing 33.3%, Medicine 16.7%, Pharmacy 16.7%, Dentistry 16.7%, and Science 16.7%- The participants are within 19-22 years old. Despite several attempts, there were no voluntary participants from Allied Health Science. Based on the thematic analysis, two main themes were finalised which is awareness to antibiotic hypersensitivity and factors leads to the antibiotic hypersensitivity.

### Awareness To Antibiotic Hypersensitivity

The study revealed varying levels of understanding among participants regarding the use of antibiotics. Most participants correctly identified antibiotics as a treatment for bacterial infections. They recognized that antibiotics are ineffective against viral infections and do not alleviate pain and inflammation. Quotes from participants emphasize this understanding:

*"Medicine used to treat the bacterial infection, where they work by killing or inhibiting the growth of bacteria. So, it helps the body's immune system fight off infection."*

(Sepia)

*"Medication used to treat bacterial infection."*

(Milah)

*"Antibiotics are used to control bacterial infections."*

(Lina)

*"Antibiotic medication can fight bacterial infections in humans and animals. Besides that, it kills bacteria and makes it harder for them to grow and multiply."*

(Wish)

However, some participants mistakenly believe that antibiotics can treat both bacterial and viral infections or can be used to reduce pain and inflammation. For example:

*"I believe that antibiotics are used to treat bacterial and viral infections."*

(Rose)

*"Some people also believe that antibiotics cannot treat viral infections, but they can be used to reduce pain and inflammation."*

(Mia)

Regarding sources of information on antibiotic allergies, most participants were well-informed and cited reliable sources such as government websites, like the Ministry of Health's Portal MyHealth, and published articles on PubMed. Participants also valued information from medical professionals and educational resources, emphasising proper education's importance in understanding antibiotic use and hypersensitivity.

*"I check websites like KKM and the pharmacy. I use the KKM MyHealth Portal."*

(Milah)

*"I use websites from the internet, and I prefer to use the MyPortal Health from KKM and also some articles on PubMed."*

(Rose)

*"I use the KKM Portal, Portal MyHealth."*

(Lina)

*"I think the sources come from medical doctors and our education."*

(Sepia)

*"I know from studying nursing."*

(Milah)

*"I rely on medical literature or clinical guidelines like IDSA, or WHO, or CDC."*

(Wish)

The participants clearly understood the indications for antibiotic use. They acknowledged that antibiotics are prescribed for bacterial infections, not viral infections like

the flu. Misuse of antibiotics can lead to resistance, making future treatments less effective. Participants also showed awareness of symptoms that require antibiotic treatment, such as persistent fever, sore throat, and infections like eczema.

"Antibiotics are important to treat infections. When we have a fever or maybe we have rashes like eczema, they give antibiotics."

(Sepia)

"If we have a fever for several days, the doctor will prescribe antibiotics."

(Milah)

"Signs and symptoms of infection like fever or infection."

(Rose)

"Assess symptoms such as a high fever, persistent cough with mucus or sore throat, and an illness lasting longer than one week, as these may indicate a bacterial infection."

(Wish)

Participants recognized that antibiotics should only be used when a specific bacterial infection is identified to prevent misuse. They also understood that antibiotics are not effective in treating the flu or a cold, demonstrating a deep understanding of proper antibiotic use.

"It is necessary to determine the cause, specifically bacteria, before administering antibiotics. Sore throats are typically caused by bacteria. It is important to know the cause, the specific bacteria, to determine whether antibiotics can cure the infection."

(Lina)

"Antibiotics cannot treat the flu or a cold."

(Wish)

In dental cases, antibiotics were found to be prescribed for gum infections, highlighting their specific use in treating bacterial infections in different parts of the body.

"I was advised to take antibiotics because of swelling in my teeth."

(Wish)

The study also explored participants' experiences with antibiotic hypersensitivity, revealing a range of symptoms from mild rashes to severe anaphylactic shock. Common

symptoms included skin reactions, gastrointestinal issues, and, in severe cases, difficulty breathing. Participants emphasized the importance of immediate treatment for severe reactions to prevent complications.

"I experienced rashes, lymph node swelling, redness, itchiness, and ultimately, difficulty breathing due to anaphylactic shock."

(Milah)

"I understand that antibiotics can cause skin rashes as a side effect. I have personally experienced skin rashes and shortness of breath as a result."

(Rose)

"Difficulty breathing, eye and facial swelling, followed by rashes."

(Lina)

"Shortness of breath, rashes, and vomiting."

(Mia)

"Anaphylaxis reaction. Skin reactions, such as urticarial, experiencing shortness of breath, and swelling of the face, lips, and tongue."

(Wish)

"Nausea and vomiting, followed by diarrhoea."

(Mia)

"Symptoms like rashes, itchiness, and swelling on the face and eyes, followed by symptoms like nausea and diarrhoea."

(Wish)

One participant mentioned that frequent use of antibiotics due to a condition like eczema could lead to yeast infections. This highlights the importance of carefully managing antibiotic use.

"It disrupts my growth and sometimes leads to yeast infections."

(Sepia)

Overall, the study emphasizes the importance of proper antibiotic use and education to prevent misuse and resistance and the need to be aware of potential allergic reactions.

### Factors Leads To The Antibiotic Hypersensitivity

When experiencing antibiotic hypersensitivity, seeking treatment is essential for symptom relief and diagnosis. One primary reason for

seeking treatment is the inability to endure pain and the desire for quick symptom alleviation, such as in the case of prolonged fever. Additionally, participants visit doctors to ascertain if symptoms indicate a bacterial infection and to obtain appropriate antibiotic treatment. It is important to note that not all illnesses and patients require the same type of antibiotic.

Participants shared their reasons for seeking treatment:

*"Influence me to seek a decision from medical team treatment for an infection."*  
(Sepia)

*"I have been bearing the pain for a long time, and I want to get well soon."*  
(Milah)

*"To get the most suitable antibiotic, so that when I seek medical treatment, I can get the most suitable one to treat the infection."*  
(Rose)

*"The severity of the infection and how long it lasts. I need to know the cause of the bacteria, so I can determine if the use of antibiotics is necessary."*  
(Lina)

*"If the fever just does not subside."*  
(Mia)

*"Factors that influence the severity of symptoms, like persistent high fever, may indicate a serious infection or the seriousness of an illness if symptoms last for more than a week."*  
(Wish)

Participants sometimes sought medical help because a family member experienced an allergic reaction to an antibiotic purchased from a pharmacy. This highlights the need for professional medical advice when managing antibiotic allergies, especially for those without a medical background.

*"His face became swollen, so we rushed to the doctor to seek help. If the family member had a medical education, I think they could manage it themselves."*  
(Sepia)

Complications from antibiotic use, such as allergic reactions, can affect the body's organs and require appropriate dosage based on the patient's condition and age to avoid overdose.

*"Vomiting is possibly a side effect. For example, an overdose of antibiotics can affect the liver."*  
(Lina)

Precautions before and during antibiotic use are crucial to prevent allergies. Healthcare providers must take thorough histories to ensure patients are not allergic to the prescribed antibiotics. Patients must inform healthcare providers about any known allergies to avoid complications and ensure appropriate alternative medications are prescribed.

*"It is a little difficult to have a fever, but when I have one, I will be aware of it so that the doctor doesn't give me amoxicillin."*  
(Milah)

*"Every time we need medication, we need to verify if there are any allergies. It's a fundamental question."*  
(Rose)

*"Need to inform healthcare providers if allergic to antibiotics. Also need to remember the name of the antibiotic."*  
(Lina)

*"I think it should be changed to another antibiotic."*  
(Mia)

## DISCUSSION

This study emphasizes the critical role of effective communication between patients and healthcare providers, especially concerning antibiotic allergies. Patients who disclose their allergy history enable healthcare providers to choose safer, alternative antibiotics that minimize the risk of adverse reactions. The use of an allergy card is a practical measure for patients with known drug allergies, as it offers a quick reference for providers, potentially reducing the risk of allergic reactions due to oversight or miscommunication (13). This aligns with previous findings showing that clear documentation of drug allergies can prevent serious medical errors and enhance patient safety (14).

Another key aspect discussed is the issue of self-prescribing antibiotics based on online information. Many individuals might turn to the internet for health advice, yet when it comes to antibiotics, unsupervised use can have severe implications (15). Incorrect self-prescription may lead to inadequate dosing,

ineffective treatment, or even harmful side effects, including allergic reactions. Additionally, the misuse of antibiotics contributes to antibiotic resistance, a growing global concern that complicates infection treatment and increases healthcare costs (16). Adherence to prescribed courses ensures that infections are treated effectively, minimizing the chances of resistant bacteria developing. Therefore, this study highlights the necessity for patient education regarding responsible antibiotic use and adherence to professional medical guidance.

The study also discusses appropriate responses to antibiotic allergies, stressing that patients should immediately cease taking the antibiotic and seek medical assistance upon noticing any reaction. Participants emphasized the importance of consulting healthcare professionals for guidance rather than attempting self-treatment, as professional oversight ensures that allergic responses are managed effectively, and further complications are avoided (17). For severe allergic reactions, like anaphylaxis, hospital-administered epinephrine is the standard treatment, underscoring the importance of rapid access to emergency care. Patients are encouraged to seek immediate medical help in such cases and remain hydrated, as dehydration can worsen allergic reactions. The insights provided by this study reinforce the significance of professional guidance in both preventing and managing antibiotic allergies, promoting patient safety and informed healthcare practices (18).

## CONCLUSION

In conclusion, the purpose of this research was to assess the awareness of antibiotic hypersensitivity among undergraduate students in IIUM Kuantan. Based on the data analysis, the study identified evidence indicating that the current community requires further intervention to enhance their awareness.

## RECOMMENDATIONS

Furthermore, there is a necessity to enhance current health education to better manage antibiotic hypersensitivity and minimize complications. Implementing skill training could be an effective approach to enhance student awareness in this field. However, further clarification is required regarding the

specific skill training that is appropriate for implementation in Malaysia. Collaboration between healthcare providers and the community is crucial to improving healthcare services for patients.

## CONFLICT OF INTEREST

The author(s) state(s) that there are no conflicts of interest.

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## AUTHOR CONTRIBUTIONS

**SS:** drafted the manuscript and contributes to the concept development and design of the article.

**RR:** revised the manuscript critically with intellectual contents and approved the final version of the manuscript

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