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EVALUATION OF AWARENESS REGARDING ANTIBIOTIC USE AND ANTIMICROBIAL RESISTANCE AMONG STUDENTS

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ABSTRACT

This study evaluates the knowledge, attitude, and practices (KAP) regarding antibiotic use and antimicrobial resistance (AMR) among Doctor of Pharmacy (PharmD) students in selected institutions across Punjab. A cross-sectional study was conducted using a structured questionnaire administered to 500 PharmD students from various institutions. The findings revealed that participants had adequate knowledge and a positive attitude toward antibiotics, but their practices were notably poor. These results underscore the need for enhanced educational interventions and practical training for PharmD students to improve antibiotic stewardship and patient care outcomes.

Keywords: Antimicrobial resistance, Attitude, Doctor of Pharmacy, Knowledge, Practice.

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INTRODUCTION

Antibiotics are a cornerstone of modern medicine, often referred to as "magic bullets" for their effectiveness in combating infectious diseases and saving lives. However, the global misuse of antibiotics—encompassing overuse, self-medication, and inappropriate prescribing—has led to the emergence of antimicrobial resistance (AMR) [1-4]. AMR, characterized by microorganisms' decreased sensitivity to antibiotics, has significant implications, including prolonged illness and increased mortality. The World Health Organization (WHO) has identified AMR as a critical global health threat, projecting that by 2050, it could cause approximately 10 million deaths annually, disproportionately affecting low- and middle-income countries. Addressing AMR requires a robust diagnostic infrastructure, effective surveillance, stringent regulatory frameworks, and enhanced education for healthcare professionals [5]. While KAP studies on AMR have been conducted among medical and

nursing students, there is a lack of studies focusing on PharmD students, despite their critical role in antibiotic stewardship. This study aims to assess the knowledge, attitude, and practices of PharmD students regarding antibiotic use and AMR to identify gaps and provide insights for targeted interventions [6].

METHODS

Study Design and Sites

The study was a cross-sectional observational research project that utilized a questionnaire and involved PharmD students from several institutions (135 males and 365 females). Each institution was treated as a cluster, and students were randomly selected to participate [7].

Study Instrument

The questionnaire was drafted using common attribute found in survey questionnaires. It comprised demographic information, knowledge, attitudes, and practices related to antibiotic use and antimicrobial resistance (AMR). The knowledge

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section included questions about antibiotic use, awareness of culture sensitivity testing, and treatment options. The attitude section addressed participants' intentions and perceptions regarding AMR, while the practice section focused on their implementations and approaches related to AMR. Each question, scored from 0 to 10, with scores above 5 indicating adequate performance [8-11].

Data Collection

A link to the questionnaire was distributed via

Google Forms, and responses were collected within a specified timeframe. Each site was given two days to complete data collection [12].

Statistical Analysis

Data analysis was performed using GraphPad Prism 9.3.1. Descriptive statistics, including mean, standard deviation, and proportions, were employed to evaluate knowledge, attitude, and practice (KAP) scores. Scores exceeding 5 were considered adequate for each domain [13].

Table 1: Knowledge, Attitude, and Practice towards AMR among the study respondents.

A	KNOWLEDGE-BASED
1	Have you ever heard of antibiotic resistance
2	Can antibiotics cure viral infections
3	Cold and cough can be treated with antibiotics
4	Antibiotics can kill bacteria
5	Antibiotics have no side effect
6	Do you know that using antibiotics frequently will decrease the efficacy of treatment?
7	Costly antibiotics are more effective
8	Can we test an antibiotic resistance
9	Overuse of antibiotics causes resistance
B	ATTITUDE-BASED
10	Our community is consuming antibiotics excessively
11	Antibiotic resistance has become a major challenge
12	Can we play role in reducing antibiotic resistance
13	We can use antibiotics after the suggestions from friends and family
14	Sensitivity tests are good option for assessing antibiotic resistance
15	We can buy antibiotic from medicine pharmacies directly
16	Can antibiotic resistance impact on the health of patient
C	PRACTICES-BASED
17	The dose of antibiotics should be adjusted according to the condition
18	Sensitivity test for assessing antibiotic resistance would be useful
19	Using antibiotics in low doses can cause resistance.
20	Antibiotics should be prescribed in all infections
21	Can we give prescribed antibiotic to our family members as well
22	Stop taking the prescribed antibiotics once we get better
23	Patient should consult pharmacist about taking antibiotics?
24	Antibiotic stock should be kept at home in case of emergency
25	Should we stop taking antibiotics without completing the full course

Table 2: Displays the distribution of Knowledge, Attitude, and Practice (KAP) scores.

Factors	Good	Moderate	Poor
Knowledge	96.4	2.1	1.5
Attitude	95.1	3.7	1.2
Practices	84.8	11.2	4.0

RESULTS AND DISCUSSION

One of the most significant achievements in medicine is the discovery of antibiotics, which have had a substantial impact on public health. Physicians routinely prescribe these medications; however, their overuse is prevalent worldwide, particularly in low- and middle-income countries. Proper antibiotic use is essential for maintaining their effectiveness, while improper use contributes to the development of antimicrobial resistance (AMR), a growing global concern [14].

This study examined the knowledge, attitudes, and practices (KAP) of Doctor of Pharmacy (PharmD) students, who will become the healthcare professionals responsible for delivering effective pharmaceutical care to patients. Their curriculum includes courses in Pharmacology, Microbiology, Clinical Pharmacy, Hospital Pharmacy, Community Pharmacy, and Pharmacotherapeutics, providing them with a comprehensive understanding of antibiotics from various perspectives [15].

The study found that PharmD students generally possess good knowledge about antibiotics and AMR; most scored above 4 on the assessment, consistent with findings by Habib et al. [8]. However, significant gaps were identified, particularly regarding the use of antibiotics for viral infections and misconceptions about their effectiveness for treating colds and coughs.

Students exhibited a predominantly positive attitude toward AMR, with 95.89% scoring above 4, reflecting a high level of awareness [16].

The most concerning finding was the students' poor application of their knowledge, with over half scoring 4 or lower in the practice section. This aligns with previous studies showing that healthcare students often lack practical skills in antibiotic use and AMR management. The gap

between knowledge and practice highlights the need for increased hands-on training and practical exposure. In comparison to medical students PharmD students demonstrated better attitudes but poorer practical skills. This discrepancy may stem from differences in clinical exposure and the focus of their training [17]. Overall, these results are consistent with findings across various healthcare fields, where students show good theoretical knowledge but struggle with practical application.

Study Limitations

This study relied on self-reported data gathered through an online questionnaire, which may introduce bias, as students could have consulted external sources when responding. Future research should involve direct observation of practices and employ more rigorous assessment methods.

CONCLUSION

This study demonstrates that although PharmD students possess a solid understanding and a positive attitude toward antibiotics and antimicrobial resistance (AMR), their ability to apply this knowledge in practice is lacking. To better prepare them as future healthcare professionals and improve patient outcomes, it is essential to enhance their practical skills. Incorporating more practical training, workshops, and symposia into the curriculum will help address this gap.

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