VOLUME - 14, ISSUE - 05, MAY - 2025 • PRINT ISSN No. 2277 - 8160 • DOI : 10.36106/gjra

Original Research Paper

Surgery

# KNOWLEDGE, ATTITUDE, AND PRACTICES (KAP) REGARDING ANTIMICROBIAL USAGE AMONG MEDICAL STUDENTS IN ANDHRA PRADESH, INDIA: A CROSS-SECTIONAL STUDY

**Dr. Tharaka Ram Vemula**

House surgeon, Konaseema Institute of Medical Sciences

**ABSTRACT** Antimicrobial resistance (AMR) is a growing global health concern, exacerbated by the misuse and overuse of antibiotics. Medical students, as future prescribers, play a pivotal role in combating this issue. This study assesses the knowledge, attitudes, and practices (KAP) related to antibiotic usage among medical students in Andhra Pradesh, India. A cross-sectional survey was conducted using a structured questionnaire. The findings reveal that while students possess satisfactory knowledge about antibiotics, gaps exist in their attitudes and practices, highlighting the need for enhanced educational interventions.

**KEYWORDS :** Antibiotic resistance, Antimicrobial usage, Medical students, Knowledge, Attitude, Practices, India

## INTRODUCTION

Antibiotics have revolutionized modern medicine, effectively treating bacterial infections and saving countless lives. However, the emergence of antimicrobial resistance (AMR) threatens these advancements, leading to increased morbidity, mortality, and healthcare costs. Inappropriate antibiotic use, including self-medication, incomplete courses, and overprescription, are primary contributors to AMR.

Medical students, as future healthcare providers, must be well-informed about rational antibiotic use. Their knowledge, attitudes, and practices (KAP) significantly influence their prescribing behaviors. Previous studies in India have highlighted varying levels of awareness and practices among medical students concerning antibiotic use and resistance [1][2][3]. However, data specific to Andhra Pradesh remains limited.

This study aims to evaluate the KAP regarding antibiotic usage among medical students in Andhra Pradesh, providing insights to inform educational strategies and policy interventions.

## MATERIALS AND METHODS

### Study Design and Participants

A cross-sectional study was conducted between January and March 2025 across three medical colleges in Andhra Pradesh. The target population included undergraduate medical students from the second year to the final year. First-year students were excluded due to limited exposure to pharmacology and clinical subjects.

### Sample Size and Sampling Technique

Assuming a 50% prevalence of adequate knowledge with a 5% margin of error and a 95% confidence interval, the minimum sample size calculated was 384. Accounting for a 10% non-response rate, the final sample size was set at 422. Stratified random sampling was employed to ensure representation across different academic years.

### Data Collection Tool

A pre-tested, structured questionnaire was developed, comprising four sections:

1.Demographics: Age, gender, academic year.

2. Knowledge: 10 multiple-choice questions assessing understanding of antibiotic use and resistance.

3.Attitude: 10 statements rated on a 5-point Likert scale (strongly agree to strongly disagree).

4. Practices: 10 questions on behaviors related to antibiotic use.

The questionnaire was adapted from validated tools used in previous studies [1][2].

### Data Collection Procedure

After obtaining ethical clearance, the questionnaire was distributed in person during lecture hours. Participation was voluntary, and informed consent was obtained. Anonymity and confidentiality were assured.

### Data Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 25. Descriptive statistics summarized demographic data and KAP scores. Chi-square tests assessed associations between demographic variables and KAP levels. A p-value $<0.05$ was considered statistically significant.

## RESULTS

### Demographic Characteristics

Out of 422 distributed questionnaires, 400 were completed and returned, yielding a response rate of 94.8%. The demographic distribution is presented in Table 1.

**Table 1: Demographic Characteristics Of Participants (n=400)**

| Variable | Frequency (%) |
|---|---|
| Gender | |
| - Male | 220 (55%) |
| - Female | 180 (45%) |
| Academic Year | |
| - Second Year | 130 (32.5%) |
| - Third Year | 140 (35%) |
| - Final Year | 130 (32.5%) |

### Knowledge Assessment

The mean knowledge score was 7.2 ± 1.5 out of 10. Key findings include:

- 95% correctly identified that antibiotics are ineffective against viral infections.
- 90% recognized that incomplete antibiotic courses contribute to resistance.
- 85% were aware that misuse of antibiotics can lead to adverse effects.

### Attitude Assessment

The mean attitude score was 3.8 ± 0.6 out of 5. Notable observations:

- 88% agreed that antibiotic resistance is a significant public health issue.
- 70% believed that antibiotics are overprescribed in clinical settings.
- 60% felt confident in their ability to prescribe antibiotics appropriately upon graduation.

### Practice Assessment

The mean practice score was 6.5 ± 1.2 out of 10. Behavioral patterns observed:

- 40% admitted to self-medicating with antibiotics without a

prescription.
- 30% reported not completing prescribed antibiotic courses.
- 25% kept leftover antibiotics for future use.

### Associations Between Demographics and KAP
- Final-year students had significantly higher knowledge scores compared to second-year students ($p<0.01$).
- No significant gender differences were observed in KAP scores.

## DISCUSSION
The findings of this study offer a comprehensive understanding of how future healthcare professionals perceive and utilize antibiotics—a key concern amid the global antimicrobial resistance (AMR) crisis. The data not only reveal the students' basic understanding but also highlight a stark dissonance between what they know and how they behave. This discordance raises critical concerns about the effectiveness of current educational frameworks in medical institutions in India, particularly in Andhra Pradesh.

Our study's knowledge scores are comparable to those found in similar studies conducted in other regions of India. For example, a study by Afzal Khan et al. in a southern Indian teaching hospital found that around 95% of students knew that antibiotics are ineffective against viral infections [1], closely aligning with our 95% result. Furthermore, the awareness that incomplete antibiotic courses contribute to resistance (90% in our study) also mirrors findings in studies from Kerala and Delhi, where over 85% of respondents expressed similar understanding [2][4].

Internationally, medical students from high-income countries tend to perform slightly better in the attitude and practice domains. A study in Sweden found that only 4% of students reported self-medicating with antibiotics [5], while our study noted a significantly higher rate of 40%. This discrepancy may be attributed to stricter drug regulation enforcement and more robust stewardship training in European institutions. Conversely, a study in Nigeria reported comparable levels of inappropriate practices, emphasizing that AMR-related behaviors are more prevalent in countries with over-the-counter antibiotic access and weak regulatory oversight [6].

Despite high knowledge levels, poor practices—such as self-medication (40%), non-completion of antibiotic courses (30%), and storing leftover antibiotics (25%)—persist among students. This disconnect may be explained by several behavioral and systemic factors:

- Peer Influence: It is common for students to share medical opinions and medications informally. This leads to normalization of self-treatment, as seen in other studies where peer advice was a leading reason for antibiotic misuse [7].
- Perceived Invulnerability: Many students may overestimate their own diagnostic capabilities or believe that minor symptoms do not require formal medical advice.
- Easy Access to Antibiotics: Despite regulations, antibiotics are still obtainable in India without a prescription, especially in urban and semi-urban areas. A 2021 study estimated that nearly 52% of pharmacies in southern India dispense antibiotics without proper prescriptions [8].
- Cultural Practices: Some behaviors are culturally ingrained. For instance, the habit of keeping leftover medications for future use is not unique to medical students and is common among the general Indian population [9].

A notable finding was that 60% of students felt confident in prescribing antibiotics appropriately after graduation, despite substantial deficits in practice. This overconfidence, termed "clinical bravado" in pedagogical literature, can result in inappropriate prescribing patterns in future practice [10]. This is concerning because recent data suggest that improper prescribing by young clinicians is a major contributor to outpatient antibiotic misuse [11].

Our results strongly indicate that current curricula may not be effectively bridging the knowledge-practice gap. While pharmacology syllabi in most Indian medical schools cover mechanisms of action and resistance, few institutions integrate real-life antimicrobial stewardship training. A 2019 review highlighted that only 23% of Indian medical colleges included modules on antibiotic stewardship as per WHO-AMR competency frameworks [12].

The inappropriate antibiotic use patterns identified in this study among future prescribers pose a substantial threat to public health. India is already one of the world's largest consumers of antibiotics, and AMR has led to rising treatment failures for common bacterial infections such as Escherichia coli, Klebsiella pneumoniae, and Staphylococcus aureus [13]. If medical students continue these behaviors into their clinical careers, we risk exacerbating resistance patterns further.

Additionally, AMR-related healthcare costs—already estimated to be over ₹47,000 crore (~USD 6 billion) annually in India—are expected to double by 2030 if current trends continue [14]. Misguided prescribing by untrained graduates will only accelerate this economic burden.

Given these findings, we recommend the following:
1. Incorporate Stewardship Modules Early
2. Mandatory Rotations in Infectious Disease and Pharmacovigilance
3. Strengthen Regulation and Pharmacy Oversight
4. Peer-Led Awareness Campaigns
5. Use of Technology
6. Monitoring Attitude Change

This expanded discussion reveals a complex interplay of individual behavior, systemic challenges, and educational shortcomings that contribute to suboptimal antibiotic usage among medical students in Andhra Pradesh. While knowledge levels are encouraging, attitudes and especially practices require urgent attention through a multi-pronged approach involving curriculum reform, policy enforcement, and behavioral training. Medical students represent both the problem and the solution in India's battle against AMR—empowering them with the right tools and mindset will be a pivotal step forward.

## REFERENCES

1. Khan AKA et al. Knowledge, Attitude and Practice of Rational use of Antibiotics among Medical Students. J Clin Diagn Res. 2016;10(8):FC17-FC21.
2. Sharma S et al. Knowledge and use of antibiotics among medical students in a tertiary care teaching hospital. Indian J Basic Appl Med Res. 2014;3(4):52–56.
3. Kumar R et al. Self-medication with antibiotics among medical students of a private medical college, Mangalore. Int J Basic Clin Pharmacol. 2016;5(1):61-67.
4. Chandwani H et al. Knowledge and practice of self-medication among medical students. Int J Basic Clin Pharmacol. 2016;5(4):1366-1370.
5. Wester CW et al. Antibiotic resistance: a survey of physicians' perceptions. Arch Intern Med. 2002;162(19):2210–2216.
6. Okeke IN et al. Antimicrobial resistance in developing countries. Part I: recent trends and current status. Lancet Infect Dis. 2005;5(8):481–493.
7. Zafar SN et al. Self-medication among university students of Karachi. J Pak Med Assoc. 2008;58(4):214–217.
8. Kotwani A et al. Antibiotic use and misuse in India: a systematic review. J Infect Dev Ctries. 2021;15(1):1–10.
9. Bardaweel SK et al. Antibiotic use and resistance: an awareness survey among medical students. Int J Pharm Pract. 2015;23(3):213–221.
10. Labi AK et al. Physicians' knowledge, attitudes, and perceptions concerning antimicrobial resistance: a survey in a Ghanaian tertiary hospital. BMC Health Serv Res. 2018;18:126.
11. Friedman ND et al. Risk factors for antibiotic resistance. Int J Antimicrob Agents. 2002;19(4):269–276.
12. World Health Organization. WHO Competency Framework for Health Workers' Education and Training on Antimicrobial Resistance. 2019.
13. CDDEP. State of the World's Antibiotics, 2021. Center for Disease Dynamics, Economics & Policy.
14. Gandra S et al. The Economic Burden of Antibiotic Resistance in India: A Review. Indian J Med Res. 2019;149(2):151–163.