

Knowledge, Attitudes and Practices Regarding Azithromycin among Undergraduate Students

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Abstract

Objectives: Azithromycin is a commonly used macrolide antibiotic for treating bacterial infections. Self-medication with azithromycin is becoming more common nowadays. Its widespread availability has led to frequent misuse, major contribution antibiotic resistance. The study aims to assess the knowledge, attitudes and practices of undergraduate students about Azithromycin, mainly focusing on their awareness of self-medication and antibiotic resistance.

Methods: An online cross-sectional questionnaire-based survey was conducted among undergraduate students from healthcare fields using google form, which includes sections on Demographic data, Knowledge of azithromycin, Attitudes towards azithromycin use, Practices and sources of information, and its Resistance. The data were analyzed using simple descriptive statistics.

Results: The study revealed a moderate understanding of Azithromycin, 41.1% of self-medication, 25.8% of them failed to complete the full course, 12.1% were not sure of it, and 87.1% had high awareness of its resistance, though perceptions of its severity and personal responsibility varied significantly among participants.

Conclusion: Strengthening their knowledge on Azithromycin usage and its resistance is the key for enhancing compliance and promoting effective antibiotic stewardship.

Keywords: Azithromycin, Resistance, Knowledge, Attitude, Practice.

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Introduction

Antimicrobials constitute a broad group of therapeutic agents that act by selectively targeting pathogenic microorganisms while causing minimal harm to the host. [1] They include macrolides, beta-lactams and fluoroquinolones, each operating through distinct mechanisms of action. [2] Macrolides in particular remain important because of their activity against common respiratory and soft-tissue pathogens and their generally favourable safety profile.

Azithromycin, a widely used macrolide, inhibits bacterial protein synthesis by binding to the 50S ribosomal subunit and preventing peptide-chain elongation. [3] It is frequently prescribed for respiratory tract, gastrointestinal and certain sexually transmitted infections due to its long half-life, extensive tissue penetration and convenient once-daily dosing. [4] However, these therapeutic advantages have also contributed to its increased misuse, including self-medication, incomplete

treatment courses and over-the-counter access. Misuse and overuse of antibiotics are major contributors to the global rise in antimicrobial resistance (AMR). [5]

Irrational antibiotic consumption accelerates the emergence and spread of resistant strains, posing significant clinical and public-health challenges. Azithromycin resistance has been increasingly reported, driven largely by inappropriate prescribing and unregulated community use.

Undergraduate healthcare students represent a key group for early antimicrobial-stewardship (AMS) training, as they will become future prescribers whose practices directly influence rational antibiotic use. Understanding their knowledge, attitudes and practices regarding azithromycin helps identify gaps that require targeted educational interventions. Strengthening AMS at this foundational stage is essential for reducing misuse and limiting the progression of resistance.

Aims and Objective (S):

1. To assess the level of knowledge among undergraduate students about azithromycin uses.
2. To analyse the attitude towards the prescription, usage, and potential risks associated with azithromycin.
3. To examine the practices related to azithromycin use among undergraduate students and to identify the cause that may contribute to antibiotic resistance

Materials and Methods

A questionnaire based cross sectional study was conducted among Undergraduate students from various healthcare related fields at a tertiary care teaching hospital (RRMCH, Kengeri, Karnataka) after approval from the Institutional Ethics Committee (RRMCH/IEC/369/NOV /2024).

Study Design

Study Population: Undergraduate students from various healthcare related fields in RRMCH.

Inclusion Criteria: Undergraduate students who are willing to participate on the day of data collection.

Exclusion Criteria: Undergraduate students who are unwilling to participate will be excluded.

Study Procedure: After getting approval from the Institutional Ethics Committee, an online google questionnaire form was circulated during one of their lecture sessions. Informed consent was obtained before enrolling the participants in the study. The questionnaire contains 5 different sections (i.e.) demographic data, Knowledge of azithromycin, Attitudes towards azithromycin use, Practices and sources of information, and Concerns related to azithromycin resistance. The responses were collected through Google Forms and a detailed analysis of the data was done and the recorded data were entered into an Excel spreadsheet and expressed in numbers and percentages, using Statistical software SPSS v23 and MS Excel.

The sample size (n=365) was calculated using a prevalence of azithromycin use of 39% reported in an earlier study⁶. All the statistical analysis was carried out at 5% level of significance and a p-value of < 0.05 considered as significant.

Results

A total of 367 students participated in the study. The mean age group was predominantly 21–23 years (n=176, 48.0%), followed by 18–20 years (n=165, 45.0%). Female respondents were higher (n=243, 66.2%) compared to males (n=124, 33.8%). Majority of participants were in the second year (n=244, 66.5%) (Table 1).

Regarding knowledge of Azithromycin, 98.1% (n=360) had heard of the drug, and 89.6% (n=329) knew it is commonly used for bacterial infections. About 80.9% (n=297) correctly identified the typical treatment course as 3–5 days. Concerning missed doses, 61.0% (n=224) reported they would take it as soon as remembered, while 15.5% (n=57) would skip the dose. The most frequently reported side effects were nausea/vomiting (n=183, 49.9%) and diarrhoea (n=142, 38.7%) (Table 2, Fig. 1).

In terms of attitudes, 84.7% (n=311) stated that Azithromycin should not be used as first-line for all bacterial infections, and 76.8% (n=282) emphasized the importance of culture and sensitivity testing before prescribing. More than half of the respondents (n=201, 54.7%) believed Azithromycin should be taken with food. Awareness of drug–drug interactions was present in 72.7% (n=267) (Table 3, Fig. 2).

Regarding practices, 59.1% (n=217) had been prescribed Azithromycin at least once, while 41.1% (n=150) admitted to self-medication, most commonly due to easy access (n=92, 24.8%). Non-completion of the full course was reported by 25.8% (n=95), primarily due to symptom improvement (n=61, 16.6%). The majority (n=242, 66.0%) always or often checked expiry dates and package inserts (Table 4, Fig. 3). Awareness of antimicrobial resistance (AMR) was high, with 87.1% (n=320) familiar with the term. Most correctly identified causes as misuse (n=295, 80.4%) and incomplete treatment (n=278, 75.7%). Reported consequences included limited treatment options (n=276, 75.2%) and increased illness duration (n=251, 68.4%).

A majority (n=311, 84.7%) agreed that healthcare professionals play a critical role in preventing resistance, and 71.7% (n=263) were willing to change their own antimicrobial use practices (Table 5, Fig. 4).

Discussion

In this cross-sectional study involving 367 undergraduate healthcare students, overall awareness of azithromycin was high, with most participants correctly identifying its use in bacterial infections and its usual treatment duration.

These findings align with previous studies among medical and pharmacy students in India, which similarly reported high baseline knowledge of commonly used antibiotics. [7] However, consistent with earlier research, notable gaps were seen between knowledge and actual behaviours related to antibiotic use.

In the present study self-medication with azithromycin (41.1%) is lower than the 63% reported by Badiger et al., [8] and comparable to

findings from Shrestha et al. [9] Incomplete treatment courses (25.8%) further escalates the risk of antimicrobial resistance (AMR) similar to study by Navadiya and Bhadiyadara, [10] Such findings emphasize the subtle differences with theoretical understanding and actual clinical practice.

Awareness of AMR was high (87.1%) which is similar to studies by Gupta et al. [7] and Saksena et al., [11] who noted that students conceptual understanding of resistance mechanisms remains

stronger yet translation of this knowledge into safe practices is inconsistent. Even after identifying that misuse and not completing the course are the primary key for AMR still many participants were engaged in self-medication, it clearly shows that understanding the risks alone doesn't guarantee responsible behaviour. Similar concerns were raised by Horvat et al., [12] who emphasised the necessity of behaviour-focused antimicrobial stewardship (AMS) training rather than depending only on traditional teaching methods.

Table 1: Demographic characteristics of participants (n = 367)

Variables	Frequency (n) n= 367	Percentage (%)
Gender		
Males	124	33.8 %
Females	243	66.2 %
Age		
18-20 yrs	172	46.9 %
21-23 yrs	176	48 %
24 and above	19	5.2 %
Field of study		
MBBS	290	79 %
BDS	17	4.6 %
Nursing	21	5.7 %
Physiotherapy	35	9.5 %

Table 2: Knowledge regarding Azithromycin among participants (n=367)

Knowledge Parameter	Correct Response (n, %)	Incorrect/Not Sure (n, %)
Heard of Azithromycin	360 (98.1%)	7 (1.9%)
Knew it is used for bacterial infections	329 (89.6%)	38 (10.4%)
Aware that usual course lasts 3–5 days	297 (80.9%)	70 (19.1%)
Identified it as a macrolide antibiotic	290 (79.0%)	77 (21.0%)

Table 3: Attitudes toward Azithromycin use among participants (n=367)

Attitude Statement	Agree (n, %)	Disagree/Neutral (n, %)
Azithromycin should be taken only after prescription	310 (84.5%)	57 (15.5%)
Self-medication can lead to resistance	287 (78.2%)	80 (21.8%)
Completing full course is essential	329 (89.6%)	38 (10.4%)
Resistance is a global health problem	332 (90.5%)	35 (9.5%)

Table 4: Practices related to Azithromycin use among participants (n=367)

Practice Parameter	Yes (n, %)	No (n, %)
Self-medicated with Azithromycin	151 (41.1%)	216 (58.9%)
Did not complete full course	95 (25.8%)	272 (74.2%)
Not sure about completing course	44 (12.1%)	323 (87.9%)
Used leftover tablets from previous illness	87 (23.7%)	280 (76.3%)
Took advice from doctor/pharmacist	225 (61.3%)	142 (38.7%)
Used online sources or peers for information	142 (38.7%)	225 (61.3%)

Table 5: Awareness regarding Azithromycin resistance

Resistance Awareness Parameter	Yes (n, %)	No/Not Sure (n, %)
Aware that misuse causes resistance	320 (87.1%)	47 (12.9%)
Understood resistance makes treatment harder	289 (78.7%)	78 (21.3%)
Believed antibiotic misuse is a public health concern	301 (82.0%)	66 (18.0%)

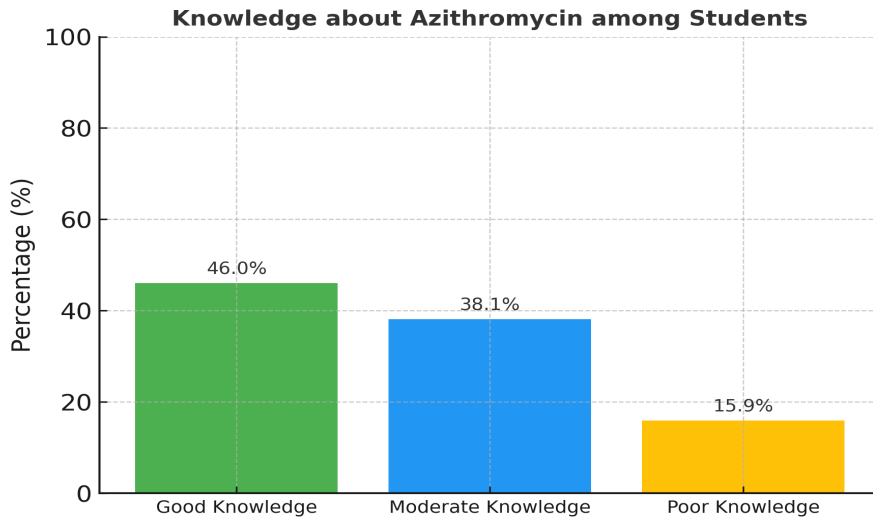


Figure 1: Knowledge regarding azithromycin among participants (n=367)

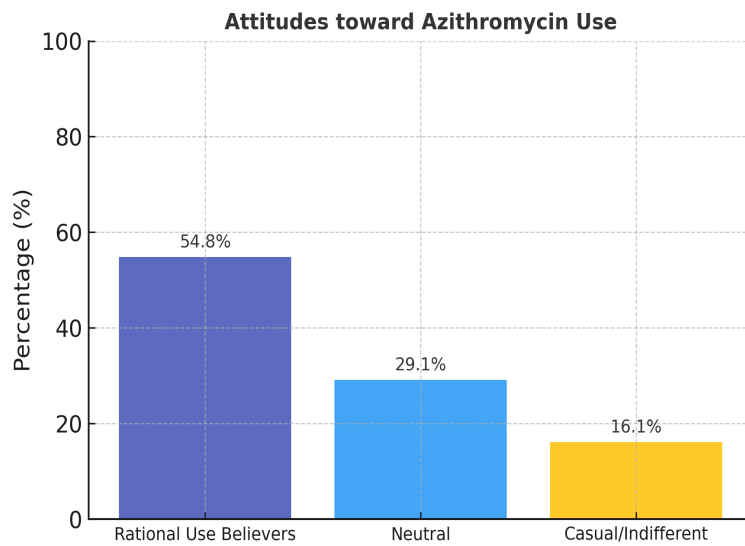


Figure 2: Attitudes toward Azithromycin use among participants (n=367)

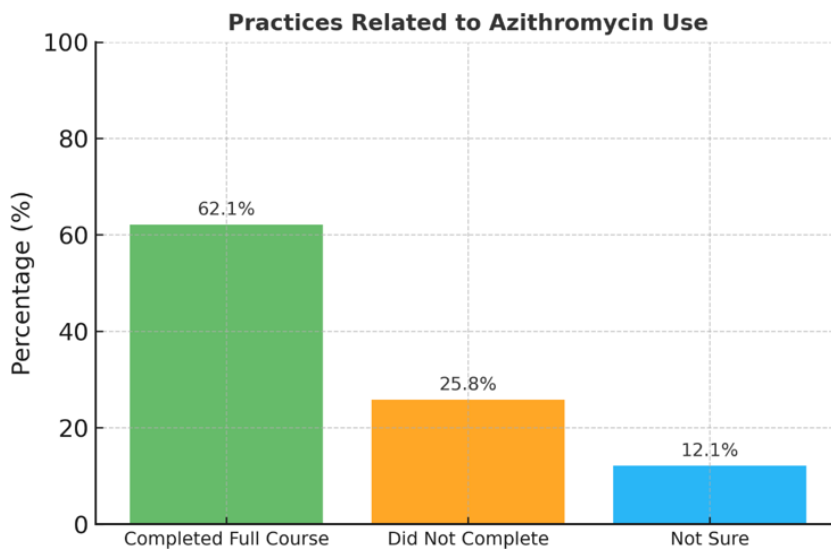


Figure 3: Practices related to Azithromycin use among participants (n=367)

Awareness regarding Azithromycin Resistance

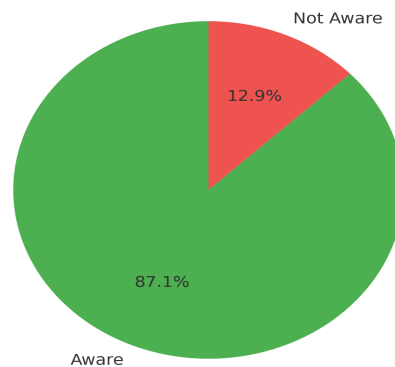


Figure 4: Awareness regarding Azithromycin resistance among participants (n=367)

This study emphasizes the need for integration of AMS principles in their academics. Rational antibiotic use can be enhanced by periodic prescription audits, problem-based AMR, clinical supervision. [11] Institutions can further reinforce appropriate practices by implementing regular awareness programs, strict regulations with over-the-counter antibiotic over the pharmacist guidance.

Overall, this study underlines a notable deficiency in antibiotic-use practices and can be addressed through targeted AMS training and early practical reinforcement which is essential to bring down azithromycin misuse and curb the growing threat of resistance.

Conclusion

Our study demonstrates a good baseline awareness of azithromycin, AMR and a significant gap persisted in practice—particularly in self-medication and incomplete treatment courses among participants. Bridging this gap requires practical stewardship training, institutional regulation and community-level measures to enhance safer antibiotic use.

Limitations

Our study recognized that the generalizability is constrained with single centered location, cross-sectional nature, precluding causal inference and few questions were complicated by the presence of overlapping categories within the multiple-response items (such as reasons for self-medicating).

Recommendations

Based on the findings of this study, the following recommendations are proposed:

1. **Integrate structured antimicrobial stewardship (AMS) training** into the undergraduate curriculum, including case-

based learning, prescription audits and supervised clinical exposure.

2. **Strengthen education on rational antibiotic use**, emphasising the risks of self-medication, incomplete courses and inappropriate use of azithromycin.
3. **Promote regulated antibiotic dispensing** by enforcing policies that restrict over-the-counter sale of antimicrobials without prescription.
4. **Improve accessibility to reliable drug information** through academic teaching sessions, pharmacist-led counselling and institutional awareness campaigns.
5. **Conduct periodic sensitisation programs** focusing on antimicrobial resistance (AMR), targeting both early-year and clinical-phase students.
6. **Encourage interventions**, such as, feedback, reminders and reflective practice to ensure knowledge into responsible antibiotic use.
7. **Support further multi-centre research** to monitor trends in antibiotic knowledge, practices and resistance patterns among healthcare students across different regions.

Ethical Approval: Obtained from Institutional Ethics Committee (RRMCH/IEC/369/NOV /2024).

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