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Knowledge, Attitude and Practice of Rational Use of Antibiotics among Interns of A Tertiary Care Hospital - A Cross-Sectional Study

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Abstract

Objective: To assess the knowledge, attitude, and practice of rational use of antibiotics among interns in a tertiary care hospital.

Methods: This cross-sectional study was conducted among 81 interns in a tertiary care hospital after getting institutional ethics committee approval. Interns who gave informed consent were asked to answer the pre-formed pre-tested questionnaire to assess their knowledge, attitude, and practice about antibiotic use and antibiotic resistance. Data collected using Google Forms was entered in Excel and analysed using descriptive statistics to generate the mean and percentage.

Results: The mean age of interns was 24.5 years. 93.8% had good knowledge about antibiotic usage and resistance. The majority had a favourable attitude, with 51.9% strongly agreeing and 45.7% agreeing that self-medication of antibiotics was not advisable. All knew that a hospital's antibiotic policy would help reduce irrational use of antibiotics. There was a concern that 53.1% of interns prescribe broad-spectrum antibiotics usually in their practice, with 13.6% sometimes prescribing antibiotics at the patient's request. Most of them used to advise the patient regarding completion of the antibiotic course as prescribed. Regarding the solution for combating antibiotic resistance, some have emphasized the importance of health education and

awareness programs for doctors on the rational use of antibiotics.

Conclusion: Medical interns had a good understanding of the importance of rational antibiotic use and had a positive attitude towards it; however, the translation of the knowledge into optimal prescribing practices reveals a gap. Continuous and multifaceted education regarding rational prescription of antibiotics, including practical training and mentorship, is essential to help interns make consistent prescribing decisions from the start of their careers.

Keywords: Antibiotics Knowledge Attitude Practice Rational prescription Interns

Introduction

Rational prescription ensures that the patient receives the right antibiotic for their specific indication, at the right dose, for the right duration, and via the right route.[1] Rational prescribing helps to preserve the efficacy of existing antibiotics for when they are truly needed, ensuring that patients have effective treatment options for serious bacterial infections in the future. Every time an antibiotic is used irrationally, it increases the selective pressure for bacteria to develop resistance.[2] The bacteriostatic and bactericidal effects of antibiotics are diminished due to antimicrobial resistance. As a consequence, treatment failure occurs, causing significant morbidity and mortality in the patient. Prolonged hospital stays, more complex treatments for resistant infections, additional diagnostic tests, and the need for more expensive, last-line antibiotics also increase the health care cost. Thus, antimicrobial resistance has now become a major public health issue. Unnecessary prescription of antibiotics without correct diagnosis, inappropriate selection of antibiotics, incorrect duration & frequency, etc, are the contributing factors of antimicrobial resistance from healthcare professionals. In this context, there is a need to develop the practice of rational prescription of antibiotics among upcoming new doctors before they develop their views and improper behaviour regarding the same. This study aims to assess the existing knowledge, attitudes, and practices of medical interns regarding antibiotics and their rational use. Proper recommendations and guidelines regarding rational antibiotic prescription can be made to the interns according to the findings of the study.

Materials and Methods

Study design: A cross-sectional study

Study Population: 81 medical interns of a tertiary care hospital, who gave informed consent and have completed at least 3 months of internship in a tertiary care hospital.

Sample size: The sample size of 81 participants required for the study was obtained by assuming a 95% confidence interval and 10% relative precision to the mean and calculated using the formula, $n= Z\alpha^2 s^2/d^2$, where $Z\alpha$ = Z value of α error at 5% = 1.96, s is standard deviation and, d is desired relative precision.

Study procedure

The study was started after getting approval from the Institutional Ethics Committee. Interns who gave informed consent were given a preformed pretested questionnaire in Google Forms to assess their knowledge, attitude, and practice of rational use of antibiotics. The questionnaire had three sections with a total of 18 questions. Participants were asked to respond with the most appropriate answer. The first section contained six ‘yes’ or ‘no’ type questions to assess the knowledge and understanding about antibiotics and their resistance. The second section had six questions in a 5-

point Likert scale format with responses ranging from strongly agree to strongly disagree to assess the attitude. The third section to assess the practice of interns had an initial two questions in the Likert scale type with responses ranging from never to always, followed by two multiple-choice questions, and finally two open-ended questions. Data obtained was entered in Excel and analysed using descriptive statistics to generate mean, frequency, and percentage.

Results

The response rate for the questionnaire was 100%, as 81 interns had participated in the study. There were 27 male interns and 54 female interns, with an average age of 24.5 years.

The questionnaire to evaluate the intern's knowledge is given in Table 1. In this study, most interns (95.06%) knew that common cold symptoms don't require antibiotics. All of them know that antibiotics can't cure viral infections. The meaning of antibiotic resistance was understood by 93.8% of respondents. Only 13.6% of the interns opined that newer and costlier antibiotics are effective than existing ones; the rest of them denied it. 87.7% were against the sale of antibiotics without prescription from pharmacies, as they have an idea that this contributes to antibiotic misuse and resistance. The majority (98.8%) knew that antibiotic resistance is an important and serious public health issue.

Table 2 shows the attitude of the interns about rational antibiotic use. Interns are well aware that antibiotic use without a prescription should not be done. 45.7% strongly disagreed and 51.9% disagreed with the statement 'self-medication of antibiotics is advisable'. All of them opined that inadequate or unduly prolonged use of antibiotics contributes to antibiotic resistance, with 53.1% strongly agreeing and 46.9% agreeing with it. Only 1.2% strongly agreed and 9.9% agreed that antibiotics should be stopped as soon as symptoms disappear, while 34.6% disagreed and 42% strongly disagreed with this. 29.6% strongly agreed and 51.9% agreed that sending appropriate samples for culture & sensitivity before prescribing an antibiotic was important. While 12.3% strongly agreed and 60.5% agreed, 21% had no idea whether the cost of antibiotics should be considered in rational prescribing. 50.6% strongly agreed and 48.1% agreed regarding the need for a hospital antibiotic policy to ensure rational use of antibiotics.

Practice of antibiotic prescription by interns is given in Tables 3.1 and 3.2.

Broad-spectrum antibiotics are always prescribed for empirical treatment by 8.6 % and usually by 53.1% interns, respectively. 13.6% sometimes and 21% rarely prescribed antibiotics at the patient's request, even when they were not indicated. Cephalosporins (53.1%) and Penicillins (44.4%) are the most often prescribed antibiotics in the OPD. Only 12.3% opined that antibiotics are always transitioned from IV to PO at the earliest possible time. 49.4% responded that antibiotics are usually transitioned from IV to PO at the earliest possible time.

Additionally, two open-ended questions were asked. One open-ended question was about the advice given to the patients regarding antibiotic use. The majority of them advised taking antibiotics for the entire prescribed duration. Some also cautioned against self-medicating with inappropriate antibiotics, and also about their side effects.

Finally, many suggestions were made by interns to reduce the problem of growing antibiotic resistance as a response to the last open-ended question. These include

health education to doctors, especially future prescribers like interns, strict hospital policies for rational antibiotic prescription after proper diagnosis, and government rules for banning non-prescription sale of antibiotics to avoid self-medication. Some expressed opinions regarding the necessity of conducting research and development of new antibiotics.

Discussion

In this study, interns had good knowledge of antibiotics and their resistance. All of the participants were aware that antibiotics won't cure viral infections. In contrast, in a study done by Nukaly et al.[3] 25.20 % of the participants believed that antibiotics should be prescribed for viral illnesses. Only a few respondents to this study believe that treating the common cold with antibiotics is essential, which was similar to the findings of Afzal Khan et al.[4] While in a study by Bano et al., 43.9% of interns believed that the common cold requires antibiotics.[5] This perception may stem from a limited understanding of the common cold's aetiology, potentially resulting in unwarranted antibiotic prescriptions. A greater number of interns knew the meaning of antibiotic resistance, and they were aware that it is an important and global public health problem. This was also seen in the study done by Joraket al.[6] Not understanding antibiotic resistance can lead to inappropriate antibiotic prescriptions. This means the chosen antibiotic may not be effective against the resistant bacteria, leading to treatment failure, prolonged illness, etc. In our study, 87.7% of the participants felt that the non-prescription sale of antibiotics in pharmacies contributes to antibiotic resistance. But, many interns lacked clarity on the implications of non-prescription antibiotic sales in a study by Arthi et al.[7] Interns should know that pharmacists, as the first point of contact for the public, have a role in irrational antibiotic dispensing.

Attitude refers to the intern's beliefs, values, and perceptions towards antibiotic use and antimicrobial resistance. Even if interns possess good knowledge, a poor attitude can lead to irrational practices. Although the intern's attitude towards rational antibiotic use was favourable, some of them require further clarification and education regarding the components of rational prescription. The majority of the interns showed a strong attitude against self-medication of antibiotics. This is more favourable than a study conducted by Saikia et al., where 27.7 % of participants were not against self-medication of antibiotics.[8] All were aware that inadequate or unduly prolonged use of antibiotics contributes to antibiotic resistance. Similar responses were obtained from the study of Huang Y et al.[9] When antibiotics are stopped prematurely or used for too long, resistance strains may survive and multiply. Almost all agreed on the requirement of a hospital antibiotic policy to ensure rational use of antibiotics, which was similar to a study by Kulkarni et al.[10] In contrast, a study by Banerjee et al. found limited awareness of the hospital's antibiotic policy among healthcare professionals.[11] This underscores that even when policies exist, awareness and implementation can lag, emphasizing the importance of not just policy creation, but also education and enforcement. The results of our study suggest that there is a need for a change of attitude about antibiotic use. More education is needed on completing the full course of antibiotics, sending a sample for culture and sensitivity before starting antibiotics, interpreting susceptibility reports, and prescribing cost-effective drugs.

Practice describes how interns act when writing prescriptions for antibiotics. Despite strong knowledge and attitudes, practice patterns reveal some gaps in our study. Over 61% of interns usually or always prescribe broad-spectrum antibiotics empirically. A study done by Kaur et al. also showed more prescription of broad-spectrum antibiotics.[12] Such practices may arise from diagnostic uncertainty or perceived patient expectations. 13.6% interns sometimes prescribed antibiotics at the patient's request, even when not indicated. This is lower than a study done by Precha et al., where pressure from patients significantly influenced prescribing behaviour.[13] Education about avoiding prescribing antibiotics at the request of patients must be given. The preference for Cephalosporins and Penicillins in OPD settings is consistent with prescribing trends observed in a study by Joena et al.[14] Intravenous antibiotics were mostly changed to oral antibiotics at the earliest possible time. However, the relatively low rate (12.3%) of always transitioning from intravenous to oral antibiotics at the earliest opportunity suggests a need for improvement in stewardship practices.

The majority of the interns advised the patients to finish the course of antibiotics and to refrain from using antibiotics for self-medication. Finally, suggestions for reducing antibiotic resistance included educating doctors about the components of rational prescription and antibiotic resistance, the requirement for stringent government regulations to prohibit the selling of antibiotics without a prescription, as well as hospital antibiotic policies to optimize the usage of antibiotics.

This study has limitations as it was based on a self-administered questionnaire, where there was a chance of discussion among interns about the favourable responses. The results cannot be generalized to interns of other hospitals because the knowledge, attitude, and practice can vary according to the teaching and training method given in their institution.

Table 1: Knowledge of the interns about rational antibiotic use (N=81)

Statement	Yes N (%)	No N (%)
Do patients with common cold symptoms need antibiotic treatment	4(4.9%)	77(95.06%)
Do antibiotics cure viral infections?	0(0)	81(100%)
Does antimicrobial resistance mean unresponsiveness of a microorganism to an antimicrobial agent	76(93.8%)	5(6.2%)
Are newer and costlier antibiotics always more effective?	11(13.6%)	70(86.4%)
Does the non-prescribed sale of antibiotics in pharmacies contribute to antibiotic resistance	71(87.7%)	10(12.3%)
Is antibiotic resistance an important and serious global public health issue	80(98.8%)	1(1.2%)

Table 2: Attitude of the interns about rational antibiotic use (N=81)

Statement	Strongly agree N (%)	Agree N (%)	Undecided N (%)	Disagree N (%)	Strongly disagree N (%)
Self-medication of antibiotics is advisable	0(0)	1(1.2)	1(1.2)	42(51.9)	37(45.7)
Inadequate or unduly prolonged use of	43(53.5)	38(46.9)	0(0)	0(0)	0(0)

antibiotics contributes to antibiotic resistance					
Antibiotics should be stopped as soon as symptoms disappear	1(1.2)	8(9.9)	10(12.3)	28(34.6)	34(42)
It is important to send appropriate samples for culture & sensitivity before prescribing an antibiotic	24(29.6)	42(51.9)	11(13.6)	3(3.7)	1(1.2)
The cost of antibiotics should be considered in rational prescribing	10(12.3)	49(60.5)	17(21)	4(4.9)	1(1.2)
A hospital antibiotic policy is needed to ensure the rational use of antibiotics	41(50.6)	39(48.1)	1(1.2)	0(0)	0(0)

Table 3.1: Practice of antibiotic prescription by interns (N=81)

Statement	Never N (%)	Rarely N (%)	Sometimes N (%)	Usually N (%)	Always N (%)
When prescribing empiric antibiotics, I prefer to use a broad-spectrum antibiotic.	1(1.2)	5(6.2)	25(30.9)	43(53.1)	7(8.6)
Prescribes antibiotics even when they are not indicated, at the patient's request	53(65.4)	17(21)	11(13.6)	0(0)	0(0)

Table 3.2: Practice of antibiotic prescription by interns (N= 81)

Questions	N(%)
Which is the commonly prescribed group of antibiotics in OPD?	
Penicillins	36(44.4)
Cephalosporins	43(53.1)
Fluoroquinolones	1(1.2)
Others	1(1.2)
How would you rate the effectiveness of intravenous to oral transitions of antibiotics?	
Antibiotics are never transitioned from IV to PO at the earliest possible time	3(3.7)
Antibiotics are not usually transitioned from IV to PO at the earliest possible time.	4(4.9)
Antibiotics are sometimes transitioned from IV to PO at the earliest possible time	24(29.6)
Antibiotics are usually transitioned from IV to PO at the earliest possible time	40(49.4)
Antibiotics are always transitioned from IV to PO at the earliest possible time	10(12.3)

Conclusion

This cross-sectional study revealed a knowledge-attitude-practice gap in rational antibiotic use among medical interns. While interns generally possess a foundational understanding of antibiotic use and favourable attitudes towards rational prescribing, their clinical practice showed concerning deficiencies. Most of them prefer broad-spectrum antibiotics for empirical

treatment, and one-third sometimes prescribe antibiotics upon patient request even when not clinically indicated. Without adequate knowledge, interns are prone to making irrational prescribing decisions, such as using broad-spectrum antibiotics unnecessarily, prescribing antibiotics for viral infections, or incorrect dosing/duration, all of which increase the risk of antimicrobial resistance and negative implications for individual patients and global public health. Good knowledge and a positive attitude must translate into consistent, rational prescribing behaviours. Gaps in practice, even with good knowledge and attitude, can still lead to antibiotic misuse. Enhancing rational antibiotic use among medical interns necessitates a multifaceted and sustained educational intervention. Future strategies must incorporate ongoing, practical training, real-time help when they are prescribing, mentorship from senior doctors, and regular feedback on their choices of antibiotics. By developing a culture of vigilant antimicrobial stewardship from the earliest stages of their clinical career, we can empower medical interns to become responsible prescribers, thereby safeguarding the efficacy of existing antibiotics and ensuring sustainable patient care in the face of evolving antimicrobial resistance.

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