



# Perception and Knowledge of Antibiotic Resistance: A Cross Sectional Study among Students in a Medical College, India

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## Abstract

**Background & Aims:** The threat of antibiotic resistance is rapidly progressing and intensifying. It is an important global issue and health-care problem that needs urgent attention. This study will help provide a better understanding of what the students know and believe about the issue of antibiotic resistance. This study was designed to assess the knowledge, attitude and perception level among students concerning antibiotic resistance as well as their self-reported practices related to antibiotic usage.

**Materials and Methods:** A cross sectional descriptive study was conducted among 230 study participants (Interns and post graduates). A semi structured questionnaire was administered to the participants.

**Results:** All the participants are aware of antibiotic resistance. 192 (83.4%) of the participants agreed that indiscriminate and injudicious use of antibiotics leads to ineffective treatment in future. The perception and attitude of the study participants showed that 144 (62.6%) of participants agreed that skipping one or two doses contributes to the development of antibiotic resistance. Majority of the study participants opined that they need more training in the antibiotic selection and on antibiotic resistance.

**Conclusion:** The findings of the study concluded that there is a need for proper planning and devising an effective and tailored educational intervention, which can unlock the initial step to curb the alarming increase in resistance.

**Keywords:** Antibiotic Resistance, Knowledge, Perception, Medical College, Students

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## Introduction

Selman Waksman first used the word antibiotics in 1941 to describe any small molecule made by a microbe that antagonizes the growth of other microbes (1).

WHO defines “antimicrobial resistance” as the resistance of a microorganism to an antimicrobial drug that was initially effective for the treatment of infections caused by it (2).

Antimicrobial resistance is a global problem that is growing worldwide. This is particularly pressing in developing countries(3). In India as a country with a high infectious disease burden, antibiotics are the most widely and frequently prescribed drugs that cause an alarming rise in antimicrobial resistance (4). Irrational use of antibiotics without proper guidelines and laws against its use makes the drugs ineffective very soon, which is a serious health-care problem in many developing countries (5).

Unlike many other drugs whose administration is generally limited to well-trained specialists, antibiotics are prescribed by virtually all doctors and allied healthcare practitioners regardless of training or knowledge (6).

Studies have estimated that between 20% and 50% of antibiotic uses are either unnecessary or inappropriate, and decreasing their use is a necessary first step to curb antibiotic resistance (3).

Young medical students who will be prescribing antibiotics should be given more education during their undergraduate training regarding antibiotic resistance and appropriate prescription. This is a crucial time period during which the importance of these issues should be emphasized; otherwise it will be difficult to change their deeply entrenched views and behaviors (7).

Educational interventions have to be undertaken to prevent and control antibiotic resistance, which bring about behavioral changes in the target group, and the outcome of these interventions is affected by the previous beliefs and motivations held by this group (7).

Before outlining any training programme or an educational intervention, we must be aware of the baseline knowledge of the target population, which will help in planning a suitable approach and an effective curriculum.

Thus this study was undertaken with the objective of assessing the knowledge, attitude and perception level among students concerning antibiotic resistance as well as their self-reported practices related to antibiotic usage.

## Materials & Methods

A cross sectional descriptive study was conducted among interns and post graduate students in a medical college, Bengaluru.

### Sample size:

Complete enumeration of all post graduate students and Interns i.e 230 individuals present on the day of study

### Inclusion criteria:

- The students who are willing to participate in the study.

### Exclusion criteria:

- The students who are absent on the day of data collection.
- Students who do not give consent for the study.

### Study duration:

- Two months

### Data collection:

A semi structured questionnaire was administered to the students. The questionnaire included socio-demographic characteristics of the students, questions on their knowledge of antibiotic resistance and of antibiotic misuse, attitude about antibiotic prescribing, their perception of the importance of the problem of antibiotic resistance, their beliefs about the causes of antibiotic resistance, and their attitude about current and potential interventions designed to reduce antibiotic resistance. Data was collected after obtaining clearance from the institutional ethical committee. The participants were explained in detail about the study and the written consent was obtained. The participating post graduates and interns were assembled separately on a scheduled day and questionnaires were distributed. The students were ensured that complete confidentiality would be maintained. A pilot study was conducted before the actual study, following which necessary changes were incorporated in the questionnaire. The data was excluded from the main study.

### Statistical Analysis:

The data was compiled in Microsoft (MS) Excel worksheet and analyzed using SPSS Software version 20.0. The descriptive statistics- All qualitative variables were presented as frequency and percentages.

## Results

Among 230 study participants 145 were interns and 85 were post graduates. One question tested the ability of students to identify the antibiotics among a group of drugs. All of them identified amoxicillin correctly, 99.2% tetracycline and 94.5% vancomycin. All the participants are aware of antibiotic resistance and 214 (93%) of them consider it to be a serious public health problem.

**Table 1.** Summarizes the knowledge of antibiotic resistance among the study participants. 192 (83.4%) of the participants agreed that indiscriminate and injudicious use of antibiotics leads to ineffective treatment in future. 204 (88.7%) of total participants believed that if antibiotics are taken too often, they were less likely to work in future. 175 (76%) were aware that increased adverse effect of antibiotics were also due to their indiscriminate uses.

**Table 1.** Knowledge of antibiotic resistance among study participants (N=230)

Statement	Yes (%)	No(%)
Indiscriminate use of antibiotics can lead to the emergence of the growing problem of resistance	204(88.7)	26(11.3)
Ineffective treatment in future can occur due to indiscriminate and injudicious antibiotic use	192(83.4)	38(16.5)
Patients with common cold symptoms need antibiotic treatment	15(6.6)	215(93.4)
Increase adverse effect due to indiscriminate use of antibiotics	175(76)	55(24)
The efficacy is better if the antibiotics are newer and more costly?	42(18.3)	188(81.7)
Aware of antimicrobial policy in hospital	76(33.1)	154(66.9)
Self-medication of antibiotics without a doctors' consultation or prescription can lead to antibiotic resistance	140(61)	90(39)

The perception and attitude of the study participants towards antibiotic resistance and usage is shown in **Table 2**. Where 144 (62.6%) of participants agreed that

skipping one or two doses contributes to the development of antibiotic resistance. 185 (80.4%) of study participants stated that they always completed the full course of treatment.

**Table 2.** Perception and attitude of antibiotic usage and resistance among study participants (N=230)

Statement	Agree N(%)	Disagree N(%)	Undecided N(%)
Antibiotics are safe drugs, hence they can be commonly used medication	91(39.6)	133(57.8)	6(2.6)
Skipping one or two doses contributes to the development of antibiotic resistance.	144(62.6)	81(35.2)	5(2.2)
Combination of antibiotics can prevent development of antibiotic resistance	128(55.6)	85(37)	17(7.4)
It is always better to stop antibiotics once the symptoms of illness get resolved	104(45.2)	118(51.3)	8(3.4)
Consult seniors before prescribing higher antibiotics	153(66.5)	66(28.7)	11(4.8)
Send sample for culture & sensitivity test in every case before starting antibiotics	117(50.9)	92(40.0)	21(9.1)

The majority (200; 86.9%) of the study participants stated that more training is needed in regard to antibiotic selection and on antibiotic resistance.

**Table 3:** Sources of information on antibiotics and antibiotic resistance (N=230)

Source	Frequency	Percentage
Training in medical school	189	82.1
Medical representatives	33	14.3
Peers and seniors	202	87.8
Text books or Journals	154	67.0

\*Multiple Answers

**Table 4:** Interventions/suggestions to curb the problem of antibiotic resistance (N=230)

Intervention	Frequency	Percentage
Judicious, and rational use of antibiotics	61	26.5
Complete the full course of antibiotics in the prescribed dose	54	23.4
Avoid self medication	49	21.3
Awareness among patients by organizing public health campaigns	32	14
Symptomatic management in self limiting conditions	12	5.2
Combination of antibiotics	11	4.8
Development of new drugs	11	4.8
Total	230	100

## Discussion

The study was conducted to evaluate the knowledge, attitude and perception of interns and post graduates towards antibiotic resistance and usage. Most of the participants 214 (93%) in the present study were aware of the fact that antibiotic resistance has become an important and serious public health problem. A similar response was observed in previous studies conducted by Singh et. al (8) and Jorak et. al. (9) A study done by Mahajan et. al. (10) showed that all participants were aware of the fact that indiscriminate use of antimicrobial agents results in the bacterial resistance, and these results were similar to the present study. Around 51.3% of the participants of this study never stop taking antibiotics in spite of feeling better and these results were similar to the study done by Khan et. Al. (7). The response rate was higher in studies done by Yashin et.

**Table 3.** Summarizes sources of information on antibiotics and antibiotic resistance (N=230) and **table 4.** Indicates interventions or suggestions to curb the problem of antibiotic resistance (N=230).

al. (11) and Mahajan et. al. (10). Incorrect information regarding indications of antibiotics can worsen the problem of antimicrobial resistance. Students should be explained and trained clearly.

Majority of the participants (93.4%) in the present study knew that antibiotics are not required to treat the symptoms of common cold. These results were similar to the study done by Joraket. al. (9). However, according to the study done by Hueng et. al. (12), the majority of the participants had a belief that antibiotics can speed up recovery of common cold. This difference in the results may be due to the increased usage of antibiotics and difference in the geographical area.

Limitation of the present study is the use of self-administered questionnaire instead of face to face interviews, which can cause recall bias resulting in under reporting or over reporting of information.

## Conclusion

The study revealed that the participants have a clear concept of knowledge of antibiotic resistance and cautious use of antibiotics. However, there is a need of education in regard to the antibiotic policy with more emphasis on the practice of antibiotic prescription. The findings in the study conclude that there is a need for proper planning and devising an effective and tailored educational intervention that can unlock the initial step to curb the alarming increase in resistance.

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