

## Assessment of Knowledge, Attitude and Practice Regarding Antibiotic Usage Amongst Undergraduate, Interns and Postgraduate Dental Students in Kanpur City- A Questionnaire Based Study

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#### Abstract

**Introduction:** To assess the knowledge, attitude and practice of rational use of antibiotics among undergraduate, intern and postgraduate dental students and make necessary interventions suitable to meet their needs and aspiration. **Methods:** A questionnaire was administered to the students of Rama dental college hospital & research centre to assess their knowledge, attitude and practice about the rational use of antibiotics. Data were analysed after entering into a Microsoft Excel sheet and using descriptive statistics. **Results:** 135 dental students were included, with a response rate of 82%. Of the total participants, 120 (88.88%) know that Improper antibiotic use can cause antibiotic resistance. 56 (41.48%) participants agreed that antibiotics should be prescribed for all dental infections, while 79 (58.52%) denied this. Among all the participants, 48 (35.56%) participated in prescribing antibiotics because the patient expected it, while 87 (64.44%) said no. **Conclusions:** This study showed that most students had average knowledge of antibiotics. Their attitude could have been more satisfactory towards the rational use of antibiotics, and the same was true for the practice as well. Educational intervention is of utmost essential to improve their KAP regarding the sensible use of antibiotics.

**Keywords:** Antibiotic, Dental, Rational, Undergraduate, interns, Postgraduate

#### Introduction

The era of antibiotics has changed the treatment pattern and outcomes of infectious diseases. But at the same time, the irrational use of antibiotics has created havoc in antibiotic resistance. (1)

Antibiotics are the most frequently prescribed drugs around the world. But unfortunately, it has been prescribed irrationally in many cases. Around 70 to 80% of antibiotic prescriptions are prescribed

unnecessarily by health professionals. Imprudent uses of these drugs have resulted in antimicrobial resistance, which is now emerging as one of the significant threats to health care globally.(2)

Resistance is a serious issue leading to severe difficulty in treating infections caused by bacteria. The problem of resistance in developing countries for many reasons, including self-medication without prescription, over-the-counter (OTC) availability of antibiotics, high medical consultation fees, insufficient regulation of antibiotics, and lack of satisfaction with medical practitioners.(3)

Medical students are going to be primary care physicians to serve the community. These future prescribers are frontline fighters against antimicrobial resistance by rationally prescribing antibiotics and promoting patient awareness.

The inappropriate use of antibiotics could result from a complex interaction among various factors: prescriber behaviours and knowledge, diagnostic uncertainty, patient demand, poor patient-prescriber interaction and macro-level factors such as sociocultural, economic, and healthcare regulatory policy.(4)

Overprescribing remains widespread, driven mainly by uncertainty about the diagnosis, the demand of patients and the pressure of time on clinicians. The rational use of antibiotics is thought to be the best way to control resistance. Antimicrobial resistance is a threat that is progressing rapidly and intensifying. The first step towards curtailing its progress is developing awareness of its significance and seriousness. A strong correlation between the levels of antibiotic use and antibiotic resistance has been shown in various studies, where populations who use lower amounts of antibiotics develop a lower number of resistant bacteria.

Therefore, it has been emphasised that undergraduate and postgraduate students should be given proper training and awareness regarding the careful prescribing, manufacturing and use of antibiotics. This important measure will help to promote the judicious use of antibiotics. So, this study was undertaken among dental students to assess their knowledge and attitude concerning antibiotics and their resistance and practices related to antibiotic usage.(5)

World Health Organization (WHO) has described antibiotic resistance as a major global health problem that threatens our ability to treat common infectious diseases and needs urgent action.(6)

A strong correlation between the levels of antibiotic usage and antibiotic resistance has been shown in various studies, where populations who use a lower amount of antibiotics develop a lower amount of resistance toward bacteria.

### **Aim**

This study aims to assess the knowledge, attitude and practice of antibiotic use and its resistance amongst dental students. (BDS final year, Interns and Postgraduates)

### **Material and Methods**

Study design and study population: - It is a cross-sectional questionnaire-based study conducted among 135 dental students (final year, interns, postgraduates) of Rama Dental College Hospital & Research Centre, Kanpur.

Study duration: The study was conducted among 135 dental students of Rama Dental College Hospital & Research Centre, Kanpur, over a period of 4 months from September to December 2021.

Ethical approval for the study- The study proposal was submitted for approval and clearance to the Institutional Review Board of Rama Dental College, Hospital and Research Centre, Kanpur, before the start of the study. The Ethical Committee reviewed the study protocol, and ethical clearance was granted.

Informed consent-. A detailed information sheet in English was presented to the participants to explain the purpose of the study, procedure, benefits and risks to the participants. Following this, written informed consent was obtained from all participants willing to participate in the study. All Participants signed informed consent forms before participating in this study.

**Validity of the Questionnaire:** - Face validity of the questions was tested by the faculty in the department. Twenty subjects were randomly selected to assess the test-retest reliability of the questionnaire using Cohen's Kappa coefficient.

### **Sample size and sampling method**

The study population was the B.D.S final year, interns and postgraduate dental students of Rama dental college, whose number amounted to nearly 165 students, out of which 65 were B.D.S final year,35 interns, and 65 were postgraduate dental students. One hundred thirty-fiveOne hundred thirty-five students were present on the day of data collection was taken as sample size.

Out of 135 sample sizes obtained, 59 are B.D.S final year,29 are interns, and 47 are postgraduate dental students.

Sampling method- 135 dental students were selected by using the Convenience sampling technique.

### **Inclusion criteria**

All dental students from final year, interns and postgraduates

### **Exclusion criteria**

Dental students who did not give their consent were excluded from the study.

Dental students who were absent at the time of the study.

### **Collection of data**

The investigator interviewed the subjects, and the following data was collected through a validated, self-administered structured questionnaire which included

#### **Section-1 Demographic data**

Demographic characteristics include Name, Age, Gender, Participants and year of study.

#### **Section-2 Knowledge regarding antibiotic usage**

It consisted eight questions regarding knowledge of antibiotic usage; the correct answer for knowledge questions was awarded 1 mark each, and 0 for incorrect answers. (Minimum score=0 and maximum score=8).

#### **Section-3 Attitude regarding antibiotic usage**

The attitude of dental students towards antibiotic usage was assessed using 6 questions.

The correct answer for attitude questions was awarded 1 mark each, and 0 for incorrect answers. (minimum score=0 and maximum score=6).

#### **Section-4 Practice of antibiotics.**

It consisted eight questions regarding the practice of antibiotic

The correct answer for practice questions was awarded 1 mark each, and 0 for incorrect answers.

## Statistical Analysis

The data was statistically analysed using SPSS version 23.0, and results drawn using appropriate statistical tests.

Data collected and entered in the master chart, and descriptive statistical methods were included. Calculation of mean and percentages

Statistical tests used were Chi-square and ANOVA wherever applicable.

## Results

This table shows the mean age of the study population was 25.24 years, and the standard deviation was 2.887. The maximum age of the study population is 34 years, and the minimum is 20 years. (TABLE 1)

This graph shows the frequency distribution according to different age groups in patients. The participants were divided into three age groups that were 19-22 years, 23-26 years and more than 26 years. In this study, 29 (21.5%) belonged to the 19-22 years age group, 62 (45.90%) from the 23-26 years group, and 44 (32.6%) from the more than 26 years group. The maximum number of participants belonged to the 23-26 years group, whereas the lowest belonged to the 19-22 years age group. (GRAPH 1)

This graph presents the gender distribution of the study participants according to gender. The percentage of male participants is 34.8% (47), and females are 65.2% (88). (GRAPH-2)

This graph shows the frequency distribution according to a year of study among the participants; 59 (43.7%) of participants were in their Final year BDS, 29 (21.5%) participants were interns, and 47 (34.8%) participants were post-graduate dental students. (GRAPH-3)

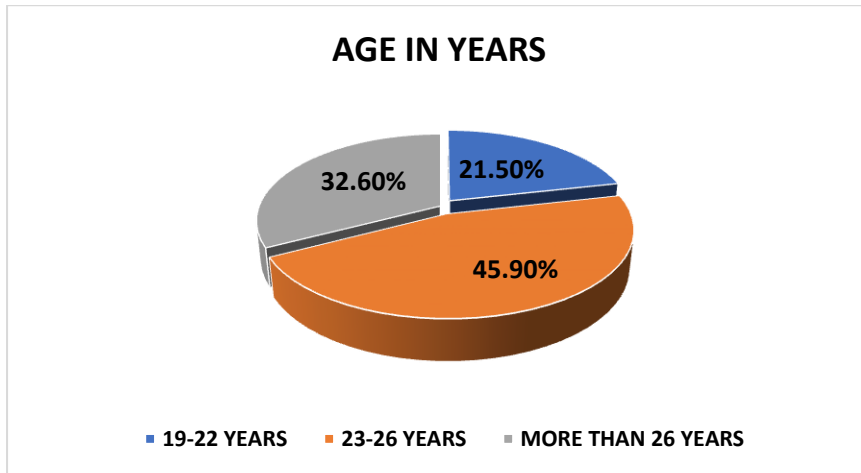
This table shows the association between socio-demographic characteristics and Knowledge regarding antibiotic usage. The prevalence of knowledge among people aged 23-26 years was more (20.0%) as compared to the aged 19-22 years (13.3%) and more than 26 years (19.3%) with a p-value of 0.148. Knowledge regarding antibiotic usage among 4th year B.D.S students was 28.9%, among interns was 3.7%, and among postgraduate students was 20.0%, with a p-value of 0.000. (TABLE-2)

This table shows the association between predisposing socio-demographic characteristics and attitudes towards antibiotic usage. Age and year of study were found to be significantly associated with attitude questions regarding antibiotic usage. The attitude was found positively the highest among people aged 23-26 years (28.9%), followed by those aged more than 26 years (12.6%), and 19-22 years age group (11.9%) with a p-value of 0.046. The attitude was positively highest among 4th year B.D.S (28.1%), among postgraduates (13.3%), and among interns (11.9%), with a p-value of 0.027. (TABLE-3)

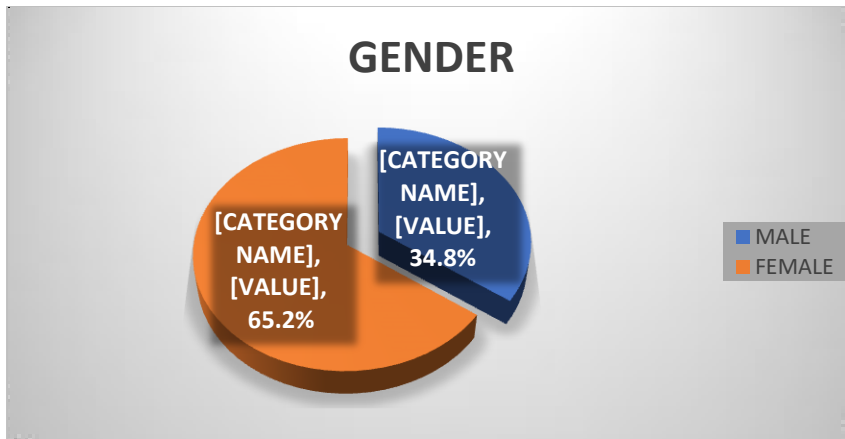
This table shows the association between predisposing socio-demographic characteristics and practice regarding antibiotic usage. Year of study and age groups were statistically significantly associated with practice questions of antibiotic usage. Practice regarding prescription antibiotic usage among females was higher, i.e. (60.7%), compared to males (32.6%). The practice among the 19-22 years age group was (20.7%), among the 23-26 years age group (35.6%) and more than 26 years (23.7%) with a P value of 0.035. The practice of prescription antibiotic usage was seen higher among final year B.D.S (43.0%), followed by postgraduates (34.8%) and among interns (15.6%) with a p-value of 0.000. (TABLE-4)

GRAPHS

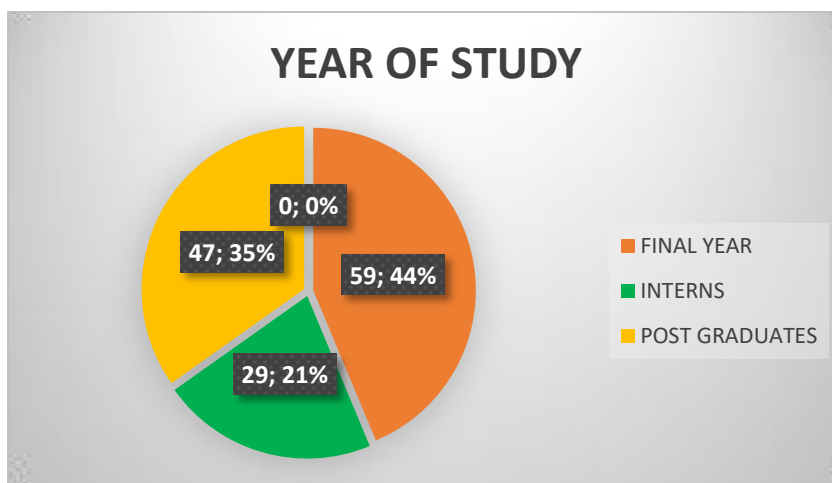
GRAPH-1 DISTRIBUTION OF STUDY POPULATION ACCORDING TO AGE



GRAPH-2 DISTRIBUTION OF STUDY POPULATION ACCORDING TO GENDER



GRAPH-3 DISTRIBUTION OF STUDY POPULATION ACCORDING TO THEIR YEAR OF STUDY



**TABLES**

**TABLE-1: MEAN AGE OF STUDY POPULATION**

N	MEAN	ST. DEVIATION	(MINIMUM-MAXIMUM)
135	25.24	2.887	20-34

**TABLE-2: ASSOCIATION OF KNOWLEDGE REGARDING ANTIBIOTIC USAGE WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS**

VARIABLES	ASSOCIATION OF KNOWLEDGE WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS				CHI-SQUARE	P VALUE
	GOOD		POOR			
	N	%	N	%		
<b>GENDER</b>					0.387	0.534
<b>MALE</b>	23	17.0%	24	17.8%		
<b>FEMALE</b>	48	35.6%	40	29.6%		
<b>AGE GROUPS</b>						
<b>19-22 YEARS</b>	18	13.3%	11	8.1%	3.824	0.148
<b>23-26 YEARS</b>	27	20.0%	35	25.9%		
<b>MORE THAN 26 YEARS</b>	26	19.3%	18	13.3%		
<b>YEAR OF STUDY</b>						
<b>FINAL YEAR</b>	39	28.9%	20	14.8%	19.298	<b>0.000</b>
<b>INTERNS</b>	5	3.7%	24	17.8%		
<b>POST GRADUATES</b>	27	20.0%	20	14.8%		

**TABLE-3: ASSOCIATION OF ATTITUDE TOWARD ANTIBIOTIC USAGE WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS**

VARIABLES	ASSOCIATION OF ATTITUDE WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS				CHI-SQUARE	P VALUE
	GOOD		POOR			
	N	%	N	%		
<b>GENDER</b>					0.114	0.735
<b>MALE</b>	26	19.3%	21	15.6%		
<b>FEMALE</b>	46	34.1%	42	31.1%		
<b>AGE GROUPS</b>						
<b>19-22 YEARS</b>	16	11.9%	13	9.6%	6.139	<b>0.046</b>

<b>23-26 YEARS</b>	39	28.9%	23	17.0%		
<b>MORE THAN 26 YEARS</b>	17	12.6%	27	20.0%		
<b>YEAR OF STUDY</b>						
<b>FINAL YEAR</b>	38	28.1%	21	15.6%	7.215	<b>0.027</b>
<b>INTERNS</b>	16	11.9%	13	9.6%		
<b>POST GRADUATES</b>	18	13.3%	29	21.5%		

**TABLE-4: ASSOCIATION OF PRACTICE REGARDING ANTIBIOTIC USAGE WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS.**

VARIABLES	ASSOCIATION OF PRACTICE OF ANTIBIOTICS WITH SOCIO-DEMOGRAPHIC CHARACTERSTICS					CHI-SQUARE	P VALUE
	GOOD		POOR				
SOCIO-DEMOGRAPHIC	N	%	N	%			
<b>GENDER</b>					0.009	0.923	
<b>MALE</b>	44	32.6%	3	2.2%			
<b>FEMALE</b>	82	60.7%	6	4.4%			
<b>AGE GROUPS</b>							
<b>19-22 YEARS</b>	28	20.7%	1	0.7%	6.678	<b>0.035</b>	
<b>23-26 YEARS</b>	48	35.6%	14	10.4%			
<b>MORE THAN 26 YEARS</b>	32	23.7%	12	8.9%			
<b>YEAR OF STUDY</b>							
<b>FINAL YEAR</b>	58	43.0%	1	0.7%	26.098	<b>0.000</b>	
<b>INTERNS</b>	21	15.6%	8	5.9%			
<b>POST GRADUATES</b>	47	34.8%	0	0.0%			

**TABLE-5: COMPARISON OF KNOWLEDGE, ATTITUDE AND PRACTICE AMONG FINAL YEAR (B.D.S), INTERNS AND POSTGRADUATES.**

VARIABLES	COMPARISON OF KNOWLEDGE, ATTITUDE AND PRACTICE AMONG FINAL YEAR (B.D.S), INTERNS AND POSTGRADUATES.				CHI-SQUARE	P VALUE
	GOOD		POOR			
<b>KNOWLEDGE</b>						
FINAL YEAR	39	28.9%	20	14.8%	19.298	<b>0.000</b>
INTERNS	5	3.7%	24	17.8%		
POST GRADUATES	27	20.0%	20	14.8%		
<b>ATTITUDE</b>						
FINAL YEAR	38	28.1%	21	15.6%	7.215	<b>0.027</b>
INTERNS	16	11.9%	13	9.6%		
POST GRADUATES	18	13.3%	29	21.5%		
<b>PRACTICE</b>						
FINAL YEAR	58	43.0%	1	0.7%	26.098	<b>0.000</b>
INTERNS	21	15.6%	8	5.9%		
POST GRADUATES	47	34.8%	0	0.0%		

### Discussion

Antibiotics are essential to modern medicine, and antibiotic resistance severely threatens human health worldwide. Antibiotic exposure and its resistance are apparent at the population level and in individual patients. Reducing unnecessary use of antibiotics is thus essential to mitigate antibiotic resistance.(7) It is widely known that any use of antimicrobials, despite being appropriate and justified, contributes to the emergence of resistance, but unnecessary and too much use makes the situation worse.

The prevalence of antimicrobial resistance varies significantly between and within countries and between different pathogens.(8) In developing countries, antimicrobials misuse is facilitated by their availability as open trade sales, without prescription and through unregulated supply chains.

The knowledge amongst the students towards the role of antibiotics in minor viral illnesses in our study was doubtful as, on the one hand, they (more than 80% of each group) were aware of the fact that antibiotics cannot cure viral infection; on the other hand, they (70% of each group) perceived that antibiotics could speed up the recovery of common cold and cough, assuming common cold and cough as bacterial illness. Such wrong assumptions may lead to a high rate of antibiotic overconsumption and inappropriate use and consequently lead to antibiotic resistance development. The majority of the students (88.88%) in our study were aware of the fact that improper use of antibiotics leads to the emergence of antibiotic resistance. The maximum correct response was given by UG students (100%), and the minimum correct answer was given by Interns (55.18%), followed by PG students (95.74%) for the question "Indiscriminate use of antibiotics leads to the emergence of antibiotic resistance". The finding in UG students was higher than final year students of MBBS (78.94%), BDS (70.83%) and BSc nursing (58.10%)



in a study done by Hemant Kumar Dutt et al.(3) In the present study, more than 70% of students believed that abuse of antibiotics had become the main cause leading to bacterial resistance, which was in accordance with another study conducted amongst Chinese students by Ying Huang et al.(9) but was not inconsistent with the findings in the study done by Poonam Patel et al. amongst medical students (87.29%).(10) Considerable students in our study believed that skipping a few doses of antibiotics does not contribute to resistance. For the question, "Do you think skipping 1 or 2 doses of antibiotic does not contribute to developing antibiotic resistance". Our finding in each group was higher than the finding in a similar study previously done by Manali Mahajan et al. amongst MBBS undergraduates.(11) Self-medication has a positive effect on individuals as well as health care systems in general if appropriately practised. However, studies in various settings indicate a high prevalence of self-medication practice ranging from 38.7% to 83%, frequently associating it with the irrational use of medications.(12) In our study, 95.56 % of the students reported not completing the entire course of prescribed antibiotics, which was comparatively higher than the finding amongst nursing students (68.50%) and also higher than dental students (26.90%) and MBBS students (32.10 %) in the survey done in an Indian university.(13) Around 77.78% of students agreed that they stocked leftover antibiotics for future use. These findings were different from the previous study.(14) This study gives us an idea of knowledge, attitude and practice concerning antibiotic usage and its resistance amongst budding dental health professionals in our Institution, which can help us to plan for an effective curriculum.

The limitation of this study was the small sample size and the recruitment of participants from a single Institution.

### **Recommendations**

Following recommendations are listed to restrict the over use of antibiotics.

In a developing country with scarce government and individual resources, self-medication, if done responsibly could be a cornerstone of healthcare provision and health policy

Restricting sales of antimicrobials with medical prescriptions only, efficient surveillance of antimicrobial usage and resistance, using celebrity endorsements for spreading awareness on the misuse of antibiotics, effective use of mass media such as television, newspapers, and internet for providing reliable, authentic, and complete knowledge about the drugs and for improving awareness about adverse consequences of antimicrobial usage, are a few solutions to curb this global problem at the community level.

### **Conclusion**

Our study has generated information about the knowledge, attitude and practice of final-year BDS, Interns and postgraduates towards antibiotic usage. The level of knowledge and attitude about antibiotic usage and antibiotic resistance of health professional students is high; however, the practice of antibiotics is still poor. Hence, educational interventions on antibiotic use and its association with drug resistance are needed to promote the judicious use of antibiotics. Enforcing antibiotic regulations at a national level is also a key measure to reduce over-the-counter sales, which in turn reduces antibiotic self-prescription.

The curriculum also should be modified accordingly, and different aspects of antibiotic resistance should be incorporated into their pharmacology course.

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