

STUDY TO ASSESS THE KNOWLEDGE ATTITUDE AND PRACTISE OF ANTIMICROBIAL USE AND RESISTANCE AMONG 2ND MBBS AND 2ND BDS STUDENTS IN A MEDICAL AND DENTAL COLLEGE

Sudhakar K¹, Sri Sangeetha², Vineela N³, Sindu P³ Suresh Babu Sayana⁴

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Corresponding Author:

Dr. Sindu Punna,

Email: dr.punnasindhu@gmail.com

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¹Associate Professor, Department of Pharmacology, Bhaskar Medical College, Moinabad, Ranga Reddy, Hyderabad, Telangana, India.

²Assistant Professor, Department of Physiology, Bhaskar Medical College Moinabad, Ranga Reddy, Hyderabad, Telangana, India.

³Assistant Professor, Department of Pharmacology, Bhaskar Medical College Moinabad, Ranga Reddy, Hyderabad, Telangana, India.

⁴Assistant Professor, Department of Pharmacology, Government Medical College, Suryapet, Telangana, India.

Abstract

Background: Antimicrobial resistance occurs when microorganisms such as bacteria, virus, parasites, or fungi become resistant to antimicrobial treatments to which they were previously susceptible. It is an important threat to global health, primarily attributed to the improper and excessive use of antimicrobials. To assess the knowledge, attitude and practise (KAP) of antimicrobial use and resistance among 2nd MBBS and 2nd BDS Students. **Materials and Methods:** A cross-sectional questionnaire-based study was conducted among 2nd MBBS and 2nd BDS students at Bhaskar Medical College and Sri Balaji Dental College in Moinabad, Telangana. A structured questionnaire comprising of 10 knowledge, 14 attitude and 7 practise based questions were given to the students. Descriptive statistics (mean, percentage) were used to describe the data. Chi Square test was used to find the difference between the two groups. P value less than 0.05 was considered significant. **Result:** Among MBBS students, 57.6% demonstrated a moderate level of knowledge, and 40% exhibited good knowledge. In the BDS group, 53.01% showed moderate knowledge, and 37.34% had good knowledge. Better attitude was seen in MBBS students compared to BDS. Self-medication was reported by 14.1% of MBBS and 9.6% of BDS students. **Conclusion:** The majority of students in both groups demonstrated a moderate to high level of knowledge regarding antimicrobial use and resistance. While self-medication was quite low in both groups, a significant number of students did not complete the full course of antimicrobials.

INTRODUCTION

Discovery of various antibiotics have transformed medicine and saved millions of lives. Average human lifespan was extended by 23 years due to antibiotics.^[1] However, there is a rapid emergence of resistant bacteria worldwide which is endangering the efficacy of antibiotics.^[2] Antibiotic resistance arises when bacteria evolve and become resistant to the effects of antibiotics.^[3] It typically occurs from the selective pressure exerted by antibiotic usage, either through genetic mutations or the acquisition of genetic material via plasmid transfer from a bacterium that has developed resistance.^[4] WHO has declared that Antimicrobial resistance (AMR) is one of the top 10 threats to global health.^[5]

Widespread misuse and overuse of antibiotics are the major factors for rapid emergence of resistance. Pharmacists who are often the first point of care, frequently dispense antibiotics without a valid prescription. They sometimes offer alternative antibiotics even when the patient presents with a valid prescription.^[6] This is especially seen in low and middle income countries. In India, there is an increased use of antibiotics not only to treat sick animals, but they are also included in animal feeds to promote growth.^[7] This can lead to resistance in animals which can further be passed on to human beings. Further there is a slowing pace in the discovery of new antibiotics in the past few decades which is aggravating the problem. Unlike chronic diseases that require long term treatment, antibiotics are mostly used for short courses which may not

bring the same financial benefits for the pharmaceutical companies. This makes them less interested in investing for the discovery of new antibiotics.^[2,8,9]

Antibiotic resistance poses significant threat to public health not only in the developing countries but also throughout the world.^[10,11] It can lead to increase mortality and morbidity. Common infections that were once easily treatable can now become life threatening. It also causes substantial economic burdens on the healthcare system due to the need for more expensive and prolonged treatment. By the year 2050, global estimates suggest that approximately 10 million individuals will lose their lives annually due to antimicrobial resistance, with an anticipated 2 million of these cases occurring specifically in India. There is also an estimated decrease in gross domestic product (GDP) by 2 to 3.5%, costing USD 100 trillion to the world.^[12,13]

India carries one of the largest burdens of drug resistant pathogens worldwide.^[6] Alarming high level of resistance is observed among both Gram-negative and Gram-positive bacteria, even extending to relatively new antimicrobials like carbapenems^[14] Antimicrobial resistance is a multifaceted problem and its control requires multi-pronged approach.^[15] As future medical and dental practitioners, 2nd MBBS and 2nd BDS students have a significant responsibility to understand and combat antibiotic resistance. There are very few studies conducted in India comparing MBBS and BDS students regarding antibiotic resistance. Therefore, this study is done to assess the knowledge attitude and practise of antimicrobial use and resistance among 2nd MBBS and 2nd BDS Students. By understanding their current knowledge and attitudes, appropriate educational interventions can be designed to improve their understanding of antibiotic resistance and encourage responsible antibiotic prescribing and usage.

MATERIALS AND METHODS

Study design & Participants: This was a cross sectional questionnaire-based study conducted at Bhaskar Medical College and Sri Balaji dental college in Moinabad Telangana, from January 2023 to April 2023. 100 students each from 2nd MBBS and 2nd BDS, who were willing to participate in the study were included. Students who did not return the forms, incompletely filled, or left them unanswered were excluded from the study.

Data Collection: After explaining the nature and purpose of the study, informed consent was taken from students. Standard Structured Questionnaire was given to each student with different sections related to their KAP of antimicrobial use and resistance. Doubts regarding the questionnaire were clarified by the investigators. 30 minutes duration was given to the respondents to fill the forms. There are a total of 4 sections in the questionnaire. The first section consists of 10 questions to test the knowledge

of the students. Correct answer will be awarded one mark and zero for the wrong answer (Maximum score is 10). The overall knowledge was categorized into "Good knowledge" if the score ranges from 80-100%, Moderate 50-79% and poor <50%. The second section tests the attitude of the students towards antimicrobial resistance. This is further subdivided into 3 sub-sections where students were asked about the reasons (4 questions), consequences (3 questions), and prevention (7 questions) of antimicrobial resistance. 3 point Likert scale with 3 answerable options (Disagree, Neutral, Agree) were given for each question. Third section consists of 4 questions related to antibiotic usage by the students.

Statistical Analysis: Data was entered into Microsoft Excel Sheet and analysed using SPSS 28 (Statistical package for social sciences version 28). Descriptive statistics (mean, percentage) were used to describe the data. The difference between the two groups was assessed using Chi Square test. P value less than 0.05 was considered significant.

Ethical Considerations: Ethical approval was obtained from institutional ethics committee Bhaskar Medical College Moinabad.

RESULTS

A total of 200 students, 100 belonging each group (2nd MBBS and 2nd BDS) were given the questionnaire. In the MBBS group, 5 students did not return the forms whereas 10 students submitted either incompletely filled or unanswered sheets. In the BDS group there were 8 students who did not return the forms and 9 submitted incompletely filled or unanswered forms. After excluding them, 85 forms belonging to 2nd MBBS and 83 from 2nd BDS were analysed. The demographic distribution of students who participated in the study was given in the [Table 1].

More than 90% students of both MBBS and BDS answered correctly for the questions 1,3,5 and 10. The difference between the two groups is not significant except for the 4th question i.e., Antibiotics are indicated to reduce pain and inflammation. The same question also has the least percentage of correct answers where only 45.9% MBBS students and 30.1% BDS students answered correctly. For questions 3,5,7 and 8, BDS students scored better than MBBS; whereas in the remaining six questions MBBS students fared better. Responses to knowledge questions was given in [Table 2]. More than half of the students belonging to both MBBS and BDS groups have moderate knowledge (57.6% and 53.01% respectively). Number of students having good knowledge is almost similar in both the groups (40% and 37.34% respectively). However, percentage of students having poor knowledge is more in BDS group compared to MBBS (9.63% VS 2.4%). Difference between the two groups is not statistically significant P=0.13. The overall knowledge grade of both the groups was given in [Figure 1].

Regarding the reasons for antimicrobial resistance, MBBS students showed better attitude compared to BDS. Majority of the MBBS students hold the belief that easy access (83.5%) and over prescription (82.4%) of antibiotics contributes significantly to the issue of antimicrobial resistance. However, in the BDS group, easy access (77.1%) and over use of antibiotics in animals (61.4%), were the main reasons stated for antimicrobial resistance. [Table 3]. When it comes to consequences, most of the MBBS students (90.6%) believed that antimicrobial resistance may lead to the relapse of infection after treatment. Whereas, in the BDS group about 3/4th students (74.7%) think that antimicrobial resistance is a serious global health issue [Table 3]. 92.9% MBBS students believe that antimicrobial resistance can be prevented by creating awareness among general public by organising public health campaigns. Incentives for discovering new antibiotics was

suggested by (87.1%) MBBS and 73.5% BDS students. Implementation of antibiotic stewardship was recommended by 73.5% of BDS students [Table 3].

92.9% of MBBS and 91.6% BDS students take antibiotics according to the prescription of a physician or dentist. More MBBS students (14.1%) reported self-medication compared to BDS students (9.6%). [Table 4]. 68 (80.0%) MBBS students and 73 (88%) BDS students took antibiotics at least once within the last 12 months. About 58 (68.23%) students of MBBS group and 54 (65.06%) students of BDS group generally complete the full course of antibiotics. Among the remaining 27 MBBS and 29 BDS students who do not complete the course; stopping antibiotics after feeling better was the most important reason mentioned in both the groups (70.4% in MBBS and 75.9%), followed by side effects (25.9% MBBS, 27.6% BDS) [Figure 2].

Table 1: Demographic characteristics of study participants

	2nd MBBS n (%)	2nd BDS n (%)
Male	30(35.3)	24 (28.9)
Female	55(64.7)	59(71.1)
Total	85	83
Mean age	20.85	21.41

Table 2: Knowledge of students regarding antimicrobial use and resistance

Sl.no	Question	Student Category	Correct %	Incorrect %	P value
1	Amoxicillin is an antibiotic	MBBS	94.1	5.9	.268
		BDS	90.4	9.6	
2	Acyclovir is an antibiotic	MBBS	83.5	16.5	.111
		BDS	74.7	25.3	
3	Antibiotics are useful in the treatment of bacterial infections	MBBS	90.6	9.4	0.520
		BDS	91.6	8.4	
4	Antibiotics are indicated to reduce pain and inflammation	MBBS	45.9	54.1	0.026*
		BDS	30.1	69.9	
5	Antibiotics speed up the recovery of common cold and flu	MBBS	78.8	21.2	0.097
		BDS	67.5	32.5	
6	Prescribing broad spectrum antibiotics is always better than narrow spectrum antibiotics	MBBS	51.8	48.2	0.321
		BDS	47	53	
7	Antibiotic resistance is when antibiotics no longer work to treat infections	MBBS	83.5	16.5	0.202
		BDS	89.2	10.8	
8	Antimicrobial Resistance can spread from animals to humans	MBBS	76.5	23.5	0.064
		BDS	86.7	13.3	
9	Amoxicillin is effective in methicillin resistance staphylococcus aureus (MRSA)	MBBS	61.2	38.8	0.388
		BDS	57.8	42.2	
10	Antibiotics can cause secondary infection.	MBBS	96.5	3.5	0.487
		BDS	95.2	4.8	

* represents P<0.05

Table 3: Attitude of students- Reasons, Consequences, and Prevention of antimicrobial resistance.

Sl.no		Group	D%	N%	A%	P value
REASONS						
1	Access to antibiotics is too easy in many countries ("over the counter" without a medical prescription).	MBBS	9.4	7.1	83.5	0.028
		BDS	3.6	19.3	77.1	
2	Over-prescription of antibiotics	MBBS	12.9	4.7	82.4	0.001*
		BDS	15.7	24.1	60.2	
3	Patients not completing the entire antibiotic course	MBBS	10.6	20.0	69.4	0.297
		BDS	10.8	30.1	59	
4	Overuse of antibiotics in livestock and fish farming	MBBS	14.1	10.6	75.3	0.080
		BDS	15.7	22.9	61.4	
CONSEQUENCES						
1	Decreased availability of clinically effective antibiotics	MBBS	4.7	20.0	75.3	0.003*
		BDS	14.5	34.9	50.6	
2	Relapse of the infection after treatment	MBBS	2.4	7.1	90.6	0.003*
		BDS	6	24.1	69.9	

3	Antimicrobial resistance is a serious global health issue	MBBS	1.2	60.5	82.4	0.196
		BDS	6	19.3	74.7	
PREVENTION						
1	Antibiotics should be used only when prescribed by a certified health professional	MBBS	9.4	7.1	83.5	0.040*
		BDS	7.2	20.5	72.3	
2	Symptomatic management should be preferred in self-limiting conditions	MBBS	9.4	8.2	82.4	0.010*
		BDS	3.6	24.1	72.3	
3	Implementation of Antimicrobial Stewardship Programme and Infection Control Strategies at all hospitals.	MBBS	1.2	15.3	83.5	0.188
		BDS	4.8	21.7	73.5	
4	Establishing robust surveillance system to track antimicrobial resistance locally nationally and Internationally.	MBBS	3.5	17.6	78.8	0.007*
		BDS	15.7	25.3	59	
5	Creating awareness among general public by organizing public health campaigns	MBBS	3.5	3.5	92.9	0.001*
		BDS	8.4	20.5	71.1	
6	Policy makers should Regulate and promote the appropriate use of antibiotics	MBBS	8.2	8.2	83.5	0.0001*
		BDS	4.8	32.5	62.7	
7	Government or policy makers should provide incentives for discovery of new antibiotics	MBBS	9.4	3.5	87.1	0.005*
		BDS	7.2	19.8	73.5	

* represents $P < 0.05$

Table 4: Everyday practise of taking antibiotics by students.

Sl.no		MBBS n(%)	BDS n(%)
1	Prescription from Physician or dentist	79 (92.9)	76 (91.6)
2	Suggested by nurse	4 (4.7)	3 (3.6)
3	Suggested by Pharmacist	8 (9.4)	11 (13.3)
4	Self-medication	12 (14.1)	8 (9.6)
5	From previous prescription	13 (15.3)	14 (16.9)
6	From friends/family members	10 (11.8)	7 (8.4)

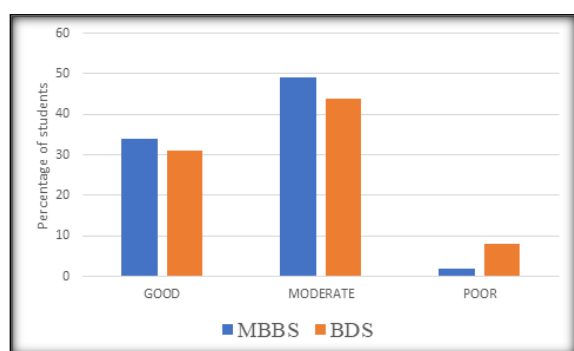


Figure 1: Knowledge grade of students

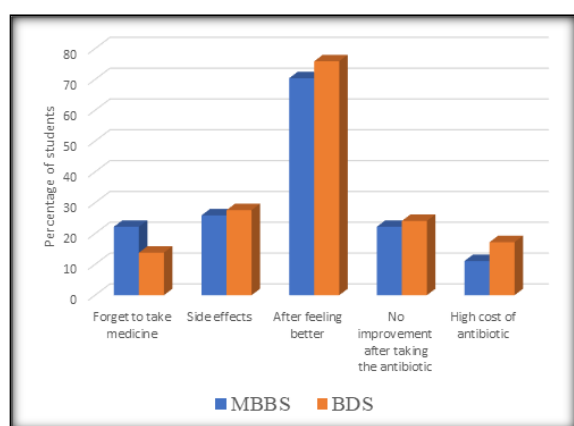


Figure 2. Reasons for not completing the antibiotic course

DISCUSSION

This study was done to explore the KAP of medical and dental students regarding antimicrobial use and resistance, as they are future prescribers who provide primary health care to the community.

A significant portion of students in both the groups exhibited an overall moderate to good level of knowledge. This aligns with the research conducted by Gupta MK et al and Marzan M et al which highlighted that students in medical and biological fields showed satisfactory knowledge regarding antimicrobials and their resistance.^[16,17] In the current study, majority of students in both the groups were able to correctly identify the antibiotics. Similar findings were observed in the studies conducted among medical students by Gupta MK et al. in India and Scaioli et al. in Italy.^[16,18] A common misconception found within the knowledge section of both the groups was the belief that antibiotics can reduce pain and inflammation. This is in line to the study carried out by Gupta MK et al where majority of medical students thought that antibiotics are indicated to alleviate pain and inflammation.^[16] Though both the groups of students possess an overall fair level of knowledge, a notable proportion among them were unable to accurately identify the indications for antimicrobials. There are some knowledge gaps regarding antimicrobial use which should be addressed at the undergraduate level. MBBS students showed an overall better attitude than BDS students. A significant proportion of both MBBS and BDS students felt that easy access to antibiotics without medical prescription as an important factor contributing to antimicrobial resistance. Though Indian Drugs and Cosmetics Act 1940, prohibits the sale of antimicrobials without a valid prescription, several studies conducted in our country have revealed a significant proportion of antibiotics are being sold in India without a prescription; leading to self-medication practices.^[19-21] 82.4% MBBS, 72.7% BDS students felt that Antimicrobial resistance is a serious global

health issue which aligns with the study conducted by Sakr et al on university students of Lebanon.^[22]

Majority of students in the present study opined that creating awareness among general public by organizing public health campaigns prevents antimicrobial resistance. This is comparable to study conducted by Marzan M et al where significant number of students opined that government is responsible for generating awareness about antibiotic resistance.^[17] Contrasting results were seen in the study conducted in Iran where only 41% of medical students believed that educational workshops helps in creating knowledge about antimicrobial resistance.^[23] The difference could be due to different geographies and their cultural beliefs.

Majority of students in both the groups (80.0% MBBS students and 88% BDS) took antibiotics at least once within the last 12 months. This is similar to the study conducted by Gupta M k et al where 83.3% of students took antibiotic in the last year.^[16] Whereas, study by Ayepola et al showed only 60.6% of students took antibiotics in the last 6 months.²⁴ Difference in the duration could be the reason for this variation.

92.9% MBBS and 91.6% BDS students take antibiotics according to the prescription of physician or dentist. This aligns with the study conducted by Marzan M et al where more than 90% students took antibiotics based on physician prescription.^[17] More MBBS students (14.1%) reported self-medication compared to BDS students (9.6%). Study conducted in Nepal by Mandal NK, et al also reported higher self-medication practises among MBBS students compared to BDS. However, self-medication is reported substantially higher (61.7% MBBS, 38.3% BDS) than in the present study.^[25] Study by Patil SB et al, on second year MBBS students also showed higher (34%) practise of self-medication compared to the present study.^[26] 58 (68.23%) students of MBBS group and 54 (65.06%) students of BDS group generally complete the full course of antibiotics. Among the students who do not complete the course, majority of them stated that they stop the medication after feeling better. Ghaieth et al also reported the same.^[27] Multiple other studies reported diverse findings.^[28-30]

CONCLUSION

This study shows that medical and dental students have moderate to high level of knowledge regarding antimicrobial use and resistance. However, there are certain knowledge gaps like, student's misconception that "antibiotics decrease pain and inflammation," which needs to be addressed. MBBS students showed better attitude compared to BDS. This might be due to the clinical postings attended by the 2nd MBBS students.

Despite the low rate of self-medication, non-compliance to the prescription was seen in both the groups. Governments and policymakers should

ensure that antibiotics are dispensed only with a valid prescription. Awareness campaigns targeting the general population, should be conducted frequently. Regular workshops and Continuing Medical Education (CME) sessions should be provided to medical and dental students.

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