



KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING ANTIBIOTIC USE AND ANTIBIOTIC RESISTANCE AMONG MEDICAL STUDENTS, INTERNS AND RESIDENT DOCTORS IN CENTRAL INDIA: A CROSS-SECTIONAL STUDY

Community Medicine

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ABSTRACT

Antibiotics are medicines used to prevent and treat infectious diseases. They are most used as well as misused drugs. This resulted in bacterial resistance, treatment failure and additional costs to therapy. Antibiotic resistance is an improving growing global health issue that needs special attention focusing on social aspects of knowledge, attitude and practice towards antibiotic use and its resistance among medical students, interns and resident doctors. **Aim and objectives of the study:** To study the current knowledge, attitude and practices regarding antibiotic use and antibiotic resistance among medical students, interns and resident doctors. **Material and methods:** This was a questionnaire based cross sectional study. It had been conducted among a total of 96 participants including medical students, interns and resident doctors from November 2021 to January 2022 coincide with the "Antibiotic Awareness Week" of the World Health Organization. A pretested questionnaire with 9 knowledge, 8 attitude and 4 practice items were prepared in Google docs after an extensive literature search. The link for the questions was distributed to all participants through "WhatsApp" social media and e-mails. **Analysis:** Data had been checked for consistency and completeness and entered in SPSS 20. Descriptive statistics like mean, standard deviation and percentages would be used to describe the findings. **Results:** A total of 96 participants (medical students, interns and resident doctors) responded well. There were 54 medical students, 12 interns and 30 resident doctors have participated. Most of the participants had good 74(77.08%) knowledge and only 3(3.1%) had poor knowledge regarding antibiotic use and its resistance. **Conclusion:** Consultation of a doctor is recommended by most medical students before the use of antibiotic drugs. Many medical students recommended that they do not pressure doctor for use of antibiotic drugs.

KEYWORDS

Antibiotics, Antibiotic resistance, knowledge, attitude, practice

INTRODUCTION

Antibiotics are the most prescribed drugs across the globe. The role of antibiotics is to treat infectious diseases. Many surgical procedures, transplantations or other treatments of immune deficient patients such as cancer patients who are on chemotherapy, preterm babies, people having HIV/AIDS, before travelling to an endemic region of infectious disease all requires access to effective antibiotics. For over 65 years, since the invention of the first generation of antibiotics treating from small wound infection to higher infectious diseases all are treated with a different class of antibiotics successfully.

The discovery of the first antibiotic named "penicillin"(naturally occurring) from a mold culture by scientist Alexander Fleming, Professor of Bacteriology, St. Mary's Hospital in London¹. Antibiotics are the most frequently prescribed medications in modern medicine. But excess use results in bacterial resistance, treatment failure, drug abuse, drug dependency, unknowingly leading to misuse, selection pressure which leads to the evolution of resistance characteristics in bacterial populations (Fischbach and Walsh, 2009)⁴. Excessive or irrational use of antibiotics can not only lead to the emergence of resistant bacterial strains but also lead to side effects (Zakirulla et al. 2019⁵; Nazari et al .2020⁶) and economic burdens on the national health system (Gyssens, 2001)⁷.

The rise of antibiotic resistance is increasingly threatening to human health worldwide. In 2007 report, the World Health Organization (WHO) referred to antibiotic resistance as one of the major concerns to human wellbeing in the 21st century². In 2011, WHO set the theme of World Health Day as 'Combat Antimicrobial Resistance: No Action Today, No Cure Tomorrow'³. This shows a serious and global problem of antibiotic abuse. Therefore, the World Health Organization (WHO) declared "World Antibiotic Awareness Week" from 18-24 November, intending to increase awareness of global antimicrobial resistance and to encourage best practices among general public, health workers and policy makers to avoid further emergence and spread of drug resistant infections.

Medical students are future doctors. They are particularly important since they will be future leaders in clinic practice, responsible for antibiotic prescription and communication about antibiotic use with

their patients. Medical students, intern doctors and resident doctors play a vital role in raising awareness of health-related issues. The lack of adequate training during their undergraduate and postgraduate years may be responsible for their inability to undertake these tasks confidently. Hence the current knowledge, attitude and practices (KAP) regarding antibiotic use and antibiotic resistance among medical students, interns and resident doctors is needed.

This study would help to develop an intervention of training curriculum in universities in the future, which would further help to inform policy guidance and interventions to improve their training on appropriate antibiotic use that should lead to changes in behavior. The objective of this study was to study the current knowledge, attitude and practices regarding antibiotic use and antibiotic resistance among medical students, interns and resident doctors.

MATERIAL AND METHODS

This was a questionnaire based cross sectional study. It had been conducted among a total of 96 medical students, interns and resident doctors from November 2021 to January 2022 coincide with the "Antibiotic Awareness Week" of the World Health Organization.

Inclusion criteria: MBBS students from V term, VII term and IX term, Interns and resident doctors who were willing to participate were included in this study.

Exclusion criteria: Those who were not willing to participate in the study.

Study tool: A pretested questionnaire of 21 questions divided into three sections with the first section of 9 knowledge items, the second section of 8 attitude items and third section of 4 practice items was prepared in Google docs after an extensive literature search.

The link for the questions was distributed to all participants through "WhatsApp" social media and e-mails. Informed consent of study participants was taken, and confidentiality was ensured to the study participants.

Responses were collected from Google sheets. Data would be checked for consistency and completeness and then results were analyzed using SPSS version 20.

The sample size was estimated by taking 45.5% of good knowledge score among participants, a study conducted by Asharani, et al.¹¹ in Karnataka, India, applying the suitable formula for a cross-sectional study, sample size came out to be 95 while 96 participants were enrolled in this study.

Scoring for knowledge regarding antibiotic use and its resistance were classified as, Poor (0–5), Adequate (6–10), Good (11–15).

RESULTS

In this study, all 96 participants (medical students, interns and resident doctors) responded well of which 47(48.95%) were males while 49(51.04%) were females.

The mean age of study participants was 24.1 years with SD of 4.13 years. The minimum age of study participants was 18 years while the maximum age was found to be 38 years.

In this study, among 96 participants, 54 medical students, 12 interns and 30 resident doctors participated (table no.2).

Table no.1 Distribution of study participants according to score of knowledge regarding antibiotic use and its resistance

Knowledge domain	N	%
Poor (0-15)	3	3.1
Adequate (6-10)	19	19.79
Good (11-15)	74	77.08
Total	96	100

In this study, Table no.1 shows that majority of the participants had good 74(77.08%) knowledge and only 3(3.1%) participants had poor knowledge regarding antibiotic use and its resistance.

Table no.2 Distribution of medical students, interns and resident doctors as per score of knowledge regarding antibiotic use and its resistance

Study participants	Knowledge score			Total N (%)
	PoorN (%)	Adequate N (%)	Good N (%)	
Medical students	2 (3.7)	13(24.07)	39(72.22)	54
Interns	0(0)	0(0)	12(100)	12
Resident Doctors	1(3.33)	4(13.33)	25(83.33)	30
Total	3(3.1)	17(19.79)	76(77.08)	96(100)

Table no.2 shows that, among 54 medical students, 39(72.22%) participants were having good knowledge followed by 13(24.07%) participants were having adequate knowledge regarding antibiotic use and its resistance. All the interns i.e., 12(100%) participants were found to have good knowledge regarding antibiotic use and its resistance. Among 30 resident doctors, 25(83.3%) participants had good knowledge regarding antibiotic use and its resistance.

Table no.3 Distribution of knowledge items response among study participants

KNOWLEDGE ITEMS (Correct response)	Medical students (n=54)		Interns (n=12)		Resident Doctors(n=30)	
	n	%	n	%	n	%
Antibiotics are used to treat bacterial infections (A)	54	100	12	100	30	100
Antibiotics are useful against all types of the common cold (D)	17	31.48	3	25.0	1	3.33
Clinical samples should be sent to culture and sensitivity before starting antibiotics(A)	44	81.48	8	66.7	25	83.33
The efficacy is better if the antibiotics are newer and more costly (D)	12	22.22	4	33.3	2	6.67

Antibiotics cause negative effects on the body's own bacterial flora (A)	42	77.78	9	75.0	26	86.67
Following factors contribute to antibiotic resistance : Incomplete antibiotic intake (A)	44	81.48	11	91.7	25	83.33
Inaccurate antibiotic (A)	40	74.07	12	100	23	76.67
Inadequate dosage (A)	42	77.78	12	100	26	86.67
Overprescription (A)	49	90.74	11	91.7	26	86.67
Overconsumption (A)	47	87.04	11	91.7	25	83.33
Nosocomial spread (A)	48	88.89	10	83.3	20	66.67
Self-medication (A)	44	81.48	9	75.0	24	80.00
Inadequate dosage (A)	42	77.78	12	100	26	86.67

A: Agree, D: Disagree

Table no.3 shows all the participants had acceptable knowledge of the appropriate use of antibiotics in bacterial infections. 86.67% (26) participants of the resident doctors had correct knowledge of ill effects of antibiotic use on the body's own bacterial flora. 26(86.67%) of the resident doctors had correct knowledge of ill effects of antibiotic use on body's own bacterial flora. 83.33% (25) of resident doctors agreed that incomplete antibiotic intake, inaccurate antibiotic 76.67% (23), inadequate dosage 86.67% (26), overprescription 86.67%(26), overconsumption 83.33%(25) and self medication 80%(24) are all the contributing factors for antibiotic resistance.

Table no.4 Participant's attitude towards antimicrobial prescribing and resistance

Attitude items (correct response)	Medical Students n=54(%)	Interns n=12(%)	Resident doctors n=30(%)
Antibiotics are safe drugs hence can be commonly used (D)	31(75.4)	7(58.33)	21(70)
Irrational antibiotic practice locally will not matter for global resistance (D)	46(85.18)	12(100)	28(93.33)
Skipping one or two doses does not contribute to antibiotic resistance (D)	36(66.6%)	9(75)	24(80)
Antibiotic resistance can be reduced using higher antibiotic in spite of lower antibiotics being sensitive (D)	40(74.07)	9(75)	21(70)
Medical experts will solve the problem of antibiotic resistance before it becomes too serious (D)	19(35.18)	7(58.33)	14(46.66)
There is not much, people like me, can do to stop antibiotic resistance (D)	34(62.96)	6(50)	18(60)
Adhering to the antibiotic policy of the hospital will reduce the development of antibiotic resistance (A)	44(81.48)	11(91.66)	28(93.33)
Antibiotic resistance is one of the biggest problems the world faces (A)	144(81.48)	11(91.66)	28(93.33)

A: Agree, D: Disagree

Table no: 4 shows that in most medical students (75.4%) and resident doctors (70%) have disagreed that antibiotics are safe drugs and hence can be commonly used. All interns (100%) and most resident doctors (93.33%) disagreed that irrational antibiotic practice locally will not matter for global resistance. Most interns (58.33%) disagreed that medical experts should solve the problem of antibiotic resistance before it becomes too serious. Most resident doctors (93.33%) agreed that adhering to an antibiotic policy of the hospital will reduce the development of antibiotic resistance.

Table No.5 Details of participant's self reported practices regarding the antibiotic usage

Practice items (correct response)	Medical students N=54(%)	Interns N=12(%)	Resident doctors N=30(%)
Do you consult a doctor before starting an antibiotic? (Y)	51(94.44)	7(58.33)	24(80)
Do you prescribe the same antibiotic for relatives/ friends for similar illness without consulting the doctor (N)	46(85.18)	6(50)	26(86.66)
Do you pressurize the doctor to prescribe antibiotics (N)	52(96.29)	11(91.66)	30(100)
The doctor prescribes a course of antibiotic for you, after taking for 2-3 doses you start feeling better, then do you complete the full course of treatment? (Y)	44(81.48)	10(83.33)	28(93.33)
Do you save the remaining antibiotics for the next time you get sick? (N)	39(72.22)	10(83.33)	21(70)

Y: yes, N: No

Table no.5 shows that many medical students (94.4%) consult a doctor before starting an antibiotic for themselves. About (93.3%) of resident doctors will complete the full course of antibiotic treatment, and 86.66% of them will prescribe the same and leftover antibiotics for relatives/friends for similar illness without consulting the doctors. Also 83.33% of interns save the remaining antibiotics for the next time they get sick.

DISCUSSION

In the present study, the knowledge, attitude, and practices of medical students and interns and resident doctors were assessed about antibiotic usage and antibiotic resistance. Most participants i.e., 77.08% have good knowledge regarding antibiotic use and its resistance and this finding agrees with studies done in Bangladesh⁸, Sweden⁹ and India¹⁰ which also showed majority of participants had good knowledge. Most of the participants disagreed that "antibiotics are useful against all types of the common cold." The similar perception was also observed among participants of the studies conducted by Pulcini and Gyssens¹² and Chandan and Nagabushan¹³.

However, a Chinese study¹⁴ done among 2500 students showed that majority of the respondents had a belief that antibiotics can speed up recovery of common cold, cough, and other related infections arising from viral infection. In our study 75% of the interns agreed with the statement, "antibiotics are useful against all types of the common cold." The wrong perception can result in increased usage of antibiotics which, in turn, can result in increased antibiotic resistance. Nearly 93.3% of the residents felt that antibiotics are safe which can be used frequently and skipping the doses will not contribute to antibiotic resistance. A similar observation was also made by Khan et al¹⁵ and Huang et al¹⁴.

Most of the study participants felt that antibiotic resistance is one of the biggest global issues and unnecessary antibiotic usage can lead to it. Only a few interns and resident doctors were unaware of it. This lack of awareness in those few participants regarding the importance of appropriate use of antibiotics among medical students may indirectly increase the burden of antibiotic resistance and may pose hindrances on the implementation of basic infection control practices and antibiotic policies in the hospital. About practices on antibiotic prescription and usage, it was observed that nearly 94.44% of medical students would consult a doctor before starting an antibiotic for themselves. However, 72.22% of them would use the leftover antibiotics next time and give them to their friends or relatives with similar illnesses.

Mukharjee et al.⁸ reported good knowledge, but poor practice among their study participants and study by Shehadeh et al.¹⁶ has found more gap in knowledge than attitude and practices. Interestingly, in our

study, the differences in the KAP levels observed in different studies can be attributed to differences in the study group and their differences in the medical curricula.

CONCLUSION

Most medical students do not advise the common use of antibiotic drugs as safe. Consultation of a doctor is recommended by most of medical students before use of antibiotic drugs. The high number of medical students recommends that they do not pressure doctor for use of antibiotic drugs.

Despite adequate to good knowledge, there were attitudinal lacunae toward antibiotic usage and resistance. Interestingly, regardless of casual attitudes, the self-reported practices of the participants were found to be substantially good. There is a need for strategizing educational programs for students not only to enhance their knowledge but also to reshape the behavior of the students.

RECOMMENDATIONS

Medical students should focus on rational use of antibiotics by increasing awareness, proper follow-up of prescription and proper dosage regimen of antibiotics guided by health physicians, doctors and pharmacists. The government, Health ministry and DGDA should provide guidelines to raise awareness.

As antibiotic resistance becomes a global issue, laws and policies regarding purchasing of antibiotics should be implemented by the government. Future studies should focus on the development and implementation of such educational measures to improve antibiotic use among medical students.

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Nil

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