Research Article

KNOWLEDGE AND PRACTICE OF ANTIBIOTIC AS SELF-MEDICATION AMONG MEDICAL AND NON-MEDICAL STUDENTS

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ABSTRACT

Background: Antibiotics are essential therapeutic agents used to treat bacterial infections and, in some cases, protozoal infections. With diverse sources including natural, semi-synthetic, and synthetic, antibiotics play a critical role in healthcare across all age groups, from neonates to the elderly, and during pregnancy or lactation. However, over the years, the emergence of antibiotic resistance has become a major global challenge, compromising the effectiveness of existing antibiotics and leading to increased morbidity, mortality, and healthcare costs. Self-medication, particularly the misuse of antibiotics, is a key contributor to the growing problem of antimicrobial resistance (AMR), with individuals often using antibiotics without proper medical guidance or adhering to incomplete dosage regimens. This practice, common in both developed and developing countries, further exacerbates the issue. In developing nations like India, the inappropriate use of antibiotics without prescription is widespread, contributing significantly to AMR. While self-medication may offer short-term convenience and cost savings, it often results in harmful consequences, including increased resistance and side effects. **Objective:** To evaluate the student knowledge about antibiotics including, their interaction, side effect and resistance. To determine the student awareness of the potential risk associated with the misuse and over use of the antibiotics. **Methodology:** This descriptive cross-sectional study was conducted at medical and non-medical students in Erode district, Tamil Nadu. The study was conducted at medical students and non-medical students of different colleges at Erode district. The sample size was calculated by using RAO-software online sample calculator. The calculated sample was 278, with a confidence level of 95%, a margin of error of 5%, and a response distribution of 50%. During the data collection period, a total of 1000 students participated, reducing the margin of error to 0.5%. **Result:** The medical students have 89.91% knowledge about antibiotic as compared to non-medical students have 60.07% of knowledge about antibiotic. From the above medical students have knowledge about antibiotic so they are not taking antibiotic as self-medication without doctor's consultation (93.52%) whereas non-medical students (56.47%) are not taking antibiotic as self-medication and knowledge about antibiotic resistance the medical students have 64.02% and non-medical students have 22.66% and medical students have more knowledge about antibiotic resistance so 61.87% medical students does not recommend the leftover antibiotic to others compared to non-medical students of 61.57% having less knowledge about antibiotic resistance. The overall average of knowledge of antibiotic and antibiotic resistance medical students having 77.33% and non-medical students having 50.16%. **Conclusion:** The results emphasize the need for public education programs, stricter regulations on antibiotic sales, and interventions targeting students to promote responsible antibiotic use.

KEYWORDS: Antibiotics, Antibiotic Resistance, Self-Medication, Antimicrobial Resistance, Public Health, India, Medical Education, Global Health.

INTRODUCTION

Antibiotics are essential therapeutic agents used to treat bacterial infections and, in some cases, protozoal infections. With diverse sources including natural, semi-synthetic, and synthetic, antibiotics play a critical role in healthcare across all age groups, from neonates to the elderly, and during pregnancy or lactation. Since the discovery of penicillin in 1928 by Alexander Fleming, antibiotics have significantly advanced medical practice, with the majority of antibiotics developed before 1987, during a period termed the "Golden Decade." However, over the years, the emergence of antibiotic resistance has become a major global challenge, compromising the effectiveness of existing antibiotics and leading to increased morbidity, mortality, and healthcare costs. Self-medication, particularly the misuse of antibiotics, is a key contributor to the growing problem of antimicrobial resistance (AMR), with individuals often using antibiotics without proper medical guidance or adhering to incomplete dosage regimens. This practice, common in both developed and developing countries, further exacerbates the issue. In developing nations like India, the inappropriate use of antibiotics without prescription is widespread, contributing significantly to AMR. While self-medication may offer short-term convenience and cost savings, it often results in harmful consequences, including increased resistance and side effects. This highlights the need for better education, awareness, and regulation surrounding the use of antibiotics, particularly in medical sectors. Addressing AMR is critical for safeguarding the effectiveness of antibiotics, and it requires a collaborative effort to ensure responsible antibiotic use and to develop new strategies for combating resistance. The future of antibiotic therapy depends on improving public health education, enforcing regulations, and fostering global cooperation in antibiotic stewardship.

METHODOLOGY

This descriptive cross-sectional study was conducted at medical and non-medical students in Erode district, Tamil Nadu. The study was conducted at medical students and non-medical students of different colleges at Erode district.

The sample size was calculated using RAO-software online sample calculator (Rao soft Inc., Seattle, WA). The calculated sample was 278, with a confidence level of 95%, a margin of error of 5%, and a response distribution of 50%. During the data collection period, a total of 1000 students participated, reducing the margin of error to 0.5%.

RESULT AND DISCUSSION

This study provides strong evidence of flaws in policy regarding the sale of antibiotics without a prescription, and this has resulted in an increasing level of SM with antibiotics, as discussed earlier. This study also demonstrated unsatisfactory outcomes in relation to the SM of antibiotics, and it also verified that the burden of SM is high in low- to middle-income countries, as compared to high-income ones. The study was conducted in Tamil Nadu at Erode district such that in can be used as the baseline for future studies and interventional programmes. The study was designed and primarily focused on medical and non-medical students in Erode district.

The study reveals that common cold, dengue and flu, diarrhoea and stomach pain and others include throat pain, fever, bacterial infection, allergy and rashes for this reason antibiotics are commonly used.

TABLE DESCRIPTION OF BASELINE VARIABLES   N=278

S. NO	SAMPLE CHARACTERISTIC	FREQUENCY	PERCENTAGE %
1	GENDER		
	MALE	307	55.21%
	FEMALE	249	44.78%
2	EDUCATION		
	MEDICAL	278	50%
	NON-MEDICAL	278	50%

TABLE DESCRIPTION FOR KNOWLEDGE QUESTIONS

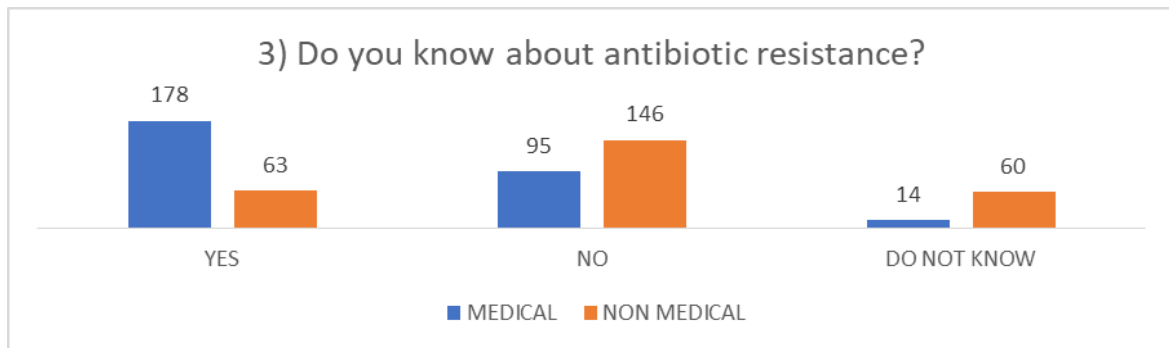| 1	DO YOU KNOW ABOUT ANTIBIOTIC	FERQUENCY	PERCENTAGE (%)
	MEDICAL		
	a) YES	250	89.91%
	b) NO	13	4.67%
	c) MAY BE	15	5.39%
	NON-MEDICAL		
	a) YES	167	60.07%
	b) NO	84	30.21%
	c) MAY BE	27	9.71%

1) Do you know about antibiotic?
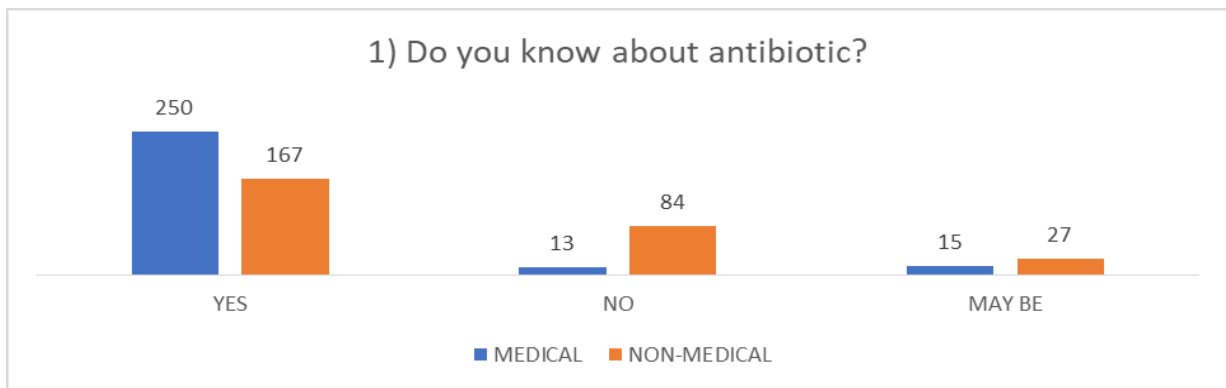
Medical students have more knowledge about antibiotic compared to non-medical students.

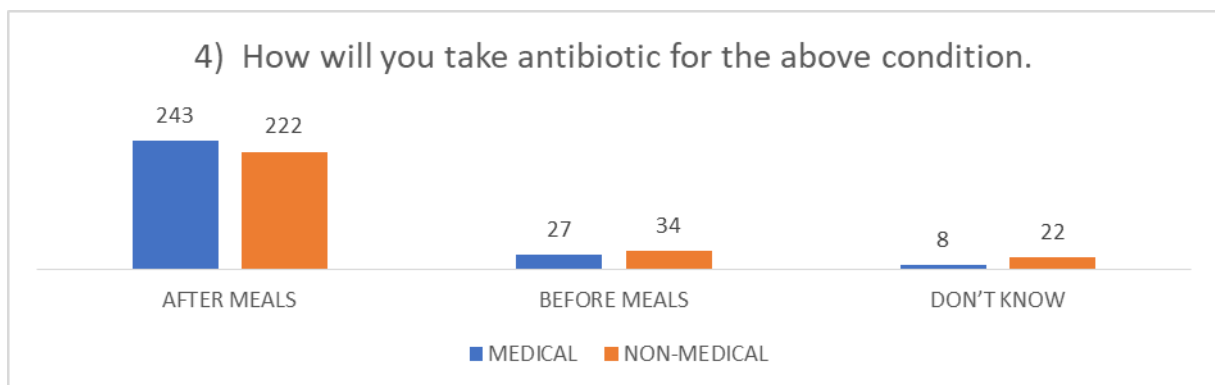| 2	DO YOU TAKE ANTIBIOTIC AS SELF-MEDICATION	FERQUENCY	PERCENTAGE (%)
	MEDICAL		
	a) YES	13	4.67%
	b) NO	260	93.52%
	c) DON'T KNOW	16	5.71%
	NON-MEDICAL		
	a) YES	85	30.57%
	b) NO	157	56.47%
	c) DON'T KNOW	25	8.99%

2) Do you take antibiotic as self-medication
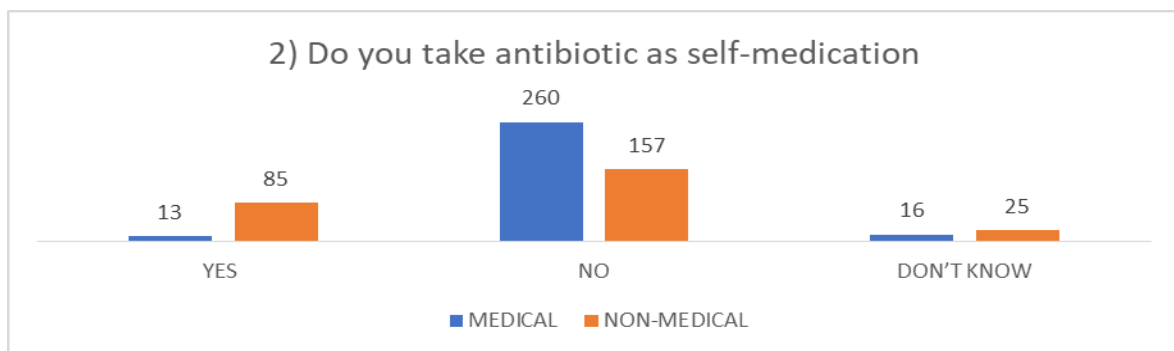
Non-medical students take more amount of antibiotic as self-medication compared to medical students.

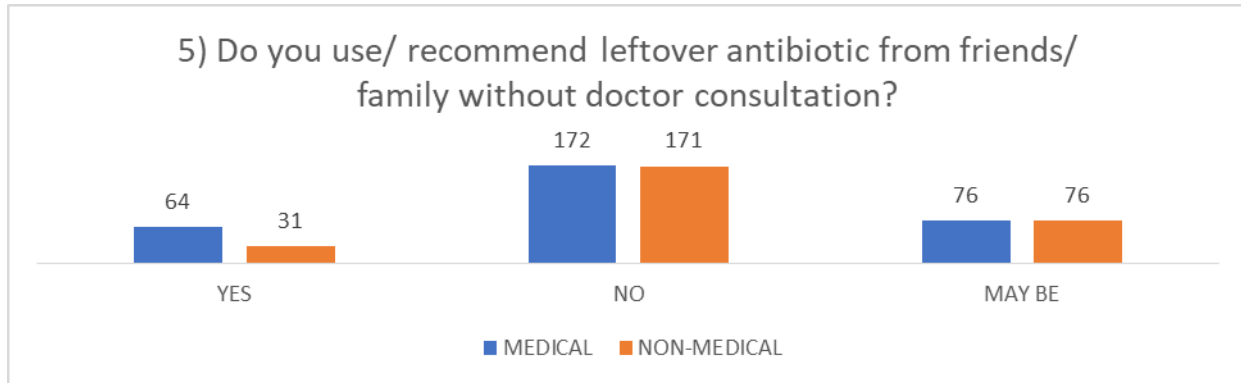| 3	DO YOU KNOW ANTIBIOTIC RESISTANCE?	FERQUENCY	PERCENTAGE (%)
	MEDICAL a) YES b) NO c) DON'T KNOW	178 95 14	64.02% 34.17% 5.03%
	NON-MEDICAL a) YES b) NO c) DON'T KNOW	63 146 60	22.66% 52.51% 21.58%

Medical students have known about antibiotic resistance compared to non-medical students.

4	HOW WILL YOU TAKE ANTIBIOTIC FOR THE CONDITION?	FERQUENCY	PERCENTAGE (%)
	MEDICAL a) AFTER MEALS b) BEFORE MEALS c) DON'T KNOW	243 27 08	74.41% 9.71% 2.87%
	NON-MEDICAL a) AFTER MEALS b) BEFORE MEALS c) DON'T KNOW	132 78 68	47.48% 28.05% 24.46%

Generally antibiotics are prescribed to take after the meals. Here medical students take antibiotic after the meals for 74.41% compared to non-medical students 47.48%. So medical students have more knowledge about taking the antibiotic after meals.

5	DO YOU USE/ RECOMMEND LEFTOVER ANTIBIOTIC FROM FRIENDS/ FAMILY WITHOUT DOCTOR CONSULTATION?	FERQUENCY	PERCENTAGE (%)
	MEDICAL a) YES b) NO c) MAY BE	64 172 76	23.02% 61.87% 27.33%
	NON-MEDICAL a) YES b) NO c) MAY BE	31 171 76	11.15% 61.57% 27.33%

Total knowledge of question on (Knowledge)

S. No	Questions	Knowledge	Medical	Non-Medical
1	DO YOU KNOW ABOUT ANTIBIOTIC.	YES	89.91%	60.07%
2	DO YOU TAKE ANTIBIOTIC AS SELF-MEDICATION.	NO	93.52%	56.47%
3	DO YOU KNOW ANTIBIOTIC RESISTANCE?	YES	64.02%	22.66%
4	DO YOU USE/ RECOMMEND LEFTOVER ANTIBIOTIC FROM FRIENDS/ FAMILY WITHOUT DOCTOR CONSULTATION?	NO	61.87%	61.57%
		AVERAGE	77.33%	50.19%

For the above knowledge questionnaire, we have come to know that the medical students have 89.91% knowledge about antibiotic as compared to non-medical students have 60.07% of knowledge about antibiotic so medical students have more knowledge as compared to non-medical students. From the above question that medical students have knowledge about antibiotic so they are not taking antibiotic as self-medication without doctor's consultation (93.52%) whereas non-medical students (56.47%) are not taking antibiotic as self-medication.

As the above students have knowledge about antibiotic resistance the medical students have 64.02% of knowledge and non-medical students have 22.66% knowledge about antibiotic resistance. As compared medical students have more knowledge compared to non-medical students. From the above question that medical students have more knowledge about antibiotic resistance so 61.87% medical students does not recommend the leftover antibiotic to others compared to non-medical students of 61.57% having less knowledge about antibiotic resistance. The overall average of knowledge of antibiotic and antibiotic resistance medical students having 77.33% and non-medical students having 50.16%.

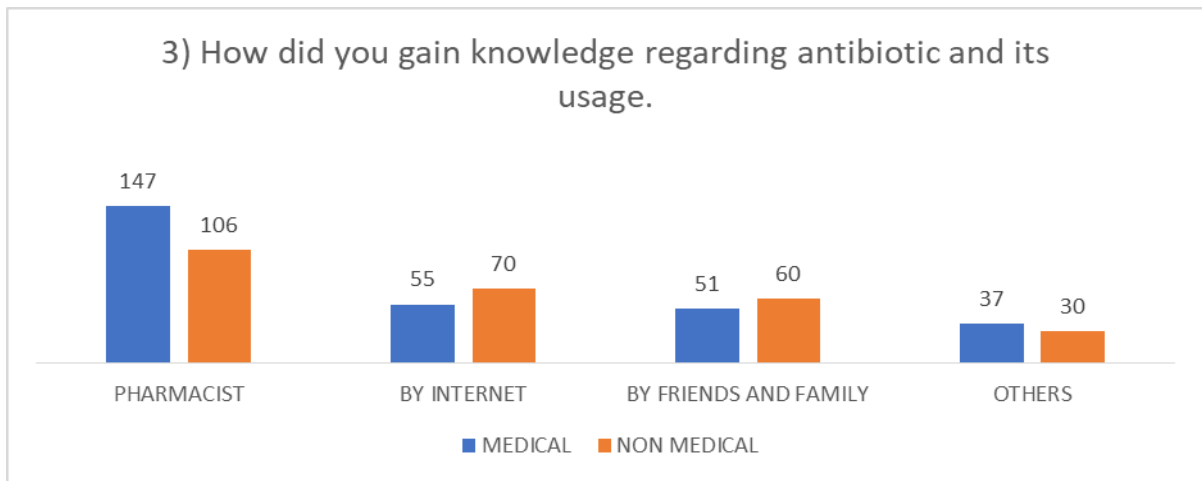| 1	NAME OF THE ANTIBIOTIC USED AS SELF-MEDICATION.	FERQUENCY	PERCENTAGE (%)
	MEDICAL		
	a) AMOXICILLIN	172	61.87%
	b) CIPROFLOXACIN	37	13.30%
	c) DOXYCYCLINE	34	12.23%
	d) OTHERS	35	12.58%
	NON-MEDICAL		
	a) AMOXICILLIN	112	40.28%
	b) CIPROFLOXACIN	38	13.66%
	c) DOXYCYCLINE	57	20.50%
	d) OTHERS	71	25.53%

1) Name of the antibiotic you use as self-medication.
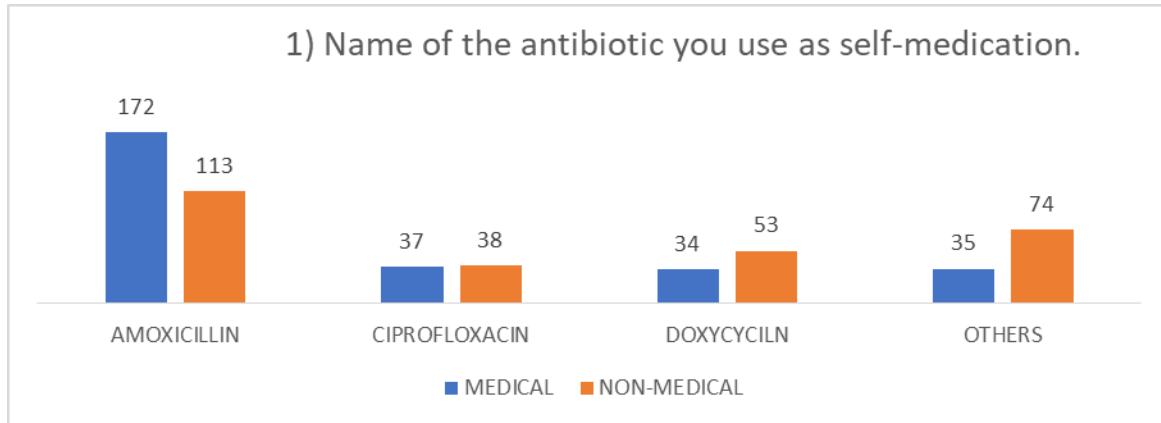
Medical and non-medical students both use amoxicillin as self-medication.

2	REASON FOR PRACTICING ANTIBIOTIC AS SELF-MEDICATION.	FERQUENCY	PERCENTAGE (%)
	MEDICAL		
	a) COMMON COLD	158	56.83%
	b) DENGUE AND FLU	27	9.71%
	c) DIARRHEA AND STOMACH PAIN	46	16.54%
	d) OTHERS	47	16.90%
	NON-MEDICAL		
	a) COMMON COLD	158	56.83%
	b) DENGUE AND FLU	26	9.35%
	c) DIARRHEA AND STOMACH PAIN	47	16.90%
	d) OTHERS	47	16.90%

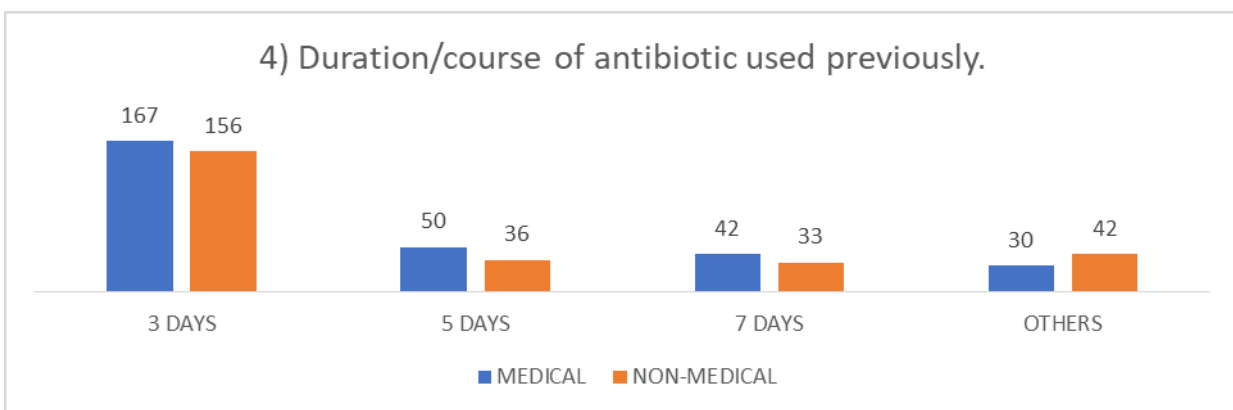2) REASON FOR PRACTICING ANTIBIOTIC AS SELF- MEDICATION.
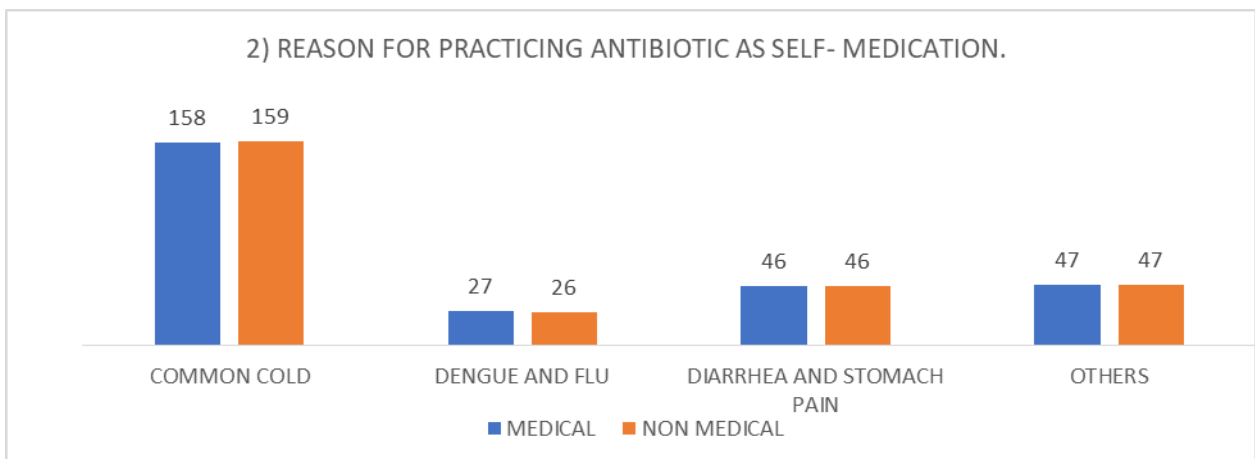
Medical and non-medical students both take antibiotic for the reason for common cold as self-medication.

3	HOW DID YOU GAIN KNOWLEDGE REGARDING ANTIBIOTIC AND ITS USAGE.	FERQUENCY	PERCENTAGE (%)
	MEDICAL a) BY PHARMACIST b) BY INTERNET c) BY FAMILY AND FRIENDS d) OTHERS	147 55 51 37	52.87% 19.78% 18.34% 13.30%
	NON-MEDICAL a) BY PHARMACIST b) BY INTERNET c) BY FAMILY AND FRIENDS d) OTHERS	106 70 60 30	38.12% 25.17% 21.57% 10.79%

Medical and non-medical students gain knowledge regarding antibiotic by pharmacist

4	DURATION/ COURSE OF ANTIBIOTC USED PREVIOUSLY.	FERQUENCY	PERCENTAGE (%)
	MEDICAL a) 3-DAYS b) 5-DAYS c) 7-DAYS d) OTHERS	167 50 42 30	60.07% 17.98% 15.10% 10.79%
	NON-MEDICAL a) 3-DAYS b) 5-DAYS c) 7-DAYS d) OTHERS	156 36 33 42	56.11% 12.94% 11.87% 15.10%

Medical and non-medical students take antibiotic for the duration/course of 3 days.

Most of the medical and non-medical students are consuming the Amoxicillin drug, medical student to take (61.67%) and non -medical student (40.28%). as the reason of antibiotic to take as self-medication at the condition for common cold on medical student (56.83%) and non-medical student (56.83%), Most of the medical and non-medical student gain knowledge from pharmacist as medical students 52.87% and non-medical students 38.12% for the course duration for 3 days.

Archana Parihar, Diwanshu Sharma, Pavan Malhotra et.al., (2018). This study has found a prevalence of **self-medication** in 86.5% medical undergraduates compared to our study medical students have 93.52% of knowledge about antibiotic as self-medication. This study signifies that nowadays medical students gain more knowledge about antibiotics.

Rojjares Netthong, Ros Kane, and Keivan Ahmadi, et.al., (2022). Dispensing antibiotics without a prescription is contributing to the development of **antibiotic resistance**. 55.81% compared to this our study has 64.02% of medical students have more knowledge about antibiotic resistance.

Nourhan M. Emera1, Iman A. El-Baraky1, Maggie M. Abbassi1, Nirmeen A. Sabry, et.al., (2024) This study has the knowledge that they **recommend leftover antibiotic** from friends/ family without prescription it covers 64.9% medical students compared to this our study has 61.87% of medical students have knowledge about the recommending the leftover antibiotic.

Nourhan M. Emera1, Iman A. El-Baraky1, Maggie M. Abbassi1, Nirmeen A. Sabry, et.al., (2024) This study has the knowledge that they **gain knowledge** by the community pharmacist is 31.67% as compared to our study medical students have 52.87% knowledge gained by the community pharmacist.

Suleiman Ibrahim Sharif1, Rubian Suleiman Sharif, et.al., (2013). This study has the knowledge that the **duration/ course of antibiotic** used previously of 3 days with 26.1% as compared to our study medical students have 60.07% take antibiotic for 3 days.

CONCLUSION

The study highlights significant differences in ASM practices between medical and non-medical students. Medical students having more knowledge compared to non-medical student, driven by easier access to antibiotics and having academic knowledge. Non-Medical students often relied on local medical shop. Both groups exhibited unsafe practices without proper guidance. Educational interventions should be given to promote antibiotic use and emphasizing the risk of ASM. Effort should be made to improve the students knowledge, particularly in non-medical field. In Additional, education campaigns should be directed towards changing the medical and non-medical students attitude and behaviour to rationalize antibiotic use and limit self-medication and over use.

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