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A STUDY ON KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING ANTIBIOTIC USE AND RESISTANCE AMONG MEDICAL STUDENTS

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ABSTRACT:

Introduction: Antibiotic resistance is a global public health concern, and inappropriate antibiotic use plays a significant role in its development. As future healthcare professionals, medical student's knowledge, attitudes, and practices regarding antibiotic use and resistance are crucial in addressing this issue effectively.

Aims and objectives: This study aims to assess the current state of knowledge, attitudes, and practices among medical students regarding antibiotic use and resistance and identify areas for improvement.

Materials and methods: This is a cross sectional study conducted at a Medical College, Andhra Pradesh, India on undergraduate medical students of preclinical years who are willing to participate in the study with questionnaire to assess knowledge ,attitude and the prescribing practices.

Results: Out of 177 students 150 students were willing to participate in the study. The response rate was 84.74%. Out of 150 students 98%(n= 147) has knowledge towards antibiotic resistance, 90%(n=195)agreed that self medication is main cause of antibiotic resistance. 7.3%(n-=11) answered that they will always use antimicrobials given to a friend or family as long as they were used to treat same illness, 18%(n=27) answered that antibiotics can be prescribed for common cold, 9.3%(n=14) agreed that they will prescribe antibiotics at patients request.

Conclusion: From this study it is clear that though they were medical students who seems to have knowledge regarding the antimicrobial resistance and emergence mechanism of resistance, but proper use of antibiotics is not reflected in their daily life.By integrating focused education on antibiotic resistance awareness and strategies for combating multidrug-resistant organisms early in their careers, these initiatives aim to equip future healthcare professionals with the necessary tools to mitigate the emergence of resistance and deliver quality patient care..

Key words: Medical students, Antimicrobial resistance, Global concern

INTRODUCTION:

Antibiotics once called magic bullets for quite some time were always not magical enough to survive the serious downsides(1).In the 21st century one of the major problems worldwide is

emergence and spread of bacterial resistance to available antibiotics posing a significant threat to global public health(2).Increasing antibiotic resistance will lead to consequences like decrease in therapeutic effectiveness, increase in treatment failures, prolonged and severe illness episodes, increased cost and increased mortality rates ultimately increasing the burden on national health system(3).Estimated deaths due to multidrug resistant organisms were more than 7,00,000 per year(4).

Among the factors that contribute to increase of resistance, one of the key factor is inappropriate and excessive use of antibiotics (5-7).Overuse and misuse of antibiotics leads to increased selection pressure thereby causing the development of resistant traits in bacterial populations. The bacteria can acquire antibiotic resistance by either mutational or gene transfer mechanisms(4).Improper use of antibiotics is due to various factors like prescriber knowledge regarding antibiotic resistance and experiences, diagnostic uncertainty, inadequate patient prescriber interaction, insufficient patient education by physicians, patients knowledge towards antibiotic use etc (8-10).

The forthcoming generation of healthcare professionals is represented by medical students, who play a critical role in combating antibiotic resistance. However, there is a clear comprehension gap with regard to their AMR-related knowledge, attitudes, and practices. To successfully customize treatments and educational programmes, it is important to investigate these elements. Targeted interventions to improve medical student's awareness and encourage ethical prescribing practices can be devised by assessing their attitudes and behaviors around antibiotic usage and resistance. Furthermore, by identifying the regions in which education and awareness campaigns are most needed, these studies help to minimize antimicrobial resistance (AMR) by designing effective interventions. By giving medical students the appropriate information and abilities at an early stage of their education will enable them to advocate for the responsible use of antibiotics, which will greatly aid the worldwide fight against antimicrobial resistance.

Hence the present study is conducted with an aim to evaluate the medical student's knowledge, attitude and practices regarding antimicrobial resistance.

Materials and Methods:

This is a cross sectional study performed using validated, structured questionnaire prepared by reviewing questionnaires of validated surveys that were previously reported and was customized to reflect issues in our country(11). The study was conducted at a Medical College, Andhra Pradesh, India. The study participants were undergraduate medical students of preclinical years who are willing to participate in the study. The questionnaire has three sections. First section assess knowledge regarding antimicrobial resistance comprising of 10 questions, second section assess the attitude towards antimicrobial usage comprising of 4 questions, third section assess the prescribing practices comprising of 4 questions. The responses collected were based on answers like agree,disagree , neutral .

Results:

Out of 177 students 150 students were willing to participate in the study. The response rate was 84.74%.

A. Knowledge Towards Antibiotic Usage, Action, Resistance:

Out of 150 students 98%(n= 147) has knowledge towards antibiotic resistance, only 2% (n=3)has no knowledge .93%(n=140) agreed that lack of control in the sale of antibiotics leads to antibiotic resistance ,but 2.6%(n=4) disagreed with this and 4%(n=6) remained neutral.90%(n=195)agreed that self medication is main cause of antibiotic resistance,4.6%(n=7) disagreed ,5.3%(n=8) remained neutral in decision making.52.6%(n=79) agreed that empiric antibiotic therapy contributes to antibiotic resistance ,14%(n=21) disagreed,33.3%(n=50) remained neutral.56%(n=84) of students agreed that antibiotics for shorter duration than indicated contributes to antibiotic resistance,33.3%(n=50)disagreed and 10.6%(n=16) remained neutral.75.3%(n=113) agreed that antibiotics in self limiting infections contributes to antibiotic resistance,13.3%(n=20) disagreed and

11.3%(n=17) remained neutral.36%(n=54) agreed that there are bacterial infections resistant to all available antibiotics.78%(n=117) answered that antibiotics can cause secondary infections after killing normal microbial flora present in the body,8%(n=12) disagreed ,14%(n=21) remained neutral.74%(n=111) students answered that there is abuse of antimicrobials,6.6%(n=10)disagreed to this and 19.3%(n=21) remained neutral.32.6%(n=49) of students are aware of antibiotic resistance awareness week by WHO whereas 67.3%(n=101) were not aware of the AMR week..

Table 1.knowledge towards antibiotic resistance

KNOWLEDGE	**AGREE(%)**	**DISAGREE(%)**	**NEUTRAL(%)**
Antibiotic resistance is a worldwide public health problem	147(98%)	0	3(2%)
Lack of control in the sale of antibiotics in pharmacies contributes to antibiotic resistance	140(93%)	4(2.6%)	6(4%)
Self medication is one of the main causes of antibiotic resistance	135(90%)	7(4.6%)	8(5.3%)
Empiric antibiotic therapy contributes to antibiotic resistance	79(52.6%)	21(14%)	50(33.3%)
Antibiotics for a duration shorter than that indicated contributes to antibiotic resistance	84(56%)	50(33.3%)	16(10.6%)
Antibiotics use in self limiting infections contributes to antibiotic resistance	113(75.3%)	20(13.3%)	17(11.3%)
There are bacterial infections resistant to all available antibiotics	54(36%)	58(38.6%)	38(25.3%)
Antibiotics can cause secondary infections after killing normal microbial flora present in the body	117(78%)	12(8%)	21(14%)
Do you think there is abuse of the current antimicrobials?	111(74%)	10(6.6%)	29(19.3%)
	YES(%)	**NO(%)**	
Are you aware of antibiotic resistance awareness week by the WHO?	49(32.6%)	101(67.3%)	

B. Attitude towards Antibiotic Usage:

Out of 150 students 7.3%(n-=11) answered that they will always use antimicrobials given to a friend or family as long as they were used to treat same illness and 49.3%(n=74) never use them where as 43.3%(n=65) will sometimes use them.11.3%(n=17) answered that they will take antibiotics if symptoms do not go away after few days, and 37.3% (n=56) never take them ,50%(n=75) will sometimes take them.4%(n=6)will take low antibiotic doses for limited time without prescription ,59.3%(n=89) will never take them and 36.6%(n=55) will sometimes take them 4.6%(n=7) answered that they will take left over antibiotics when they have same symptoms at another time,53.3% (n=80) will never take them,42%(n=63) sometimes take them.

Table 2. Attitude towards Antibiotic usage

ATTITUDE	**ALWAYS(%)**	**NEVER(%)**	**SOMETIMES(%)**
I will you use antimicrobials that were given to a friend or family, as long as they were used to treat the same illness?	11(7.3%)	74(49.3%)	65(43.3%)
I will take antibiotics if symptoms do not go away after a few days	17(11.3%)	56(37.3%)	75(50%)
I take low antibiotic doses for a limited time without a prescription.	6(4%)	89(59.3%)	55(36.6%)
I will use the rest of the antibiotics when i have the same symptoms at another time.	7(4.6%)	80(53.3%)	63(42%)

C. Practice of Prescribing Antibiotics:

Out of 150 students 18%(n=27) answered that antibiotics can be prescribed for common cold,70%(n=105) disagreed to prescribing them ,12%(n=18) remained neutral.39.3%(n=59)agreed that antibiotics should be suspended as soon as the symptoms disappear,48%(n=72) disagreed

,12.6%(n=19) remained neutral.9.3%(n=14) agreed that they will prescribe antibiotics at patients request,74%(n=111)disagreed with that and 16.6%(n=25)remained neutral.31.3%(n=47) agreed that antibiotics are the first drug of choice for early treatment in cough and sorethroat,52%(n=78) disagreed ,16.6%(n=25) remained neutral.

Table-3: Practice of Antibiotic prescription

PRACTICE	AGREE(%)	DISAGREE (%)	NEUTRAL (%)
Antibiotics can be prescribed for viral infections (common cold)	27(18%)	105(70%)	18(12%)
Antibiotics should be suspended as soon as the symptoms disappear	59(39.3%)	72(48%)	19(12.6%)
At the patient's request ,Iwould prescribe antibiotics	14(9.3%)	111(74%)	25(16.6%)
When you have a cough and sore throat, antibiotics are the first drug of choice for early treatment	47(31.3%)	78(52%)	25(16.6%)

DISCUSSION:

Our study is to assess the knowledge regarding antibiotic resistance, attitude towards usage of antibiotics and practice of prescribing antibiotics among the preclinical undergraduate medical students.

Majority of students 98% had knowledge that antibiotic resistance is a worldwide public health problem and indiscriminate and unnecessary use of antibiotics would lead to increase in resistance which is almost similar to Kumar et al where it is 94% (12) .

More than 50% of students have the attitude of using the antibiotics unnecessarily.So it is necessary to provide more information regarding the indiscriminate use of antibiotics and their possible adverse effects, as this will result in decrease in frequency of using the antibiotics and will help in encouraging the proper usage of drugs.

Though majority of students 70% disagree to prescribing the antibiotics for viral infections ,still few students 27% are not aware of this .This is an issue of concern as incorrect knowledge on etiology of viral infections may lead to high rate in the use of antibiotics which can result in corresponding increase in the resistance to used antibiotic(13).so the prescribers need to be educated regarding the prescription of antibiotics. Improvement in the medical students knowledge will increase their confidence while prescribing right antibiotic for right patient(14).

Approximately 6% of students agreed that they will use the leftover antibiotics if they need them later,and 40 % will sometimes use them ,this is very high when compared to other studies where only 20%of students will use them. This shows that either the doses prescribed or the quantity purchased were more than required dose, or the regimen was not completed with the prescribed drug dose and duration(15,16)).This act of self medication with left over antibiotics will lead to antibiotic resistance.

Approximately 40% of the students said that they would suspend the antibiotic as soon as the symptoms disappear.Almost 1/3rd (31.3%) of students said that the antibiotics are the first drug of choice in case of cough and sore throat.61% of students in our study had correct prescription practice regarding antibiotic which is very low compared to kumar et al and Sharma et al where they was 91.3% and 89.4%(12).

Limitations:

This survey was administered exclusively to second-year medical graduates, thus limiting its generalizability to the broader population of medical students. Additionally, the dataset is relatively small, comprising only 150 respondents. The study design employed is cross-sectional, a type of observational study commonly utilized to ascertain prevalence rates and draw inferences regarding causation.

Conclusion:

The study highlights that while medical students demonstrate awareness of antimicrobial resistance (AMR) mechanisms, their antibiotic usage doesn't always align with this knowledge. Despite

recognizing the risks of unnecessary antibiotic prescribing, their practices often fall short. However, there's optimism in their eagerness to learn and improve. To address this gap, ongoing training programs tailored to medical students can enhance their skills and understanding of AMR prevention. By integrating focused education on antibiotic resistance awareness and strategies for combating multidrug-resistant organisms early in their careers, these initiatives aim to equip future healthcare professionals with the necessary tools to mitigate the emergence of resistance and deliver quality patient care.

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