

# **A Survey on Knowledge and Attitude of Rational Use of Antibiotics on Predesigned Proforma among Interns and 1<sup>st</sup> year Postgraduate Students'**

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**Abstract \_ BACKGROUND-**In the present era we are facing the major problem called antibiotics resistance. Appropriate knowledge of antibiotics of medical student can greatly help to combat this problem. Keeping these points in mind we have planned the study to assess the knowledge, attitude and practice of antibiotics prescribing among the medical student and sensitizing the student regarding antibiotics resistance.

**METHODOLOGY-** In this study, 181 students (interns and 1<sup>st</sup> year PG resident) were included to participate in the questionnaire survey on students' knowledge, attitude and practice toward antibiotic usage. The forms were collected immediately after completion.

**RESULT-**total 181 students participated. Our study reveal that attitude, behaviour towards prescribing antibiotics and awareness of students for antibiotics resistance are adequate but they have less knowledge about clinical situation faced in wards and OPD. 98.34% student says yes to get more education about antibiotics. 94.47% student says yes for sensitization program to be scheduled every 3-5yrs for all the doctors regarding rational use of antibiotics

**CONCLUSION-**This study shows that there is a need for interventions (like strict antibiotics policy, scheduled antibiotics sensitization programme, integrated teaching) that support rational use of antibiotics.

**KEY WORDS-**antibiotic resistance, antibiotics abuse, Questionnaire survey, medical student

## **INTRODUCTION-**

Antimicrobials are the drugs used to injure the invading organism hence the major tool to help the natural defence of the body in the management of infection<sup>1</sup>. Antibiotics are drugs that brought us back from the era of death due to communicable disease to healthy life. In modern era self medication with antibiotics are increased. Readily available information about the various medicines through advertisements using various forms of media like newspapers, radio, TV, internet etc., plays a major factor for the rising trends of self-medication practices<sup>2</sup> which are mostly inaccurate and of poor educational value. Medical student during the 5 yr course are taught about pathogenic microorganisms and infectious diseases. Inadequate knowledge of antibiotics or causative

agent by doctors leads to irrational prescription, and promote resistance. The problem is further added by the promotional policies of drug manufacturers. Now a day researchers are more interested in developing drug for chronic disease, and so we have a limited effective antibiotic, and if strict antibiotics policies are not made soon we will reach a era where we have antibiotics but not effective against microbes. Antimicrobial resistance (AMR) is a worldwide problem preferentially affecting low- and middle income countries<sup>3,4</sup>. The main factors are irrational drug use such as over prescription and unnecessary prescription of AB (such as for viral infections), incomplete treatments and self-medication as well as insufficient infection control measures to prevent spread of resistant bacteria both in the community and the hospital<sup>5</sup>. An insufficient infection control policy favours the spread of resistant microorganisms. In 2011, WHO set the theme of World Health Day as 'Combat Antimicrobial Resistance: No Action Today, No Cure Tomorrow'<sup>6</sup>. The prescribing behaviour of medical doctors plays a key role in the consumption of antibiotics and is a potential tool for control and containment of antibiotics resistance and thus greatly impacts the future on antibiotic-related issues. Keeping these points in mind we have planned this study. All the students were given a form containing question on different aspect to assess the knowledge attitude and practice about rational use of antibiotic. The forms were collected immediately after completion study so as to assess the knowledge of antibiotics of medical student and depending on result making essential changes in educating them about antibiotic and their application.

### STUDY METHODOLOGY

It was a prospective, non- interventional, observational, analytical type of study. In this study, 181 students (first year P.G resident and interns) were included. It was designed mainly to assess the students' understanding of antibiotics. The questionnaire was modified from the KAP study conducted in china among the medical students<sup>7</sup>, KAP study in Chennai<sup>8</sup> and KAP studies in Congo<sup>9</sup>.

(i) The part on knowledge of antibiotic use had 12 questions covering the normal flora of microbes, concepts of drug sensitivity and susceptibility; relationship of disease, drug resistance, and side effects of antibiotics; views on effectiveness of antibiotics among others.

(ii) The part on attitude had 10 questions on the seriousness of antibiotic abuse; its influence on the student and his/her family, and the causes of the abuse, proper use of antibiotics campaign.

(iii)The part on behaviour had 8 questions ranging from the frequency of antibiotic use in fever, illnesses and various other common symptoms.

(iv)The part on the perception and awareness of medical student had 5 questions relating to sources of antibiotics knowledge, information channel, and factors contributing to antibiotics resistance.

The data was analyzed by using simple descriptive statistics to generate frequencies, percentages and proportions.

### RESULT-

Our study reveals (Table 1) 55.81% students prefer to give only ORS while 44.19 % students prefer to give antibiotics with or without ORS in non-infectious diarrhoea. Out of this 32.04% student prefer single drug therapy and 12.15% student prefer combination therapy. Fluroquinolones (16.02%) was most commonly suggested followed by metronidazole (9.4%). Combination of ofloxacin- ornidazole (5.52%) was most commonly suggested by students. Most of time cough cold with mild fever is viral in origin and doesn't require antibiotics. Our study reveals 167(92.26%) student will prefer to prescribe antibiotics and only 14(7.7%) students will not prefer antibiotics and go for symptomatic treatment. Azithromycin (34.80%) was the most commonly misused drug followed by Amoxicillin (34.25%), (Table 1). Typhoid is common infectious disease prevalent in community. 156(86.18 %) student know the treatment of typhoid while 25(13.81%) don't know the treatment. Oral cephalosporin was the mostly suggested by students followed by Fluoroquinolones (25.96%) (Table 2)Pregnancy was a condition in which every drug is not safe so knowledge of antibiotics whether it is safe or not is must for every doctors in our study reveals that 95(52.48%) students knows the answer and 86(47.5%) students don't know the answer. The most commonly suggested antibiotics during pregnancy were Cephalosporin (25.96%). Only 53(29.28%) student knows that streptomycin is contraindicated in tubercular female during pregnancy. For empirical therapy of UTI, 112 students (61.87%) know the antibiotics which can be given in UTI and 69 students (38.12%) don't know the answer. Fluoroquinolones was preferred by 35.35% student while 9.39% students prefer Cephalosporin. Likewise rest of the question and answer are given in the table 2

Table1. Knowledge of the students regarding the use of antibiotics in diarrhoea and rhinitis

Question	Yes (%)	No (%)	If yes 1 <sup>st</sup> preference (%)	2 <sup>nd</sup> preference (%)
In diarrhoea without fever do we need antibiotic? If yes what should be preference?	80(44.19%)	101 (55.81%)	Fluoroquinolones (16.02%)	Metronidazole (9.4%)
In rhinitis with fever do we need to prescribe antibiotics? If yes what should be your preference?	167 (92.26%)	14 (7.7%)	Azithromycin (34.80%)	Amoxicillin (34.25%)

Table2. Knowledge of students regarding use of antibiotics in given condition

Question	Who knows the answer (%)	Who don't know the answer (%)	If knows 1 <sup>st</sup> preference of the student
Preferred drug for typhoid fever	156(86.18%)	25(13.81%)	Cephalosporin (41.43%)
Empirical therapy for UTI before getting culture report	112(61.87%)	69(38.12%)	Fluoroquinolones (35.35%)
Antibiotics safe during pregnancy	95(52.48%)	86(47.5%)	Cephalosporin (25.96%)
Antibiotics safe in renal failure	30(16.57%)	146(80.66%)	Ceftriaxone(8.83%)
Antibiotics avoided to child	56 (30.93%)	125(69.06%)	Tetracycline (25.41%)
Antibiotics safe in hepatic insufficiency	61(33.70%)	120(66.29%)	Penicillin (12.70%)
Which first line anti-tubercular drug should not be used during pregnancy	53(29.28%)	128(70.71%)	Streptomycin (29.28%)
Antibiotics preferred in gram positive bacterial infection	143(79%)	38(21%)	Penicillin (45.85%)
Antibiotics preferred in gram negative bacterial infection	108(59.66%)	73(40.33%)	Aminoglycosides (29.83%)
Antibiotics preferred for anaerobes	71(39.22%)	110(60.77%)	Metronidazole (34.80%)

#### Attitude of medical student towards antibiotics

Our study reveals that student have good attitude towards antibiotics. In question like expensive antibiotics are always better than cheaper? 146(80.66%) students answer no. 158(87.29%) student agree that Abuse of antibiotics has become the main cause leading to bacterial resistance. 178(98.34%) students says that It is necessary to get more education about antibiotics. According to 171(94.47%) student, a sensitization program should be scheduled every 3-5 yrs for all the doctors regarding rational use of antibiotics. (table 3.)

Table3. Attitude of students towards rational use of antibiotics

S. No	Question	Yes (%)	No (%)	Can't comment (%)
1	There is abuse of antibiotics at present?	159(87.84%)	9(4.97%)	13(7.18%)
2	Newer antibiotics are always better than older?	68(37.56%)	70(38.67%)	43(23.75%)
3	Expensive antibiotics are always better than cheaper?	14(7.73%)	146(80.66%)	21(11.60%)
4	Antibiotics resistance has become a problem?	173(95.58%)	4(2.20%)	4(2.20%)
5	Abuse of antibiotics has become the main cause leading to bacterial resistance?	158(87.29%)	16(8.83%)	7(3.86%)
6	Antibiotic resistance affects you and your family's health?	145(80.11%)	19(10.49%)	17(9.39%)
7	It is necessary to get more education about antibiotics?	178(98.34%)	2(1.10%)	1(0.55%)
8	A sensitization program should be scheduled every 3-5 yrs for all the doctors regarding rational use of antibiotics.	171(94.47%)	2(1.10%)	8(4.41%)
9	Extensive promotion of antibiotics by Pharmaceuticals is necessary	76(41.98%)	73(40.33%)	32(17.67%)
10	The use of antibiotics can speed up the recovery of cold, cough	73(40.33%)	91(50.27%)	17(9.39%)

**Prescribing behaviour of antibiotics, among medical students.**

Only 32(17.67%) students say that they always prescribe antibiotics for each and every case of fever while 145(80.11%) students deny this. In case of Acute bronchitis 135(74.58%) students agree that they will give antibiotic in each and every case. 161(88.95%) student agree to give antibiotics each and every case of Coughing up yellow/green sputum. 164(90.60%) student will give antibiotics in each and every case Cough lasting 2 weeks or more. 176(98.41%) student go for Culture and sensitivity in case of severe infection and this is good practise instead of blindly prescribing antibiotics.

Table 4. Student’s behaviour of using antibiotics

S. No	Question	Yes (%)	No (%)	Can’t comment (%)
1	Fever	32(17.67%)	145(80.11%)	4(2.20%)
2	Common cold	28(15.46%)	145(80.11%)	8(4.41%)
3	Acute bronchitis	135(74.58%)	29(16.02%)	17(9.39%)
4	Acute diarrhoea	83(45.85%)	91(50.27%)	7(3.86%)
5	Cough lasting 2 weeks or more.	164(90.60%)	12(6.62%)	5(2.76%)
6	Culture and sensitivity in case of severe infection.	176(98.41%)	2(1.10%)	3(1.65%)

Common reason for antibiotics resistance as students think are Irrational use of antibiotics (83%), Lack of proper knowledge, Poor compliance, OTC availability. Important sources for information regarding antibiotics according to students are textbook (44%), senior practice (23%), internet (15%), WHO (14%), pharmaceutical company (4%).

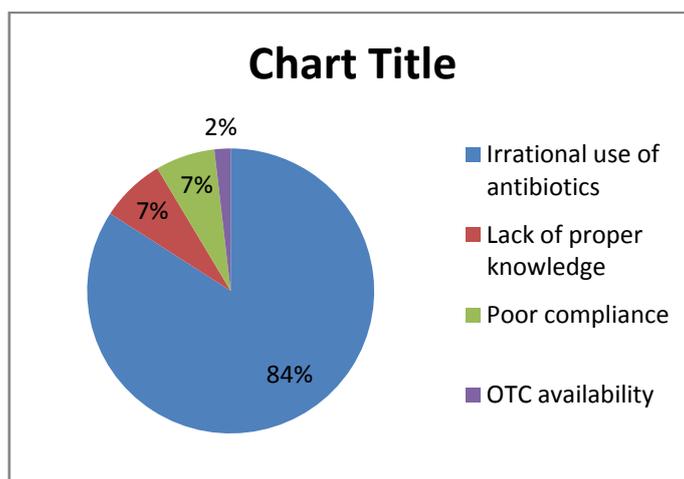


Figure 1. According to student factor contributing to antibiotic resistance

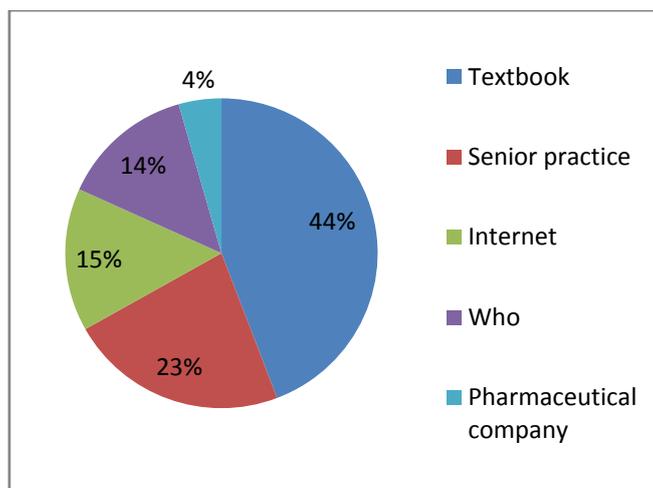


Figure 2. Preference of students regarding source information of antibiotics

## DISCUSSION

The uncontrolled irrational use of antibiotics is a well-established reason for antibiotic resistance which leads to emergence of virulent strains of resistant microbes. Diarrhoea is common condition in which antibiotics is commonly misused. Ronald (1988) reported that more than 4 million children yearly worldwide develop acute diarrhoea, which can be treated simply by fluid replenishment, rather than medication<sup>10</sup>. Our study reveals that Fluroquinolones and metronidazole are most commonly misused drug in diarrhoea. In study of Das et al, we found metronidazole is the most commonly prescribed drug followed by fluoroquinolones<sup>11</sup>. The role of antimicrobials remains doubtful in acute secretory diarrhoea, which is non-infectious and self limited in nature. Frequent use of antimicrobials would lead to the escalation of cost of therapy, resulting in diversion of meagre resources, increased side effects, prolongation of the carrier state, in addition to an increase in resistance<sup>11</sup>. The base line survey of pharmaceutical sector in Tanzania of 2002 to assess the availability and use of medicine in Tanzania revealed that antibiotics were used by more than 90% of patients in management of non-pneumonic acute respiratory infection<sup>12</sup>. In peru, 58% of children who had cough/cold and diarrhoea were prescribed antibiotics by nurses and doctors. Antibiotics do not reduces the severity or time of illness in viral infections hence their use exposes patient to risks of medicine use without benefit<sup>13</sup>. Our study results also prompt that the antibiotic knowledge should be strengthened in India. Even many students believed that antibiotics can speed up recovery of common cold, cough and a number of other related illnesses arising from viral infections. This is still an important cause of antibiotic over-use.

For treatment of drug-susceptible typhoid fever, Fluroquinolones are the most effective class of agents, with cure rates of ~98% and relapse and faecal carriage rates of <2%. Empirical Treatment may start with ceftriaxone or other third generation cephalosporin<sup>14</sup>. In our study 86.18% students know the drug used for treatment of typhoid.41.43% student prefer cephalosporin for treatment and 25.96% prefer Fluroquinolones. Except in acute uncomplicated cystitis in women, a quantitative urine culture or a comparable alternative diagnostic test should be performed to confirm infection before empirical treatment is begun, and antimicrobial sensitivity testing should be used to direct therapy. *E. coli* and *S. saprophyticus* cause >90–95% of cases of acute uncomplicated cystitis<sup>15</sup>. Keeping in mind the local resistance pattern, therapy can be started with quinolones, trimethoprim-sulfamethoxazole, cefpodoxime, amoxicillin. In our study we found 52.48% students know the answer and 47.5% student don't know the answer. 35.35% students prefer to start Fluroquinolones and 9.39% students prefer to give cephalosporin as empirical therapy. Every student must know the antibiotics safe in pregnancy like penicillin group, cephalosporins, erythromycin<sup>16</sup>. In our study we found 52.48% student correctly answer the question and the preferred antibiotics' is cephalosporin 25.96%. Tuberculosis is also common in pregnancy in low income families and so student must know the treatment like Isoniazid, rifampicins are considered safe. Safety of pyrazinamide and ethambutol are uncertain. WHO and British Thoracic Society consider H, R and Z to be safe to the foetus and recommend the standard 6 month HRZ regimen for pregnant women with TB. E can be added during late but not early pregnancy However, Z is not recommended in the USA (due to lack of adequate teratogenicity data). In India, it is advised to avoid Z, and to treat Pregnant TB patients with HRE<sup>17</sup>. Streptomycin is absolutely contraindicated during pregnancy. In our study only 29.28% student know the drug absolutely contraindicated in pregnancy. Most of the antibiotics are excreted by renal mechanism; few drugs like erythromycin, chloramphenicol, doxycycline, cefoperazone, ceftriaxone are excreted by non renal mechanism<sup>18</sup> so considered safe in renal insufficiency. In our study only 16.57% student know the drug safe in renal insufficiency. Preferred drug is ceftriaxone 8.83%. Choice may vary depending on situation. Drug mainly excreted by renal mechanism are considered safe in hepatic insufficiency like penicillin, Aminoglycosides, most cephalosporin, Fluroquinolones, polymyxin<sup>18</sup>. In our study only 33.70% student know the answer. Preferred drug is penicillin group 12.70%. Drug like tetracycline and Fluroquinolones to be avoided in children as tetracycline can cause yellow staining of the teeth of infant, defective formation of enamel, and hypoplasia of teeth. There is increase risk of dental caries. There is risk cartilage damage in weight bearing joints of young animals through Fluroquinolones, so they should be avoided in pregnant, nursing mother and in young children. In our study only 30.93% student know the drug to avoid in children. 79% student have clear concept drug that can be used in gram positive infection and drug preferred by students are penicillin group(45.85%), cephalosporin(19.335), Macrolide (6.62%), other(7.18%) include ofloxacin, levofloxacin, linezolid, tetracycline. 59.66% student have concept about drug that can be used in gram negative infection. Drug suggested by student are Aminoglycosides (29.83%), Fluroquinolones (16.02%), other include 3<sup>rd</sup> generation cephalosporin, cotrimoxazole. Only 39.22% student have clear concept about the drug that can be used in anaerobic infection. The preferred drug is metronidazole (34.80%), clindamycin (4.41%). From this section we conclude that student needs more education about antibiotics in different clinical situation.

94.47% student in our study favoured that sensitization program should be scheduled every 3-5 yrs for all the doctors regarding rational use of antibiotics to boost their knowledge level (Table 3). Minen et al. in a KAP survey on antibiotics among 304 MS in America 2010, reported that more than 75% of the students preferred more education on antibiotics<sup>19</sup> which is consistent with our study (94.47%). According to a research among

503 interns and senior physicians in France, 98% of physicians considered antibiotic resistance as a national problem<sup>20</sup>, in our study 95.58% of the medical students shared this view suggesting there is still need for sensitization in India. One study has reported that more than 60 % of the participants believed that antibiotics should be prescribed for viral illnesses assuming bacterial etiology<sup>21</sup>. Such wrong beliefs may lead to inappropriately high rates of antibiotic consumption, which can result in a corresponding increase in the bacterial resistance<sup>22</sup>. In our study, 91(50.27%) student were aware that diseases like influenza and common cold are not of bacterial aetiology and hence they did not recommend antimicrobial drugs. While 40.02% student still believes that antibiotics can hasten the recovery from cough and cold and thus suggesting that we have requirement of sensitization. Even majority of clinicians acknowledge that antibiotics were prescribed too often in such conditions<sup>23,24</sup>. Extensive promotion of antibiotics may play a role in biased selection of antibiotics and play a role in resistance. In our study 41.98% student favouring the promotion while 40.33% do not favour this. Students must be educated about the harm due to extensive promotion of antibiotics and govt should be strict regarding this.

The availability of unbiased information about AB is a prerequisite for appropriate AB prescribing<sup>25</sup>. In our study we found textbook are the important sources of information followed by senior practice (23%), internet (15%). Thriemer et al in his KAP study found pharmaceutical companies ranked highest for source of information regarding antibiotics<sup>9</sup>. The difference between two studies may be because we include medical student for study while in study of Thriemer et al, doctors are also enrolled, but if we see among medical student then university course ranked highest. We also find that senior's practise of antibiotics also affect prescribing behaviour. Apart from teaching about antibiotic prescribing, the principles of the protocol development for antibiotic use in health care facilities should form an integral part of the undergraduate teaching<sup>26</sup>. Learning about the antimicrobial prescribing in pharmacology must be connected clearly with the infection control in microbiology<sup>27</sup>. Simple measures like hand hygiene which are emphasised in the lectures, for the control of resistance should be inculcated in day to day life<sup>28</sup>.

### CONCLUSION

students are the future doctors who are going to practise in field, so if they have clear concept about antibiotics like when to use and when not we can greatly reduce the above mention factors responsible for antibiotics resistance. It is important to organise sensitization program every 3-5 yrs for all the student and doctors regarding rational use of antibiotics. Bacterial sensitivity pattern must be carried out in every institution and results must be discussed. Secondly government should also take strict action to restrict the easy availability of antibiotics. The medical education strategies should aim, not only to increase the knowledge, but also to change the behaviour and practices among medical students<sup>29</sup>

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