



ST.PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

**KNOWLEDGE, ATTITUDE AND PRACTICE TOWARDS RATIONAL USE OF
ANTIBIOTICS AMONG MEDICAL STUDENTS IN ST PAULS HOSPITAL MILLENNIUM
MEDICAL COLLEGE**

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List of abbreviations

AB- Antibiotics

AMR- Antimicrobial resistance

IUM- Irrational use of medicine

RUM-Rational use of medicine

WHO- World health organization

Abstract

Introduction: Developing countries including Ethiopia experience a heavy burden of infectious diseases with a growing prevalence of disease morbidity and mortality. With the increased intensity of antimicrobial use following the increased burden of infectious disease in Ethiopia, AMR remains being a huge concern in the progress of treating infectious diseases. Health care facilities, particularly those which provide service to large number of patients, are a focal point in the emergence of AMR. Health science students who are future physicians are expected to have appropriate knowledge and attitude towards the growing menace of antibiotic resistance (ABR)

Objectives: To assess the knowledge attitude and practice of rational use of antibiotics among medical students in St. Paul medical college medical students

Methods: A quantitative, cross-sectional interview study based on a structured questionnaire was distributed among medical students, whereby a Likert scale was used to determine their KAP regarding antibiotic use and resistance. The responses of this scale ranged from —strongly agree to —strongly disagree, —always to —never. Some questions were of —true or —false or —uncertain type.

Results: In general 85% of medical students has a good knowledge. The mean knowledge score was 10.8238 (SD: 1.16167) out of a possible maximum of 12 and minimum of 7. 59.8% of respondent are aware of that antibiotics do not help to treat viral infections. From total of 403 respondent 63% of them have a better attitude. 93.3% agree on a need to establish a course on rational use on antibiotics and 95.3% of respondent believes that there should be antibiotic

stewardship or antibiotic policy in hospital setting. And 44.4% has a right practice, 34% complete the full course of treatment and 125(31%) of students always consult a doctor before start an antibiotics. According to this research finding age and year of student has significance in knowledge and practice.

Conclusions and Recommendation: The participants in our study had knowledge, attitude and practice about the rational use of antibiotics and a perception that antibiotics were being overused and that rational drug prescribing had an important role in the antibiotic resistance.. Students belonging to medical health care sector should be well aware about the antibiotic prescribing and resistance for the welfare of the general masses. The provision of unbiased and evidence based information about AB and local AB resistance rates to all prescribers and the implementation of quality assurance for drugs in order to improve confidence among the general public and professionals. Educational measures such as trainings are highly welcomed, and the implementation of AB committees should be studied at national pilot settings.

1. Background

According to World Health Organization (WHO) definition, rational use of medicine (RUM) requires that patients receive medications appropriate to their clinical needs, in doses that meet their own requirements, for an adequate period of time, and at the lowest cost to them and their community. [1] Prescribing is a complex and challenging task which must be based on scientific evidences, which requires knowledge of essential medicine (EM), RUM and personal drugs (P-drug). It should not be an automated action, without critical thinking or in response to commercial pressure. There are world-wide evidences of poor prescribing due to errors, polypharmacy, and inappropriate or irrational prescribing leading to serious health risks and financial burden to the patient.[2]

An antibiotic is an agent that inhibits bacterial growth or kills bacteria.

Irrational antibiotics/antibacterial drug refers to the failure to complete treatment, skipping of doses, reuse of leftovers and this leads to sub-therapeutic doses or toxicity of the drugs as well as failure of eradicating infectious bacteria and potentially promoting the emergence of resistance.[3] Irrational drug use may involve drug misuse and/or inappropriate drug use and many other issues.

Misuse of antibiotics drugs involves many key players including various cadres of healthcare workers such as prescribers and dispensers; patients or consumers and the communities. Inappropriate and overuse of antibiotics have been a contributing factor to the emergence of bacterial resistance globally. The problem is further exacerbated by self-medication of these drugs by individuals without the guidance of qualified health workers and also the non-therapeutic use of antibiotics as growth promoters. The inappropriate prescriptions of these

drugs by both the trained and untrained health care workers for conditions where there is no proven benefit of such therapy like in the viral infections has lead to the development of antimicrobial resistance and unnecessary expense to patients and to the healthcare system as a whole .[4-7]

Almost half of all medicines globally are used irrationally. This can have severe consequences: adverse drug reactions, drug resistance, protracted illness and even death. In addition, the financial cost incurred by individuals and governments due to irrational use is unnecessary and often extremely high, particularly in developing countries where patients often pay for medicines out of their own pockets. [8]

Strong beliefs among the community in the curative power of medicines, their limited knowledge about prevention and the easy accessibility to household medicines raises serious concerns. [9]

The rational use of antibiotics is thought to be the best way to control resistance. The antimicrobial resistance is a threat that is progressing rapidly and intensifying. The first step towards curtailing its progress is developing awareness on its significance and seriousness. A strong correlation between the levels of antibiotic use and antibiotic resistance have been showed in various studies, where populations who use lower amount of antibiotics develop lower amount of resistant bacteria.[10] To meet the challenges which are posed by its spread, various approaches have been developed. One of the approaches is to undertake various institutional and educational programs among the public sector [11] as well as among the medical sector [12] about antibiotic resistance and its complications and regarding the steps which can prevent its development and spread.[13,14]

Therefore, it has been emphasized that proper training and awareness should be provided to the undergraduate and postgraduate students regarding the careful prescribing, manufacturing and the use of antibiotics. This important measure will help to promote the judicious use of antibiotics.[15] So, this study was undertaken among medical students, in order to assess their knowledge and attitude concerning antibiotics and its resistance and practices which are related to antibiotic usage.

2. Statement of the problem

Over the last 50 years, antibiotics are among the most commonly prescribed drugs used in human medicine. And it has saved the lives and eased the suffering of millions of people. [16] Antibiotics, when appropriately targeted to a susceptible pathogen, improve outcomes for patients. However, up to 50% of all the antibiotics prescribed for people are not needed or are not optimally effective as prescribed. Therefore, the use of antibiotics is the single most important factor leading to antibiotic resistance around the world.[17,18]

Nowadays, antibiotic resistance is becoming an existing worldwide problem, mainly in developing countries [19,20] . New forms of resistant pathogens can cross international boundaries and spread between continents with ease. World health leaders have described antibiotic-resistant microorganisms as “nightmare bacteria” that “pose a catastrophic threat” to people in every country in the world .[18] Therefore, the issue of its availability, selection, and proper use is of critical importance to the global community [16]

Causes of irrational use include lack of knowledge, skills or independent information, unrestricted availability of medicines, overwork of health personnel, inappropriate promotion of medicines and profit motives from selling medicines.

The availability and distributions of these drugs have improved in many developing countries, especially after the introduction of essential drug programmed concepts.[21] Even though, its availability and distributions are increased, global irrational use is still on a rise (50% to almost 100%).[19] Moreover, the availability of information about rational handling and use is also inadequate in many developing countries. [22]

Illegal purveyors of drugs are also common in many developing countries. Thus, the use of these drugs from informal sectors encourages the practice of self-medication and home drug storage. This easy access to home-stocked medicine has enabled a high consumption rate of medicine for self-limiting diseases. Therefore, in order to handle unnecessary health risk and bacterial resistance due to improperly obtained drugs, it is important to consider the manners of drug availability to consumers. [23,24]

On the other hand, the use of antibiotics without medical guidance could result missed diagnosis and delays in appropriate treatments and adverse effects [23,24,25]. In addition, medicines in households lead to medicine wastage which has an economic impact on the health care system. Worldwide, unused (leftover) medicines cost billions of dollars[22]

These rampant irrational uses of antibiotics not only lead to wastage of medical resources, but also contribute to the emergence of multi-drug resistant pathogens. This is potentially dangerous for both individuals and societies [18,19]

Although most of the focus regarding inappropriate antibiotic use has been directed at physicians, some researchers have proposed that the role of patients also be assessed. Self Medication with Antibiotics (SMA) is possible via several avenues such as they are legally available OTC, antibiotics initially prescribed by physicians are saved and subsequently used without a medical consultation, antibiotics are obtained through friends or relatives, and they can be acquired via the Internet[26,27]

Studies revealed that SMA is widely practiced both in developed and developing countries, and its prevalence ranges from 3% to 75% [28]. The prevalence is higher in developing countries due to poor supervision of antibiotic prescription and loose regulatory systems. The frequency ranges from 24% to 73.9% in Africa, 36.1% to 45.8% in the Middle East, 29% in South America and 4% to 75% in Asia [27].

In the last 20 years progress has been made to promote rational use of medicine, like a formulary replacement or restriction, health care provider education, feedback activities, approval requirement from an infectious disease specialist for the drug prescription. [28]

In 1977 WHO established the first Model List of Essential Medicines to assist countries to formulate their own national lists. In 1985, the present definition of rational use was agreed to at an international conference held in Kenya. In 1989, the International Network for the Rational Use of Drugs (INRUD) was formed to conduct multi-disciplinary intervention research projects to promote more rational use of medicines. Following this, the WHO/INRUD indicators to investigate drug use in primary health care facilities were developed and many intervention studies conducted.[29]

A review of all the published intervention studies with adequate study design was presented at the first ICIUM in Thailand in 1997.4 A summary of the magnitude of prescribing improvement by type of intervention shows the effect varied with intervention type. Printed materials alone had little impact compared to the greater effects associated with supervision, audit, group

process and community case management. Furthermore, the effects of training were variable and often unsustained, possibly due to differences in training quality and the presence or absence of follow-up and supervision.[29]

The review of intervention impact carried out for ICIUM 1997 is presently being revised using the data from the WHO database on drug use surveys. Of the 700 surveys included in this database, less than half were conducted in order to evaluate the impact of an intervention or strategy to promote more rational use of medicines.[29]

Thus, relatively few interventions aimed at promoting rational use of medicines have been implemented and evaluated. Most of these interventions were introduced only at the local level and only about 20% of them were adequately evaluated for their impact on medicines use.

Although we know from the first review in 1997 that some of the most effective and sustainable interventions combine managerial and economic strategies, still only 25% of interventions being reported are managerial or economic, the rest being educational in nature.

In 2004, the second ICIUM was held in Thailand. All the evidence presented at the conference made it clear that the misuse of medicines continues to be widespread and has serious health and economic implications, especially in resource- poor settings. [28]

3. Literature review

Rational use of medicine is simply prescribing the right medicine at the right dose for a sufficient time according to the actual clinical needs of the patient at the lowest cost to the individual and community at large. It is the appropriate use of medicines and when we say appropriate we refer to indications, medicine quantity, efficacy, safety, suitability and cost. Appropriate also includes the right dosage and its administration, correct dispensing, and proper patient information in addition to patient adherence to treatment.

Many reasons have led to Irrational Use of Medicines (IRUM) over the past few decades. The recent "drug explosion", doctors' knowledge and experiences, diagnostic uncertainty, patients' expectations, lack of patient and health care professionals education, pharmaceutical marketing, antibiotic selling without a prescription as well as economic and political reasons, inadequate training of healthcare professionals and patient demand are some of these reasons. The situation was worsened by the poor communication between health team members and patients in addition to promotional activities of the pharmaceutical firms with some exaggerated claims on their products efficacy and safety.[30]

A significant number of population worldwide have been using antibiotics incorrectly, putting their self at a greater risk instead of being cured. Most of the regular populations "especially in the developing countries" consume antibiotics without understanding the antimicrobial route and mechanisms inside the human body.

A major cause of antibiotic resistance is inappropriate use of antibiotics. Moreover, a quite big number of the population worldwide are unaware of the bacterial resistance towards antibiotics, one of the most common misbeliefs among many communities specially in

developing and middle east countries believes on antibiotics can be used for viral infections (such as common cold) medication, this wrong practice of antibiotic misuse may lead to over dose and in long run to bacterial resistant. The term 'bacterial resistant' might as well not be familiar to them. [30]

Appropriate use of antibiotics is of high importance in order to achieve excellent health degree within individuals and communities. An obvious example of a misunderstanding of antibiotic therapy is the idea that antibiotics are effective against viral infection. There are a lot of cases where people take antibiotics without following the right indications and treatment course and this leads to the failure of a complete cure. When a strain of bacteria develops resistance towards antibacterial agents, the antibiotics might be ineffective to eradicate the bacteria and thus the infection is less likely to be cured. Aside from the failure, there is also a risk of adverse effects ranging from mild ones to fatal cases. In addition, resistance towards antibacterial agent can cause the reduction of options for alternative drug choices (particularly in case of first line options).[31]

A previous study conducted by Sanya et al., 2014, investigated antibiotic misuse based on self-report by undergraduate students who were studying majors not related to medicine (art, social sciences, humanities, technology, basic science, agriculture and education) at a Nigerian University. The study involved a questionnaire which surveyed sociodemographic background (gender, age, education level) and open-ended questions. More than 95% of the participants reported that they have experienced antibiotic consumption (Sanya et al., 2014). The antibiotics were obtained according to a prescription by a physicians (68.3%), recommendation by pharmacists (11%), nurse and trade-medical practitioner's recommendation (7.3%), offered by friends/relatives (6.3%) and self-medication (7.3%) (Sanya et al., 2014). Over one-fourth of the participants claimed that they would take antibiotics whenever they feel unwell, while only 2.5% of the participants took antibiotics about once a year (Sanya et al., 2014). Around 36% of participants were willing to take antibiotics if recommended. Interestingly, almost half of the participants completed the treatment course while 30% did not have antibiotic compliance (Sanya et al., 2014). Antibiotics were stopped when the symptoms seem to have been alleviated (28%) or even without any reason (21.5%). Roughly 2% of participants reported that they switched to other antibiotics due to slow progress of cure (Sanya et al., 2014).

In 2013, Huang et al. conducted a questionnaire-based study on students' knowledge, attitude and practice toward antibiotic usage. The study involved 2500 students from three different universities in North-East China, in which one of the universities is a medical university. The study provided an overview of how the students understand antibiotic usage and the difference of such understanding between medical students and non-medical students. Four aspects were assessed in the study: knowledge regarding antibiotics, attitude towards antibiotic usage, perception of public education and the practice of antibiotic consumption. It was found that the knowledge of antibiotic usage among medical students were significantly higher than non-medical students ($\chi^2 = 191.8869$, $p < 0.0001$) but there was no significant difference between first-year-medical student and first-year non-medical student ($\chi^2 = 1.2190$, $p = 0.2696$) (Huang et al., 2013). The study reported that medical students had a better access to information about

antibiotics compared to non-medical students or the public (Huang et al., 2013). This was based on their response to relatively specialized question: whether antibiotics can cure viral infection.

In one cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan shows around 70% of medical students and 29.9% of non medical students have a good knowledge about antibiotic usage. The marked knowledge gap between the two populations can be explained by the closeness for related topics in the attachment courses. Nonetheless, the knowledge and attitude of the respondents did not necessarily reflect on their behavior.

In another study conducted by Shehadeh et al., 2012, similar questionnaire-based study was performed in a wider range of participants at various study sites such as shopping center, supermarket, café/restaurant, gym, beauty center, and many more. The reason was to achieve an improved generalizability of sample. Out of 1500 sheets of questionnaire, 1141 were answered completely (response rate=76.1%). More than 70% of the participants were female and more than half the participants were in 18-25 age group. Around 66% of the participants were single. Findings showed that almost 80% of participants have recently consumed antibiotics as outpatients at least once (Shehadeh et al., 2012). However, they seemed not to have insufficient knowledge regarding effectiveness of antibiotics either for bacterial-, viral-, and parasitic infections. Only 32.9% were aware that antibiotics are effective for bacterial infection while around 7% believed that antibiotics can be used to treat viral infection (Shehadeh et al., 2012).

Interestingly, 9.7% of participants thought that antibiotics work similarly like antipyretic drugs to treat fever and around 28% thought that antibiotics can be used as a pain-killer in stomach upset (Shehadeh et al., 2012). Over half the participants even believed that antibiotics are effective for common cold, cough, and nasal congestion (Shehadeh et al., 2012).

Based on previous research, it is very likely that antibiotic misuse in other parts of the world follows the same pattern. Therefore, this study was conducted with the aim to assess the knowledge, attitude and practice of medical students in SPHMMC, regarding antibiotic usage.

4. Objective

4.1. General objective

- To assess the knowledge, attitude and practice toward rational use of antibiotics among medical students in SPHMMC.

4.2. Specific objectives

- To assess the knowledge of Medical students regarding rational use of antibiotics.
- To determine the attitude of medical students on antibiotic usage
- To identify the practice of medical students on use of medicines

5. Method

5.1. Study area

The study will be conducted in Addis Ababa, the capital city of Ethiopia. Addis Ababa has a population size of over 3 million (3,038,096) with an annual growth rate of 2.1% (data obtained from the central statistical agency of Ethiopia). The city is divided into ten sub-cities and 100 Kebeles (lowest administrative units in Ethiopia).

Addis Ababa is located at 9°1'48" North and 38°44'24" East and the total land area is 54,000 hectares. Its average elevation is 2,500m above sea level, and hence has a fairly favorable climate and moderate weather conditions.

The study will be conducted in St. Paul's Hospital Millennium Medical College. SPHMMC is situated in Gulele sub-city; Addis Ababa. The hospital serves as teaching for medical students and provides health care services for out-patients and in-patients, in addition to that gives private wings services. It currently has 550 medical students.

5.2. Study Design

A cross-sectional study was conducted from June–July, 2017 in SPHMMC. The study involved the use of a quantitative approach to assess the knowledge, attitude and practice (KAP) of medical students to ward rational antibiotic use.

5.3. Study population

Medical students in SPHMMC of Addis Abeba, Ethiopia were the study population. Study participants for KAP survey concerning rational antibiotic use were recruited using random sampling technique.

5.4. Sample size determination

- The sample size was determined taking the following assumptions; since there was no previous study in the area, the estimated prevalence rate of population who practice and have positive agreement towards rational use to be 50%, with confidence of 95%, margin of error 5% and non response rate of 5% was taken

I used the following formula to determine the sample size of the study.

$$n = \frac{z_{\alpha/2}^2 p(1-p)}{d^2}$$

Where: n = sample size

Z=standard normal distribution corresponding to significance level at $\alpha=0.05$

P=estimated value for particular indicator (0.5 is in this case)

d =margin of error 5%

$$\begin{aligned} n &= \frac{(1.96)^2 \times (0.5(1-0.5))}{(0.05)^2} \\ &= \underline{\underline{384}} \end{aligned}$$

By adding 5% of the non-response rate the final sample size is 384+ 5% of calculated sample which is 403.

5.5. Methods of data collection

- **Data collection tools**

For the KAP survey self administered questionnaires were used. The questionnaires had four sections; demographics, knowledge, attitude and practice sections. The composition of each section is the same for all respondents. The questionnaires were adopted from other instrument that had been previously employed by other similar study.

A total of 6 “true” or “false” knowledge assessment questions were incorporated in the questionnaires to assess the knowledge of medical students regarding antibiotic usage. Questions on respondent’s attitude toward rational antibiotic use a 5-point Likert scale with response options varying from “strongly agree” to “strongly disagree”. Practice assessment questions were a total of 7 ranging from “always” to “never”.

➤ **Data collection**

Prior to distribution of the questionnaires, all participants were explained about the objectives and importance of the research by the data collectors. Each participant was also asked to complete all section of questionnaire. Participants were engaged in the study based on their willingness to participate.

5.6. Study variables

☐ **Dependent variables**

- The knowledge ,attitude and practice of medical students regarding antibiotic use

☐ **Independent variable**

- Socio demographic characteristics (sex, age, ethnicity, educational level, place of residence,)

5.7. Ethical considerations

Approval had been sought from SPHMMC public health department .Informed verbal consent process involved the principal investigator and the data collectors verbal explanation to each potential participants’ on the nature of the study, its purpose, procedures and expected duration. The participants were assured that all information gathered would be treated as

confidential. The name of study participants were not recorded on self administered questionnaires to assure anonymity.

5.8. Operational definitions

Operational definitions for medical student's in SPHMMC good and poor knowledge, positive and negative attitude and right and wrong practice were set by the principal investigator.

- **Good knowledge:** In this study, good knowledge on antibiotic use refers to knowledge score obtained above 9
 - **Poor knowledge:** In this study, good knowledge on antibiotic use refers to knowledge score obtained below or equal to 9
 - **Positive attitude:** In this study, Positive attitude on antibiotic use refers to attitude score obtained above or equal to 32
 - **Negative attitude:** In this study, negative attitude on antibiotic use refers to attitude score obtained below 32
 - **Right practice:** In this study, Right practice on antibiotic use refers to practice score obtained above and equal to 21
 - **Fair practice:** In this study, Right practice on antibiotic use refers to practice score obtained between 14-21
 - **wrong practice:** In this study, wrong practice on antibiotic use refers to practice score obtained below and equal to 14
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- **Community pharmacy** is a licensed drug retail outlet lead by a pharmacist.
 - **Drug retail outlets:** pharmacy, drug shop, or rural drug vendor.
 - **In appropriate drug use:** Characterized by any of the following: the use of in appropriate dosage (too high or too low; in correct duration (too short or too long), in correct selection (mismatch between organisms); unnecessary expense (the selection of newer and more expensive drugs when older, cheaper drugs are clinically adequate (WHO, 2000).
 - **Over-the-counter or non-prescription drugs** are those drugs that can be legally purchased from a drug retail outlet without having a prescription from a licensed health care provider. These drugs do not include prescription only drugs.
 - **Self-medication:** use of modern drugs without the advice of a health professional.

6. Results

6.1. Knowledge, attitude and practice survey result

6.1.1 Socio-demographic characteristics of the respondents

Of the 403 questioner distributed 403 are filled and returned, giving a response rate of 100%, majority of the respondents 218(54.1%) were within the age group of 21-25 years. Most of the respondents 312 (77.4%) were males and 211(52.4%) of the respondents are Orthodox Christian in religion. From 403 respondents, 116(22.8%) are preclinical 1 students, 108(26.8%) clinical 1, 86(21.3%) preclinical 2, 67(16.6%) clinical 2 and 26 (6.5%) interns. Most of the respondents are from Addis Ababa 295(73.2%) and Amhara in ethnicity 129(32%)(**Table 1**).

TABLE1:SOCIO-DEMOGRAPHIC CHARACTERISTICS DISTRIBUTION

<u>Variables</u>	Number(N=403)	Percent
AGE		
<21	178	44.1
21-25	218	54.1
>25	7	1.7
Sex		

Male	312	77.4
Female	91	22.6

Religion

OrthodoxChristian	211	52.4
Muslim	121	30
Protestant	59	14.6
Other	12	3

Place of residence

Addis Ababa	295	73.2
Amhara region	25	6.2
Oromia region	26	6.5
SNNPR	28	6.9
Tigray region	4	1
Somali region	14	3.5
Other parts of Ethiopia	11	2.7

Year of study of the student

Preclinical year 1	116	28.8
preclinical year 2	86	21.3
Clinical year 1	108	26.8
Clinical year 2	67	16.6
Interns	26	6.5

Ethnicity

Oromo	108	26.8
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Amhara	129	32
Tigray	33	8.2
SNNPR	74	18.4
Somali	35	8.7
Other	23	5.7

6.1.2. Survey respondent knowledge about rational antibiotic usage

The mean knowledge score was 10.8238 (SD: 1.16167) out of a possible maximum of 12 and minimum of 7. The knowledge scores of participants ranged from 6 to 12. Around 85% of respondent has a good knowledge.

[Table 2] and [Fig 1] show the knowledge of respondents.

As the table shows 381(94.5%) of respondent knew that indiscriminate and injudicious use of antibiotics lead to emergence of growing problem of resistance and 350(86.8%) support the idea that taking antibiotics too often increase the likely hood of reduce the future efficacy of the drug. 240(59.6%) respondent were aware that antibiotics do not use to speed up the recovery of common cold and cough. From the 403 students 341(84.6%) of them respond “Antibiotic treatment should be stopped as soon as the patient feels better” as “FALSE” and 335(83.1%) of respondent do not agree on saving the remaining antibiotic doses for other occasions. 274(68%) of students do not support the idea of the efficacy of Antibiotic is better if it is newer and more costly.

Table 2| Knowledge of respondents regarding antibiotic use

Assessment item		Number of correct responses	Percentage of correct responses (95% confidence interval)
(A)	Indiscriminate and injudicious use of antibiotics leads to emergence of the growing problem of resistance	381	94.5%
(B)	If taken too often antibiotics are less likely to work in future.	350	86.8%

(C)	Antibiotics speed up the recovery of common cold and cough.	240	59.6%
(D)	Antibiotic treatment should be stopped as soon as the patient feels better.	341	84.6%
(E)	Remaining antibiotic doses can be saved for use on other occasions.	335	83.1%
(F)	Antibiotic efficacy is better if it is newer and more costly.	274	68%

FIGURE 1: knowledge score of respondent



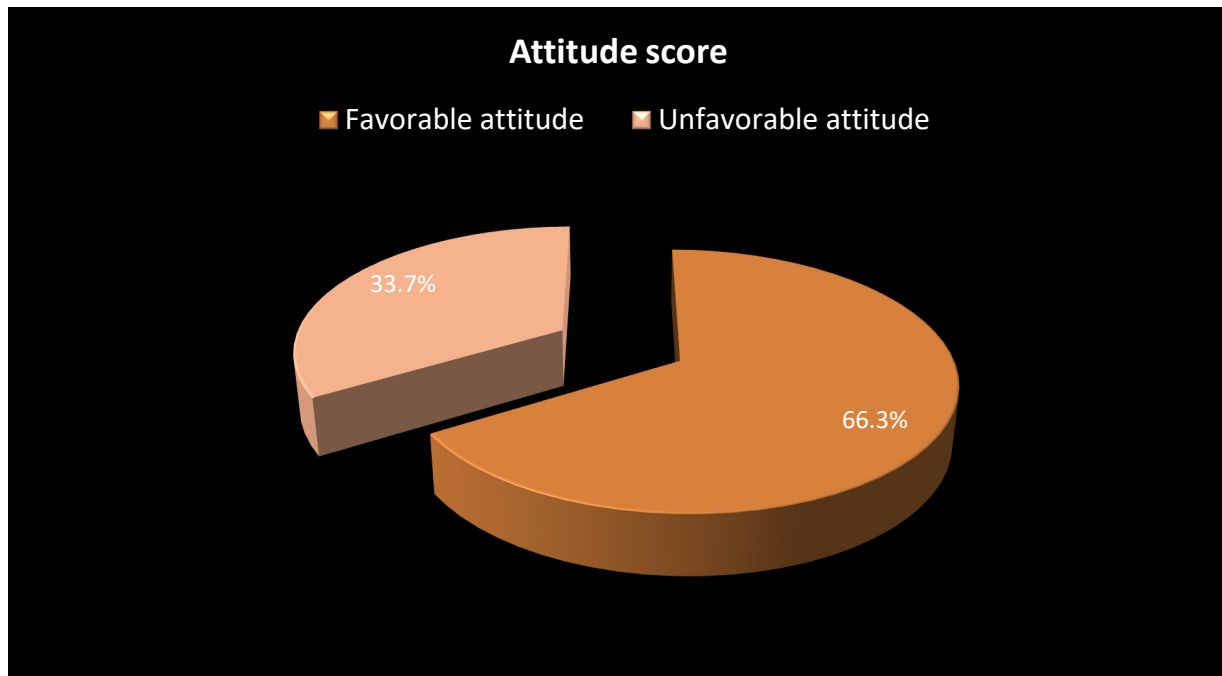
6.1.3. Survey respondent attitude about rational antibiotic usage

Concerning attitudes, 199 (49.4%) agreed that Skipping one or two doses will contribute to the development of antibiotic resistance, 380 (93.3%) thought that Antibiotic resistance is an important and serious public health issue facing the world and 372 (92.4%) considered that there is abuse of antibiotics at present among common people. 376 (93.3%) agree on a need to establish a course on rational use on antibiotics and 279 (69.2%) agree on the idea of culture reports should guide antibiotic prescription pattern. 384 (95.3%) of respondent believes that there should be antibiotic stewardship or antibiotic policy in hospital setting

Table 3 shows the attitudes respondents regarding antibiotic use

Assessment item		Strongly agree	somewh at agree	Undecided	Somewhat disagree	Strongly disagree
A	Skipping one or two doses does not contribute to the development of antibiotic resistance.	89(22.1%)	109(27%)	6(1.5%)	75(18.6%)	124(30.8%)
B	Antibiotic resistance is an important and serious public health issue facing the world.	273(67.7%)	103(25.6%)	11(2.7%)	4(1%)	12(3%)
C	There is abuse of antibiotics at present among common people	238(59.1%)	134(33.3%)	15(3.7%)	9(2.2%)	7(1.7%)
D	There is a need to establish a course on —rational use on antibiotics	280(69.5%)	96(23.8%)	12(3%)	12(3%)	3(7%)
E	Giving consideration to the manufacturing company makes difference in the treatment when using antibiotics.	101(25.1%)	142(35.2%)	36(8.9%)	79(19.6%)	41(10.3%)
F	Culture reports should guide antibiotic prescription pattern	144(35.7%)	135(33.5%)	18(4.5%)	66(16.4%)	40(9.9%)
G	There should be antibiotic stewardship or antibiotic policy in hospital setting.	220(54.6%)	164(40.7%)	12(3%)	5(1.2%)	2(5%)
H	Antibiotics should not be dispensed without a valid prescription.	230(57.1%)	129(32%)	16(4%)	16(4%)	12(3%)

FIGURE 2: Attitude score of respondent



6.1.4. Survey respondent practice about rational antibiotic usage

As for practice, After taking 2-3 doses and start feeling better 132(32.8%) never stop taking further treatment, 169(41.9%) won't save the remaining antibiotic for the next time/58(14.4%) of respondent discard the left over, 152(38.2%) never give the left over to a friend/137(34%) complete the full course of treatment.

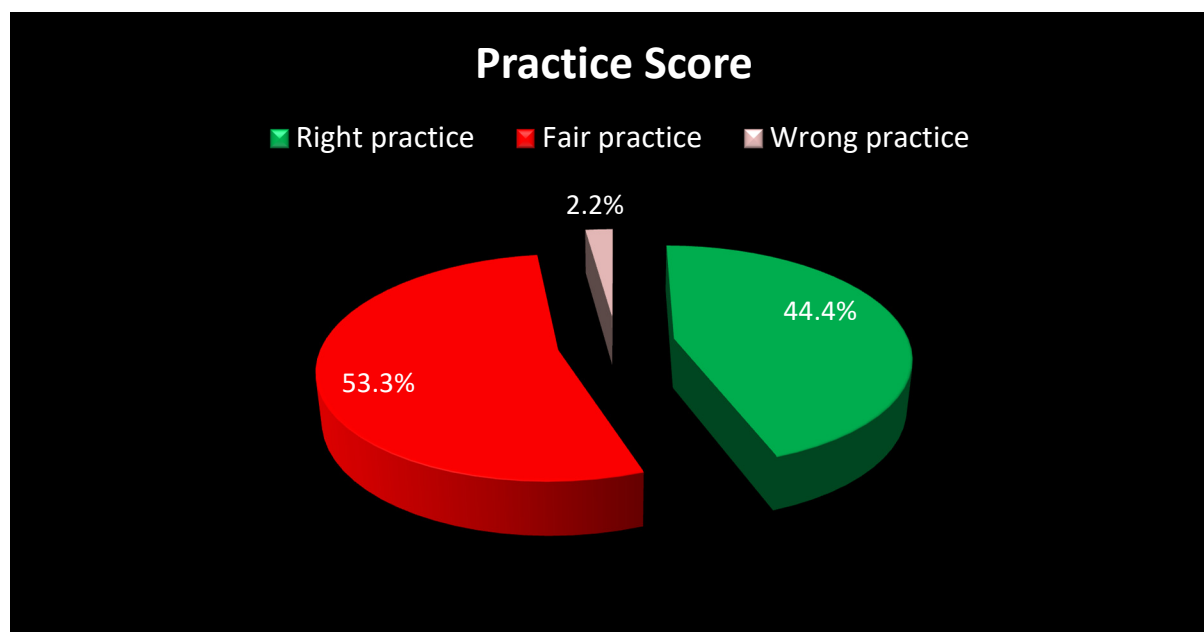
125(31%) of students always consult a doctor before start an antibiotic and 72(24.6%) of them don't prefer antibiotics when they got cough and sore throat.

Table 4 shows the practice of respondents regarding antibiotic use

	Assessment item	Always	Usually	Sometimes	Never
1	The doctor prescribes a course of antibiotics for you. After taking 2-3 doses you start feeling better				
	I. Do you stop taking the further treatment?	32(7.9%)	112(27.8%)	127(31.5%)	132(32.8%)

	II. Do you save the remaining antibiotics for the next time	22(5.5%)	74(18.9%)	138(34.2%)	169(41.9%)
	III. Do you discard the remaining, left over medication?	58(14.4%)	140(34.7%)	109(27%)	96(23.8%)
	IV. Do you give left over antibiotics to your friend/roommate if they get sick?	31(7.7%)	86(21.3%)	134(33.3%)	152(38.2%)
	V. Do you complete the full course of treatment?	137(34%)	171(42.4%)	83(20.6%)	12(3%)
2	Do you consult a doctor before start an antibiotic?	125(31%)	183(45.4%)	73(18.1%)	22(5.4%)
3	Do you prefer to take an antibiotic when you have cough and sore throat?	47(11.7%)	135(33.5%)	116(28.8%)	72(24.6 %)

FIGURE3: practice score of respondent



6.1.5 Associations between knowledge, attitudes and practice

Participants who agreed that if antibiotics taken too often they are less likely to work in future were less likely to expect prescription of antibiotics when visiting the doctor for common cold ($\chi^2 = 8.027$, $P = 0.005$), , more likely to always complete the whole course of antibiotics ($\chi^2 = 6.496$, $P = 0.011$), less likely to have kept leftover antibiotics ($\chi^2 = 8.002$, $P = 0.005$) and less likely to have requested prescription of antibiotics ($\chi^2 = 4.516$, $P = 0.034$).

Respondents who agreed that they could contribute to reducing antibiotic resistance had significantly higher mean knowledge score than those who disagreed (10.88 vs 9.01, $P < 0.0005$), while those who disagreed that they expected prescription of antibiotics when they visited the doctor for common cold had significantly higher mean knowledge score than those who agreed (8.68 vs 5.41, $P < 0.0005$). Students who always completed the whole course of antibiotics had significantly higher mean knowledge score than those who did not (10.722 vs 9.577, $P < 0.0005$), whereas those who had not taken antibiotics without prescription had significantly higher mean knowledge score than those who had (8.50 vs 7.29, $P = 0.022$)

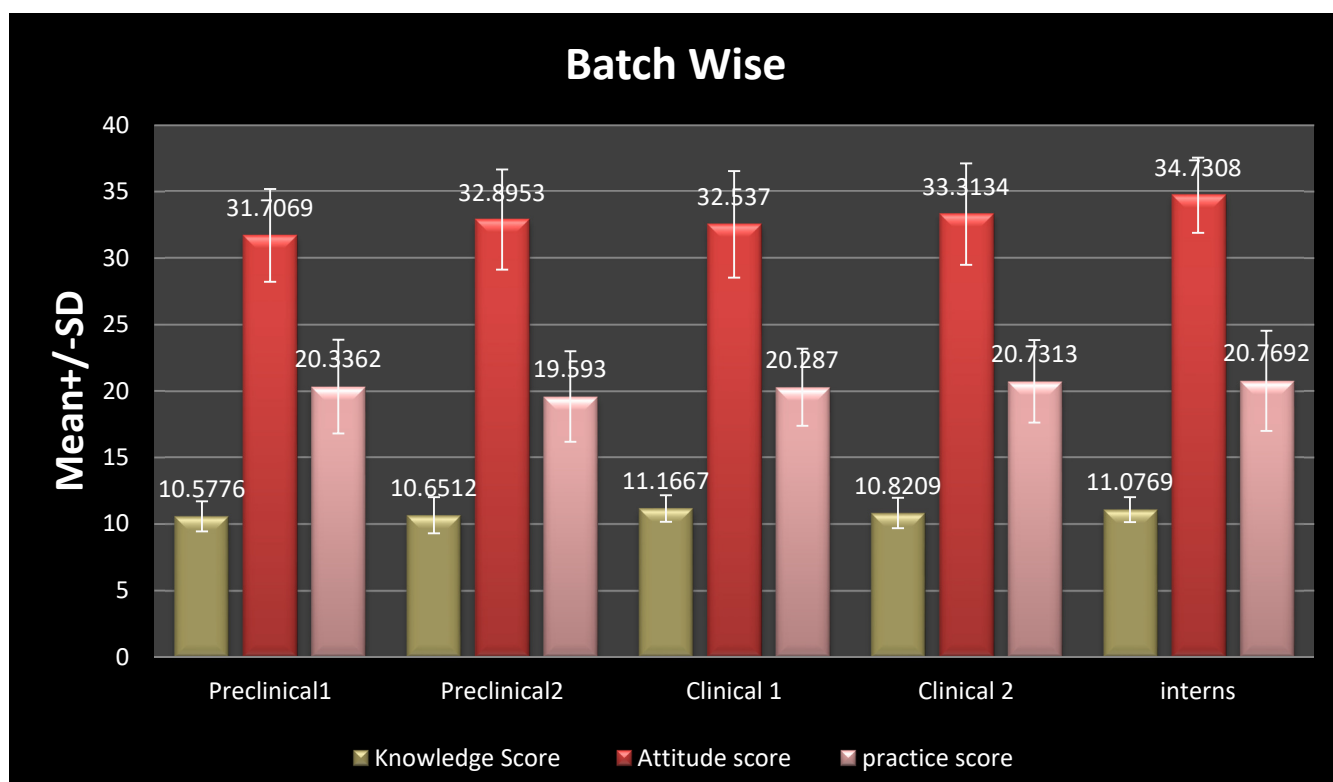
6.2. RESULTS OF KAP SCORES IN DIFFERENT BATCH YEARS

When different batch years were asked to take up the questionnaire, there was significant correlation seen with the knowledge and the attitude score while the practice scores showed no significant differences ($P > 0.05$) (TABLE 3, Fig 3).

Table 5: Knowledge, attitude and practice scores in different batches

BATCH	Knowledge score		Attitude score		Practice score	
	Mean	SD	Mean	SD	Mean	SD
Preclinical1	10.5776	1.13560	31.7069	3.49414	20.3362	3.52863
Preclinical2	10.6512	1.36138	32.8953	3.76369	19.5930	3.40027
Clinical 1	11.1667	0.99061	32.5370	4.01266	20.2870	2.90681
Clinical 2	10.8209	1.14051	33.3134	3.80673	20.7313	3.11196
Interns	11.0769	0.93480	34.7308	2.82217	20.7692	3.77813
Anova	10.180		1.966		2.957	
P-value	0.001*		0.001*		0.221	

FIGURE 4: Knowledge, attitude and practice scores in different batches



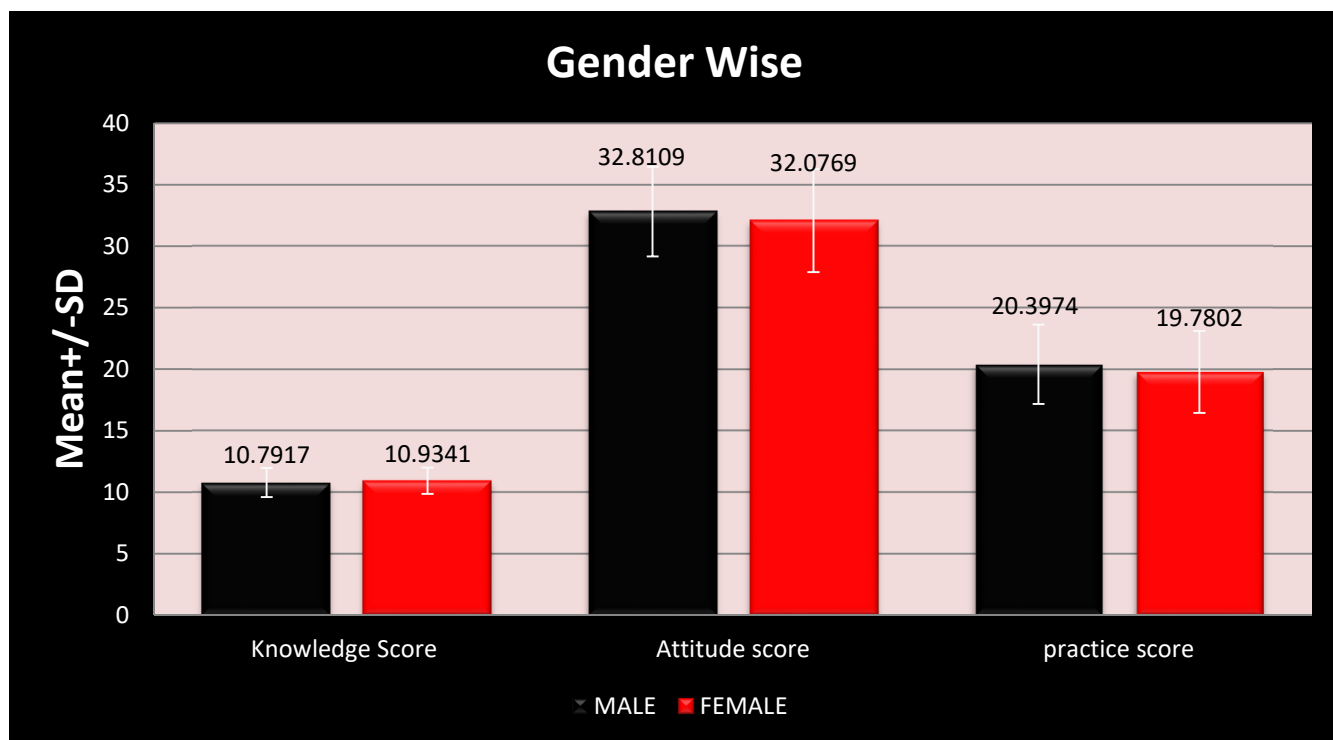
6.3. RESULTS OF KAP SCORES IN DIFFERENT GENDER

In attitude and practice there was no statistical significance seen when comparison was made gender wise but it was significant in knowledge score. ($P < 0.05$) (TABLE4, FIG 4).

Table 6: Knowledge, attitude and practice scores in different sex groups

SEX	Knowledge Score		Attitude Score		Practice Score	
	Mean	SD	Mean	SD	Mean	SD
MALE	10.7917	1.18601	32.8109	3.64230	20.3974	3.22406
FEMALE	10.9341	1.07292	32.0769	4.18258	19.7802	3.33267
t-test	-2.099		1.119		1.148	
P-value	0.037*		0.264		0.252	

FIGURE 5: Knowledge, attitude and practice scores in different sex group



7. DISCUSSION

The emergence of resistant bacterial strains to antimicrobial agents is of great concern worldwide.[35] Among other factors, the irrational use of antibiotics has contributed to the bacterial resistance with substantial clinical and economic impact.[36]

The clinical effectiveness and efficacy of antibiotics depends partially on their correct usage, on patients, physicians and retailers.[37] Various factors such as the fear of losing a patient's trust, the lack of correct information on indications of antibiotic usage and forced usage of antibiotics due to pressure from patients and families. Self-medication, sharing medication with other people, compliance of the patient and keeping part of the course for another occasion are the various patient factors.[38]

This study surveyed medical students from St. poul medical college to assess their knowledge, attitude and practice towards antibiotic use in the form of questionnaires

A majority of the students in our study were well informed and aware of the problem of antimicrobial resistance. Since there is no restriction on Over The Counter (OTC) manufacturing of antibiotics without prescription, any antibiotic, including higher- end ones, can be purchased OTC without prescription.[39,40] Previous studies have shown high rates of self medication (35%) amongst medical students with respect to antibiotics.[41] However, this was not the case with our participants. A majority of the participants always referred to a doctor before taking an antibiotic and most of them always completed the full course of the prescribed treatment.

In one cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan shows around 70% of medical students and 29.9% of non medical students have a good knowledge about antibiotic usage. The result of knowledge score is comparable to our finding 85%. The marked knowledge gap between the two populations can be explained by the closeness for related topics in the attachment courses.

A study conducted on public knowledge and attitude towards antibiotics, which play a vital role in the success of the treatment process. The results showed that nearly 55% of the respondents had a moderate level of knowledge. Three quarters of the respondents (76.7%) could correctly identify that antibiotics are indicated for the treatment of bacterial infections. However, 67.2% incorrectly thought that antibiotics are also used to treat viral infections. About 59.1% of the respondents were aware of antibiotic resistance phenomena in relation to overuse of antibiotics. With regard to attitudes, 38% believed that taking antibiotics when having cold symptoms could help them to recover faster, while 47.3% expected antibiotics to be prescribed for common cold symptoms.[42] In comparison with our results, in terms of having antibiotics to treat cold symptoms, we have a better result which 63% of the students do not use antibiotics for common cold and cough, while only small percentage (11.7%) used antibiotics for such conditions. This indicates that most of the students have a good awareness in this issue. On the other hand, more than 78% did not realize about antibiotics resistance and that excessive use of antibiotics will decrease its efficacy.

When we carried about the relationship of knowledge, attitude and practice, the correlation analysis showed that students' knowledge on antibiotics had a positive correlation with their attitude and practice. Similar result was found in one study done on KAP among students indicating that there was a direct relationship between their knowledge level and attitude towards promotion of public awareness today, many countries like Britain and Holland are focusing on public education aimed at changing the irrational and indiscriminate use of antibiotics in the community in order to delaying curtail the development resistance to antibiotics. Whereas some researchers have reported that public education alone may not necessarily improve the tendency misuse and abuse antibiotics in the society, other works argue that providing clear guidelines for medical practitioners may provide a quicker and more effective route to prudent and rational use of antibiotics eventually reversing the current trend.

8. Conclusion

The participants in our study had a good knowledge, attitude and practice about the rational use of antibiotics and a perception that antibiotics were being over used and that rational drug prescribing had an important role in the antibiotic resistance. But since they are medical students, a future physicians and prescribers the result were suppose to be bigger than what is found and they should practice rational antibiotic use more.

9. Recommendation

It must be taken into consideration that the students should be made aware of all the facts and points with a sense of responsibility that they as prescribers play a major role in the upliftment of not just of their own patients but also at a larger level. Undergraduate teaching, hence should just not inculcate the training of antibiotic prescribing but also the principles of the protocol for use of antibiotics in health care sector.

In medical sector, the educational sector should not just aim at increasing the knowledge but also think to bring about a change in behavior to improve the treatment efficacy. Students have to be taught as per the student development, caliber, expertise and knowledge.

- Future interventional researchers with sustained follow up
- Establish a course and training on rational use of antibiotics to all medical students in all level
- Discusses about the growing problem of antibiotic resistance in internet, media, newspapers and with other major sources of information to increase public knowledge

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ANNEXES

ST. POUL HOSPITAL MILLENNUM MEDICAL COLLEGE School of Medicine

Dear respondent

I am Firegenet Asnake a fellow student as SPHMMC and I am conducting research with the title of knowledge ,attitude and practice of medical students toward rational antibiotic usage in SPHMMC, as part of my research processes I prepared a set of question to be answered by voluntary students ,which are meant only to

achieve the study objective. By this I declare that the identity of any participant will be through randomly set code name and will not be disclosed under any circumstance. The questionnaires take 5-10min to answer, so I need your genuine cooperation. If you need any clarification, do not hesitate to ask the investigator assigned for you.

PERSONAL IDENTIFICATIONS

1. Questionnaire number.....
2. Age of respondent.....
3. Sex
4. Ethnicity.....
5. Place of residence.....
6. Religious back ground.....
7. Academic Year.....

QUESTIONS TO ASSESS KNOWLEDGE OF MEDICAL STUDENTS TOWARD RATIONAL ANTIBIOTIC USE

Q. No	Knowledge Questions	True	False
(8)	Indiscriminate and injudicious use of antibiotics leads to emergence of the growing problem of resistance		
(9)	If taken too often antibiotics are less likely to work in future.		
(10)	Antibiotics speed up the recovery of common cold and		

	cough.		
(11)	Antibiotic treatment should be stopped as soon as the patient feels better.		
(12)	Remaining antibiotic doses can be saved for use on other occasions.		
(13)	Antibiotic efficacy is better if it is newer and more costly.		

QUESTIONS TO ASSESS PRACTICE OF MEDICAL STUDENTS TOWARD RATIONAL ANTIBIOTIC USE

Q. No.	Medical Practice Questions	Always	Usually	Sometimes	Never
(14)	The doctor prescribes a course of antibiotics for you. After taking 2-3 doses you start feeling better I. Do you stop taking the further treatment? II. Do you save the remaining antibiotics for the next time? III. Do you discard the remaining, left over medication? IV. Do you give left over antibiotics to your friend/roommate if they get sick? V. Do you complete the full course of treatment?				
(15)	Do you consult a doctor before start an antibiotic?				
(16)	Do you prefer to take an antibiotic when you have cough and sore throat?				

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**QUESTIONS TO ASSESS THE ATTITUDE OF MEDICAL STUDENTS TOWARD
RATIONAL ANTIBIOTIC USE**

Q. No	Attitude Questions	SA	SWA	UD	SWD	SD
(17.)	Skipping one or two doses does not contribute to the development of antibiotic resistance.					
(18.)	Antibiotic resistance is an important and serious publichealth issue facing the world.					
(19)	There is abuse of antibiotics at present among common people					
(20)	There is a need to establish a course on —rational use on antibiotics					
(21)	Giving consideration to the manufacturing company makes difference in the treatment when using antibiotics.					
(22)	Culture reports should guide antibiotic prescription pattern					
(23)	There should be antibiotic stewardship or antibiotic policy in hospital setting.					
(24)	Antibiotics should not be dispensed without a valid prescription.					

Thank you!!!