



SAINT PAUL'S HOSPITAL MILLENNIUM MEDICAL COLLEGE

ASSESSMENT OF THE KNOWLEDGE ATTITUDE AND PRACTICE OF
HEALTH PROFESSIONALS TOWARDS THE RATIONAL USE OF
ANTIBIOTICS IN SAINT PAUL'S HOSPITAL MILLENIUM MEDICAL
COLLEGE.

PREPARED BY: AMANUEL TAKELE (MEDICAL INTERN)

A STUDENT FINAL REPORT SUBMITTED TO THE DEPARTMENT OF
PUBLIC HEALTH, SAINT PAUL'S HOSPITAL MILLENIUM MEDICAL
COLLEGE, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
DEGREE OF DOCTOR OF MENICINE.

SEPTEMBER, 2017

ADDIS ABABA, ETHIOPIA



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OF HEALTH PROFESSIONALS TOWARDS THE RATIONAL USE
OF ANTIBIOTICS IN SAINT PAUL'S HOSPITAL MILLENNIUM
MEDICAL COLLEGE**

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ABBREVIATIONS AND ACRONYMS

ABR.....antibiotic resistance

Dr.....doctor

E.C Ethiopian calendar

ETB Ethiopian Birr

KAP.....knowledge attitude and practice

MD.....doctor of medicine

MOH.....Ministry of Health

MPH.....master of public health

MR.....mistress

NGO....Non-Governmental Organization

STD.....Sexually Transmitted Diseases

SPHMMC.....Saint Paul's Hospital Millennium Medical College

TB ...Tuberculosis

WHO.....World Health Organization

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SUMMARY

Background: Antibiotics are frequently prescribed in clinical practice. Emergence of antibiotic-resistant microorganisms due to excessive and indiscriminate use of these drugs is a serious issue which is plaguing healthcare delivery throughout the world. Available literature highlights the necessity of rationalization of antimicrobial therapy in developing countries along with educational interventions and a strict antibiotic policy and reported good knowledge among health professionals which could not be translated into practice as inappropriateness of antibiotic prescribing was observed in these studies. This gap in execution of knowledge could be bridged by effective interventions and promoting rational antibiotic use.

Objective: This study was planned to assess the knowledge, attitude and practice of health professionals towards the rational use of antibiotics in Saint Paul's Hospital Millennium Medical College.

Methods: A cross sectional, institutional based descriptive study was conducted on knowledge, attitude and practice among 330 health professionals including medical doctors' health officers and pharmacist towards the rational use of antibiotics in Saint Paul's Hospital Millennium Medical College from January 06, 2017 up to June 30, 2017 G.C..

Results: Three hundred study subjects were participated using questionnaire most of the study subjects were physicians, Oromo 40%, male 60%. 85% have moderate knowledge, 64% have negative attitude and 71% have moderate practice towards rational use of antibiotics.

Conclusions: The study found that a majority of the health professionals have moderate knowledge and moderate practice and negative attitude towards the rational use of antibiotics. The study concluded that the socio demographic factors except educational status of the respondents has shown association with the level knowledge, attitude and practice of health professionals towards the rational use of antibiotics.

Recommendation: Outcome based education could be an effective approach to bridge the gap from knowledge to practice and more importantly the significance of following guidelines for the empirical therapy.

Key words: antibiotics, rational, knowledge, attitude, practice, resistance

INTRODUCTION

Background

Antibiotics are defined as a generalized term to designate synthetic as well as naturally obtained drugs that attenuate micro-organisms and are among the most frequently prescribed drugs worldwide (1). They are used to treat both life threatening and trivial infections. The overuse and/or misuse of antibiotics can lead to significant consequences, like increased costs, bacterial resistance, therapeutic failures, drug toxicities and drug interactions (5). There have been reports on high incidences of infectious diseases due to a high usage of antibiotics and bacterial resistance from the low and middle income countries (1). Overcrowding, poor sanitation and a warm-humid climate in these countries, results in the rapid spread of resistant bacteria (11). A global proportion crisis of infectious diseases is threatening the health and the life expectancy (2). In children and young adults, infectious diseases are the world's biggest killers, causing more than 13 million deaths per year (6). Ninety percent of the deaths are due to six deadly infectious diseases, namely; pneumonia, tuberculosis, diarrhea, malaria and measles (4). The burden of infectious disease is highest in developing countries including Ethiopia (3).

The prevalence of the use of antimicrobial agents varies from 24 to 67% in India, and about 64% of the total antibiotics which are prescribed are either not indicated or are prescribed in incorrect dosages or are inappropriately prescribed (10). They account for more than 50% of the drugs which are sold, which puts an excessive strain on the limited health care budget. According to the results of various surveillance studies which were done, the percentage of irrational antibiotic use was 40-60% (9). Antibiotic resistance develops with the inappropriate use, which includes the wrong indication, mode of use, and the poor adherence to the prescribed drugs. Many strategies have been proposed for the use of antibiotics, like a formulary replacement or restriction, health care provider education, feedback activities, approval requirement from an infectious disease specialist for the drug prescription and a more rational use of antimicrobial agents all over the world(3).

Statement of the Problem

This study examines the KAP of the health professionals towards the rational use of antibiotics in SPHMMC. In recent decades, the emergence and spread of bacterial resistance to antibiotics is a growing problem worldwide, which presents a significant threat to public health globally in the 21st century (3). The increase of antibiotics resistance will endanger their therapeutic effectiveness, increase treatment failures and, as a result, lead to longer and more severe illness episodes with higher costs and mortality rates (13). The inappropriate and excessive use of antibiotics are among the key factors for the increase and spread of antibiotic resistance (8). The improper use of antibiotics may arise from a complex interaction between numerous factors, such as prescribers' knowledge and experiences, diagnostic uncertainty, perceptions of patients in relation to the patient-prescriber interaction, and insufficient patient education by physicians. In addition, other factors include patients' knowledge, beliefs and attitudes towards antibiotic use, self-medication, patients' expectations, and patients' experience with antibiotics (11). Thus, the control of antibiotic utilization needs multifaceted interventions involving a formulary replacement or restriction, health care provider education, feedback activities, approval requirement from an infectious disease specialist for the drug prescription and a more rational use of antimicrobial agents all over the world (17). The rational use of antibiotics requires that patients received medications appropriate to their clinical needs, in doses that meets their own requirements for an adequate period of time and at the lowest cost to them and their community (15). This means deciding on the correct treatment for an individual patient is based on good scientific reasons which involves making an accurate diagnosis, selecting the most appropriate antibiotic from these available, prescribing this drug in adequate doses for a sufficient length of time according to standard treatment (16). Furthermore, it involves monitoring the effect of the drug both on the patient and on the illness. There is plentiful evidence of the inappropriate use of antibiotics, not through self-medication or unauthorized prescribing, but inadequate medical prescribing and dispensing (4).

Significance of the Study

The concept of rational antibiotic use is new in the developing countries and it refers to prescription of the right drug to the right patient, in the right dose, at right time intervals and for the right duration. Some measures are required for the rational drug use, which include knowledgeable and engaged healthcare practitioners and the public, the development and revision of the national essential drug list, the national formulary development, the amending pharmacy act and the opening of drug information centers. The rational drug therapy practice include members of the health care team and the patients' knowledge regarding their medications and their use.

Various studies, which were done in both developing and developed countries, have highlighted the importance of rational antibiotic use, along with educational interventions and a strict antibiotic policy, but most of these studies have either taken into consideration, the rational use of antibiotics or an educational intervention. Hence, I considered it worthwhile to study the knowledge, attitude and practice of health professionals in SPHMMC towards a rational antibiotic use.

LITERATURE REVIEW

Worldwide

In 2006, a study was conducted to identify the patterns of antibiotic resistance in China, Kuwait and the USA. It revealed that Kuwait had the second rapid growth rate of resistance during the period from 1999 to 2003. This rise in the antibiotic resistance was attributed mainly to the inappropriate prescribing of antibiotics and overuse of antibiotics including self-medication. Other factors included the lack of policies for restricting and auditing antibiotic prescriptions in many countries, misuse of antibiotics in the animal health sector recognizing most classes of antibiotics are used both in animal and human health, and lack of guidelines for the use of antibiotics in the animal industry (13).

A substantial global evidence has shown that the general community plays a role in the increase and spread of antibiotic resistance. The World Health Organization (WHO) identified three key issues for public involvement: improving access to medical facilities, decreasing unnecessary use of antimicrobials, taking a full course of treatment, and not giving out medication to other people or keeping left-over medication for future needs. The WHO also urged member countries to initiate educational interventions for patients and the general population aimed at rationalizing the use of antibiotics to combat resistance. Thus, improving the public knowledge and changing their attitudes towards antibiotic use will be a crucial early strategy to maintain antibiotic effectiveness. However, there are wide variations in antibiotic utilization globally, and tailoring of educational interventions necessitates understanding of the public knowledge, attitudes, and perceptions towards rational antibiotic use in each country (3).

Africa

Survey of antibiotic prescribing pattern in government health facilities of Wassa West district of Ghana (Bosu and Adjei, 1997). Antibiotic prescribing pattern was studied from 700 retrospective outpatients clinical; records from seven government health facilities in the Wassa West of Ghana. Prescribing patterns were compared between the district hospital six-health centers. The percentage of patients receiving one or more antibiotic was significantly more at the health centers (60.7%) than at the hospital 41.2% the average number of antibiotics was 1.4 and 1.1, respectively. The commonest antibiotics prescribed were penicillin, cotrimoxazole, benzyl penicillin, metronidazole and amoxicillin. Malaria, upper respiratory tract infection, soft tissue infection and diarrhea are the commonest indications for antibiotic use factors such as the diagnostic facilities, type of prescriber, lack of refresher training and pattern demand were considered to significantly influence antibiotic prescribing(14).

Ethiopia

Antibiotics prescribing pattern for outpatients in three hospitals in northwest Ethiopia by Desta Zeruesenay, Abula Teferra, Asfawoseen, Gebre-Yohannes and Worku Alemayehu (Desta et al., 2002). The leading diagnoses in the three hospitals were similar and include disease of the respiratory system, gastrointestinal tract, sexually transmitted and skin. The average number of antibiotics per patient was 0.98 in Gondar, 1.8 in Bahir Dar and 2.2 in Debre Tabor hospitals. Antibacterial including anti-TB drugs (40-51%) were the most frequently prescribed in the three hospitals. Deviation of prescribing pattern among the outpatients possibly reflects the availability of antibiotics, attitude (habit) of the prescriber and diagnostic profiles and facilities. Much remains to be done to promote rational selection and use of antibiotics in hospitals (11).

Antibiotic use and utilization in the primary health care centers in Jimma (Ethiopia) (Mohamed et al., 1997). It was found that 92% of visits to the health centers resulted in a prescription before intervention and it dropped to 85% after intervention and the difference was statistically significant. The percentage of prescriptions of antibiotics dropped from 45% before to 35% after intervention, the percentage of encounters with an injection dropped from 16% before to 14% after intervention. The average consultation and dispensing times were similar before and after intervention. Antibiotics commonly prescribed were penicillin (most frequently amoxycillin), far ahead of cephalosporins and erythromycin. The prescription of penicillin dropped after intervention, while erythromycin and cephalosporins increased after intervention (15).

OBJECTIVES

General Objectives

- ✓ To assess the knowledge, attitude and practice among health professionals towards a rational use of antibiotics in SPHMMC.

Specific Objectives

- ✓ To assess the knowledge among health professionals towards a rational use of antibiotics in SPHMMC.
- ✓ To determine the attitude among health professionals towards a rational use of antibiotics in SPHMMC.
- ✓ To describe the practice among health professionals towards a rational use of antibiotics in SPHMMC.

METHODOLOGY

Study Area and period

The study was conducted in SPHMMC. SPHMMC is referral hospital found in Addis Ababa Capital city of Ethiopia under the Ethiopian federal ministry of health .It is the second largest public hospital in the nation built by the Emperor Haile Selassie in collaboration with the German Evangelical Church in 1961 as a source of medical care for underserved populations. In 2007 it became a medical college and its core services include the provision of medical care, teaching and research. Currently it has 392 beds, with an annual average of 200,000 patients and a catchment population of more than 5 million. Approximately 75% of patients receive medical service free of charge. There are about 1313 health professionals in over 13 departments (18, 19).

The research was conducted in between January 06, 2017 up to June 30, 2017 G.C.

Study Design

A cross sectional, institutional based descriptive study was carried out on health professionals in SPHMMC

Source populations

The source population was all staff of SPHMMC regardless of their profession.

Study Population

Health professionals in SPHMMC were considered as study population.

Sampling populations

Health professionals including health officers, medical doctors, and pharmacist.

Inclusion and Exclusion Criteria

Inclusion Criteria

Health officers, medical doctors, and pharmacist in SPHMMC were included in the study.

Exclusion Criteria

Laboratory technicians, nurses, midwives, radiology technicians and interns were excluded from the study.

Sampling Technique and Sample Size

Sample Size Determination

The following assumptions was used to determine sample size, the proportions of response to most of the main questions is 50%, since the percentage of irrational use of antibiotics from previous study in Jimma (Ethiopia) was 50%.

Sample size was determined using the Raosoft sample size calculator using a margin of error of 5%, a confidence interval of 95%.

$n = (z@/2)^2 p (1-p) / D^2$, Where

n=number of the study subjects

Z= the standardized normal distribution curve value for the 95% confidence interval (1.96)

P= P is population proportion; (p = 50%)

d=the desired precision of the estimate (the margin of error between the sample and population, 5%)

$n_0 = (1.96^2 * 0.5 * 0.5) / (0.05^2) = 384.16 \approx 385$

Population correction formula was used because the total population is less than 10,000

$n = n_0 / 1 + n_0 / N = 385 / 1 + 385 / 1313 = 297.706 \approx 298$

Thus, the study should include at least 298 $\approx$ 300 subjects. Adding 10% non-response rate the total sample size will be 328 $\approx$ 330.

4.4.2. Sampling Technique and Procedure

In the first stage of selection, a random sampling was used to select five departments (pharmacology, emergency medicine, internal medicine, pediatrics and surgery) out of thirteen departments in SPHMMC. The health professionals was selected using a stratified random sample.

Data Collection Technique and Procedure

The study was conducted in SPHMMC using self-administered questionnaire. Two days training was given for two data collectors (medical students) and one supervisor. The training was given on the study purpose and the questionnaire itself, and also ethical considerations in collecting the data. Two medical students were recruited as data collectors, I was supervising them.

Variables

Dependent variables

- ✓ Knowledge of health professionals towards the rational use of antibiotics.
- ✓ Attitude of health professionals towards the rational use of antibiotics.
- ✓ Practice health professionals towards the rational use of antibiotics.

Independent variables

Sociodemographic characters such as age, sex, marital status, religion, ethnicity, educational status, and profession.

Operational Definitions

- ✓ **Health professionals** includes medical doctors (MD), health officer (HO), pharmacist, laboratory technicians, nurses, midwives, radiology technicians (4).
- ✓ **Rational use of antibiotics** is defined as prescription of the right drug to the right patient, in the right dose, at right time, at right time intervals, for the right duration and at the lowest cost to them and their community.
- ✓ **Knowledge**-the understanding of the subject matter about the rational use of antibiotics. Knowledge levels were categorized into 3 levels using mean and standard deviation score of respondents to determine.
 - **Poor knowledge:** - Respondents who had knowledge mean less than or equal to 3 would be classified as poor knowledge.
 - **Moderate knowledge:** - Respondents who had knowledge mean score between 4.0 to 7.0 would be classified as Moderate Knowledge.
 - **Good knowledge:** - Respondents who had knowledge mean score above 7.0 would be classified Good Knowledge (1, 7).
- ✓ **Attitude**-the manner, position or orientation of the health professionals towards the rational use of antibiotics. Attitude levels were categorized into 2 levels using mean score of respondents to determine.
 - **Negative attitude:** - Respondents who had attitude mean score between less than or equal to 1.0 would be classified as Negative Attitude.
 - **Positive attitude:** - Respondents who had attitude mean score above 1.0 would be classified as Positive Attitude (5, 8).

- ✓ Practice-pattern, or act of health professionals towards the rational use of antibiotics.

Practice levels were categorized into 3 levels using mean score of respondents to determine.

- **Poor practice:** - Respondents who had attitude mean score less than or equal to 12 would be classified as “Poor Practice.
- **Moderate practice:** - Respondents who had practice mean score between 13.0 to 17.0 would be classified as Moderate Practice.
- **Good practice:** - Respondents who had practice mean score between greater than or equal to 18.0 would be classified as Good practice (5, 8).

Data Processing and Analysis

The principal investigator entered the data using EPI info version 3.5 statistical packages and SPSS version 20. Any logical and consistency error identified during entry was corrected after revision of the original compiled questioner. The cleaned and edited data was ready for appropriate statistical analysis (percentage, ratio, mean, S.D). The result was presented in the table and graphs.

Data Quality Management

To assure the quality of data properly designed data collection instrument was prepared and training of supervisor was done. Health professionals was told to complete the questioner and supervisor and principal investigator had clarify the doubt which is raised by the health professionals during filling of the questionnaire. Finally the principal investigator have checked for its completeness.

Ethical Considerations

Approval letter was obtained from SPHMMC and informed consent was asked to all the health professionals who was participated in this study and confidentiality of each respondent were maintained throughout the study by avoiding specific identification of the respondents.

Dissemination of the Result

The result of this study was submitted to the public health department of SPHMMC as a partial fulfillment of Degree of Medical Doctor (MD). Hard copy and soft copy of this study will be available in SPHMMC library for all undergraduate medical students and other concerned bodies. Publication of the result of this study may be considered according its acceptance and the importance of the findings.

Results

The response rate was 90 % (n=300) among the 330 health professionals who were initially selected subjects.

Socio-demographic characteristics

A total of 300 respondents were participated, of whom 40.0% were females and 60.0% males. The respondents' age ranged from 20 to 67 years. The mean age of interviewees was 34.5. The highest proportion was within the age group of 25-29 years, with the least proportion being 45 years and above. More than half of the respondents were married and 42.0% of them were single. Regarding their profession almost all of the respondents were medical doctors.

Table 1 Demographic characteristics of participants

Socio-demographic data		N (%)
Age	20-24	36(12.0%)
	25-29	150(50.0%)
	30-34	46(15.3%)
	35-39	15(5.0%)
	40-44	17(5.7%)
	>/=45	36(12.0%)
Sex	Male	180(60.0%)
	Female	120(40.0%)
Marital Status	Single	126(42.0%)
	Married	160(53.3%)
	Divorced	10(3.3%)
	Widowed	4(1.3%)
Educational Status	Degree	138(46.0%)
	Resident	113 (37.7%)
	Consultant	49(16.3%)
Profession	HO	6(2.0%)

Ethnicity	MD	290(96.7%)
	Pharmacist	4(1.3%)
	Oromo	114(38.0%)
	Amhara	89(29.7%)
	Gurage	38(12.7%)
	Tigre	35(11.7%)
	Other	24(8.0%)

Knowledge towards the rational use of antibiotics

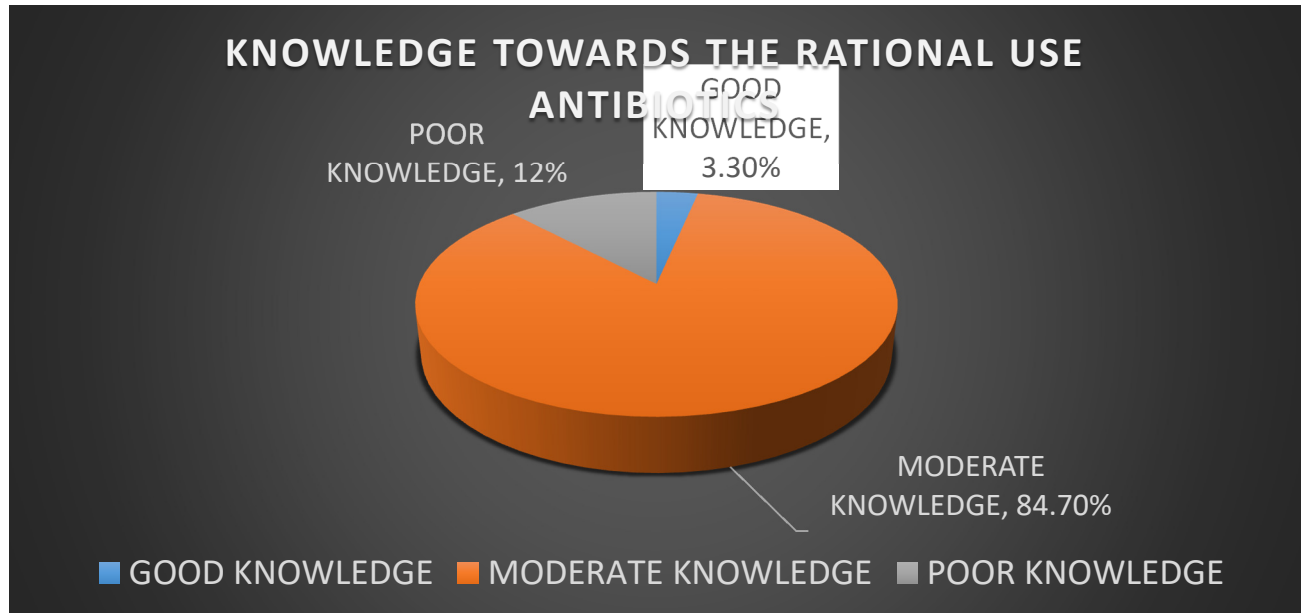
The study provides useful information about the knowledge, attitudes, and the practices of health professionals towards the rational use of antibiotics in SPHMMC.

Out of study participants, 84.7% (n=254) of the health professionals defined antibiotics as a generalized term to designate synthetic as well as naturally obtained drugs that attenuate M.O, 90.0%(n=270) defined rational use of antibiotics correctly, 77.7%(n=233) defined ABR correctly and 89.3% (n=268) aware that antibiotic resistance is an important and serious global public health issue.

Table 2 percent of response on Knowledge.

Q. No.	Question	True N (%)	False N (%)	Uncertain N (%)
1	Indiscriminate antimicrobial use leads to the emergence of the growing problem of antibiotic resistance	240(80.0%)	53(17.7%)	7(2.3%)
2	Antimicrobial resistance means that if they are taken too often, antimicrobials are less likely to work in the future	255(85%)	30(10%)	15(5%)
3	Bacteria cause common cold and influenza	6(2.0%)	291(97.0%)	3(1.0%)
4	Antibiotic Resistance is an important and serious global public health issue	268(89.3%)	17(5.7%)	15(5.0%)
5	Ineffective treatment can occur due to indiscriminate and injudicious antimicrobial use	242(80.0%)	33(11.0%)	27(9.0%)

Fig 1 Level of knowledge of health professionals towards the rational use of antibiotics



Attitude towards the rational use of antibiotics

Regarding attitude of the study subjects about 21% of participants believed that antibiotics were safe drugs; and hence they could be commonly used. 62% preferred to prescribe an antibiotic when they encounter patients with cough and sore throat and thought that antimicrobials are the first drug of choice to prevent the emergence of resistant strains.

Fig 2 Attitude of health professionals towards the rational use of antibiotics

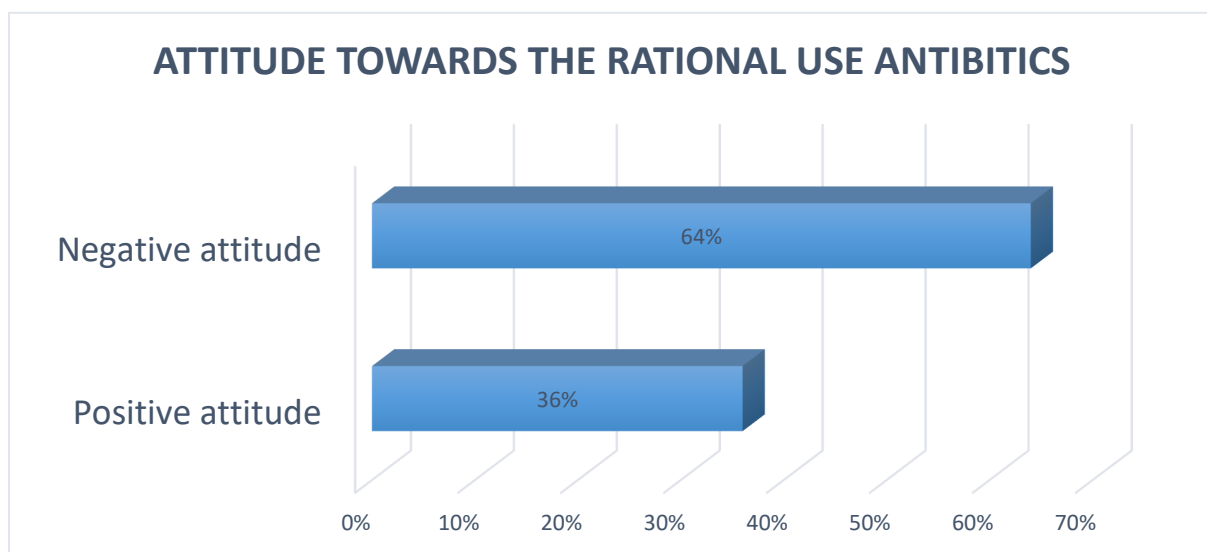


Table 3 Percent of response on Attitude

Q. No	Question	Agree N (%)	Disagree N (%)	Uncertain N (%)
1	Antibiotics are safe drugs, hence they can be commonly used medication	75(25.0%)	222(74.0%)	3(1.0%)
2	Skipping one or two doses does not contribute to the development of antibiotic resistance	35(11.7%)	226(75.3%)	39(13.0%)
3	Adverse effects of antimicrobials are reduced by using more than one antimicrobial at a time	9(3.0%)	282(94.0%)	9(3.0%)
4	Efficacy of antibiotics can be increased by using more than one antimicrobial at a time	237(79.3%)	53(17.7%)	9(3.0%)
5	Injudicious use of antimicrobials shortens the duration of illness	11(3.7%)	195(65.0%)	94(31.3%)
6	When you encounter patients with cough and sore throat, antimicrobials are the first drug of choice for early treatment and to prevent emergence of resistant strains	174(58.0)	32(10.7%)	94(31.3%)

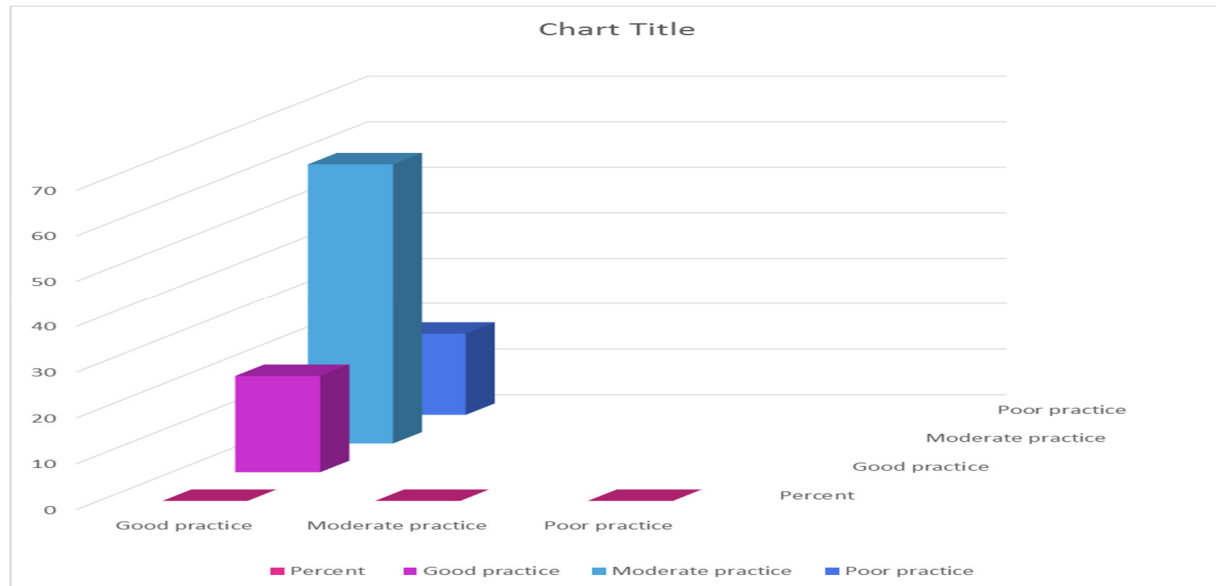
Practice towards the rational use of antibiotics

A majority of health professionals always consulted their senior before starting an antibiotic, most of them counsel their patients to complete the full course of the prescribed treatment and 1.3% of the health professionals (Almost all pharmacist) checked the expiry date before prescribing antimicrobials. 84 % of the health professionals advice their patients to discard the remaining, leftover medication.

Table 4 Percent of response on practice

Q. No	Question	Always	Usually	sometimes	Never
1	Do you counsel your patients to complete a course of antibiotics?	174(58.0%)	89(29.7%)	37(12.3%)	-
2	Do you change an antibiotics whenever the patient complains that his or her symptoms are not improving?	3(1.0%)	43(14.3%)	200(66.7%)	54(18.0%)
3	Do you advise your client to use the remaining antibiotics for the next time he or she get sick?	9(3.0%)	24(8.0%)	62(20.7%)	205(68.3%)
4	Do you tell your patients to discard the remaining, leftover medication?	222(84.0%)	30(10.0%)	9(3.0%)	9(3.0%)
5	Do you consult your senior before prescribing an antibiotic?	211(70.3%)	49(16.3%)	3(1.0%)	37(12.3%)
6	Do you check the expiry date of the antibiotic before prescribing it?	61(20.3%)	81(27.0%)	144(48.0%)	14(4.7%)
7	Do you prefer to prescribe an antibiotic for cough and sore throat?	186(62.0%)	61(20.3%)	51(17.0%)	2(.7%)
8	Do you use antibiotics empirically?	6(2.0%)	219(73.0%)	67(22.3%)	8(2.7%)
9	Do you culture and sensitivity before prescribing a course of antibiotics?	5(1.7%)	19(6.3%)	216(72.0%)	60(20.0%)

Fig 3 practice level of the study participants



Possible solutions to growing problem of antimicrobial resistance

Lastly, the participants were asked an open ended question, to recommend a solution to curb this growing problem of antimicrobial resistance. Their replies are tabulated in the following table.

Table 5 percent response on possible solutions to growing problem of antimicrobial resistance

What according to you is the solution for the growing problem of Antimicrobial Resistance?	
Judicious, careful and rational use of medicines	161(53.7%)
Complete the full course of antimicrobials in the prescribed dose	56(18.7%)
Avoid self-medication	30(10.0%)
Multidrug therapy	9(3.0%)
Symptomatic management in self-limiting conditions	7(2.3%)
Awareness among patients by organizing public health campaigns	27(9.0%)
No response	-
Prescribe using culture sensitivity reports	9(3.0%)
New drug discovery	1(0.3%)

Discussion

The emergence of bacterial strains resistant to antimicrobial agents presents a growing concern worldwide. Among other factors, the irrational use of antibiotics has contributed to the progressive loss of bacterial sensitivity to antibiotics and spreading of resistant strains of bacteria, with substantial clinical and economic impact. The clinical effectiveness of antibiotics depends partially on their correct use, depending on patients, physicians and retailers. Physicians' decisions may be influenced by several factors such as the fear of losing a patient's trust, the lack of correct information on indications for antibiotic use and pressure from patients and families. Patient factors relating to incorrect antibiotic use include self-medication, sharing medication with other people, not taking a full course of treatment and keeping part of the course for another occasion (2) (3).

The study examined the KAP of rational use of antibiotic among health professionals in SPHMMC. The mean age of the health professionals indicates that most respondents were between the age of 25-29 years and 30-34. This finding is similar with the study done in Kuwait (12). Most of health professionals with good knowledge were female while both gender had comparable number of moderate and poor knowledge. In contrary to study done among health professionals in Kuwait male have better knowledge than female (12).

The results suggested that the knowledge of most of the health professionals regarding the rational use of antibiotic was moderate. This finding is in contrary to the study among physicians and nurses in hospitals in Amhara Region, Ethiopia which reported good understanding of the rational use of antibiotics among health professionals (3). The results were also similar to another study done in Ghana which reported moderate knowledge of medical students with respect to antibiotic use and resistance (19).

However, it was noted that this increased knowledge of health professionals in SPHMMC could not be translated into practice as inappropriateness of antibiotic prescribing was observed in this study. Most of health professionals with good knowledge were medical doctors and pharmacist and respondents have comparable number of poor and moderate practice towards the rational use of antibiotics unlike the study conducted in India which reported that almost all medical doctors have good knowledge (16) (17). The likely reasons of this discrepancy could be lack of resources and training opportunities and excessive workload.

This gap in execution of knowledge could be bridged by effective interventions and promoting rational antibiotic use. Outcome based education could be an effective approach to bridge the gap from knowledge to practice.

Almost all participants believed that irrational use of antibiotic can lead to ineffective treatment, it is also noteworthy to mention that most of health professionals correctly answered when asked whether antibiotics are required in common cold and flu. This result is relatively better in accordance to a study which was conducted to identify the patterns of antibiotic resistance in China, Kuwait and the USA (2006) in which only 62% of health professionals correctly answered the question (13)(14). Another similar study conducted in China has reported that more than two third of the participants believed that antibiotics should be prescribed for viral illnesses assuming bacterial etiology (20) (21). Such wrong beliefs may lead to inappropriately high rates of antibiotic consumption, which can result in a corresponding increase in the bacterial resistance. But in this study, majority of the participants were aware that diseases like influenza and common cold are not of bacterial etiology and hence they did not recommend antimicrobial drugs.

The findings of the current study showed a negative attitude of health professionals towards the rational antibiotic use as one fourth of health professionals believed that antibiotics are safe enough to be used in common practice. In contrast, research conducted in Wassa West district of Ghana (Bosu and Adjei, 1997) reported that 15% participants perceived antibiotics as safe drugs (18) (19). Similarly, the results were also not much different when it was revealed that health professionals did not have clear concepts of medication adherence as a reasonable number of health professionals (25.0%) believed skipping of doses would not contribute to resistance. When asked about the solution for the growing problem of antimicrobial resistance, it was observed that judicious, careful and rational use of medicines, counseling patients to complete the full course of antimicrobials in the prescribed dose, avoiding self-medication and creating awareness among patients by organizing public health campaigns were the major solutions identified by the participants, while fewer participants perceived multidrug therapy, symptomatic management in self-limiting conditions and prescribing using culture sensitivity reports as potential solution. The results were also similar to another study done in India which reported the same response about the solution for the growing problem of antimicrobial resistance (6).

Strength and Limitations

The strength of this study is that it addresses the major issue of irrational use of antibiotic and its consequence antibiotic resistance which has public health relevance. The other potential feature of this study is that it selected post graduate health professionals as a sample population on which not much research has been done in the past. The findings of this study would urge the researchers to explore this area by recruiting more health professionals from other health facilities. However, like any other study, this research also has some limitations. The convenience sampling approach of recruitment of one hospital may limit the generalizability of the results. As a general limitation to knowledge, attitude and practice research, we cannot ignore the tendency of participants to provide more socially desirable results. The fact that the questionnaire was self-administered may affect the response rate. And the time and financial constraint also one of the limitation during this study.

Recommendation

Based on the findings from this research it is recommended

To federal ministry of health:

- ✓ The key findings of this study will help policy makers to plan and establish further multi-centered meta-analysis to investigate knowledge, attitude and practice of health professionals towards the rational use of antibiotics among expatriates which will help in the adoption and implementation of successful future policies to promote rational antibiotic use among the health professionals.

To SPHMMC

The results highlight the need to educate both under graduate medical students and post graduate health professionals regarding the rational use of antibiotics, solutions for the growing problem of Antimicrobial Resistance and more importantly the significance of following guidelines for the empirical therapy.

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 and postgraduate teaching.

Learning about the antimicrobial prescribing in pharmacology must be connected clearly with the infection control in microbiology.

The medical education strategies should aim, not only to increase the knowledge, but also to change the behavior and practices among health professionals by

- ✓ Limiting the use of antimicrobials,
- ✓ Discouraging their misuse,
- ✓ Reducing infection through disease prevention measures,
- ✓ Creating incentives for improved treatment and innovation.
- ✓ Improved infection control in the community and in hospitals.

To health care providers

- ✓ Finally, physicians would have to change their approach to patients with presumed infectious diseases, emphasizing the need for diagnosis to select appropriate therapy.
- ✓ Pharmacists should take responsibility in prohibiting antibiotic dispensing without prescription

To other researchers

- ✓ Further multi-centered meta-analysis to investigate knowledge, attitude and practice towards the rational use of antibiotic among health professionals will help in the adoption and implementation of future effective multifaceted interventions to improve the appropriate use of antibiotics.

Conclusion

This study was conducted in SPHMMC among the health professionals out of which majority of the respondents being in the age range of 25-29 where majority of them are male and medical doctors. The study found that a majority of the health professionals have moderate knowledge and moderate practice and negative attitude towards the rational use of antibiotics.

Most of the study participants responded that judicious, careful and rational use of antibiotics, completing the full course of antimicrobials in the prescribed dose and avoid self-medication will curb this growing problem of antimicrobial resistance.

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ANNEXES

Section one

Consent Form

This study assess the KAP of health professionals towards the rational use of antibiotics. During your participation in this study your confidentiality will be maintained throughout the study by avoiding any of your specific identification. Thank you for your time and willingness.

Section two- demographic data

Background information

1. Age
2. Sex a) Male b) Female
3. Marital status a) Single b) Married c) Divorced e) Widowed
4. Educational status a) Diploma b) Degree c) Resident d) Consultant
5. Profession a) HO b) Doctor c) Pharmacist e) Others(specify)
6. Ethnicity a) Oromo b) Amhara c) Gurage d) Tigre e) Others (specify)

Section three- questionnaires on knowledge

Choose the statement that you think best explains the following terms

1. Antibiotics
 - a) Antibiotics are substances produced by various species of microorganisms (M.Os) that suppress the growth of other M.O. at low concentration.
 - b) Antibiotics are generalized term to designate synthetic as well as naturally obtained drugs that attenuate M.O.
2. Rational use of antibiotics
 - a) Is defined as prescription of the right drug to the right patient, in the right dose, at right time, at right time intervals and for the right duration.
 - b) Is defined as prescription of antibiotics empirically.
 - c) The rational use of antibiotics is that patients received medications in appropriate to their clinical needs, in doses that meets their own requirements for an adequate period of time and at the lowest cost to them and their community.
3. Antibiotic resistance
 - a) Unresponsiveness of a microorganism to antibiotics.
 - b) Ineffectiveness of antibiotics.
 - c) The unresponsiveness of a microorganism to a specific antibiotic to which it was initially sensitive.

Table 12 Reply with: true or false or uncertain

<i>Q.NO</i>	Question	True	False	uncertain
1.	Indiscriminate antimicrobial use leads to the emergence of the growing problem of antimicrobial resistance			
2.	Antimicrobial resistance means that if they are taken too often, antimicrobials are less likely to work in the future			
3.	Bacteria cause common cold and influenza			
4.	Antibiotic Resistance is an important and serious global public health issue			
5.	Ineffective treatment can occur due to indiscriminate and injudicious antimicrobial use			

Section four- questionnaires on attitude

Table 13 Reply with: Agree, Uncertain, Disagree

<i>Q. NO</i>	Question	Agree	Uncertain	Disagree:
1.	Antibiotics are safe drugs, hence they can be commonly used medication			
2.	Skipping one or two doses does not contribute to the development of antibiotic resistance			
3.	Adverse effects of antimicrobials are reduced by using more than one antimicrobial at a time			
4.	Efficacy of antibiotics can be increased by using more than one antimicrobial at a time			
5.	Injudicious use of antimicrobials shortens the duration of illness			
6.	When you encounter patients with cough and sore throat, antimicrobials are the first drug of choice for early treatment and to prevent emergence of resistant strains			

Section five- questionnaires on practice

Table 14 Reply with always, usually, sometimes or never

Q. Question	Always	usually	sometimes	Never
NO				
1. Do you counsel your patients to complete a course of antibiotics?				
2. Do you change an antibiotics whenever the patient complains that his/her symptoms are not improving?				
3. Do you advise your client to use the remaining antibiotics for the next time he or she get sick?				
4. Do you tell your patients to discard the remaining, leftover medication?				
5. Do you culture and sensitivity before prescribing a course of antibiotics?				
6. Do you consult your senior before prescribing an antibiotic?				
7. Do you check the expiry date of the antibiotic before prescribing it?				
8. Do you prefer to prescribe an antibiotic for cough and sore throat?				
9. Do you use antibiotics empirically?				

Table 15 possible the solution for the growing problem of Antimicrobial Resistance?

What according to you is the solution for the growing problem of Antimicrobial Resistance?	
Judicious, careful and rational use of medicines	
Complete the full course of antimicrobials in the prescribed dose	
Avoid self-medication	
Multidrug therapy	\
Symptomatic management in self-limiting conditions	
Awareness among patients by organizing public health campaigns	
No response	-
Prescribe using culture sensitivity reports	
New drug discovery	

Table 16 Percent of response on Knowledge

<i>Q. No.</i>	Question	N (%)
<i>I.</i>	Choose the statement that you think best explains the following terms	
<i>I.</i>	Antibiotics	
<i>A</i>	Antibiotics are substances produced by various species of microorganisms (M.Os) that suppress the growth of other M.O. at low concentration.	46(15.3%)
<i>B</i>	Antibiotics are generalized term to designate synthetic as well as naturally obtained drugs that attenuate M.O.	254(84.7%)
<i>2.</i>	Rational use of antibiotics	
<i>A</i>	Is defined as prescription of the right drug to the right patient, in the right dose, at right time, at right time intervals and for the right duration.	146(48.7%)
<i>B</i>	Is defined as prescription of antibiotics empirically.	30(10%)
<i>C</i>	The rational use of antibiotics is that patients received medications in appropriate to their clinical needs, in doses that meets their own requirements for an adequate period of time and at the lowest cost to them and their community.	124(41.3%)
<i>3.</i>	Antibiotic resistance	
<i>A</i>	It refers to unresponsiveness of a microorganism to antibiotics.	27(9%)
<i>B</i>	It refers to ineffectiveness of antibiotics.	40(13.3%)
<i>C</i>	It refers to the unresponsiveness of a microorganism to a specific antibiotic to which it was initially sensitive	233(77.7%)