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Knowledge and Attitude of Students on Antimicrobial Resistance at Debre Markos University, Ethiopia

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ABSTRACT

Irrational use of medicines is a key reason for the increase and spread of antimicrobial resistance and it is a global concern. It is a fast mounting universal crisis. The main of this study of this study was to assess knowledge, attitude and practice of university students on antimicrobial resistance at Debre Markos University. Institutional based comparative cross-sectional survey was conducted from June to July with total sample size of 670. Participants were selected using simple random sampling method using random number table. Data clerk double entered the data into Epi data version 3.1 and transferred to SPSS Windows software version 21.0. Those variables that had associations at binary stage with p-value < 0.1, not collinear and biologically important variables were entered in to multiple logistic regression models. The cut off point for association was p-value < 0.05. About 14.8% study participants had adequate knowledge towards drug resistance. Rural residences of the participants were significantly associated with drug resistance as compared to urban residence. Knowledgeable participants were significantly protective to self- medication and drug resistance as compare to those who had inadequate knowledge and participants who had positive attitude were positively associated with self-medication as compare to those who had negative attitude. The overall knowledge of participants regarding to antimicrobial resistance was low. In the other hand, majority of participants had positive attitude. Those participants who had positive attitude were significantly associated with antimicrobial resistance as compared to who had negative attitude.

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1. INTRODUCTION

Antimicrobial resistance is a global concern [1]. Irrational use of medicines is a key reason for the increase and spread of antimicrobial resistance [2-5]. Several factors enhance irrational use of antibiotics, which could be doctors' knowledge and experience [6], diagnostic uncertainty, patients' expectations, lack of patient and health care professionals' education, pharmaceutical marketing, antibiotic selling without a prescription and economic [7].

Antimicrobial drug resistance is a fast mounting universal crisis. Many factors like inappropriate use of antibiotics, not following use of antibiotics by prescribing physician, unregulated sale of medicines and self-medication accredited to the advancement of resistance to several antimicrobials [8-9].

Lack or ignorance of microbiology services, using antibiotics for non bacterial infections like self remitted viral illness, have all led to overuse of antibiotics [10-11]. From the above factors, the self-medication is the important one that further intensified by using leftover drugs from similar previous prescription or drugs obtained from known persons and easy accessibility of antimicrobial drugs at local pharmacy stores. The literature on self-medication with antimicrobial drugs in the developed world is limited. Several studies indicated that the use of household leftovers drugs, a pharmacy, or from other sources contribute for drug resistance [12-13].

Antibiotic resistance can be defined as the ability of a microorganism to survive and resist exposure to antimicrobial drugs, threatening the effectiveness of successful treatment of infection. Antibiotic resistance is a recognized public health issue at the local, national and global levels. Currently, antibiotic resistance is a concern as it is no longer a predictor of maintaining health within populations but an increasing threat to future of health as antibiotics are being misused [14-18]. The main aim of this study was to assess the level of knowledge and attitude of participants towards antimicrobial resistance.

2. METHODS AND MATERIALS

2.1. Study Setting and Design

The study was done at Debre Markos University from June to July 2015. It is 299 km far from the capital city of Ethiopia, Addis Ababa. All Debre Markos University extension students' who fulfill the inclusion criteria were the study population. Institutional based comparative cross-sectional survey was conducted.

2.2. Inclusion and Excluded Criteria

All non-health science and health science students who were registered in the university program as extension students were included in the study. Health science students were selected at least taking pharmacology course. Those students who dismissed, withdraw, and drop out were excluded from this study.

2.3. Sample Size Determination and Sampling Technique

The sample size was calculated using the assumption of 95% confidence interval, 80% power with one to one ratio of medical and non-medical students using the respective proportion of 72.5% and 61.5% from previous study [19]. Epi Info version 3.5.1 was used to calculate the required sample size using the following formula [20].

$$n = \frac{\left[Z_{\alpha}\sqrt{(1+1/m)\bar{p}(1-\bar{p})} + Z_{\beta}\sqrt{p_0(1-p_0)/m + p_1(1-p_1)}\right]^2}{(p_0 - p_1)^2}$$

$$\bar{p} = \frac{p_1 + m\,p_0}{m+1}$$

Including 10%, none response rate the final sample was 670. The list of students was taken from the university registrar and the sampling frame for medical and non-medical students were prepared from their list. Selection of participants carried out by applying simple random sampling method using random table. In order to get select participants, the learning classroom number was identified from each department.

2.4. Data Collection Tools

The data were collected using self-administered questionnaire. Four diploma and two-bachelor degree graduated nurses were data collectors and supervisors, respectively.

2.5. Data Quality Control

A pre-tested and standardized questionnaire was used. It was adapted and modified in to local context. Training was given for both data collectors and supervisors. Daily supervision was carried out during data collection period. Then, data cleaning was done using frequency, listing, sorting and to identify outliers and any missed values.

2.6. Data Processing and Analysis

Data clerk double entered the data into Epi data version 3.1 and transferred to SPSS version 21.0. The descriptive output of the study was presented on the tables. The association between dependent and independent variables was examined using binary and multiple logistic regressions. Those variables that had

associations at binary stage with p-value < 0.1, not collinear and biologically important variables were entered in to multiple logistic regression models. The cut off point for association was p-value <0.05.

2.7. Ethical Consideration

Ethical approval and clearance was obtained from Debre Markos University, medicine and health science College research ethical review committee. A permission and support letter was written for each selected colleges and departments. Informed consent was obtained from each individuals and confidentiality was kept.

3. RESULTS

3.1. Participants' Characteristics:

Five hundred sixty one participants were participated in the study. Half of the 282 (50.3%) of them were health science student. Majority (63.3%) of participants were rural residence (Table 1).

Table 1. Socio Demographic Characteristic of Participants

Variables	Frequency (%)
Sex	
Male	336(60.2)
Female	222(39.8)
Residence	
Rural	352(63.3)
Urban	204(36.4)
Marital status	
Married	83(14.9)
Not married	475(85.1)
Occupation of Father	
employed	77(14.7)
unemployed	446(85.3)
Education of Father	
Illiterate	386(72.0)
read or write and above	150(28.0)
Occupation of mother	
employed	57(10.4)
unemployed	491(89.6)
Education of mother	
Illiterate	161(29.6)
Read/ write and above	383(70.4)
College	
Health science	282(50.3)
Others	279(49.7)
Year of education	
≤ 2	386(72.0)
>2	150(28.0)

3.2. Participants' Behavior Towards the Use Antibiotics

About 138 (26.7%) of participants were used antibiotics longer than prescribed duration. Majority, 388 (69.2%) of participants were checked the expiry date of the medicine before bought and used. Four hundred seventeen (74.3%) were consulted a physician before they bought their medicines. One hundred seventeen (22.9%) of participants had never been completed the full course of their treatment (Table 2).

Table 2. Participants' Behavior Towards Antibiotics Self-Medication

Variables	Frequency	Percent
Use of antibiotics longer than standard duration		
Yes	138	26.7
No	287	55.6
Use of antibiotics shorter than standard duration		
Yes	148	32.8
No	285	50.8
Use of antibiotics for self-limited non bacterial infections		
Yes	156	29.9
No	158	49.5
Check the expiry date of the antibiotic before bought and used		
Yes	388	69.2
No	122	21.7
consult a doctor before starting an antibiotic		
Yes	417	74.3
No	93	16.6
Complete the full course of treatment		
Never doing	117	22.9
Always doing	245	47.9
Sometimes doing	107	20.9
Very occasional	42	8.2
Give leftover antibiotics to your friend if she/he get sick		
Never doing	323	64.3
Always doing	75	14.9
Sometimes doing	72	14.3
Very occasional	32	6.4
Discard the remaining, leftover medication		
Never doing	208	40.9
Always doing	174	34.2
Sometimes doing	85	16.7
Very occasional	42	8.3

3.3. Knowledge and Attitude of Participants Towards Self-Medication

Students who had less than or equal to 2 years of university educational status had inadequate knowledge than those who had more than 2 years of university educational status (Table 1).

About three quarter 399 (72.3%) of participants ever had been treated by self-medication. The proportion of self-medication in the last 6 month was 116 (29.3%). The median number of drugs prescribed in the last six month and one year was 2 ($\pm$2) and 2.5 ($\pm$3), respectively. Majority, 310 (88.3%) of participants had self-medication for minor illness or minor fillings. Headache was (50.6%) the commonest indicator for self-medication. Analgesics (47.7%) commonly used self-prescribed medication compared to others. Twenty-one percent of participants always had been completed the full course of their treatment.

Rural students were 2.2 time practicing self-medication than the counter parts. Students who had positive attitude contribute to practice self-prescription and this leads to drug resistance. Knowledgeable students were 32% times less likely practicing self-medication (Table 3).

Only about 14.8% of study participants had adequate knowledge towards drug resistance as shown in Figure 4. Rural residences of the participants were significantly associated with drug resistance as compared to urban residence. Participants who had adequate knowledge were protective for self- medication and drug resistance as compare to those who had inadequate knowledge. Participants who had positive attitude had association with self-medication as compare to those who had negative attitude.

Table 3. Knowledge and Attitude Towards Self-Medication at Debre Markos University

Variables	Frequency n (%)	OR	
		Crude	Adjusted
Sex			
Male	336(60.2)	1.262(0.778, 2.049)	
Female	222(39.8)	1	
Residence			
Rural	352(63.3)	1.130(0.692, 1.846)	
Urban	204(36.4)	1	
Occupation of Father			
employed	77(14.7)	0.651(0.300, 1.417)	1.941(0.690, 5.459)
unemployed	446(85.3)	1	1
Education of Father			
Illiterate	386(72.0)	1.403(0.760, 2.592)	
read or write and above	150(28.0)	1	
Occupation of mother			
employed	57(10.4)	0.887(0.360, 2.186)	1.156(0.361, 3.694)
unemployed	491(89.6)	1	1
Education of mother			
Illiterate	161(29.6)	1.340(0.694, 2.587)	
read or write and above	383(70.4)	1	
College			
Health science	282(50.3)	0.667(0.374, 1.191)	0.951(0.543, 1.666)
Others	279 (49.7)	1	1
Year of education			
≤ 2	386(72.0)	1.745(0.950, 3.207)	0.296(0.125, 0.701)
>2	150(28.0)	1	1
Knowledge of self-medication			
Adequate Knowledgeable	219(39.1)	0.930(0.552, 1.654)	
Inadequate knowledgeable	341 (60.9)	1	
Attitude towards self- medication			
Positive attitude	419(77)	1.353(0.788, 2.322)	
negative attitude	125(22.3)	1	

Table 4. Knowledge and Attitude of Students Towards Drug Resistance

Variables	Frequency n (%)	OR	
		Crude	Adjusted
Sex			
Male	336(60.2)	0.654(0.353, 1.212)	0.590(0.301, 1.155)
Female	222(39.8)	1	1
Residence			
Rural	352(63.3)	1.820(1.024, 3.236)	2.203(1.173, 4.141)
Urban	204(36.4)	1	1
College			
Health science	282(50.3)	1.316(0.815, 2.125)	0.799(0.394, 1.621)
Others	279(49.7)	1	1
Year of education			
≤2	386(72.0)	1.745(0.950, 3.207)	1.657(0.795, 3.454)
>2	150(28.0)	1	1
Attitude towards drug resistance			
Positive attitude	419(77)	2.040(1.116, 3.729)	2.323(1.215, 4.441)
Negative attitude	125(22.3)	1	1
Knowledge of drug resistance			
Adequate Knowledgeable	79(14.8)	0.354(0.186, 0.675)	0.320(0.158, 0.647)
Inadequate knowledgeable	456(85.2)	1	1

4. DISCUSSION

The focus of this study was to assess the level of knowledge and attitude of participants towards antimicrobial resistance. This study revealed that only 14.8% of participants had adequate knowledge towards drug resistance. In line with this study conducted in Georgia showed that there was a lack of knowledge on proper antibiotic use and resistance [21-22].

Our study showed that 29.9% of participants used antibiotics for self-limited non-bacterial infections. Similarly, a report showed that more than 60% of participants believed that antibiotics were used for viral illnesses [23].

This study showed that 14.8% of participants knew about antimicrobial resistance. However, population based study in Sweden showed that 94% of the responders knew that bacteria could become resistant to antibiotics [24] and another study in Southern India showed that majority 88% of respondents

were aware that if antibiotics had taken too often, they would not have been worked in the future [25]. Moreover, a study conducted in Ethiopia on nurses and physicians, 72.2% of them knew about antimicrobial resistance [26]. The difference might be due to variation in sample size, age and educational status.

Our study showed that 22.3% of participants believed that inappropriate use of antimicrobials agents could cause drug resistance. This is lower than the study conducted in Sweden that the majority of respondents had an appropriate and restrictive attitude towards antibiotics [24]. This may be due to the difference in socio-demographic characteristics of respondents. Other study explore that the erosion of effective antimicrobials continues as they witness the increased frequency of resistance to all drugs [27]. In addition, study revealed that respondents had little understanding of the concept of antibiotic resistance but they thought that over-using antibiotics was unwise because it would reduce their future effectiveness [28]. Another study conducted in the united state of America showed that 27% believed that taking antibiotics when they had a cold made them better more quickly, 32% believed that taking antibiotics when they had a cold prevented more serious illness, and 48% expected a prescription for antibiotics when they were ill enough from a cold to seek medical attention. These misguided beliefs and expectations were associated with a lack of awareness of the dangers of antibiotic use [29].

This study showed that only 20.9% of students were always complete the full course of the given treatment. No significant difference was observed between medical (29.0%) and non-medical students (27.1%) in terms of self- medication and the purchase of antibiotics without a prescription [19], [30]. Study conducted in Saudi, 75% of students have heard about the resistance of bacteria. However, more than 79% of students did not think that recurrence antibiotic use could decrease the effectiveness of the drug [31].

In this study, participants believed that self-medication could cause bacteria resistance. In consistent, other reports showed that self-medication could cause to such antibiotics resistance and may precipitate the emergence of multiple-resistant organisms that would be difficult to treat and this has caused increased morbidity [32-35]. Many reports outlined the direct relation between the abuse of antibiotics and increased bacterial resistance [36-38]. The misuse of antibiotics is another reason for the development of bacterial resistance [39].

5. CONCLUSION

The overall knowledge of participants regarding to antimicrobial resistance was inadequate. In the other hand, majority of participants had positive attitude. Those participants who had positive attitude were significantly associated with antimicrobial resistance as compared to who had negative attitude. Rural residences of the participants were significantly associated with drug resistance as compared to urban residence. Participants who had adequate knowledge were protective for self-medication and drug resistance as compare to those who had inadequate knowledge.

COMPETING INTEREST

All authors have confirmed that they have no competing interest. We have no received reimbursements, fees, funding, or salary , share, gain or lose from an organization that may in any way gain or lose financially from the publication of this manuscript, either in the past five, now or in the future. In addition, there is no financial and non-financial competing interest in relation to this paper. Currently, any content of this manuscript do not applying for any patents. Informed consent was obtained from each participant to participate in this study and the informed consent obtained from each subject for publication.

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