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Research Article

**ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES  
REGARDING ANTIBIOTIC RESISTANCE AMONG NON-MEDICAL  
UNIVERSITY STUDENTS IN RAWALPINDI****Dr. Shumaila Humayun**MBBS, MPH, Senior Lecturer, Department Of Community Medicine And Public Health  
Foundation University Medical College Islamabad**Article Received:** November 2019 **Accepted:** December 2019 **Published:** January 2020**Abstract:**

**Background:** Various practices regarding antibiotic use in community have been postulated to be related to the development of resistant strains and an effort is made to determine this relationship in non-medical university students. **Objective:** The purpose of this study was to assess the knowledge attitude and practices regarding antibiotics and antibiotic resistance among non-medical university students in Rawalpindi. **Study Design:** A Cross-sectional study. **Place and Duration:** In non-medical university students of Foundation University Rawalpindi campus for a duration of six months from January to June 2019. **Methods:** Participants were assessed through a face-to-face survey. Convenient sampling technique was used and a total of 400 non-medical students of Foundation University Rawalpindi campus, 210 females and 190 males, from January to May, 2019, were included for this study. A pretested structured questionnaire was filled by all the respondents after taking written informed consent. Data analysis was carried out using SPSS version 21. **Results:** Out of 400 respondents, 43.7% showed to have correct knowledge regarding antibiotics while 52.3% were either unaware or had incorrect knowledge. Respondents with correct knowledge regarding antibiotic resistance were 36.5% while respondents who were unaware or had incorrect knowledge were 43.5%. Results assessing attitude of respondents regarding antibiotic use depicts that 51.5% had positive attitude. About 62.8% observed incorrect practices regarding antibiotic use. **Conclusion:** From our study we concluded that despite having poor knowledge about the use of antibiotics and problems of antibiotic resistance the study respondents had positive attitude but many incorrect practices in regards to the antibiotic use. This indicates that the increase in awareness regarding the topic can lead to increase in correct practices among them.

**Keywords;** antibiotics, antibiotic resistance, convenient sampling, cross-sectional**Corresponding author:****Dr. Shumaila Humayun,**

MBBS, MPH, Senior Lecturer

Department Of Community Medicine And Public Health

Foundation University Medical College Islamabad

H# 21, ST # 12, Sector E, Defence Housing Authority, PHASE 1, Islamabad

CONTACT NO: 03055169627, shumailahn@gmail.com

QR code



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**INTRODUCTION:**

Antibiotics are medicines used to prevent and treat bacterial infections (1). They can be used either prophylactically (2) in patients who are undergoing surgery or as a part of treatment regimen, against community acquired or hospital acquired bacterial infections (3). Some antibiotics may possess anti-protozoal properties (4). But they do not have any effect against viruses (5). The ability of bacteria and other micro-organisms to resist the effects of an antibiotic to which they were once sensitive, is known as Antibiotic Resistance. (6,7).

WHO in 2014, has declared antibiotic resistance a serious threat that is no longer a prediction for the future, it is happening right now in every region of the world and has the potential to affect anyone of any age, in any country. (8) The CDC estimates that more than 2 million people get sick due to antibiotic resistant infections in the USA every year with around 23,000 losing their lives. (9). In the UK and other first world countries deaths caused by sepsis are increasing. (10,11) A high profile study estimates that annual death toll would climb to 10 million deaths by 2050, due to antimicrobial resistance (12). Antibiotic resistance is a consequence of evolution via natural selection. In other words, survival of the fittest micro-organisms (12). The timeline of evolution of antibiotics and its resistance is commendable in the aspects of its emergence and progression. WHO has issued a priority list for new antibiotics, in 2017. The bacterial threats are classified as critical, high and medium. Superbugs have emerged, that are not killed by any antibiotic. Superbug is not only an alarming health issue right now but also one of the menacing situations with respect to morbidity and mortality worldwide. Pakistan is the third highest consumer of antibiotics among lower and middle income countries after India and China. (13,14). Drug resistant strains of Mycobacterium tuberculosis and Salmonella typhi XDR (Extensively Drug Resistant) have been observed with increasing regularity in Pakistan. (15,16,17). Strains of MDR have made anti-tuberculous treatment a challenge, especially in underdeveloped and developing countries similar to Pakistan (15). Also emergence of tuberculosis by atypical mycobacteria has caught medical world off guard. Non-tuberculous mycobacteria have more Anti-tubercular drug (ATT) resistance (16). Interestingly, as the climate change is occurring due to the global warming so is the antibiotic resistance increasing accordingly (18). CDC, in 2015 stated that there were 671,689 infections in EU and European Economic Area caused by antibiotic resistant bacteria, resulting in 33,110 deaths (19,20) XDR (Extensively Drug Resistant) typhoid fever emerged in Hyderabad,

Pakistan, in 2016 with cases also being reported in 2018 and 2019 (21).

Antibiotic resistance and development of superbugs is mainly due to the inappropriate use of antibiotics (22). However, several other factors play a role as well. Antibiotics are heavily and widely used in the agriculture and livestock, making the animals, reservoirs of antibiotic resistant bacteria and therefore, making food chain one of the major components of transmission of antibiotic resistance from plants and animals to humans (10). Responsibility for antibiotic resistance can be assigned to both the physicians and the patients. In the case of doctors, the fault lies in the inappropriate prescription of antibiotics. In the case of patients, it is most likely because of antibiotics overuse, not completing the recommended course, self-medication, sharing antibiotics with others, storing part of the course for future use and over the counter purchase of antibiotics (23).

The purpose of this research is to evaluate the knowledge attitude and practices of nonmedical university students in Rawalpindi regarding antibiotic resistance. Since antibiotic resistance is a looming medical crisis in Pakistan which has widespread effects on the economy, food production, health and life expectancy, it would be beneficial to have an idea of the study participants about the said problem and the dilemma of creation of super-bugs on which our drugs are not effective. Since no significant study has been conducted in Rawalpindi, Pakistan, assessing the knowledge attitude and practices of students outside the medical field, our study aims to fill the identified knowledge gap. The findings of our study will be helpful in identifying the level of awareness and current practices of the study population and also throw light on possible reasons leading to development of antibiotic resistance, as the selected population are the potential future parents who will soon be facing this problem for their coming children. This will help in raising awareness and chalking out possible interventions for tackling the problem.

**MATERIALS AND METHODS:**

A descriptive cross sectional study was carried out among non-medical university students of Foundation University Rawalpindi campus for a duration of six months on a total of 400 students. Sample size was calculated using WHO sample size calculator. Sample size calculation:

$$\begin{aligned} \text{Sample size} &= \frac{(Z \times Z) \times (p) \times (1-p)}{c \times c} \\ &= \frac{(1.96 \times 1.96) \times (0.5) \times (1-0.5)}{0.05 \times 0.05} \\ &= 384 \end{aligned}$$

Sample size was rounded off to 400 to cater for non-responses.

Convenience sampling technique was used. All students studying in FURC at the time of study who were willing to take part in the study were included and those not willing or not present at the time of data collection were excluded. Data was self-collected by using a structured closed ended pretested questionnaire. The tool was designed and modified from the following studies.

1. Naseem S, Iffat W, Shakeel S, Tariq S. Knowledge about Antibiotic use amongst the Public: A cross sectional study in Karachi, Pakistan. Infectious Diseases Journal of Pakistan 2016; 25:49-54. (10)
2. Yasmin R, Gyeltshen T, Islam R. Knowledge, Attitude and Practice of Antibiotic usage among patient attending OPD of a Dental College Hospital in Dhaka, Bangladesh. J Medicine 2018; 19: 84-90. (11).

#### Reliability Statistics

Cronbach's Alpha	No of Items
.829	80

Informed consent was taken from the study population prior to filling the questionnaire. Before entering the data into computer, all questions were checked for mistakes and omission. After cleaning data, necessary data was entered into computer. Data analysis was done by statistical package for social science version 21 (SPSS 21). Data was mainly presented as percentages and frequencies

and shown in the form of frequency tables, pie charts and bar charts.

#### Ethical considerations:

Written informed consent was obtained from all the participants. The confidentiality of the participants was maintained. Taking part in this research was completely voluntary and they were allowed to withdraw from the study at any time if they desired. Permission was sought from the Ethical Review Committee of Foundation University.

#### RESULTS:

In order to find out the knowledge, attitude and practice of antibiotic resistance a cross-sectional study was conducted on 400 non-medical students of Foundation University Rawalpindi campus. The results have been divided into demographic characteristics of respondents, knowledge about antibiotic resistance, attitude towards antibiotic resistance and practices related to antibiotic use.

#### Demographic characteristics:

Among 400 students, 47.5% were males and 52.5% were females. Majority of respondents that is about 61.8% were between the ages of 21 to 24 years. Among the respondents 90.75% were undergraduates, 8.75% were masters' students and 0.75% were PHD students. Out of all the respondents 91.75% were unmarried and about 8.25% were married and 74.75% belonged to the nuclear family type while remaining lived in a joint family system.

TABLE NO .1: MEAN AGE OF THE RESPONDENTS

Age of the respondents	
N	400
Mean	21.31
Std. Deviation	2.229

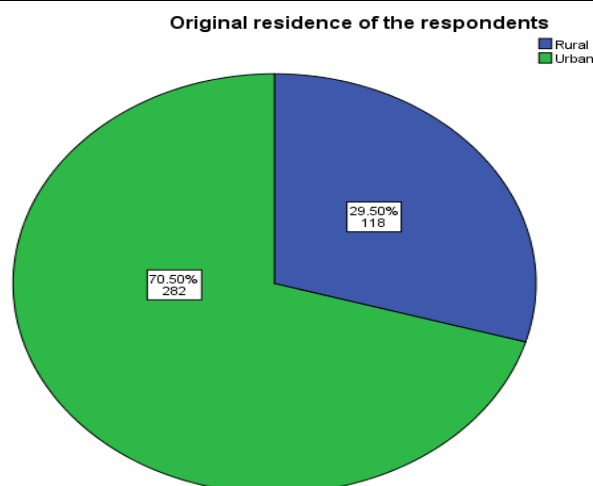


FIGURE 1: PIE CHART SHOWING ORIGINAL RESIDENCE OF THE RESPONDENTS

Majority of the respondents that is 63% were of view that antibiotics should be used in a specific dose while of the entire respondents 61.25% **thought that antibiotics have a special** course. Out of all the respondents 59.75% were of view that antibiotics are only available in the form of capsule however 69.75% **thought** that antibiotics are only available in tablet form, 41.25% of all the respondents **thought** that antibiotics are only available in syrup form and 45% of all the respondents **were** of view that antibiotics are only available in injectable form. 39.75% respondents **thought** that antibiotics can lead to organ damage. Out of all the respondents 24% obtained their information from TV/radio, 13.25% had obtained their knowledge of antibiotics from newspaper, 48.75% had obtained their knowledge from social media, 62% from friends and family and the source of information of 53.25% **was** doctors. And lastly, source of information of 31.5% was pharmacy. Around 52.5% were aware of the term antibiotic resistance.

Majority had a positive attitude towards correct antibiotic use, But 55.5% discontinued antibiotics and 63.3% decreased dose when symptoms improved and didn't follow full course.

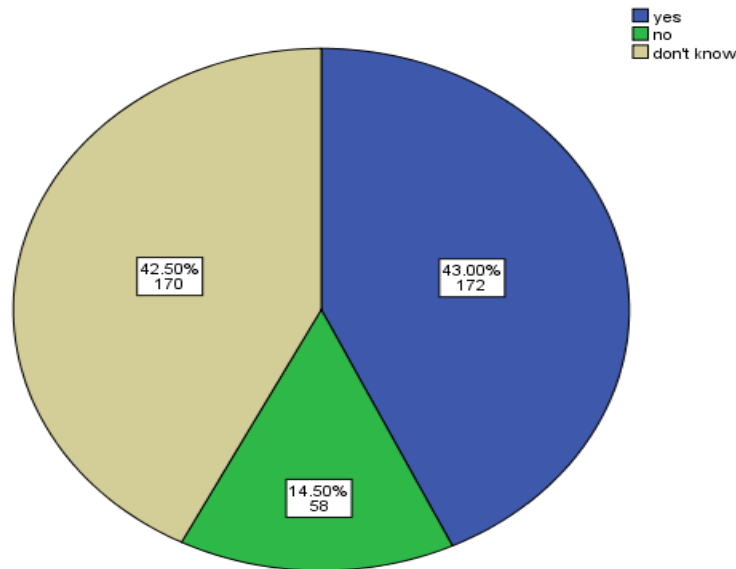
**TABLE 2:KNOWLEDGE REGARDING ANTIBIOTICS**

VARIABLES		FREQUENCY	PERCENTAGE
ANTIBIOTICS KILL BACTERIA ONLY	YES	247	<b>61.8</b>
	NO	108	27.0
	DON'T KNOW	45	11.3
ANTIBIOTICS KILL VIRUSES ONLY	YES	124	31.0
	NO	216	<b>54.0</b>
	DON'T KNOW	60	15.0
ANTIBIOTICS CAN CURE FLU, COUGH AND COMMON COLD	YES	308	77.0
	NO	57	<b>14.3</b>
	DON'T KNOW	35	8.8
ANTIBIOTICS CAN CAUSE ALLERGIES/SIDE EFFECTS	YES	<b>238</b>	<b>59.5</b>
	NO	<b>72</b>	<b>18.0</b>
ANTIBIOTICS CAN GIVE RELIEF FROM FEVER	YES	258	64.5
	NO	91	<b>22.8</b>
	DON'T KNOW	51	12.8

**TABLE 3:KNOWLEDGE REGARDING ANTIBIOTIC RESISTANCE:**

VARIABLE		FREQUENCY	PERCENTAGE
KNOWLEDGE ABOUT THE TERM ANTIBIOTICS RESISTANCE	YES	210	52.5
	NO	190	47.5
SELF MEDICATION CAUSES ANTIBIOTIC RESISTANCE	YES	162	40.5
	NO	74	18.5
	DON'T KNOW	164	41.0
NOT COMPLETING COURSE CAUSES ANTIBIOTIC RESISTANCE	YES	160	40.0
	NO	80	20.0
	DON'T KNOW	160	40.0

**Knowledge response whether antibiotic resistance occurs when bacteria becomes resistant to antibiotics**

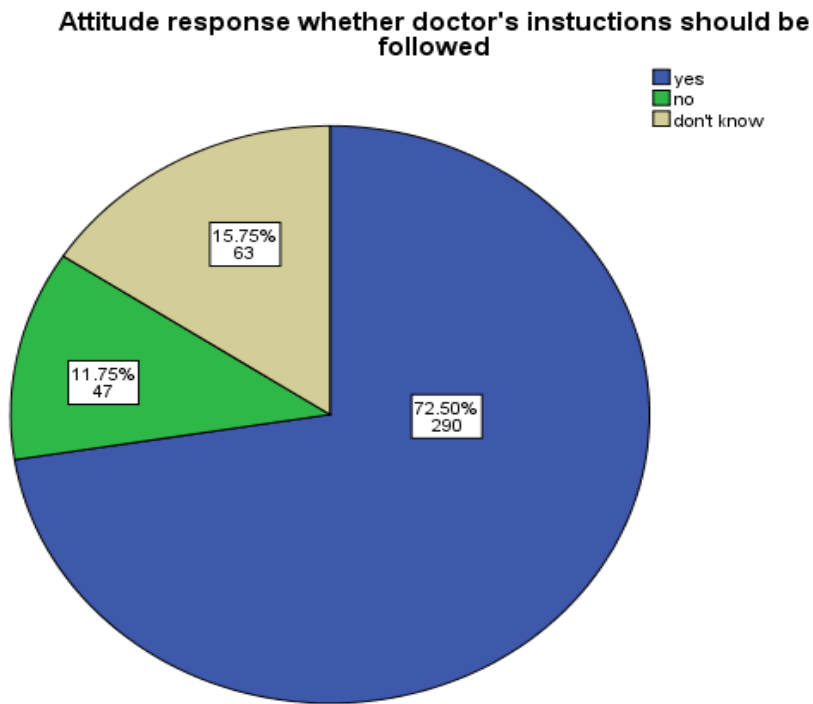


**FIG 2: KNOWLEDGE RESPONSE WHETHER ANTIBIOTIC RESISTANCE OCCURS WHEN BACTERIA BECOME RESISTANT TO ANTIBIOTICS**

**TABLE 4: ATTITUDE REGARDING ANTIBIOTIC USE:**

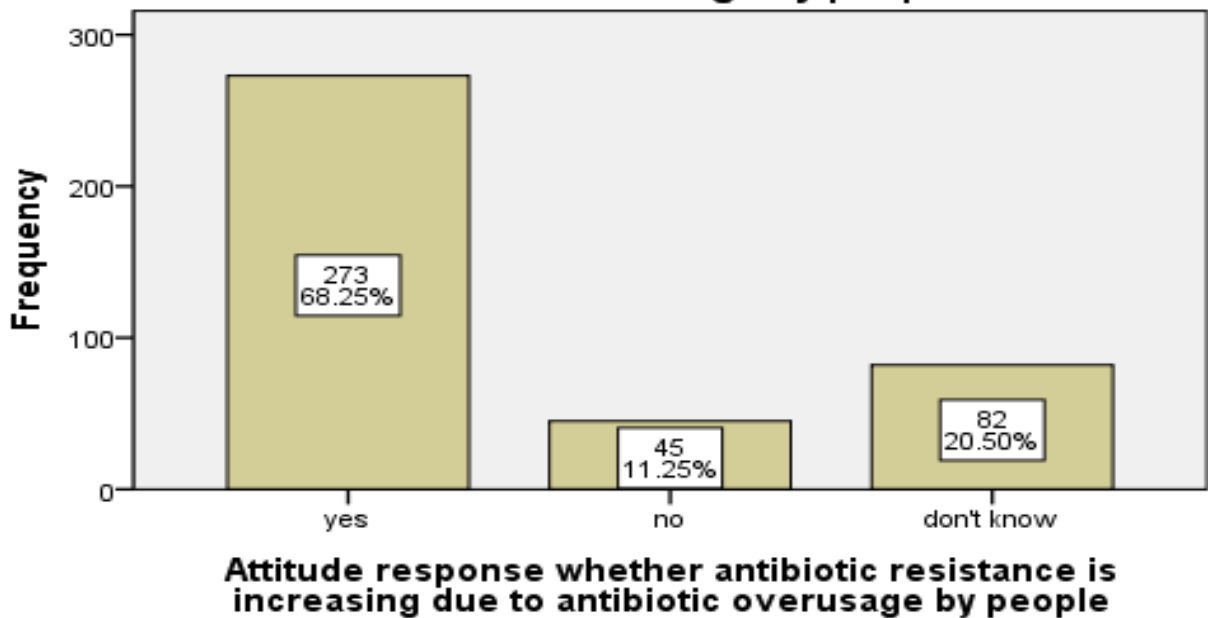
VARIABLE		FREQUENCY	PERCENTAGE
ANTIBIOTIC RESISTANCE IS INCREASING DUE TO BEING WRONGLY PERSCRIBED IN VIRAL INFECTIONS	YES	249	62.3
	NO	58	14.5
	DON'T KNOW	93	23.3
ANTIBIOTICS SHOULD BE STOPPED WHEN SYMPTOMS GET BETTER	YES	171	42.8
	NO	135	33.8
	DON'T KNOW	94	23.5
COMPLETING DOSE/COURSE CAN HAVE ADVERSE EFFECTS ON MY HEALTH	YES	98	24.5
	NO	204	51.0
	DON'T KNOW	98	24.5

DOCTORS SHOULD BE REQUESTED TO PRESCRIBE ANTIBIOTICS FOR EVERY ILLNESS	YES	123	30.8
	NO	185	46.3
	DON'T KNOW	92	23.0
LEFTOVER ANTIBIOTICS OF OTHERS SHOULD BE USED FOR FUTURE ILLNESS	YES	72	18.0
	NO	229	57.3
	DON'T KNOW	99	24.8



**FIG 3: ATTITUDE RESPONSE WHETHER DOCTOR'S INSTRUCTIONS SHOULD BE FOLLOWED**

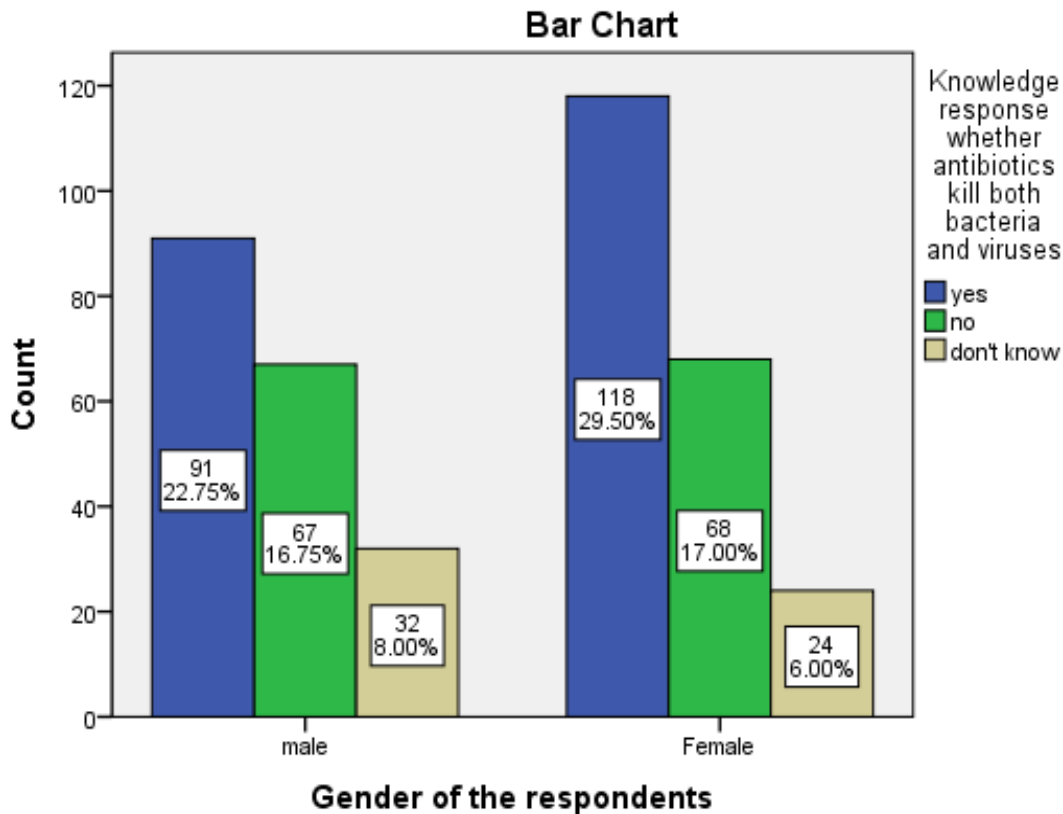
**Attitude response whether antibiotic resistance is increasing due to antibiotic overusage by people**



**FIG 4: ATTITUDE RESPONSE WHETHER ANTIBIOTIC RESISTANCE IS INCREASING DUE TO ANTIBIOTIC OVERUSAGE BY PEOPLE**

**TABLE 5:PRACTICES REGARDING ANTIBIOTIC USE:**

VARIABLES		FREQUENCY	PERCENTAGE
PRACTICE OF LOWERING DOSE OF ANTIBIOTICS WHEN SYMPTOM IMPROVES	YES	253	<b>63.3</b>
	NO	147	36.8
PRACTICE OF DISCONTINUING ANTIBIOTICS WHEN SYMPTOMS IMPROVE	YES	222	<b>55.5</b>
	NO	178	44.5
PRACTICE OF GIVING LEFTOVER ANTIBIOTICS TO FAMILY	YES	163	40.8
	NO	237	59.3
PRACTICE OF PURCHASING ANTIBIOTICS WITHOUT PRESCRIPTION	YES	163	40.8
	NO	237	59.3
PRACTICE OF TAKING ANTIBIOTICS ACCORDING TO INSTRUCTIONS ON LABELS	YES	288	72.0
	NO	112	28.0

**FIG 5:COMPARING KNOWLEDGE IN MALES AND FEMALES WHETHER ANTIBIOTICS KILL BOTH BACTERIA AND VIRUSES:****FIG 5:COMPARING KNOWLEDGE IN MALES AND FEMALES WHETHER ANTIBIOTICS KILL BOTH BACTERIA AND VIRUSES:**

**DISCUSSION:**

In our research conducted on 400 non-medical students in Rawalpindi, the knowledge that antibiotics are substances effective against bacteria only is average ,61.75%, in contrast it was 83.17% in Karachi survey (19) Our study population could not distinguish virus from bacteria (52.25% stated that antibiotics work against both viruses and bacteria) calls forth an immediate awareness campaign.

In our study ,77% of the public believe that antibiotics can be used for common cold, cough and flu which is much high compared to the statistics of London and China study (32% in affluent areas, 17% in deprived areas). (20,21). The knowledge gap between the nations might be due to the lack of public education on the matter, difference in the settings and socioeconomics.

Around 55.5% people left antibiotics during the course of treatment when they felt better and about 63.3% lowered the dose. These figures are in accordance with Naseem S. et al survey done in Karachi, in which it was maintained that 45.5% people discontinued treatment on improvement of their symptoms (19). This primarily indicates the non-compliance of patients to antibiotics and secondarily justifies the keeping of leftover antibiotics for future use (22%) and prescribing them to family members (40.75%).

About 47.5% of population was unaware of the term Antibiotic resistance which is consistent with the study of Karachi as well as Japan, this data is horrendously declaring ABR cognizance below the acceptable threshold level globally (19)(23).

80-85% population stated that they did not have media as a source of information of ABR which declares that our media has failed to recognize ABR as a conspicuous health issue which makes us wonder where will the situation lead. This scenario is in imparity with Japanese survey which rendered electronic and print media as the biggest source of information on the matter. (23).

The eagerness (69.75%) for the development of committee for health education of public regarding antibiotics indicates the receptive attitude of people for awareness and then implication of better practices.

A noteworthy reason for leaving antibiotics is improvement of symptoms with few doses (55.5%); **which** falls under the heading of non-compliance. **This** scenario is superior to Ethiopian **survey in which 67.6% of** study population does so. The justification of practice might be the socioeconomic disparity (24,25).

**CONCLUSION:**

From our study we conclude that our respondents who are non-medical students have poor knowledge about the use of antibiotics and their resistance and they are following many wrong practices leading to antibiotic resistance. Despite this they have positive attitude in this regard This indicates that the increase in awareness regarding the topic can lead to adoption of correct practices by them helping in lowering this dilemma of antibiotic resistance development.

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