IOSR Journal of Nursing and Health Science (IOSR-JNHS)
e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 4 Ser. IX. (July-Aug .2019), PP 22-28
www.iosrjournals.org

Level of Knowledge and Attitude Regarding Antibiotics Use and Misuse Among Non-Medical Female Students at King Abdulaziz University

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Abstract—*Introduction: The misuse of antibiotics is one of the major health problems worldwide, especially in Arab countries. Antibiotics are types of medicine, which used to treat bacterial infections.*
Research problem*: Few studies have been done in Arab countries particularly Saudi Arabia in regarding misusing antibiotics drugs. Thus, the aim of this study is to assess the level of knowledge and attitude regarding antibiotics use and misuse among non-medical female students at King Abdulaziz University (KAU).*
Materials *The study questionnaire was adapted from a validated survey that was previously used****.***
Method: *Descriptive cross-sectional in design. A convenient non-probability sample of 250 non-medical female students at KAU.*
Summary of *Results The results showed the main reason of using antibiotics without prescription is sore throat (16%), cough (2.4%), superficial infection (1.2%), urinary tract infection (2.4%), others (16.4%). Also, participants strongly agreed that antibiotics are effective against bacteria (29.2%) and versus (21.2%). Most of participants agreed that antibiotics work on most coughs and colds (22.8%). On the whole, respondents who had inadequate knowledge scores showed a good attitude toward antibiotic use.*
Conclusion *The results showed that the majority of the participants has a poor knowledge and good attitudes toward antibiotics use. Therefore, improving the general awareness regarding antibiotic use is needed.*
Recommendations *Educational programs should be developed, there is a need to address the knowledge and attitude to get benefits of changing pattern or behavior****.***

Date of Submission: 09-08-2019 Date of Acceptance: 23-08-2019

I. Introduction

The misuse of antibiotics is one of the major health problems worldwide, especially in Arab countries. Antibiotics are types of medicine, which used to treat bacterial infections [13]. Approximately more than 50% of antibiotics are purchased without a prescription and used over-the-counter in most parts of the world [6]. In some countries, especially in Saudi Arabia many antibiotics are available in pharmacies and you can purchase it by yourself easily without a doctor prescription and that is not legally prohibited which lead to self-prescription of antibiotics. However, there is an exception to some medications that required a special prescription [9]. Although antibiotics can be used for various reasons still there is a misuse can lead to bacterial resistance [12]. Antibiotic resistance is the ability of bacteria to resist the effects of an antibiotic that is, the bacteria are not killed, and their growth is not stopped (Centers for Disease Control and Prevention [CDC], 2018). The factors for self-administration of non-prescribed antibiotics are varied. According to Alnemri [3], these factors attribute to many reasons such as the differences in cultures, behaviors, socioeconomic status and levels of education from persons to another and from country to another. Otherwise, the decreases in the level of education about the uses of antibiotics and increases of self-medication in people behaviors toward antibiotics considered as the major important factors that lead to overuse or misuse of antibiotics.

Research problem Few studies have been done in Arab countries particularly Saudi Arabia in regarding misusing antibiotics drugs.

Research Purpose the aim of this study is to assess the level of knowledge and attitude regarding antibiotics use and misuse among non-medical female students at King Abdulaziz University (KAU).

Research Question What is the level of knowledge and attitude regarding antibiotics use and misuse among non-medical female students at King Abdulaziz University?

II. Literature Review

There are studies have been conducted to determine the level of knowledge and attitude regarding antibiotic use and misuse. In a previous study has been done among a population from different cities of Saudi Arabia. Participants were 1310 aged 18 years old. The study purpose was to assess the knowledge and behaviors of Saudi people towards antibiotics use and self-medication. The data were collected randomly through a cross-sectional questionnaire by interviewing the participants. The results showed that 63.6 % of participants took antibiotics by themselves without a prescription from pharmacies; 71.1% of them did not finish the antibiotic course as they felt better. [8]. This result is interesting because when we compared it to another study done in Kuwait and it was designed to determine knowledge, attitude and practice towards antibiotic use among the public in Kuwait. This study was performed on a sample of 770 randomly selected Kuwaiti persons aged $\geqslant$ 20 years old, using a pretested self-administered questionnaire. The result also showed that 36% of them had not finished the course of treatment. 27.5% were self-medicated with antibiotics. In addition, 47% of participants had low knowledge regarding action, use, safety and resistance of antibiotics. [5]. Furthermore, another previous study done in Jordan in 2011 aimed to assess knowledge, behavior, and attitude toward antibiotics use among adult Jordanians, and the study data were collected through using an interviewer administered-questionnaire. Data collected randomly and the sample size consists of 1141 Jordanian adults. This research concludes that 67.1% believed that antibiotics treat common cold and cough, 28.1% misused antibiotics as analgesics, 28.5% kept antibiotics at home for emergency use and 55.6% use them as prophylaxis against infections. Also, 49.0% used left-over antibiotics without physicians consultation while 51.8% used antibiotics based on their friend's advice [14]. The studies that addressed in this section, raises the question why there is insufficient information to assess the level of knowledge and attitude regarding antibiotics use and misuse especially, in Saudi Arabia.

III. Methodology

*A. **Design***

The research design is descriptive cross-sectional. descriptive design was chosen because it is the most appropriate design for our research study. Sampling participants will be selected from KAU non-medical majors using convenience sampling.

Sample Size a convenient non-probability sample of 250 non-medical female students at KAU will be selected for participating in the study. The inclusion is non-medical female students at KAU. While, the exclusion is medical female students at KAU and non-KAU students

*B. **Measurement Tool***

The study questionnaire was adapted from a validated survey that was previously used in Kuwait [5]. The researcher conducted the questionnaire from Sweden [4] and the United Kingdom [10]. The researcher modified it to suit the local population and assure its reliability and validity through a pilot study. The questionnaire was translated into Arabic and subjected to a process of forward and backward translation. The accuracy and meaning of the translated versions both forward and backward were checked. Also, it was pretested for readability and content on 20 Kuwaiti individuals, modifications were made to be simple to understand, answer and provide accurate data. The purpose of preferring this questionnaire because the Kuwaiti's culture is similar to Saudi's culture.

The questionnaire has five sections. The first section discusses "Sociodemographic data" such as age, marital status and college. The second section consists of 9 close-ended questions about the practice of antibiotic use.

The third section consisted of 13 statements to assess the participants' knowledge about antibiotics use in four parts: action and use (6 statements), side effects (3 statements), and resistance (4 statements). The fourth section included (7 statements) assessing the attitudes toward antibiotics use. Finally, the fifth section included (6 statements) to investigate the doctors' habits and the patient-doctor relationship regarding prescribing of antibiotic. A five-point Likert scale (1 = strongly disagree, 2= disagree, 3=uncertain, 4= agree, 5 = strongly agree) was used to measure the participants' responses.

IV. Analysis

C. Study Variables

The independent variable is the use of antibiotic which is the cause affected the dependent variable level of knowledge, attitude regarding antibiotics use and misuse.

D. Statistical Test Used

We will statistically analyze the results using (SPSS, version 16.0). The results will be reported as a percentages and frequency. Hypothesis tests for regression coefficients will perform and express at (significant level α = 0.05)

V. Results

A Total of 250 were selected from 281 non-medical female students at KAU who agreed to participate in the study. The median age of the participants was (21-23) years old and the standard deviation was (0.833). Table 1 summarize the characteristics of the participants. One hundred and forty-four participant (57.6%) stated that they had been prescribed an antibiotic inside Saudi Arabia in the last 12 months, while (n=4; 1.6%) had been prescribed an antibiotic outside Saudi Arabia. (n=65; 26%) used a prescribed antibiotic two to five times, (n=41; 16.4%) once, (n=11; 4.4%) six to ten times, (n=7; 2.8%) more than ten, while (n=26; 10,4%) they do not remember. (n=72;28.8%) did finish the course of antibiotic, (n=66;26.4%) they did not finish the course of antibiotic, (n=12;4.8%) did not remember.

The main reason of not finishing the antibiotic was that they felt better (n=59; 23.6%). Followed by forgot to take antibiotic (n=19; 7.6%), (n=12; 4.8%) complained of antibiotic side effect, (n=1; 0.4%) to keep it in case for future needs. Also, (n=94; 37.6%) used antibiotic without prescription from medical consultation within 12 months. Most of the participants (n=36; 14.4%) used antibiotics two to five times. The main reason of using antibiotics without prescription is sore throat (n=40; 16%), cough (n=6;2.4%), superficial infection (n=3;1.2%), urinary tract infection (n=6;2.4%), others (n=41;16.4%).

Thirty-seven (14.8%) had given antibiotic to someone else to use it without medical consultation.

Table 2 presents the level of knowledge about antibiotics.). Ninety-eight participants (39.2%) uncertain that antibiotics are effective against bacteria. On the other hand, (n=61;24.4%) agree that antibiotic effective against viruses. Almost 27.2% of 68 participants were uncertain that antibiotics work on most cough and cold. The majority of the participants (n=69;27.6%) were uncertain that antibiotic speed up the recovery from most coughs and colds. Eighty-one participants (32.4%) strongly agree that different antibiotics are needed to cure different diseases. The majority of them (n=75;30%) strongly agreed that antibiotics can kill the bacteria that normally live on the skins and in the gut. One hundred thirty-two of participants (52.8%) strongly agree that they should stop using antibiotic in case of skin reaction. Most of participants (n=83;33.2%) strongly agree that 'antibiotics can cause imbalance in the body's own bacterial flora'. The majority of respondents (n=144;57.6%) strongly agree that they should stop taking antibiotics as soon as possible if they got said effects during the course of antibiotics. Almost (n=91;36.4%) were uncertain that humans can be resistant to antibiotics. Almost (n=95;38%) strongly agree that the unnecessarily use of antibiotics can increase the resistance of bacteria to them. Over half of the participants (n=123;49.2%) uncertain regarding the use of antibiotics among animals can reduce the effect of antibiotics among humans. One hundred thirteen participants 45.2% were uncertain that resistance to antibiotics is a worldwide problem. Table 3 indicates the attitude towards use of antibiotics. Ninety-two participants 36.8% strongly disagree to keep antibiotics at home for future use. The majority of participants (n=161;64.4%) strongly disagree to be able to get antibiotics from relatives or friends without having to see medical doctor. One hundred thirty-two of participants (52.8%) were strongly disagree to be able to buy antibiotics from pharmacy without prescription. Most of participants (n=90;36%) strongly disagree to use antibiotics if they have a cough for more than week. Eighty-two of participants (32.8%) strongly disagree to use an antibiotic when they have sore throat. The majority of participants (n=65;26%) strongly agree that they always complete the course of treatment with antibiotics even if they felt better. Sixty-seven of participants (26.8%) strongly disagree that if they felt better after a few days they stop taking antibiotics before completing the course of treatment.

Table 4 presents doctor's habit and the patient/doctor relationship. Seventy-five participants (30%) were uncertain that 'doctors often take time to consider carefully whether antibiotics are needed or not'. Seventy-eight respondents (31.2%) were uncertain that doctors often prescribe antibiotics because the patient expects it. Almost eighty-two participants (32.8%) were uncertain that they trust the doctor's decision when she or he prescribes antibiotics. Seventy-nine participant (31.6%) were uncertain about 'doctors often take time to inform the patient during the consultation how antibiotics should be used. Most of the participants (n=74;29.6%) strongly agree that pharmacists often tell you how antibiotics should be use. Finally, the majority of the participants (n=122;48.8%) strongly agree that they trust the doctor decision if she or he decides not to prescribe antibiotic.

Table 5 shows the correlation between knowledge and attitude is significant (P>0.01) there is a weak association.

VI. Discussion

This study aims to assess level of knowledge and attitude regarding antibiotic use and misuse.

In our study, most of participants reported that they finished the course of antibiotics as prescribed (28.8%) and (26.4%) of participants discontinued the course which is lower than a study done in Saudi Arabia stated that "(58%) respondents discontinue using antibiotics after completing the course while (42%) discontinue antibiotics on alleviation of symptoms" [1]. Participants who used antibiotics without being prescribed by doctors (37.6%) which is similar to studies done in Italy. (Napolitano et al., 2013). In our study,

(16%) of participants used the self-medicating antibiotics for sore throat as compared to Italy (29.1%) (Napolitano et al., 2013). However, (27.2%) was uncertain that antibiotics work on cough and cold in comparison with a study done in Jordan which stated that "more than half of the respondents (51.1%) agreed that antibiotics work on common cold, cough and nasal congestion" [14], which shows a confusion regarding whither antibiotic are effective against cough and cold. Notably, in our study there was a poor knowledge about antibiotic resistance since (45.2%) of the participants were uncertain about antibiotic resistance. in terms of antibiotics resistance, there is a study showed a poor knowledge in Kuwait. [5].

VII. Limitations

as with other questionnaire studies, it relies on the honesty and recall ability of the respondents. Also, it is limited to antibiotics use only in non-medical female students at KAU. Also, It does not represent all of the population. Few studies have been done in Saudi Arabia regarding antibiotics use.

VIII. Recommendations

Educational programs should be developed, there is a need to address the knowledge and attitude to get benefits of changing pattern or behavior. The findings may help in future studies to decrease misconceptions about antibiotic use.

IX. Conclusion

The results showed that the majority of the participants has a poor knowledge regarding the use of antibiotics include believing that antibiotics are useful in the treatment of common cold, cough and viruses. Many also have a good attitude toward antibiotic use. Therefore, improving the general awareness of the public regarding antibiotics use is needed.

X. Implication

The participants level of knowledge regarding antibiotics use and misuse showed a low level than expected. Participants with a lower level of knowledge are especially in need for improvement. Our study, which is observed in a natural and un-manipulated environment, raises a number of opportunities for future research, both in terms of theory development and concept validation. More research will in fact be necessary to refine and further expand on our findings. However, there should be a further investigations in order to identify the potential of using similar approaches in other settings in the Saudi population where the problem of antibiotic use and misuse is higher.

XI. Tables

TABLE I. GENERAL CHARACTERISTICS (DEMOGRAPHIC)

General Characteristics (Demographic)		
Characteristic	***Frequency***	***Percentage***
Age(years)		
18-20	82	32.8
21-23	145	58.0
24-26	10	4.0
27-30	6	2.4
>30	7	2.8
Marital status		
Single	211	84.4
Married	35	14.0
Divorced	4	1.6
College		
Preparing year	32	12.8
Administration	32	12.8
Literature	50	20.0
Engineering	3	1.2
Science	49	19.6
Law	12	4.8
Home Economic	19	7.6
IT	23	9.2
Art	4	1.6
Media	5	2.0
Business	18	7.2
Enrollment	3	1.2

TABLE II. KNOWLEDGE ABOUT ANTIBIOTICS

Knowledge about Antibiotics							
NO.	*Statement*	*1. Strongly disagree n (%)*	*2. Disagree n (%)*	*3. Neutral (Uncertain) n (%)*	*4. Agree n (%)*	*5. Strongly agree n (%)*	*Median (SD) **
13.	*Antibiotics are effective against bacteria.*	*5 (2.0)*	*19 (7.6)*	*98 (39.2)*	*55 (22.0)*	*73 (29.2)*	*4.00 (1.037)*
14.	*Antibiotics are effective against viruses.*	*35 (14.0)*	*22 (8.8)*	*79 (31.6)*	*61 (24.4)*	*35 (21.2)*	*3.00 (1.287)*
15.	*Antibiotics work on most coughs and colds.*	*30 (12.0)*	*46 (18.4)*	*68 (27.2)*	*49 (19.6)*	*57 (22.8)*	*3.00 (1.314)*
16.	*Antibiotics speed up the recovery from most coughs and colds.*	*32 (12.8)*	*35 (14.0)*	*69 (27.6)*	*66 (26.45)*	*48 (19.2)*	*3.00 (1.276)*
17.	*Different antibiotics are needed to cure different diseases.*	*8 (3.2)*	*23 (9.2)*	*70 (28.0)*	*68 (27.2)*	*81 (32.4)*	*4.00 (1.100)*
18.	*Antibiotics can kill the bacteria that normally live on the skin and in the gut that are good for your health.*	*16 (6.4)*	*26 (10.4)*	*74 (29.6)*	*59 (23.6)*	*75 (30.0)*	*4.00 (1.199)*
19.	*If you get some kind of skin reaction when using an antibiotic, you should not use the same antibiotic again.*	*17 (6.8)*	*18 (7.2)*	*31 (12.4)*	*52 (20.8)*	*132 (52.8)*	*5.00 (1.247)*
20.	*Antibiotics can cause imbalance in the body's own bacterial flora.*	*10 (4.0)*	*20 (8.0)*	*76 (30.4)*	*61 (24.4)*	*83 (33.2)*	*4.00 (1.121)*
21.	*If you get side effects during a course of antibiotics treatment you should stop taking them as soon as possible.*	*9 (3.6)*	*14 (5.6)*	*43 (17.2)*	*40 (16.0)*	*144 (57.6)*	*5.00 (1.126)*
22.	*Humans can be resistant to antibiotics.*	*11 (4.4)*	*22 (8.8)*	*91 (36.4)*	*63 (25.2)*	*63 (25.2)*	*4.00 (1.092)*
23.	*The unnecessarily use of antibiotics can increase the resistance of bacteria to them.*	*38 (15.2)*	*15 (6.0)*	*60 (24.0)*	*42 (16.8)*	*95 (38.0)*	*4.00 (1.430)*
24.	*The use of antibiotics among animals can reduce the effect of antibiotics among humans.*	*42 (16.8)*	*28 (11.2)*	*123 (49.2)*	*29 (11.6)*	*28 (11.2)*	*3.00 (1.158)*
25.	*Resistance to antibiotics is a worldwide problem .*	*4 (1.6)*	*19 (7.6)*	*113 (45.2)*	*57 (22.8)*	*57 (22.8)*	*3.00 (0.976)*

*n: Number of participants; *1: Strongly disagree; 2: Disagree; 3: Neutral (uncertain); 4: Agree; 5: Strongly agree; SD: stander deviation .

TABLE III. ATTITUDES TOWARDS USE OF ANTIBIOTICS

No.	Attitudes towards use of Antibiotics.						
	Statement	*1. Strongly disagree n (%)*	*2. Disagree n (%)*	*3. Neutral (Uncertain) n (%)*	*4. Agree n (%)*	*5. Strongly agree n (%)*	*Median (SD)*
26.	*I prefer to keep antibiotics at home in case there may be a need for them later.*	*92 (36.8)*	*32 (12.8)*	*38 (15.2)*	*40 (16.0)*	*48 (19.2)*	*3.00 (1.561)*
27.	*It is good to be able to get antibiotics from relatives or friends without having to see a medical doctor.*	*161 (64.4)*	*21 (8.4)*	*40 (16.0)*	*13 (5.2)*	*15 (6.0)*	*1.00 (1.232)*
28.	*I prefer to be able to buy antibiotics from the pharmacy without a prescription.*	*132 (52.8)*	*34 (13.6)*	*46 (18.4)*	*24 (9.6)*	*14 (5.6)*	*1.00 (1.267)*
29.	*I prefer to use an antibiotic if I have a cough for more than a week*	*90 (36.0)*	*33 (13.2)*	*50 (20.0)*	*46 (13.4)*	*31 (12.4)*	*3.00 (1.444)*
30.	*When I have a sore throat I prefer to use an Antibiotic*	*82 (32.8)*	*33 (13.2)*	*67 (26.8)*	*32 (12.8)*	*36 (14.4)*	*3.00 (1.420)*
31.	*I always complete the course of treatment with antibiotics even if I feel better*	*58 (23.2)*	*38 (15.2)*	*53 (21.2)*	*36 (14.4)*	*65 (26.0)*	*3.00 (1.507)*
32.	*If I feel better after a few days, I sometimes stop taking my antibiotics before completing the course of treatment*	*67 (26.8)*	*27 (10.8)*	*48 (19.2)*	*50 (20.0)*	*58 (23.2)*	*3.00 (1.522)*

*n: Number of participants; *1: Strongly disagree; 2: Disagree; 3: Neutral (uncertain); 4: Agree; 5: Strongly agree; SD: stander deviation .

TABLE IV. DOCTOR'S HABIT AND THE PATIENT/DOCTOR RELATIONSHIP

Doctor's habit and the patient/doctor relationship							
NO.	*Statement.*	*1. Strongly Disagree n (%)*	*2. Disagree n(%)*	*3. Neutral (Uncertain) n (%)*	*4. Agree n(%)*	*5. Strongly agree n(%)*	*Median (SD)*
33.	*Doctors often take time to consider carefully whether antibiotics are needed or not.*	*48 (19.2)*	*62 (24.8)*	*75 (30.0)*	*32 (12.8)*	*33 (13.2)*	*3.00 (1.273)*
34.	*Doctors often prescribe antibiotics because the patient expects it.*	*25 (10.0)*	*53 (21.2)*	*78 (31.2)*	*58 (23.2)*	*36 (14.4)*	*3.00 (1.189)*
35.	*I trust the doctor's decision when she or he prescribes antibiotics.*	*29 (11.6)*	*23 (9.2)*	*82 (32.8)*	*65 (26.0)*	*51 (20.4)*	*3.00 (1.233)*
36.	*Doctors often take time to inform the patient during the consultation how antibiotics should be used.*	*38 (15.2)*	*62 (24.8)*	*79 (31.6)*	*44 (17.6)*	*27 (10.8)*	*3.00 (1.202)*
37.	*Pharmacists often tell you how antibiotics should be used.*	*17 (6.8)*	*23 (9.2)*	*66 (26.4)*	*70 (28.0)*	*74 (29.6)*	*4.00 (1.191)*
38.	*I trust the doctor decision if she or he decides not to prescribe antibiotic.*	*5 (2.0)*	*13 (5.2)*	*45 (18.0)*	*65 (26.0)*	*122 (48.8)*	*4.00 (1.020)*

*n: Number of participants; *1: Strongly disagree; 2: Disagree; 3: Neutral (uncertain); 4: Agree; 5: Strongly agree; SD: stander deviation .

TABLE V.

Correlations.			
		Knowledge	***Attitude***
Knowledge	***Pearson Correlation***	***1***	***.197*****
	Sig. (2-tailed)	***250***	***.002***
	N		***250***
Attitude	***Pearson Correlation***	***.197*****	***1***
	Sig. (2-tailed)	***.002***	
	N	***250***	***250***
*****. Correlation is significant at the 0.01 level (2-tailed).***			

Acknowledgment

We would like to express our special gratitude to our Supervisor DR. F. Alshareef who gave us a big support in our research as well as our university who gave us this golden opportunity to do this wonderful research on the topic (Level of Knowledge and Attitude Regarding Antibiotics Use and Misuse Among Non-Medical Female Students at King Abdul-Aziz University). Also, we would like to give a special thanks of appreciated to Dr. A. I. Awad who gave us the questionnaire for our research. Finally, we would like to thanks all of the participants who volunteered to share in our research.

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Fatmah H. Alsharif. " Level of Knowledge and Attitude Regarding Antibiotics Use and Misuse Among Non-Medical Female Students at King Abdulaziz University" .IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.04 , 2019, pp. 22-28.