

# Knowledge, attitude and practice of Taif university students, Saudi Arabia, towards antibiotics use

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**Abstract**—Antibiotic misuse and resistance had become a worldwide concern which maybe caused by insufficient knowledge and practice. In this article we determine knowledge, attitude and practice of antibiotics use among students at Taif University. A cross-sectional study was done on 305 students using a predesigned questionnaire at Taif University comparing medical and non-medical students. 35.1% Of participants reported that the purpose of antibiotic use is for treatment of bacterial infection, 76.1% reported the importance to take the antibiotic according to a prescription. The most commonly used antibiotic was amoxicillin and 43.3% reported that the antibiotic is a safe medicine. 75.4% Of them thought that antibiotic resistant will occur if the treatment plan is not complete. Non-medical students had a higher percent of those who used antibiotics without prescription compared to those of medical students. This study highlights the importance of increasing the knowledge regarding correct antibiotic use through implantation health education programs to all Taif University students.

**Index Terms**— Knowledge, attitude, practice, antibiotics, use, Taif, University

## 1 INTRODUCTION

Antibiotics are the most frequently prescribed medicines; they are mainly used for the treatment of upper respiratory tract infection [1]. It has been approximated that from 20% to 50% of antibiotic use is either unnecessary or unsuitable [2], this contributes to raising the level of antimicrobial resistance (AMR) which is an urgent public health crisis, and with an adverse impact on patient outcome [3,4].

Inappropriate use of antibiotics and self-medication without medical prescription have been associated with the emergence of antibiotics resistance and therapeutic failure [5]. However, it is essential for medical staff to provide enough knowledge and education to patients to limit the misuse of antibiotics [5]. Therapeutic failure may lead to difficulty in the future treatment of infection and eventually the need for expensive mortality [6].

Antibiotics is increasing recently because of the misuse of antibiotics [7]. This problem relies on public awareness and adequate knowledge about the use of antibiotics [7].

Previous studies found high percentage of self-medication among adults in Yemen (60%), Jordan (39.5%) and in eastern region in Saudi Arabia (73.7%) [6,7,8]. The causes were the poor experience and knowledge of physicians and health care providers [9]. lack of patient education, pharmaceutical marketing, ease of buying antibiotics without a prescription [10,11]. The most frequent antibiotic used without a medical prescription in the eastern region of Saudi Arabia is amoxicillin and augmentin [6].

Studies have found that young females with low level of education had less knowledge and tend toward self-medication [12]. On the other hand, another study showed that participants with a high level of education tend more to self-medication [8,13].

Many studies showed the most common causes for the antibiotics use were the treatment of colds, sore throat and upper respiratory tract infections although antibiotics are not indicated in these conditions [8,12,14]. Other studies found that participants believe that antibiotic can be used as an analgesic and will enhance recovery [15,16]. The prevalence of antibiotic self-medication among medical students was found as high as 80.89% [17]. A previous study found that 44% of non-medical and 28.1% of medical students agreed that antibiotics cure common colds and viral infections [8].

A careful literature review has found that no study was done to assess knowledge and attitude toward antibiotics use in Taif city, Saudi Arabia. that is why this study aimed at determining the knowledge, attitude and practice of antibiotics use among medical and non-medical students at Taif University.

## 2 SUBJECTS AND METHODS

**2.1. Study design:** A cross-sectional study was done

**2.2. Study settings:** campus of Taif university

**2.3. Sampling methodology:** all undergraduate students of Taif university were contacted and those who agreed to share in the study were the study participants.

**2.4. Study instrument:** A predesigned questionnaire was distributed to participant students from different colleges. The

questionnaire included items about demographic data, use of antibiotics, the purpose of its use, whether it was used according to a prescription or a treatment plan, the type of antibiotic used, and its dose. The questionnaire included items of the participants knowledge regarding antibiotic resistance and its cause and possible solution, and items of the use of more than one antibiotics. Participants were asked if side effect decrease with more than one drugs, who should give the instruction to use the antibiotic, and if the antibiotic users forgot to use the antibiotic before.

**2.5. Ethical considerations:** Research proposal was approved by the research ethics committee of Taif university. Written and verbal consents were obtained from all participants before sharing in the study.

**2.6. Data analysis:** Statistical analysis: Data were coded, tabulated and analyzed using (SPSS) version 20 (Armonk, NY: IBM Corp.). Qualitative data was expressed as numbers and percentages, and Chi- squared test ( $\chi^2$ ) was applied to test the relationship between variables. Quantitative data was expressed as mean and standard deviation (Mean  $\pm$  SD), where Mann-Whitney was applied for non-parametric variables. A p-value of  $<0.05$  was considered as statistically significant.

### 3 RESULTS

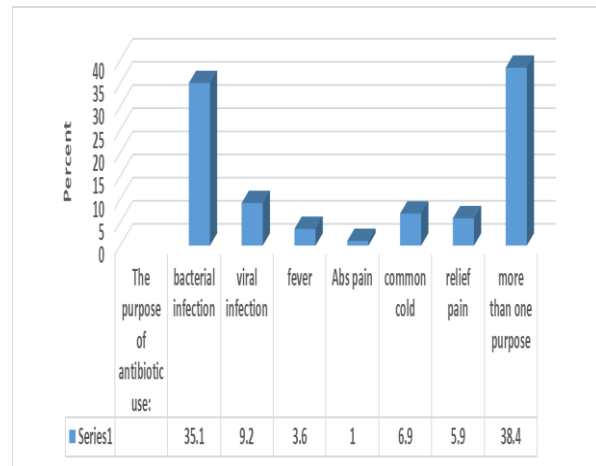
The present study included 305 undergraduate students with a mean age of  $(21.12 \pm 3.34)$  years. Of the participants, 67.9% were females, 51.1% were medical students, and 97.7% were of Saudi nationality (Table 1).

**Table 1. Distribution of the studied participants according to their characters (No. =305)**

Variable	No (%)
<b>Gender</b>	
- Male	98 (32.1)
- Female	207 (67.9)
<b>Specialty</b>	
- Medical	156 (51.1)
- Non-medical	149 (48.9)
<b>Nationality</b>	
- Saudi	298 (97.7)
- Non-Saudi	7 (2.3)

(Figure 1) shows that most of the participants (35.1%) reported that the purpose of antibiotic use is for treatment of bacterial infections, while 38.4% of them gave more than one purpose.

**Figure 1. Distribution of the studied participants according to their response to the purpose of antibiotic use**



(Table 2) shows that most of the participants thought that it is important to take the antibiotic according to a prescription (76.1%), and most of them (60.7%) complete the specific treatment plan of the used antibiotic. Only (43.3%) the participants reported that the antibiotic is a safe medicine, so can it be a common drug.

**Table 2. Distribution studied participants according to their knowledge of antibiotic use**

Variable	No (%)
<b>Do you think it is important to take the antibiotic according to a prescription?</b>	
- No	73 (23.9)
- Yes	232 (76.1)
<b>Do you usually complete the specific treatment plan of the used antibiotic?</b>	
- No	120 (39.3)
- Yes	185 (60.7)
<b>An antibiotic is a safe medicine, so can it be a common drug?</b>	
- No	173 (56.7)
- Yes	132 (43.3)

Most of the participants (66.2%) have heard before about antibiotic-resistant bacteria, (75.4%) thought that antibiotic-resistant bacteria will show up if the treatment plan is not complete, and (72.1%) thought that the solution of antibiotic resistant bacteria is to complete the antibiotic course. About sixty percent (61.1%) of the participants keep the rest of the antibiotic, (74.8%) check the expiry date of the antibiotic, and only (28.5%) thought that the side effect decreases with the use of more than one drug in the same time (Table 3).

**Table 3. Distribution studied participants according to their knowledge about antibiotic resistant bacteria**

Variable	No. (%)
<b>Did you hear before about antibiotic-resistant bacteria?</b>	
- No	103 (33.8)
- Yes	202 (66.2)

- Yes	
<b>Do you think that antibiotic-resistant bacteria will show up if the treatment plan is not complete?</b>	75 (24.6)
- No	230 (75.4)
- Yes	
<b>What is the solution of antibiotic resistant bacteria?</b>	220 (72.1)
- Complete the course	28 (9.2)
- Use more than one drug	57 (18.7)
Use new drug	
<b>Do you keep the rest of the antibiotic?</b>	
- No	117 (38.4)
- Yes	188 (61.6)
<b>Do you check the expiry date of the antibiotic?</b>	77 (25.2)
- No	228 (74.8)
- Yes	
<b>Do you think that the side effect decreases with the use of more than one drug in the same time?</b>	218 (71.5)
- No	87 (28.5)
- Yes	

(Table 4) shows that (43.3%) of the participants took an antibiotic themselves without prescription in the last year, and most of them (39.7%) did not know the exact dose of the used antibiotic. Most of the participants (53.8%) got the instruction of antibiotics use from a doctor, and (52.8%) of them said that the cause of their decision to take the antibiotic was a doctor advice. Unfortunately, (75.1%) of the participants reported that they sometimes forget to take their antibiotic dose.

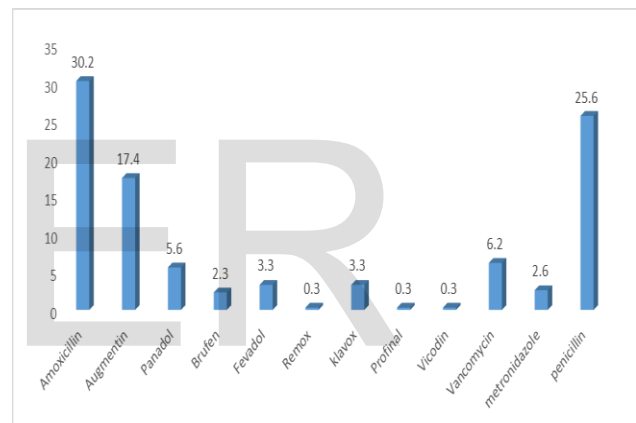
**Table 4. Distribution studied participants according to their practice of antibiotic use**

Variable	No. (%)
<b>Did you take an antibiotic yourself without prescription in the last year?</b>	173
- No	(56.7)
- Yes	132
	(43.3)
<b>What was the dose of the used antibiotic?</b>	
- 100-200	23 (7.5)
- 200-400	49 (16.1)
- 400-600	85 (27.9)
- 600-800	8 (2.6)
- 800-1000 gm	11 (3.6)
- More than 1 gm	121
- I don't know	(39.7)
<b>Where do you get the instruction of antibiotics use?</b>	164
- Doctor	(53.8)

- Pharmacologist	93 (30.5)
- Friend	18 (5.9)
- Internet	30 (9.8)
<b>What was the cause of your decision to take the antibiotic?</b>	161
- Doctor advice	(52.8)
- Previous experience	78 (25.6)
- Personal conviction	42 (13.8)
- More than one answer	24 (7.9)
<b>Do you sometimes forget to take your antibiotic dose?</b>	76 (24.9)
- No	229
- Yes	(75.1)

(Figure 2) shows that the most commonly used antibiotic among the participants was amoxicillin (30.25) and augmentin (17.4%).

**Figure 2. Distribution of the studied participants according to the most commonly used antibiotics**



(Table 5) shows that a significant difference was found between using antibiotic without prescription among the participants and their specialty, where those of non-medical specialty had a higher percent of those who used antibiotics without prescription compared to those of medical specialty (69.9% vs 43%) ( $p < 0.05$ ). On the other hand, a non-significant difference was found between using antibiotic without prescription among the participants and their age and nationality ( $p > 0.05$ ).

**Table 5. Relationship between the use of antibiotics without prescription among the studied participants and their characters**

Variable	Using antibiotic without pre-scripti-on	Not using antibiotic without pre-scripti-on	Test	p-value
	No. (%)	No. (%)		
Age (mean $\pm$ SD)	20.7 $\pm$ 2.44	21.67 $\pm$ 4.19	0.93*	0.34
Specialty				
Medical	64 (43)	85 (57)	22.4	<0.001
Non-medical	109 (69.9)	47 (30.1)	9**	
Nationality				
Saudi	168 (56.4)	130 (43.6)	0.63	0.42
Non-Saudi	5 (71.4)	2 (28.6)		

N.B. \* Mann-Whitney (U) test

\*\* Chi- squared test ( $\chi^2$ )

#### 4 DISCUSSION

This cross-sectional study aimed to evaluate the knowledge, attitude and practice of antibiotics use among medical and non-medical students at Taif University, Taif city, KSA.

In the present study, most of the participants (43.3%) were found to take antibiotic without prescription. This figure is higher than that reported from a study done in Riyadh [19] and Al-Ahsa [6], Saudi Arabia, where the prevalence of non-prescription antibiotic use was (28.1%), and 23.6%. Our results are lower than that revealed from a previous study done in Al-Jouf region, KSA, where 53.5% reported antibiotic self-medicated antibiotic [20].

On the other hand, a higher percent was found in another national study, where 63.6% of the participants took antibiotics without prescription, a matter that was explained by the insufficient implementation of antibiotics access control in Saudi Arabia [21].

In the present study, (53.8%) of the participants got the instruction of antibiotics use from a doctor, and (52.8%) of them said that the cause of their decision to take the antibiotic was a doctor advice. The same result was observed in a previous study done in Al-Madinah city, KSA, where the most common source of knowledge about antibiotics among participants was a physician (50.8%) [22].

Out result is much better than that reported in the study done in Al-Ahsa, where 28.8% of the participants reported that the main source of nonprescribed antibiotics was the pharmacist [6].

In this study, (60.7%) of the participants completed the specific treatment plan of the used antibiotic. In the study done in Al-Ahsa (71.4%) of the participants reported the same results, as 28.6% of them stated that they discontinued the antibiotics when they felt better [6]. Nearby results were obtained from another study done in Yemen, where 38.8% of the respondents stop taking antibiotic if they feel better [12].

In the present work, (75.4%) of the participants thought that antibiotic-resistant bacteria will show up if the treatment plan is not complete. Similar results were revealed from a previous Saudi study, where (74%) of the respondents thought that the

unnecessarily use of antibiotics can increase the resistance of bacteria to them [6].

This study showed that amoxicillin and augmentin were the most commonly used antibiotic among the participants. The same result was observed in a previous Saudi stud, where amoxicillin, ampicillin, and augmentin were selected by most of the participants [20].

In the present work, 61.1% of the participants kept the remnant antibiotics. This percent is higher than that reported in previous two Saudi studies, where only 44.4% [22], 43.9% [23] of the participants kept the left-over antibiotics and use it later. This wrong practice of keeping the left-over of antibiotics can cause side effects and increase the antimicrobial resistance on the long term [23].

The present study found a significant difference between medical and non-medical students according to the use of antibiotics without prescription, where non-medical students had more antibiotics use without prescription comparing to medical students. This result could be attributed to the better of medical students about common prescribed antibiotics. On the other hand, different results was observed in a study done in Jordan, that found a non-significant difference [24], and found also in another national study where self-medication use was more in medical students [23].

This study showed that 12.8% of non-medical students used antibiotics for treatment of viral infection compared to 6.3% of medical students. A previous study had found a higher figure among non-medical students, where 70% believed that antibiotics can be prescribed for treating viral infections (25). Our resuoltd are better than that observed in the study done in Jordan (24), as 44% of non-medical and 28.1% medical students agreed that antibiotics cure common colds and viral infections.

A lot of previous studies had proved that some people do not know the difference between viral and bacterial infections and use antibiotics for viral infections [23,25]. This was attributed to the communication and counseling defect in clinicians and pharmacists practice.

#### Limitations

One of the limitations of the present study was the small sample size. Another limitation was choosing one area which makes the results not representative to the whole Saudi population. Using a self-reported questionnaire for data collection could be another limitation that led to a recall bias.

#### Conclusion

Based on the results of the present study, there is insufficient knowledge regarding issues related to antibiotics among the studied samples. These issues necessitate the implementation of health education programs directed to both medical and non-medical students about the importance to use antibiotics according to a doctor prescription, the correct use and the complications of the misuses.

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