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Research Article

**IRRATIONAL USE OF ANTIBIOTICS AMONG STUDENTS  
AND EMPLOYEES AT TAIBAH UNIVERSITY AND ITS  
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**Abstract**

**Background:** Poor knowledge and attitude towards antibiotics use and resistance are some of the major challenges that need to be addressed around the world. So, this study was performed to assess the knowledge and attitudes of Taibah University students and employees about antibiotics usage, and to study the most effective practicing solutions to improve the antibiotics usage.

**Methods:** this is a prospective cross-sectional study that was conducted among Taibah University students and employees. The study included 632 randomly chosen participants. Data was obtained by a well-structured self-administrated questionnaire and analyzed.

**Results:** 64.2% of responders used antibiotics without a prescription. 66% reported that ease of access was the major reason behind self-medication attitude. Only 20.2 %faced rejection from the pharmacist to sell antibiotics without a prescription. 8.2% of participants who use antibiotics without prescription, are using regularly antibiotics until consuming the entire course.40% of participants who use antibiotics without a prescription, take the therapeutic dose based on previous experience. 58.1% knew that antibiotics treat bacterial diseases. 63.3% knew that bacteria can resist the antibiotic.45% of the participants agree that the antibiotics are used to treat and prevent symptoms together.

**Conclusions:** There was unfavorable attitude towards the antibiotics use, and insufficient knowledge and misconceptions about the antibiotics use and resistance, among Taibah University students and employees.

**Keywords:** Antibiotics, Prescription, Taibah, University, Resistance.

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**INTRODUCTION:**

Antibiotics are medications used to the kill the bacteria or inhibit its activity [1]. Antibiotics have saved and still saving a huge number of lives yearly. But, the problem of antibiotic resistance emerged in to the public health issue, it's a serious and one of the most threatening healthcare problems around the world [2]. Antibiotic resistance is defined as the microorganism ability to resist and survive the exposure to antimicrobial drugs, this behavior is threatening the effectiveness of successful treatment of infection. Antibiotic resistance also has the capability to be transferred genetically from a microorganism to another [2].

It is very important to look at what could be enhancing the rise of antibiotic resistance. So, this study was designed to assess the knowledge and attitudes of Taibah University students and employees about antibiotic usage, to determine the most common antibiotics used without prescription or with old one, to find out the most common disease that has been driven the people to misuse and overuse of antibiotic, to find out the most common side effect related to this antibiotic and to study the most effective practicing solutions to improve the antibiotic usage.

**MATERIALS AND METHODS:**

This analytical cross-sectional study was conducted in Taibah university in Nov 2015, to explore knowledge and attitudes of Taibah University students and employees. A convenience sample of 632 responders was taken among the students and employees of Taibah University of both genders.

The self-administrated questionnaire was conducted in Taibah university and its branches in hand to hand and electronic manner. The questionnaire covering questions about (1) socio-demographics and information about previous antibiotics use, (2) access to antibiotics (3) knowledge on areas of antibiotics use and effectiveness (4) knowledge on side-effects of antibiotic treatment and antibiotic resistance. There were questions that the responders could answer by yes or no agreement scale, always scale and other nominal variables .

The socio-demographic characteristics was collected and included: gender (male/female), age, income, marital status, work type (student or employee) and specialty (pharmacology related, and non-pharmacology related).

The names of the antibiotics in the questionnaire are the most common antibiotics that sold out in 8 of Madinah pharmacies without prescription.

**DATA ANALYSIS:**

The SPSS version 18 was used for data analysis. The chi-square test was used for categorical data and the t- test was used for the quantitative data analysis and  $p < 0.05$  were considered significant in the final models.

**RESULTS:**

The study population included a random sample of 632 students and employers of Taibah University. The following table shows their distribution according to personal data.

**Table 1:** Distribution of participants in the study according to personal data.

Variable		N	%	P-value
<b>Age (years)</b>	less than 20	98	15.5	.000*
	20- 29	466	73.7	
	30- 39	56	8.9	
	40 and more	12	1.9	
<b>Gender</b>	Male	307	48.6	.474
	Female	325	51.4	
<b>Marital status</b>	Single	503	79.6	.000*
	Married	123	19.5	
	Other	6	.9	
<b>Nature of work</b>	Student	527	83.4	.000*
	Employee	105	16.6	
<b>Educational level</b>	Bachelor	404	63.9	.000*
	Postgraduate	41	6.5	
	Secondary	182	28.8	
	Preparatory	4	.6	
<b>Income (Saudi Riyals)</b>	Primary	1	.2	.000*
	Less than 4000	474	75.0	
	4000 – 8000	87	13.8	
	8000 – 12000	45	7.1	
	More than 12000	26	4.1	
<b>Total</b>		632	100.0	

Chi-squared test: \*Significant at 0.01

It is clear from the previous table that almost 74% of the participants were between (20-29 years), 16% of them were less than (20 years), 9% of them were between (30-39 years), and 2% of them were more than (40 years). 49% of studied participants were males, while 51% of them were females. 80% of them were single, while 20% of them were married. 83% of our studied participants were students, while 17% of them were employees. And their distribution according to education level, 64% of them were

bachelor; and 29% of them were secondary. And their distribution according to income, 75% of them were less than (4000), 14% of them were between (4000-8000), 7% of them were between (8000-12000), and 4% of them were more than (12000).

The following table shows the participants' distribution according to their study of pharmacology, where we found that 27% have already studied pharmacology, while almost 73% have never studied pharmacology.

**Table2:** Distribution of the participants' according to their study of pharmacology.

	Frequency	Percent
Yes	173	27.4
No	459	72.6
Total	632	100.0

The following table shows the participants' distribution according to use of antibiotics without a prescription, where we found that 64% of them have

used antibiotics without a prescription, while 35% have never used antibiotics without a prescription.

**Table3:** Distribution of the participants' according to use of antibiotics without a prescription.

	Frequency	Percent
Yes	406	64.2
No	219	34.7
I didn't use antibiotics at all	7	1.1
Total	632	100.0

The following table shows the participants' distribution according to motivation for the use of antibiotics without a prescription, where we found that 66% of the participants used antibiotics without a

prescription because of "easy access," and 12% of them were using antibiotics without a prescription because of "delayed hospital dates ", and 18% had other motives.

**Table4:** Distribution of the participants' according to motivation for the use of antibiotics without a prescription.

	Frequency	Percent
Ease of access	268	66.0
Delayed hospital appointments	47	11.6
Cost of hospitals	9	2.2
Lack of confidence in the medical staff	11	2.7
Other	71	17.5
Total	406	100.0

The following table shows the participants' distribution according to the factors they rely on when purchasing antibiotics without a prescription. We found that 45% rely on their previous

experiences, 23% rely on the advice of parents or relatives, 20% rely on the pharmacist advice, and 6% rely on the prevalence of antibiotic use among people.

**Table5:** Distribution of the participants' according to the factors they rely on when purchasing antibiotics without a prescription.

	Frequency	Percent
Previous experience	184	45.3
Parents or relatives advice	95	23.4
Pharmacist advice	81	20.0
Price	4	1.0
Prevalence of use among people	26	6.4
Other	16	3.9
Total	406	100.0

The following table shows the participants' distribution according to whether they were faced rejection from the pharmacist to sell antibiotics without a prescription, where we note that almost

80% of them faced rejection from the pharmacist to sell antibiotics without a prescription, while almost 20% did not face rejection from the pharmacist to sell antibiotics without a prescription.

**Table6:** Distribution of the participants according to rejection from the pharmacist to sell antibiotics without a prescription.

	Frequency	Percent
Yes	82	20.2
No	324	79.8
Total	406	100.0

The following table shows the participants' distribution according to reported side effects of antibiotics. 77% of the participants did not have any

side effects due to the use of antibiotics, while 23% had side effects due to the use of antibiotics without prescription.

**Table7:** Distribution of the participants' according to side effects of antibiotics.

	Frequency	Percent
Yes	94	23.2
No	312	76.8
Total	406	100.0

The following table shows the participants' distribution according to the way they use antibiotics without prescription, where 48% of them regularly

use antibiotics until symptoms disappear, 37% use antibiotics intermittently when feeling symptoms, and 8% used antibiotics until end of the box.

**Table8:** Distribution of the participants' according to the way they use antibiotics without prescription.

	Frequency	Percent
You use it regularly until symptoms disappear	195	48.0
You use it intermittently when feeling symptoms	148	36.5
Use until the end of the capsules in the box	34	8.4
Other	29	7.1
Total	406	100.0

The following table shows the participants' distribution according to the way they take the therapeutic dose of antibiotic, we found that 40% of the participants take the therapeutic dose based on

previous experience, 26% take the treatment dose based on the internal prescription of the drug, and 22% take the treatment dose based on the pharmacist's prescription.

**Table9:** Distribution of the participants' according to the way they take the therapeutic dose of antibiotic.

	Frequency	Percent
Take the therapeutic dose based on previous experience	164	40.4
Take the therapeutic dose according to the internal prescription of the drug	107	26.4
Take the therapeutic dose based on the experiences of others	21	5.2
Take the dose according to the pharmacist's description	90	22.2
Other	24	5.9
Total	406	100.0

The following table shows the participants' distribution according to the result of intake of antibiotics without a prescription, where we found that almost 57% of them had relieved symptoms of

the disease, 40% less severe symptom, while 3% ask medical advice because of non-response to the antibiotic.

**Table10:** Distribution of the participants' according to the result of intake of antibiotics without a prescription.

	Frequency	Percent
Relieve of symptoms	232	57.1
Decreased symptoms	161	39.7
Ask medical advice because of non response to the antibiotic.	13	3.2
Total	406	100.0

The following table shows the participants' distribution according to the way they treat the symptoms of the disease if the symptoms return, we found that almost 52% visit the doctor, 30% use the

same antibiotic with the same dose, 13% buy another antibiotic without prescription, and 6% increased antibiotic dose.

**Table11:** Distribution of the participants according to the way they treat the symptoms of the disease if the symptoms return.

	Frequency	Percent
Using the same antibiotic with the same dose	120	29.6
Increases antibiotic dose	25	6.2
Buy another antibiotic without prescription	51	12.6
Visit the doctor	210	51.7
Total	406	100.0

The following table shows the participants' distribution in terms of motives for the purchase of antibiotics, where we found that almost 70% of the participants buy antibiotics when symptoms are

intolerable, 15% of them buy antibiotics when experience any symptoms, and 15% of them buy antibiotics when they have an urgent need to get rid of symptoms.

**Table12:** Distribution of the participants' in terms of motives for the purchase of antibiotics.

	Frequency	Percent
When you experience any symptoms	61	15.0
When the symptoms becomes too intense and can't be tolerated	286	70.4
When I have to get rid of the symptoms is important	59	14.5
Total	406	100.0

The following table shows the participants' distribution according to whether they are prescribing antibiotics to others based on their previous

experiences. We found that 73% do not prescribe antibiotics for others based on their previous experiences, while 27% do so.

**Table13:** Distribution of the participants according to whether they are prescribing antibiotics to others based on their previous experiences.

	Frequency	Percent
Yes	172	27.2
No	460	72.8
Total	632	100.0

The following table shows the participants' distribution in terms of their knowledge about penicillin, 32% don't know penicillin, 31% knowing

its name only, 20% knowing its use and side effects, and 18% knowing its use only.



**Table14:** Distribution of the participants in terms of their knowledge about penicillin.

	Frequency	Percent
I know its uses	115	18.2
I know its uses and its side effects	124	19.6
I only know its name	194	30.7
I don't know it	199	31.5
Total	632	100.0

The following table shows the participants' distribution according to their knowledge of antibiotics and methods of use.

**Table15:** Distribution of the participants according to their knowledge of antibiotics and methods of use.

	Agree		Disagree		I do not know	
	No.	%	No.	%	No.	%
• Antibiotics treat bacterial diseases.	367	58.1	82	13.0	183	29.0
• Antibiotics treat viral diseases	226	35.8	203	32.1	203	32.1
• Remaining antibiotics should be retained for further use.	219	34.7	313	49.5	100	15.8
• Different types of bacteria need different types of antibiotics.	401	63.4	46	7.3	185	29.3
• The antibiotic kills all types of bacteria in the body.	119	18.8	282	44.6	231	36.6
• Bacteria can resist the antibiotic.	400	63.3	37	5.9	195	30.9
• Increased use of antibiotics leads to bacteria resistance to antibiotics.	349	55.2	88	13.9	195	30.9
• Human can be an antibiotic resistance.	368	58.2	47	7.4	217	34.3
• The antibiotic is used to treat symptoms only.	161	25.5	262	41.5	209	33.1
• The antibiotic used for the prevention of symptoms only.	110	17.4	322	50.9	200	31.6
• The antibiotic is used to treat and prevent symptoms together.	281	44.5	135	21.4	216	34.2

We found from the previous table that:

- Almost 58% of participants agreed that antibiotics treat bacterial diseases.
- Almost 36% of participants agreed that antibiotics treat viral diseases.
- Almost 35% of the participants agree that the remaining antibiotic should be retained for further use.
- Almost 63% of responders agree that different types of bacteria need different types of antibiotics.
- Almost 18% of participants agreed that antibiotics kill all types of bacteria in the body.
- Almost 63% of the participants agree that bacteria can resist the antibiotic.
- Almost 55% of the participants agreed that increased use of antibiotics leads to bacteria resistance to antibiotics.
- Almost 58% of participants agree that humans can be an antibiotic resistance.
- Almost 26% of the participants agree that the antibiotic is used to treat symptoms only.
- Almost 17% of the participants agree that the antibiotic is used to prevent symptoms only.
- Almost 45% of the participants agree that the antibiotic is used to treat and prevent symptoms together.

## DISCUSSION:

Poor education and awareness towards antibiotic use and resistance around the world are some of the major challenges that need to be addressed at both the national and global levels in order to ensure and improve suitable antibiotic use [12]. Therefore, this study was conducted to assess the knowledge and attitudes of Taibah University students and employees about antibiotic usage, and to study the most effective practicing solutions to improve the antibiotic usage.

According to the results of this study there was high prevalence of using antibiotics without a prescription, as 64.2% of our responders used antibiotics without a

prescription. This result is higher than the result of other study in Saudi Arabia by Al-Shibani et al, 2017. where they found that about 51% used antibiotics without a prescription [10]. This study highlights the need for further enforcement of regulations which determine the access to antibiotics. Also, in Jordan Shehadeh et al, 2012 found that 49.0% use left-over antibiotics without a prescription [6]. As well as in Malta (48%), Romania (47%) and Cyprus (47%), Germany (27%), Poland (26%) and Sweden (24%) used antibiotics without a prescription [13]. The difference in proportions between different countries may be due to drug regulations that effect the access of antibiotics are applied differently in different countries and can play a major role in misconceptions about the antibiotics use [10].

The major reason behind self-medication attitude was the ease of access reported by 66% of our participants. This shows the need to apply more regulations that restrict access to antibiotics without a prescription. It is striking here that only 20.2 % of the participants in this study faced rejection from the pharmacist to sell antibiotics without a prescription. It was reported that patients' demands, and the profit interest of the private pharmacies are factors that may lead to inappropriate dispensing of antibiotics without a prescription. Hence, a balance between professionalism and profitable commercial aims needs to be addressed [9]. It was reported that profit interest of the private pharmacies and patients' demands are factors that could lead to inappropriate dispensing of antibiotics without a prescription. So, a balance between profitable commercial aims and professionalism should be addressed [9].

The present study reveals knowledge gaps and misconceptions about antibiotic use among the participants, the most common symptoms that lead participants to use antibiotics without a prescription were sore throat, high temperature, cough and cold. But the fact is a common cold and coughs are caused mostly by a virus, so it shouldn't be treated using antibiotics [8]. Also, sore throat, high temperature could be caused by bacteria or other pathogens [14,15], so it should be treated by physicians. This misuse could attribute to improper communication, while counseling, doctors use the general term 'germs' for indication of ABs, rather than specifically mentioning bacteria [10]. Of course, misuse of antibiotics can increase the resistance of antibiotics.

Only 8.2% of our participants who use antibiotics without prescription, are using regularly antibiotics until consuming the entire course. While, 48% use it regularly until symptoms disappear, this finding close to Awad et al, 2015 who found that 45% of

responders expressed negative attitude to stop taking antibiotics before completing the course once they felt better [9]. While Kandelaki et al, 2015 found that the majority of participants had correct knowledge of the importance of completing a full course of antibiotics even when symptoms improved [12]. Patients does not follow complete course of antibiotics which is the root cause of bacterial resistance, and this misconception in the use of antibiotic may put the patient at risk of relapse with resistant pathogenic bacteria.

About 40% of our participants take the therapeutic dose of antibiotics based on previous experience. This is not acceptable because the previous dose may be inaccurate, and the company may make adjustments to the concentrations of drugs and this would harm the patient if he uses the same previous dose. While, 26.4% take it based on the internal prescription of the drug, this behavior may be more prudent to the patient because internal drug releases contain appropriate concentrations for different ages.

Unfortunately, about one-third of participants use the same antibiotic with the same dose if the symptoms return, while 12.6% buy another antibiotic without prescription, and 6.2% reported that they increase the antibiotic dose. But by doing so, they increase the resistance to antibiotics.

The participants in this study displayed a poor knowledge about penicillin. 30.7 % only know its name. Where about one third of the participants know only its name, while 31.5% know nothing about it.

The participants in this study showed insufficient knowledge about the use of antibiotics and antibiotic resistance. These results correspond to the results of another study conducted in KSA by Al-Shibani et al, 2017 who found that adults showed insufficient understanding and knowledge regarding the safe use of antibiotics consumption among the population [10]. Also, study conducted by Chinnasami et al, 2016 found that the respondents showed a high level of misunderstanding clearly [16]. As well as, Kandelaki et al, 2015 reported that their respondents have many misconceptions and a lack of awareness on antibiotic use and resistance [12]. Similarly, Shehadehet al, 2012 found that the respondents had obvious poor knowledge about antibiotic resistance [6].

Studies show that public knowledge of antibiotic treatment and antibiotic resistance awareness can effect on the patient demand for antibiotic prescriptions, as well as their behavior towards use of antibiotics [17]. Therefore, it is necessary to work on

increasing knowledge about the nature of antibiotics, their effect and how to use them, as well as the antibiotic resistance and how to reduce it .

In conclusion, Taibah University students and employees showed unfavorable attitude towards the antibiotic use, there was high prevalence of using antibiotics without a prescription, the ease of access was the major reason behind self-medication attitude. Also, they showed insufficient knowledge and misconceptions about the antibiotics use and antibiotic resistance. For these reasons we recommend to do seminars and workshops for spreading awareness about antibiotics, their uses and antibiotic resistance, Put more rules and regulations that limiting access to antibiotics without a prescription, improve communication between patients and healthcare professionals and activate the role of pharmacists in health education and promotion, and the responsibility in preventing the dispensing of antibiotics without a prescription

#### **Ethical consideration:**

Free informed consent was taken after ensuring the confidentiality of the data for the subjects and the data will be used only for research purpose.

#### **Conflict of interests:**

Authors declared that there is no conflict of interest regarding this work.

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