



Assessment of Knowledge and Attitude toward Antibiotic Misuse and Resistant among Selected Group of Sudanese University Students, 2022

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<p>Abstract: Background: Globally, antimicrobial resistance is a serious public health concern. The World Health Organization (WHO) has highlighted improper antibiotic usage as a key risk factor for antimicrobial resistance. Aims: Assessing the knowledge and attitudes of students regarding antibiotic misuse and resistance could lead to better management and eventually a good quality of life. Methodology: This study is a descriptive cross-sectional study conducted on 150 students in a selected group of Sudanese university students, randomly selected from students by self-administering that was conducted using a structured questionnaire. These variables were assessed using a ten-point scale, whose responses ranged from ``YES`` to ``NO``. Results: The current study demonstrates that the highest percentage (47.3%) was in the age group (21-23), and more than half of participants had good knowledge and attitudes regarding antibiotic misuse and resistance. This study reflects that most of the participants were male, with a total of 108 (72.0%), and several females, with a total of 42 (28.0%). The study shows that most of the students at the second level are 55 (36.7%), single (144 (96.0%)), and married (4.0%). Conclusion: The research conclusion is that students have good knowledge of antibiotics and good knowledge of antibiotic resistance. The majority of these students have a mediocre attitude toward the use of antibiotics, which is insufficient for a group of students enrolled in health-related programs.</p>	<p>Research Paper</p>
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INTRODUCTION

Antibiotics, also known as antibacterials, are medications that destroy or slow the growth of bacteria. These include a range of powerful drugs that are used to treat diseases caused by bacteria. Antibiotics cannot treat viral infections such as colds, flu, and most coughs. Antibiotics are extremely important in the fight against infections, but it is thought that they are used incorrectly in almost half of cases. Antibiotic resistance is the result of bacteria changing in a way that diminishes or eliminates the effectiveness of medications, chemicals, or other agents intended to cure or prevent infections. The bacteria survive and continue to multiply causing more harm [1]. Misuse of antibiotics promotes the emergence of antibiotic resistance, which is responsible for 700,000 deaths per year worldwide, of which 12,500

occur in France [2, 3]. Resistance to antibiotics is significantly increased in almost all students. This increase can be attributed to a lack of knowledge on the issue of antibiotic resistance and inappropriate attitudes towards their usage, like self-medication. This work assessed the relationship between students' knowledge of antibiotic misuse and their attitudes toward antibiotic resistance. Also, at the same time, determine the level of students' knowledge of antibiotics. A growing list of infections such as pneumonia, tuberculosis {TB}, blood poisoning, gonorrhea, and foodborne diseases are becoming harder, and sometimes impossible, to treat as antibiotics become less effective. While antibiotics can be bought for human or animal use without a prescription, the emergence and spread of resistance are made worse [4]. Numerous studies have reported improper antibiotic use among students in both medical

and non-medical colleges with self-medication and an adequate lack of knowledge of antibacterial agents [indications, compliance with usage regimens, and specificity of agents to the infective organism] [5, 6]. Regarding antibiotic resistance in Sudan, a 2007 study established a high prevalence of self-medication with antibiotics and antimalarials among undergraduate university students in Khartoum State in 2016. The current situation of antimicrobial resistance [AMR] in Sudan is that antimicrobial use [AMU] is not regulated and antimicrobial agents can be easily obtained over the counter from pharmacies, general stores, and market stalls [7]. This increasing use, overuse, and abuse of antibiotics to treat illness is the greatest factor causing the spread of drug resistance. Antibiotics are misused because many patients do not take them according to prescription instructions [8]. Misuse of antibiotic therapy, including failure to complete therapy, skipping of doses, or reuse of leftover antibiotics, can potentially expose the patient to suboptimal doses of antibiotic therapy [9, 10]. Antibiotics do not have any effect on viral infections [11].

MATERIALS AND METHODS

- **Study Design:** A descriptive, prospective cross-sectional study.
- **Study Design:** Descriptive cross-sectional study.

- **Study Area:** This study has been carried out by a selected group of Sudanese University Students, located in southeast Khartoum state, near the Soba University Hospital and University of Khartoum (MLS), east Madani Street.
- **Study Population:** The study populations are students who are living in a selected group of Sudanese University Students.
- **Variable Study:** Socio-demographic data, knowledge, and attitude about antibiotic misuse and resistance.
- **Sample Technique:** Simple Radom sample.
- **Data Collection Tool:** A structured questionnaire will take about 15 to 20 minutes.
- **Data Collection Technique:** Self-administering technique.
- **Data Analysis:** Dates are analyzed using statistical package for social science {SPSS} version 26 inform of frequency and percentage.
- **Ethical Consideration:** Ethical approval for this study will be conducted under permission from Al-Fajr College for Science and Technology. Take permission from the students selected group of Sudanese University Students. The study will be confidential to protect the rights of the participants. Full confidentiality.

RESULTS

Table 1: Distribution of participants according to age

Age	Frequency	Percentage (%)
18 - 20 years	9	6.0
21 - 23 years	71	47.3
24 - 26 years	40	26.7
More than 27	30	20.0
Total	150	100.0

Table 2: Distribution of participants according to marital status

Marital status	Frequency	Percentage (%)
Married	6	4.0
Single	144	96.0
Total	150	100.0

Table 3: Distribution of participants according to gender

Gender	Frequency	Percentage (%)
Male	108	72.0
Female	42	28.0
Total	150	100

Table 4: Distribution of participants according to family income

Family income	Frequency	Percentage (%)
Weak	97	64.7
Middle	34	22.7
Good	18	12.0
Very good	1	0.7
Total	150	100

Table 5: Distribution of participants according to level of educational

Educational	Frequency	Percentage (%)
First level	97	64.7
Second level	34	22.7
Third level	18	12.0
Forth level	1	0.7
Total	150	100

Table 6: Distribution of participants according to Specialization

Specialization	Frequency	Percentage (%)
Health Sciences	28	18.7
Engineering sciences	64	42.7
Human sciences	8	5.3
Forest sciences	29	19.3
Other sciences	21	14.0
Total	150	100

Table 7: Distribution of participants according to use of prescription before starting antibiotics

Variable	Frequency	Percentage (%)
Yes	95	63.3
No	55	36.7
Total	150	100

Table 8: Distribution of participants according to stop taking the prescribed antibiotic after their symptoms improved

Variable	Frequency	Percentage (%)
Yes	70	46.7
No	80	53.3
Total	150	100

Table 9: Distribution of participants according to completion of the course of the prescribed antibiotic treatment.

Variable	Frequency	Percentage (%)
Yes	120	80.0
No	30	20.0
Total	150	100

Table 10: Distribution of participants according to taking the correct dose of your antibiotic at the right time for the all duration

Variable	Frequency	Percentage (%)
Yes	77	51.3
No	73	48.7
Total	150	100

Table 11: Distribution of participants according to saving the remaining antibiotic for next time when you get sick

Variable	Frequency	Percentage (%)
Yes	30	20.0
No	120	80.0
Total	150	100

Table 12: Distribution of participants according to checking the expiry date of the antibiotics before using them.

Variable	Frequency	Percentage (%)
Yes	140	93.3
No	10	6.7
Total	150	100

Table 13: Distribution of participants according to buying the same antibiotics if you are sick and they helped you get better when you had the same symptoms before

Variable	Frequency	Percentage (%)
Yes	80	53.3
No	70	46.7
Total	150	100

Table 14: Distribution of participants according to giving leftover medications to friends or family if they get sick

Variable	Frequency	Percentage (%)
Yes	40	26.7
No	110	73.3
Total	150	100

Table 15: Distribution of participants according to prefer taking antibiotics when you have cough or sore throat

Variable	Frequency	Percentage (%)
Yes	105	70.0
No	45	30.0
Total	150	100

Table 16: Distribution of participants according to Antibiotics are not effective drugs for the treatment of fever

Variable	Frequency	Percentage (%)
Yes	53	35.3
No	97	64.7
Total	150	100

Table 17: Distribution of participants according to Antibiotics can be obtained without the intervention of a doctor or pharmacies

Variable	Frequency	Percentage (%)
Yes	20	13.3
No	130	86.7
Total	150	100

Table 18: Distribution of participants according to Antibiotics can help with most disease treatment

Variable	Frequency	Percentage (%)
Yes	135	90.0
No	15	10.0
Total	150	100

Table 19: Distribution of participants according to heard about antibiotic resistance

Variable	Frequency	Percentage (%)
Yes	91	60.7
No	59	39.3
Total	150	100

DISCUSSION

This study aimed to assess students' knowledge and attitudes regarding antibiotic misuse and resistance among a Selected Group of Sudanese University Students, in 2022. The sample consisted of (150) individuals. A questionnaire was used to collect the data from all participants which included various questions to assess the knowledge regarding antibiotic misuse and resistance, other questions included attitudes regarding antibiotic misuse and resistance, and then the data was analyzed using (the SPSS) program to reach an accurate result that helped the researchers to put a clear percentage that represents the level of knowledge among students and to assess the quality about attitudes the

students have regarding antibiotics. The result of our study showed the highest percentage (47.3%), in the age group 21-23, (96.0%) single, (72.0%) are male, the highest percentage in family income (64.7%) weak, the highest percentage (36.7%) the second level of education, (42.7%) were engineering sciences the study reflect most of the participant. These results agreed with the study findings done in Mali by Chen *et al.*, [12]. Which found that the mean ages were 21.3 ± 2.4 years, 69.5% of participants were males, and the vast majority (90.6%) were single. Also, these results are consistent with Aljayyousi *et al.*, [13]. Which found that 38.6% of the participants were in the age group (21–25) years. The distribution of participants according to their attitude

regarding prescription before starting antibiotics yes 95(63.3%) regarding getting an antibiotic from a pharmacy without a prescription, the study shows that 63.3% of the students have a positive attitude about it. This result is consistent with Siam *et al.*, [14]. This found that 63.7% of the participants have a positive attitude about taking an antibiotic prescription from a doctor, the results show that they are more knowledgeable. The distribution of participants according to their attitude regarding stopping antibiotics after improved No 80 (53.3%). In addition, about Yes (47.7%) of the respondents stop taking antibiotics when they start feeling better, consequently, about the same proportion keep them in stocks at home to use in case of an emergency. This is comparable with the systemic review study where 47.1% of the respondents stop taking antibiotics when they start feeling better [15]. The distribution of participants according to their attitude regarding complete courses of antibiotics Yes 120(80%), No 30(20%), the percent 80% showed that the students have a good attitude about antibiotics misuse and their resistance. The distribution of participants according to their attitude about taking antibiotics at the right time Yes 77(51.3%), No 73(48.7%). The distribution of participants according to their attitude about saving antibiotics for the next time Yes 30 (20%), No 70(80%) because they have no refrigerator. The distribution of participants according to their attitude about the check expiry date of antibiotics Yes 140 (93.3%), No 10(6.7%) because are well knowledgeable. The distribution of participants according to their attitude about buying the same antibiotics Yes 80 (53.3%), No 70 (46.7%), The highest percentage (53.3%) of the students have a positive attitude regarding (Buying the same antibiotics or ordering them from a doctor if you are sick and helping you get better when you had the same symptoms before). The result agreed with the study findings done at the University of Brunei Darussalam [16]. The distribution of participants according to their attitude about giving leftover antibiotics to family or friends if get sick Yes 40(26.7%), No 60(73.3%). The present study shows that 73.3% of the students have a positive attitude regarding (Using antibiotics that have been given to a friend or family member for as long as they are used to treat the same disease). This result agreed with Shahpawee *et al.*, [16]. Which found that 90.0% of the participants had a positive attitude about the use of antibiotics that have been given to a friend or family member for as long as they are used to treat the same disease. The distribution of participants according to their attitude about preferring antibiotics when you have a cough or sore throat Yes 105(70%), No 45(30%). Our study shows that the result (64.7%) of the students have average knowledge regarding antibiotics. Our study views that the percent (86.7%) of the students have very good knowledge about obtaining antibiotics without intervention. Our study shows (that 90%), of students know antibiotics in most treatment diseases. Our study shows about (60.7%), of students have an average

background according to their knowledge about hearing of antibiotic resistance.

CONCLUSION

The research conclusion is that students have good knowledge of antibiotics and good knowledge of antibiotic resistance, most of these students have an average attitude regarding antibiotic usage, which is not enough in a population of students studying health-related fields. Many will look up to these students or ask them for advice on matters regarding health, and antibiotic resistance so it is required that they have a good attitude and very good knowledge on this aspect if not an excellent attitude at least.

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Conflict of Interest:

The author has affirmed that there are no conflicting interests.

REFERENCES

1. Ashraf, M. S., & Cook, P. P. (2016). Antibiotic misuse in hospital, outpatient, and long-term care settings. *North Carolina medical journal*, 77(5), 346-349.
2. O'Neill J. Tackling a Crisis for the Health and Wealth of Nations 214.
3. Colomb-Cotin, M., Lacoste, J., Coignard, B., Vaux, S., Brun-Buisson, C. & Jarlier, V. Morbiditéet in 2012.
4. Suaifan, G. A. R. Y., Shehadeh, M., Darwish, D. A., Al-Ijel, H., Yousef, A. M., & Darwish, R. M. (2012). A cross-sectional study on knowledge, attitude and behavior related to antibiotic use and resistance among medical and non-medical university students in Jordan. *Afr J Pharm Pharmacol*, 6(10), 763-770.
5. Haque, M., Rahman, N.I.A., Zulkifli, Z. & Ismail, S. (2016) Antibiotic prescribing and Saint-Maurice: Institut de veille sanitaire; 2015.
6. Resistance: knowledge level of medical students of clinical years of University Sultan Z Zainal Abidin, Malaysia. *TherClin Risk Manag* 12: 413. (6). Awad AI, Eltayeb IB (2007) Self-medication practices with antibiotics and antimalarials among Sudanese undergraduate university students. *Ann Pharmacother* 41: 1249-1255.
7. Abass, A.M., Ahmed, M.E., Ibrahim, I.G. & Yahia, S. (2016) Bacterial Resistance to Antibiotics: Current Situation in Sudan. *J AdvMicrobiol* 6: 1-7.
8. Reeves, D. S., Finch, R. G., Bax, R. P., Davey, P. G., Po, A. L. W., Lingam, G., ... & Pringle, M. A. (1999). Self-medication of antibacterials without prescription (also called 'over-the-counter' use) A report of a Working Party of the British Society for

- Antimicrobial Chemotherapy. *Journal of Antimicrobial Chemotherapy*, 44(2), 163-177.
9. Dajani, A. S. (1996). Adherence to physicians' instructions as a factor in managing streptococcal pharyngitis. *Pediatrics*, 97(6), 976-980.
 10. Sclar, D. A., Tartaglione, T. A., & Fine, M. J. (1994). Overview of issues related to medical compliance with implications for the outpatient management of infectious diseases. *Infectious agents and disease*, 3(5), 266-273.
 11. Gonzales, R., Steiner, J. F., & Sande, M. A. (1997). Antibiotic prescribing for adults with colds, upper respiratory tract infections, and bronchitis by ambulatory care physicians. *Jama*, 278(11), 901-904.
 12. El Khoury, G., Ramia, E., & Salameh, P. (2018). Misconceptions and malpractices toward antibiotic use in childhood upper respiratory tract infections among a cohort of Lebanese parents. *Evaluation & the health professions*, 41(4), 493-511.
 13. Chen, C., Chen, Y. M., Hwang, K. L., Lin, S. J., Yang, C. C., Tsay, R. W., ... & Young, T. G. (2005). Behavior, attitudes and knowledge about antibiotic usage among residents of Changhua, Taiwan. *J Micr*
 14. Aljayyousi, G. F., Abdel-Rahman, M. E., El-Heneidy, A., Kurdi, R., & Faisal, E. (2019). Public practices on antibiotic use: A cross-sectional study among Qatar University students and their family members. *PloS one*, 14(11), e0225499.
 15. Gualano, M. R., Gili, R., Scaioli, G., Bert, F., & Siliquini, R. (2015). General population's knowledge and attitudes about antibiotics: a systematic review and meta-analysis. *Pharmacoepidemiology and drug safety*, 24(1), 2-10.
 16. Siam, M. H. B., Imran, A., Limon, M. B. H., Zahid, M. H., Hossain, M. A., Siddique, M. A., ... & Hossain, M. A. (2021). Antibiotic Abuse: A Cross-Sectional Study on Knowledge, Attitude, and Behavior Among the University Students in Dhaka, Bangladesh. *Electronic Journal of General Medicine*, 18(3).