

Antibacterial Agents: Knowledge and Attitudes of Sudanese College of Medicine Undergraduates

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Abstract

Background: Animal and human health depend on antimicrobials. Following the introduction of a new antimicrobial agent, drug resistance to that antimicrobial agent emerges. Evidence demonstrates that the public is crucial to the challenge, expansion, and spread of antibacterial resistance. This study aimed to assess the knowledge, attitudes, and practices of medical students of El-Razi University regarding antimicrobial use and resistance.

Study objective: The intention of this study was to recognize the medical students at El-Razi University's awareness, perceptions, and practices regarding the use and resistance of antibiotics 2022.

Methods: On 292 randomly chosen medical students, a cross-sectional descriptive study using a pretested semi-structured questionnaire was conducted from October to November 2022. The statistics were explored using the chi-square and descriptive tests, and results were presented on tables.

Result: A total of 292 participants filled out the questionnaire and handed it back, granting us a 100% response rate. The respondents' median age was 24 years. Sixty-one percent (178) of the respondents were women, and 81.2% of them were Sudanese (237). All of the participants were undergrads in medicine. The statistical analysis also realized a positive link between respondents' awareness of antimicrobial attitudes and resistance. Around 83.6% of participants are knowledgeable of antimicrobial resistance (244). Approximately 85.3% (249) agreed that one of the major contributing factors to the emergence of bacterial organisms resistant to drugs is antibacterial misuse. Of the participants, about 34.4% (100) claimed to use antibiotics with a medical recommendation, while about 59.6% (174) accepted purchasing medications from a pharmacy without a prescription.

Conclusion: Antimicrobial resistance and its mishandling in diverse fields were issues on which participants' attitudes and awareness were better than average, but there is still much opportunity for improvement.

Keywords: Antimicrobial Resistance; Khartoum; Sudan

Introduction

Antimicrobial resistance, according to the World Health Organization, is the ability of microorganisms to withstand the effects of antibiotics that have been used to treat their infections. Standard treatments are habitually ineffective when microorganisms develop resistance to antibiotics, and in some cases, no medicines provide an effective treatment. Treatments consequently fail. Antibiotics, antivirals, antifungals, and antiparasitic are different forms of antimicrobials that are drugs used to prevent and treat infections in humans, animals, and plants [1]. Worldwide, resistant bacteria and other microbes are also rapidly emerging, jeopardizing the effectiveness of antibiotics, which have revolutionized medicine and prevented millions of deaths [2]. The protection and significance of many emergencies' medical procedures, such as operations, organ transplants, etc (Success is measured by a drug's capacity to prevent pathogenic bacteria from developing resistance) [3,4]. Any type of microbe can become resistant to medication. Antibiotic, anti-fungal, antiviral, and parasite resistance are consequences [5]. Antimicrobial resistance was primarily responsible for 1.27 million fatalities globally in 2019. One in five children under five died from antimicrobial resistance, and antimicrobial resistance may have been a major consideration in five million deaths [6] Antimicrobial resistance thus has pessimistic implications for both the health and economic sectors in both developed and developing countries [7]. A condition in which the body becomes more susceptible to disease and then treatment becomes challenging as pathogens develop immunity to the frequently taken antimicrobial drugs often results from the resistance developing naturally over time, typically through genetic changes derived from subpar infection control practices, neglected use of antimicrobials, and persistent rejection of warnings about overuse of medications [8] and self-medication as a result of the expensive healthcare system [9], which relates to clinical negligence on the part of medical staff. Other attributes encompass intensive agricultural use, epidemics, disinfectants, healthcare systems because of excessive antimicrobial use during those times, environmental pollution, improper disposal of unused or expired medications, and a lack of knowledge, initiatives, and awareness regarding best practices that can result in excessive or inappropriate use [10].

Regrettably, the negligent use of these medications is ending their miraculous effects. Due to the increased number of hospitalizations around the world, often in Sudan, the rapid development of resistance is to blame for thousands of deaths and economic difficulties [11]. The majority of medications, including antibiotics and antimalarials, can be purchased at neighborhood pharmacies in Sudan without a prescription, though there are laws that classify medications as either prescription-only or appropriate for over-the-counter sale [12]. The seriousness of the problem is demonstrated by the numerous studies conducted in Sudan that have encountered elevated incidences of the emergence of resistant strains in a variety of pathogens. Evidence showed that 3rd generation cephalosporin resistance was present in 90% to 100% of Enterobacteriaceae isolates in Ibn Sine Hospital during the Sudanese years 2008 to 2010, 78% and 80% of E. coli and K pneumonia, respectively, were ESBL producers, 51% of Staph aureus was MRSA, and the prevalence of vancomycin-resistant enterococcus ranged from 21% in Soba Hospital to 33% at the National Health Laboratory [11].

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Methodology

Study design, area, and population: Between October and November 2022, a cross-sectional descriptive study involving 292 members of Elrazi University's medical faculty took place. Elrazi University was established in 2001 on 35,000 square meters in Al-Azhari Town (Square 2) in Khartoum State. There are currently eight colleges there, and 1264 students are enrolled in the medical school.

Data collection technique:

Gathers information using self-administered structured questionnaires that the author pre-tested and created with particular objectives. Statistics on respondents' personal characteristics, knowledge of antibiotics, and familiarity with particular medications, like those used to treat malaria, were gathered using the questionnaire. The data were examined using the social sciences statistical package (SPSS version 21).

Ethical Consideration:

The Department of Community Medicine at Elrazi University awarded their authorization. The medical students' consent was obtained after they were notified of the study's aims and asked to answer a questionnaire. The questionnaire will not contain any participant identities or other data that could be used to identify them. To protect their privacy and confidentiality, each participant will receive an anonymous questionnaire. The questionnaire is made to be finished quickly so that it won't take up too much of the respondents' time.

Result

A total of 292 participants completed the questionnaire and returned it, making the response rate 100%. The respondents' average age was 24 years. 61% (178) of the respondents were female, and 81.2% of them were Sudanese (237) (Table 1).

Knowledge of antimicrobial resistance:

88.4% (258) of the respondents were aware of the advantages

Table 1: Descriptive data of the study population.

Frequency %	Characteristics	Variable
14.7 % (43)	<20	Age
63 % (184)	20-24	
15.4% (45)	25-28	
6.8% (20)	>28	
39% (114)	Male	Gender
61% (178)	Female	
81.2 % (237)	Sudanese	Nationality
18.8% (55)	Non- Sudanese	
5.8% (17)	1 st year	Level of study
15.8% (46)	2 ^{ed} year	
15.1% (44)	3 rd year	
43.8% (128)	4 th year	
19.5% (57)	6 th year	

of antibiotics; 83.6% (244) of them demonstrated knowledge of how microorganisms develop resistance to antibiotics, while 16.4% (48) did not. 85.3% (249) concurred that one of the primary causes of the emergence of pathogens with drug resistance is the misuse of antibiotics. 39.7% (116) of the participants did not have a thorough understanding of the negative effects of antimicrobial resistance. 86 out of 29.5% do not believe it can be fatal. 64% (187) were not of the opinion that it can't affect all ages, compared to 36% (105) of participants (Table 2).

Table 2: Knowledge of antimicrobial resistance.

Frequency%	Answer	Statements
88.4% (258)	True	Antimicrobials are medicines used to prevent and treat infections?
11.6% (34)	False	
83.6% (244)	True	Antimicrobial resistance occurs when microorganisms become unresponsive to drugs?
16.4% (48)	False	
85.3% (249)	Agree	The misuse and overuse of antimicrobials are one of the main causes of emergence of drug-resistant pathogens?
14.7% (43)	Disagree	
65.1% (190)	Agree	Are malaria medicines considered antimicrobials?
34.9% (102)	Disagree	
60.3% (176)	Agree	Lack of antimicrobials increases the risk of cancer chemotherapy and surgeries such as Cesarean Section?
39.7% (116)	Disagree	
70.5% (206)	Agree	Antimicrobial resistance increases mortality?
29.5% (86)	Disagree	
64% (187)	Agree	Are antimicrobials dangerous for people of all ages?
36% (105)	Disagree	

Table 3: Attitudes toward antimicrobial resistance.

Frequency %	Answer	Statements
65.8% (192)	Agree	I always complete the course of treatment with antimicrobials even if I feel better?
34.4% (100)	Disagree	
34.4% (100)	Agree	Is it good to be able to get antimicrobials from relatives or friends without having to see a medical physician?
65.8% (192)	Disagree	
59.6% (174)	Agree	I prefer to be able to buy antimicrobials from the pharmacy without a prescription?
40.4% (118)	Disagree	
58.2% (170)	Agree	I prefer to keep unused antimicrobials at home in case there may be a need for them?
41.8% (122)	Disagree	
47.9% (140)	Agree	When I have a mild illness, I prefer to use an antimicrobial and feel better quickly?
52.1% (152)	Disagree	
44.2% (129)	Agree	Missing one or two doses does not alter the effectiveness of antimicrobials?
55.8% (163)	Disagree	

Attitudes toward antimicrobial resistance:

Antimicrobial course completion commitment was extremely high. 65.8% (192) of them, but 34.8% (100) of them believe that skipping one or two doses won't have an impact. Regretfully, 59.6% (174) of the participants want to be able to purchase medications from a pharmacy without a prescription, and 34.4% (100) of the participants agreed that antimicrobial drugs could be taken without consulting a doctor. A sizable portion of the participants—a whopping 47% (140)—kept some antimicrobial medications at home in case they were needed, and many of them used them for minor illnesses. 44.2% (129) (Table 3).

Practice toward antimicrobial resistance:

A significant proportion of participants—36.1% (107) always, 54.1% (158) occasionally, and 9.2% (27) never—began using antimicrobial drugs without first consulting a doctor, 5.8% (14) use non-physician perception, 16.4% (48) use prior perception, 23.3% (68) use self-medication, and 55.5% (162) use prescription drugs from a physician. 51 percent (150) of the participants checked the expiration dates, 12% (48) never did so, and 36.6% (107) occasionally did so. When they start feeling

better, some participants save the remaining medication, with 30.8% (90) always doing so, 44.5 (130) occasionally doing so, and 24.7 (72) never doing so (Table 4).

Discussion

Numerous studies have stated that students in medical and non-medical colleges misuse antibiotics, self-medicate, and have inadequate antibacterial agent awareness. In the present study, we noticed that 83.6% (244) of respondents have awareness of how microorganisms develop resistance to antimicrobial drugs, but conversely, a study that was accomplished at the University of Brunei Darussalam (UBD) in 2020 with the intent to assess antibiotic usage and information concerning antibiotics and antimicrobial resistance among undergraduate students.

The study's findings show that while there is a good level of knowledge regarding the utilization of antibiotics, there is still some considerable uncertainty, particularly in the section about when to use antibiotics appropriately for various disease conditions because some individuals do not respond to antibiotic therapy for viral conditions. Contrary to our most recent report, the population of University Brunei Darussalam emerged from

Table 4: Practice toward antimicrobial resistance.

Frequency %	Answer	Statements
36.6% (107)	Always	Do you consult a physician before starting an antimicrobial?
54.1% (158)	Sometimes	
9.2% (27)	Never	
55.5% (162)	Physician prescription	How do you generally take antimicrobial drugs?
23.3% (68)	Self-medication	
16.4% (48)	Previous perception	
4.8% (14)	Non-Physician	
51.4% (150)	Always	Do you check the expiry date of the antimicrobial before using it?
36.6% (107)	Sometimes	
12% (35)	Never	
30.8% (90)	Always	After you start feeling better, do you save the remaining antimicrobials for the next time you get sick?
44.5% (130)	Sometimes	
24.7% (72)	Never	

both private and public healthcare facilities [13].

In our report, we unearthed that 85.3% (249) agreed that one of the chief reasons that drug-resistant pathogens arise is attributable to the improper use of antibiotics. Likewise, devotion to completing the antibiotic regimen was remarkably increased (65.8% / 192), but 34.8% (100) of them assumed that ditching one or two doses wouldn't have major implications. Whilst the majority of those who participated were cognizant of the use of antibiotics and formations of awareness and good practices, their outcomes from a cross-sectional, anonymous online survey that sought to assess these aspects indicated that respondents had negative perceptions toward antibiotic use despite the reality that they broadly had optimistic information and concepts [14].

55.5% (162) of the respondents in our study used medicines that were ordered by their doctors. Participants use antimicrobials that were previously prescribed to them and self-medicate. To figure out the incidence of self-medication with antibacterial agents and/or antimalarial drugs among university graduates in Sudan, an explanatory cross-sectional study was conducted, they implied that, summarizing, students who belonged to the age group 21 or older were substantially more inclined to self-medicate with antibiotics or antimalarials than those aged 20 or younger, and that self-medication with these drugs is relatively common among undergraduate university students in Khartoum State. Our outcomes underscore the significance of emerging strategies to encourage the responsible use of antibiotics and antimicrobials [12].

Conclusion

Antimicrobial resistance and its misuse in varied fields were issues on which participants had better knowledge and attitudes; notwithstanding, there is still much more to be accomplished.

Recommendation

Focusing on the results presented in this research, the authority may enact strict controls to prohibit the distribution and purchase of antimicrobial drugs without a legitimate prescription from a medical professional, in addition to boosting awareness of the proper use of antimicrobials among purchasers, healthcare professionals, and the general public through social media posts, TV, radio, messages, workshops, and extensive educational campaigns.

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