2025 • Vol. 3, No. 2 • pp. 54-58
Trends in Pharmaceutical Biotechnology (TPB)

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Print ISSN: 3006-0516 Online ISSN: 3006-0354

Knowledge, Attitudes, and Practices Regarding Antibiotic Use Among the Public in Al-Muthanna Governorate, Iraq: A Cross-Sectional Web Survey

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Access this article online

ORIGINAL ARTICLE
Received: 29.08.2025 **Revised:** 28.09.2025
Accepted: 28.10.2025
DOI: 10.57238/tpb.2025.153196.1035

OPEN ACCESS

ABSTRACT

Background: There is random antibiotics use in the Al-Muthanna Governorate especially in the unauthorized clinics. The aim of the study is to investigate the levels of knowledge and the behaviors of Almuthanna Governorate Public regarding antibiotics, and to investigate the presence of common factors between them. **Methods:** A survey was conducted on a self-selected web sample disseminated via social media of 175 samples for both genders. The samples were obtained from Almuthanna Governorate. The study was conducted during the month of July 2024. The study included questions on demographic characteristics, knowledge about antibiotic use and resistance, attitudes and behaviors toward antibiotic. **Results:** Generally, participants were asked what they think about antibiotics. Results showed 59.42% correctly identified antibiotics as a substance or compound that kills germs. The participants knowledge of the term antibiotic-resistant bacteria, 60% of the participants answered yes, and they have some knowledge about the term of antibiotic-resistant bacteria. 70.9% of participants know that antibiotics are used in cases of infections in general. As for how to manage and deal with antibiotics, 52% of the participants said that they have a desire to read the special instructions for antibiotics, 65.7% answered that they have a desire to make sure of the expiry date of the antibiotic before purchasing, and 81.7% of the participants said that when they finish using the antibiotic, they usually dispose of it by throwing it in the household waste basket. **Conclusion:** The survey has led to knowledge of the attitudes and behaviors towards antibiotics among the population, and the initiative should provide education and practical means to change their behavior for the better in addition to correcting misconceptions.

Keywords: Antibiotics, Bacterial Resistance, Infections. Perceptions, Public Health

1 Introduction

ANTIBIOTICS are biological substances extracted from living organisms that kill or inhibit the growth of other organisms such as bacteria, fungi, and protozoa except viruses [1]. Antibiotic therapy was one of the major medical discoveries in the last century, reducing infection-related morbidity and mortality decreased significantly since the discovery of this type of medicine. The main cause of death was infectious diseases, even if they were minor diseases [2]. However, indiscriminate and excessive use of antibiotics has been shown to cause rapid emergence of antibiotic resistant bacteria that are resistant to almost all classes of antibiotics [3]. On April 7, 2011, the World Health Organization (WHO) announced that bacterial resistance to

antibiotics is among the three most life and health threatening effects [4]. According to The AWaRe classification of antibiotics, antibiotics should be accessed, watched, reserved and updated regularly. In previous scientific studies, it has been proven that sometimes isolated bacterial species are resistant to all available antibiotics. The reason is due to not using antibiotics according to a physician's instructions and their use for viral infections, in addition to their excessive use, which led to the emergence of new resistant bacterial strains [5]. The aim of the study is to investigate the knowledge of the Iraqi public about the antibiotics and their use. In addition to their knowledge of antibiotic resistance, which is one of the consequences of using antibiotics.

2 Material and Methods

A survey was a cross-sectional, web-based sample. conducted on a self-selected web sample disseminated via social media of 175 samples for both genders, the answer was limited to one response to avoid duplicate answers, however, no answer was excluded for the sake of the validity of the questionnaire. Samples were obtained from residents of Al-Muthanna Governorate. The study was conducted during July 2024. The samples were collected via an electronic questionnaire form using Google Sheet, which was circulated to the public on social media sites. A note was placed in the questionnaire form stating that the data is subject to the ethics policies of scientific publishing by maintaining the confidentiality of answers and using them for the purpose of scientific research only according "Declaration of Helsinki" and mentioning the name of the researcher and his affiliation, an option was placed within the questionnaire to agree or not to use the data for scientific research purposes, and all participants in the questionnaire responded in agreement (e-consent). The questionnaire consists of three parts (A, B and C). Part (A, social characteristics of the participants), gender, age, there were 17 choices, a place of living, whether it is in the city center, district, or a village, academic background, the place of work, whether unemployed, a student, working in the private sector, or working in the government sector.The second part (B includes 11 questions), multiple choice questions about: general knowledge about antibiotic use and antibiotic resistance, routine use of antibiotics, antibiotic self-treatment practices, sources of information related to the use of antibiotics, what are antibiotic-resistant bacteria, how to deal with antibiotics, and part (C allow for expression with open-ended answers). The data was processed according to the Google Form algorithm, which in turn collected the data and created a summary of the percentages of answers for each section.

3 Result

3.1 General Characteristics of Participants

The questionnaire form was answered by 175 participants, 34.9% male and 65.1% female, and the average age of the participants was 58.8% (103\175), aged between 18 and 29 years (IQR= 23.5). Most of the participants in the survey are those who live in the city center, their percentage reached 54.3% (95\175). As for the academic background, high percentage went to those with a diploma about 33.7% (59\175). As for the place of work, 48.6% (85\175) are students (Table 1).

Table 1. Part A (social characteristics of the participants).

	No. of Participants	Percentage %
Gender		
Male	61	34.9
Female	114	65.1
Age		
18-29	103	58.8
30-39	59	33.7
40-49	11	6.3
50-59	1	0.6
≥60	1	0.6
Place of living		
City center	95	54.3
District	66	37.7
Village	14	8
Academic background		
Reads and writes	1	0.6
Middle school	4	2.3
High school	31	17.7
Diploma	59	33.7
Bachelor	18	10.3
Master	48	27.4
PhD	14	8
Place of work		
Unemployed	11	6.3
Student	85	48.6
Working in the private sector	9	5.1
Working in the government sector	70	40

3.2 Perceptions of Participants

Participants were asked about what they think about the following:

- Antibiotics: In the second part (B) from the survey participants knowledge about the definition of antibiotics was verified and the results were: When assessing participants knowledge of the definition of antibiotics, only 59.42% (104\175) correctly identified antibiotics as a substance or compound that kills germs. When asked why there are

different types of antibiotics in pharmacies, 56% (98\195) of the survey participants answered that there is an urgent need for them due to the rapid development of bacterial strains, which is a correct answer (Table 2).

- Methods of use: As for the use of antibiotics, 70.9% (124\175) chose that antibiotics are used in cases of infections in general (Except viruses), which is the correct answer. As for the number of times antibiotics were used in the past year, the largest percentage, which amounted to 40% (70\175), went to their use of antibiotics once or twice. As for the question, have you ever taken an antibiotic prescribed to you by a relative or friend, the largest percentage, which was 50.9% (89\175), was the answer, "No" (Table 2).
- Antibiotic resistant bacteria: As for the participants' knowledge of the term antibiotic-resistant bacteria, 60% of the participants answered yes, we know the term antibiotic-resistant bacteria. When asked how antibiotic-resistant bacteria can be defined, 65.1% (115\175) of the participants answered that they are bacteria that have not been affected by antibiotics (Table 2).
- How to administer antibiotic: As for how to manage and deal with antibiotics, 52% (91\175) of the participants said that they have a desire to read the special publications for antibiotics, 65.7% (115\175) answered that they have a desire to make sure of the expiry date of the antibiotic before purchasing, and 81.7% (143\175) of the participants said that when they finish using the antibiotic, they usually dispose of it by throwing it in the household waste basket (Table 2).

3.3 Open ended questions

In the open-ended questions, five questions were asked, as follows: When you feel you have a cold, do you usually go to the nurse, pharmacist, or doctor? The answers with the highest percentage were going to the pharmacy, at a rate of 58.28% (102\175), and the reason was the low cost and time. As for the question, when you feel better after using antibiotics, do you stop them or continue using them according to the recommended instructions, the largest percentage went to stop taking antibiotics, as the percentage reached 56% (98\175). When we asked in a questionnaire about the possibility of living without the need for antibiotics, the answer was "no" at 64% (112\175).

Table 2. Part B (multiple choice questions).

1- In your opinion, what are antibiotics:	A substance or compound that kills germs 59.42%.	Radioactive physical substance 14.85%.	Substances that enhance the strength of the immune system 25.71%.
2- When should antibiotics be used?	In cases of seasonal colds or influenza 24.6%.	In inflammatory cases in general 70.9%.	When feeling lethargic and inactive 4.6%.
3- Approximately. How many times have you used antibiotics in the last year?	Once or twice 40%.	Three to five times 20%.	More than five times 20%.
4- Have you ever taken an antibiotic prescribed to you by a relative or friend?	Yes 26.9%.	No 50.9%.	Probably 22.3%
5- Have you heard the term antibiotic-resistant bacteria?	Yes 60%.	No 22.9%.	Probably 17.1%.
6- In your opinion, how can antibiotic-resistant bacteria be defined?	These are bacteria that are not affected by antibiotics 65.1%.	These are bacteria that are sensitive to antibiotics 15.4%.	I don't have the slightest idea 19.4%.
7- Antibiotics treat infection with:	Bacteria and fungi 44.6%.	Bacteria and viruses 48%.	Fungi and viruses 7.4%.
8- Do you have the desire to read the special leaflet for the antibiotic?	Yes, 52%.	Fairly interested 37.1%.	Not interested at all 10.9%.
9- Every time you purchased an antibiotic; did you check its expiry date?	Yes, 65.7%.	not at all 7.4%.	Not every time 26.9%.
10- When you finish using the antibiotic container, I usually dispose of it by...	I throw it in the household trash 81.7%.	I throw it in the WC 18.3%.	I put it in a sealed plastic container and then throw it away in the household trash 0%.
11- In your opinion, why there are different types of antibiotics in pharmacies?	Because of the large number of patients 8%.	Because there are many pharmaceutical manufacturers 36%.	Due to the urgent need for it due to the rapid evolution of bacterial strains 56%.

When asked about the accuracy of the statement that antibiotics are always safe to use, 77.14% (135\175) said that they are not safe to use (Table 3). When asked to provide advice on the use of antibiotics, most participants said that antibiotics should be used sparingly, and some provided health care advice to avoid taking antibiotics, others said I have no advice to offer.

4 Discussion

The study aimed to identify the knowledge and behaviors of Almuthanna public regarding the use of antibiotics and to investigate the presence of common factors between them. The results of this study showed that there is no complete knowledge of how to deal with antibiotics and that there is a somewhat superficial. Fifty nine percent of participants were able to define antibiotics correctly as biological substances that kill germs. Results showed 70.9% (124\175) of participants said they should be used in inflammatory cases in general, while 24.6% (43\175) said they could be used for influenza virus, but in another survey conducted in Mongolia in 2010 on the use of antibiotics, there was a lack of knowledge. Participants gave incorrect answers about the use of antibiotics, saying that they treat colds or flu 83% (145\175) [6]. As for the term antibiotic-resistant bacteria, 60% (105\175) of the participants had heard of this term before, and in comparison with another study conducted in the form of a survey in Malaysia in 2011, about 59% (103\175) of the participants said that the excessive use of antibiotics can cause antibiotic resistance [7]. The reason behind that is the lack of health awareness in addition to the ease of access to antibiotics in pharmacies without the need to consult a specialist doctor. Also, regarding the question of whether you take antibiotics prescribed by a relative or friend, the answer was 50.9% (89\175) "No," but we find that the vast majority of the public do the opposite. In addition to the question about reading the instructions leaflet for antibiotics, 52% (91\175) answered "Yes, we read them carefully," and we also read the expiration date of antibiotics 65.7% (115\175).

As for the results of the questionnaire in Part C, which contains open-ended questions, 58.28% (102\175) of the participants classified themselves as users of antibiotics on their own without consulting a specialist doctor. This confirms my statement that there is a contradiction in the participants' answers. The reason for this is due to the lack of health awareness in addition to the ease of access to antibiotics in pharmacies. In other studies, the rate of self-medication with antibiotics among graduate students in Ghana was 70% (122\175) [8], among university students in Turkey it was 44.1% (77\175), among the general population in the United Arab Emirates it was 46% (80\175) [9], and among the general population in Lithuania it was 53.2% (93\175) [10], 47.8% (83\175) among Chinese university students [11]. In addition, 56% (98\175) of the participants answered that they will stop taking antibiotics when they feel better, or the symptoms disappear. This is a wrong answer because it causes bacterial resistance to antibiotics, so the entire course of treatment must be completed [5]. While 64% (112\175) answered that they cannot live without antibiotics and 77.14% (135\175) said that antibiotics are unsafe to use, here we find another contradiction. It is unreasonable that the largest percentage of participants say that antibiotics are unsafe to use and at the same time answer that they cannot live without antibiotics.

81.7% (143\175) of the participants said that when they finish using the antibiotic, they usually dispose of it by throwing it in the household waste basket, This, in turn, causes environmental problems and disasters, which in turn may lead to the emergence of new strains of bacteria resistant to antibiotics in the environment, in addition to water and food pollution. Therefore, antibiotics must be mixed with other materials and a distinctive seal must be placed on them to distinguish them according to the recommendations of the US Food and Drug Administration.

Table 3. Part C (open ended questions).

When you feel you have a cold, do you usually go to the nurse, pharmacist or doctor? Why?	Go to the pharmacist 58.28% The reason is due to Less time and cost.	Go to the doctor 22.28% to get the correct diagnosis and appropriate treatment.	Go to the nurse who gives the treatment 17.71%.	I don't go to anyone; I treat myself 1.71%.
If you feel better after taking an antibiotic, do you stop taking it or continue taking it as directed?	I stop taking antibiotics 56%.	I continue taking the antibiotics according to the recommended course 44%.		
In your opinion, can we live without antibiotics?	No, 64%	Yes, 33.71%	I don't know 2.28%	
How true is this statement, (Antibiotics are always safe to use).	Not safe to use 77.14%	Safe to use 22.85%		

Finally, participants gave advice on the use of antibiotics. The vast majority responded that it was necessary to rationalize and use antibiotics reasonably. It is possible that the participant answers perfectly but does not do so. How is it possible that the highest percentage says that we cannot live without antibiotics and at the same time says that they are not safe to use?

5 Conclusion

The survey generated information on knowledge, attitudes and behaviors related to antibiotic use among the general population. Temper to "In this convenience web sample from Al-Muthanna, substantial knowledge gaps were observed, notably confusion about viral indications and safe disposal. Interventions should prioritize pharmacy-based education and public stewardship messaging".

6 Recommendations

Educating the general public about the management of antibiotic use is the responsibility of health institutions by providing educational brochures or publications or through advertisements on social media sites.

Conflict of Interest: The author declares no conflict of interest.
Financing: The study was performed without external funding.
Ethical consideration: The study was approved by *Al-*Muthanna University, Al-Rumaytha, Iraq.

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How to cite this article

Alhamadani Y.S.; Hassan R.N.; Almaliki H.S.; Alwan B.H.; Almnehlawi H.S.; Alsaadawi M.A.; Knowledge, Attitudes, and Practices Regarding Antibiotic Use Among the Public in Al-Muthanna Governorate, Iraq: A Cross-Sectional Web Survey. Trends in Pharmaceutical Biotechnology (TPB). 2025;3(2):54-58. doi: 10.57238/tpb.2025.153196.1035