

# Towards Good Health and Well-Being; Antibiotic Misuse in the General Population

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## Abstract

**Background:** The uncontrolled use of antibiotics in a random manner, especially in areas lacking health supervision, is concerning. This study aims to demonstrate random usage rates among different segments of society, including males and females, educated and uneducated individuals, and urban and rural areas. It also seeks to identify which age groups consume the most antibiotics, and to what extent users are aware of bacterial resistance to antibiotics. **Materials and Methods:** A total of 2,000 copies of questionnaires were distributed, focusing on scientific and cognitive questions and reasons for the random use of antibiotics, as well as the sources of obtaining these drugs in the Babil Governorate. **Results:** Out of 2,000 respondents, the most notable result was that 1,394 individuals (69.7%) used antibiotics without a prescription, while 606 individuals (30.3%) completed the prescribed course. Among the educated, 1,248 (62.4%) used drugs without a prescription. In urban populations, 1,152, (57.6%) used drugs randomly. A total of 1,184 individuals, (59.2%) indicated they had never heard of antibiotic resistance. The main reasons participants resorted to this usage were an aversion to visiting the doctor (580 individuals, 29%) and the proximity of a pharmacy (559 individuals, 27.95%). **Conclusions:** This study revealed a high level of antibiotic misuse among the community segments in the Babylon Governorate. It is crucial to educate users about the operation of antibiotics and the necessity of limiting the unsystematic use of antibiotics.

**Key Words:** Antibiotics, Society, Pharmacy, Unsystematic.

## Introduction

With the discovery of penicillin and the dawning of the antibiotic era, the body's own defenses gained a powerful ally. In the 1920s, British scientist Alexander Fleming was working in his laboratory at St. Mary's Hospital

in London when, almost by accident, he discovered a naturally growing substance that could attack certain bacteria (Pechere, J. C. 2001). The effectiveness of antibiotics has been impressive. At the same time, however, excitement about them has been tempered by a phenomenon called antibiotic resistance. This is a problem that surfaced not long after the introduction of penicillin and now threatens the

usefulness of these important medicines. Almost from the beginning, doctors noted that in some cases, penicillin was not useful against certain strains of *Staphylococcus aureus* (bacteria that cause skin infections). Since then, this resistance problem has grown worse, involving other bacteria and antibiotics. This is a public health concern. Increasingly, some serious infections have become more difficult to treat, forcing doctors to prescribe a second or even third antibiotic when the first treatment does not work (Shao, Y., Wang, Y., et al., 2021, Abdelzaher, M. A. 2024).

In light of this growing antibiotic resistance, many doctors have become much more careful in the way they prescribe these medicines. They see the importance of giving antibiotics only when they're absolutely necessary. In fact, one recent survey of office-based physicians, published in *JAMA: The Journal of the American Medical Association* in 2002, showed that doctors lowered the number of antibiotic prescriptions they prescribed for children with common respiratory infections by about 40% during the 1990s.

Antibiotics should be used wisely and only as directed by your pediatrician. Following these guidelines will preserve their life-saving properties for your child and future generations. Antibiotics are important drugs. Many antibiotics can successfully treat bacterial infections. Antibiotics can prevent the spread of disease. Antibiotics can also reduce serious disease complications.

But some antibiotics that used to be typical treatments for bacterial infections now don't work as well. Additionally, some drugs are completely ineffective against certain strains of bacteria. When an antibiotic no longer works

against certain strains of bacteria, those bacteria are referred to as antibiotic-resistant. Antibiotic resistance is one of the world's most urgent health problems. The overuse and misuse of antibiotics are key factors leading to antibiotic resistance. The general public, health care providers, and hospitals can all help ensure the correct use of the drugs. This can reduce the growth of antibiotic resistance (Saini, N., Saini, V., & Mehta, P. W., 2014, Lee, P. R., & Lin, C., 2003).

## Antibiotic Resistance

When the bacteria change in some way, they resist a drug. The change may protect the bacteria from the drug's effects or limit the drug's access to the bacteria. Alternatively, the alteration could lead to the bacteria altering or eliminating the drug. Bacteria that survive an antibiotic treatment can multiply and pass on resistant properties. Also, some bacteria can pass on their drug-resistant properties to other bacteria. This is similar to them sharing tips to help each other survive. The fact that bacteria develop resistance to a drug is normal and expected. However, the way drugs are used influences how quickly and to what degree resistance occurs (Agarwal, S., et al., 2015, Barker, A. K., et al., 2017).

## Overuse of Antibiotics

Antibiotic resistance is a result of the overuse of antibiotics, particularly when they are not the appropriate treatment. According to the Centres for Disease Control and Prevention, about one-third of people's antibiotic use is neither needed nor appropriate (Wooten, S. V., Moestl, S., et al., 2021).

Antibiotics treat infections caused by bacteria. However, they don't treat infections caused by viruses (viral infections). Antibiotics do not help with other common viral infections (**Bjerring, A. W., Landgraff, H. E., et al., 2018, Alhomoud, F., et al, 2018**).

- Cold or runny nose
- Flu (influenza)
- Bronchitis
- Most coughs
- Some ear infections
- Some sinus infections
- Stomach flu
- Coronavirus disease (COVID-19)

If you take an antibiotic during a viral infection, it attacks bacteria in your body. These are bacteria that are beneficial or do not cause disease. This incorrect treatment can then promote antibiotic-resistant properties in harmless bacteria that can be shared with other bacteria. Or it can create an opportunity for potentially harmful bacteria to replace the harmless ones.

## Antibiotic Stewardship

The proper use of antibiotics — often called antibiotic stewardship — can help:

- Keep the effectiveness of current antibiotics
- Extend the life span of current antibiotics
- Protect people from antibiotic-resistant infections
- Avoid side effects from using antibiotics incorrectly

Many hospitals and medical associations have applied new guidelines to diagnose and treat infections. These guidelines have been made to ensure effective treatments are given for bacterial infections and to reduce the incorrect use of antibiotics (**Mallah, N., Orsini, N., et al., 2022**).

## Material and Methods

It is an inductive, prospective statistical study on 2000 samples in Babylon governorate citizens. 2000 questionnaire has been distributed to different groups of population to assess the extent of misusing of antibiotics in general population.

Samples are distributed, 1056(52.8%) males & 944 (47.2%) females participated in this study, 396 (19.9%) of the questionnaire were distributed in the rural territory & 1594 (80.1%) in the urban territory. 1960, (84.5%) of the questioned citizens were educated (we considered the educated are those who have intermediate school certificate & above) & 310 (15.5%) were uneducated (those who do not have intermediate school certificate & down including the illiterate)

The study considered all the clerks & the first academic certificate holders as educated peoples The study considered all the clerks & the first academic certificate holders as educated peoples (**Fitzgibbons, T. P., 2023**). The questionnaire includes the following topics:

- 1) Age
- 2) Occupation
- 3) Residency
- 4) Academic certificate
- 5) Do you use antibiotics without prescription?

- 6) How do you use it?
- 7) Who advise you to use it?
- 8) Do you know about the antibiotic resistance?
- 9) Why do you use the antibiotic?

## Results

In the healthcare field, the use of antibiotics without a prescription is a topic of great concern. The study, which involved 2,000 people, revealed that 1,394 individuals participated in such misuse. Among them, 704 (35.2%) were males and 690 (34.5%) were females, as shown in Figure (1).

Education appears to play a role, with 1,248 (62.4%) educated users compared to 146 (7.3%) uneducated users. Th (34.6%) urban population constitutes the majority, with 1,152 (57.6%) city residents compared to 242 (12.1%) rural residents. In terms of age, the twenty-something group leads with 727 individuals, followed by those in their thirties with 490 (23.3%), and those in their forties with 277 (13.2%) as shown in Figure (2). When it came to recommendations, 680 (48.8%) were advised by a family member or friend, while 714 (51.2%) followed the pharmacist's suggestion. Motivations for indiscriminate use of antibiotics varied: 559 (40.1%) had easy access to a pharmacy, 491 (35.2%) repeated a previous prescription, and 344 (24.7%) self-treated based on similarity of symptoms. In contrast, 606 individuals used antibiotics properly, of whom 352(17.6%) were male and 254 (12.7%) were female. Among them, 442 (22.1%) were educated, and 164 (8.2%) were uneducated. Once again, urban users outnumber rural users,

452 (22.6%) to 154 (7.7%). In age demographics, 338 (16.1) were in their 20s, 142 (6.8%) were in their 30s, and 126 (6%) were in their 40s. These statistics shed light on patterns of antibiotic use and the factors influencing such decisions, and highlight the need for increased awareness and proper guidance in the use of medicine.

The study revealed several interesting findings, including the Motivations behind indiscriminate drug use. Proximity to the pharmacy: It seems that males benefit more from having a pharmacy nearby, as their number reached 325 (58%) males compared to 234 (42%) Females., as clearly seen in Figure (3).

Educated individuals also seem to benefit from this aspect, as 426 (79%) of them prefer the nearby pharmacy compared to 113 (21%) who are uneducated. Urban pharmacies appear to be more effective than those in rural areas, as the number of people receiving treatment from a nearby pharmacy in the city is 376 (67%) compared to 183 (33%) in rural areas. Repeat antibiotic prescription: Males tend to repeatedly prescribe antibiotics more than females, as the number of males who repeat a prescription is 250 (51%) compared to 241 (49%) for females.

Figure (4), educated individuals also showed higher repeat rates, with 407 (83%) repeating antibiotic prescriptions compared to 84 (17%) of uneducated individuals. - Urban areas experience greater repeat prescriptions than rural areas, with 391 (80%) individuals in cities preferring a repeat prescription, compared to 100 (20%) in rural areas. Similarity of symptoms of the disease: Males who misused medications were more likely to report similar symptoms, as there were 208 (60%) males compared to 136 (40%) females.

If we want to know the ratio of educated men to uneducated women in relation to misuse of employment: Educated males (604) (30%) compared to uneducated males (100), (5%): Educated males appear to use antibiotics more misuse than Uneducated males. Educated females (644) (32%) compared to uneducated females (46), (2%): It is also clear that educated females use medications more Misuse.

Figure (5), reflect the situation of misuse according to rural and cities people In proper use: Educated males (225) (13%) compared to uneducated males (90) (4%). It appears that educated males use antibiotics more than uneducated males. Educated females (217) (11%) compared to uneducated females (74) (4%) It appears that educated females use antibiotics more. If we want to know the ratio of educated people to uneducated People in cities and rural areas, the following becomes clear: Misuse of antibiotics:

- Number of educated people in cities: 1144, or 57%.
- Number of uneducated individuals in cities: 94 (5%)
- Number of educated people in rural areas: 104 (5%)
- Number of uneducated individuals in the countryside: 52 (3%) Proper use of antibiotics:
- Number of educated people in cities: 311 (16%)
- Number of uneducated individuals in cities: 106 (5%)
- Number of rural learners: 131 (7%)
- Number of uneducated individuals in the countryside: 58(5%)
- The questionnaire contained questions whose purpose was to measure

participants' awareness of antibiotics. Antibiotics for bacterial infections: The survey shows that the majority of misuse respondents (53.7%) and proper respondents (21.6%) correctly believe that Antibiotics treat bacterial diseases. However, there is a significant percentage (16% misuse, 8.7% proper) who are not aware of this fact. Antibiotics for viral infections: Misconceptions persist about the effectiveness of antibiotics against viruses, with 20.4% of misuse Participants and 19.1% of proper participants incorrectly asserting Their use for viral infections. A large portion (49.3% misuse, 11.2% Proper) correctly understood that antibiotics do not treat viral Diseases.

- Adherence to antibiotic courses: completing a course of antibiotics is essential to prevent the development of resistance. The data reveals alarming numbers, as only 28.4% of misuse participants and 16.4% of Proper participants adhere to the full course, while 41.3% of misuse Users and 13.9% of proper users do not. Awareness of antibiotic resistance: The awareness rate of antibiotic Resistance was 40.1% among misuse participants and 19.1% among Proper participants. However, a large number (29.6% misuse, 11.2% Proper) are still not informed about this critical issue. Stopping antibiotics: The survey indicates a worrying practice as 54.4% of respondents stop taking antibiotics once symptoms disappear, but (25.5%) of respondents complete the prescription. Reasons for using

antibiotics: Participants use antibiotics for various Symptoms, most commonly for influenza (24.7%), followed by colds (17.4%), headaches (17.5%), fever (15.7%), and toothache (13%). Self-prescription of antibiotics: 63.8% of participants self- Antibiotics, while others do so for their children (15.9%), relatives (9.1%), and friends (11.2%).

Reasons for self-treatment: Reasons for self-treatment include saving Time (25.7%), avoiding doctor visits (36.5%), having adequate health Knowledge (25.8%), and saving money (12.1%).

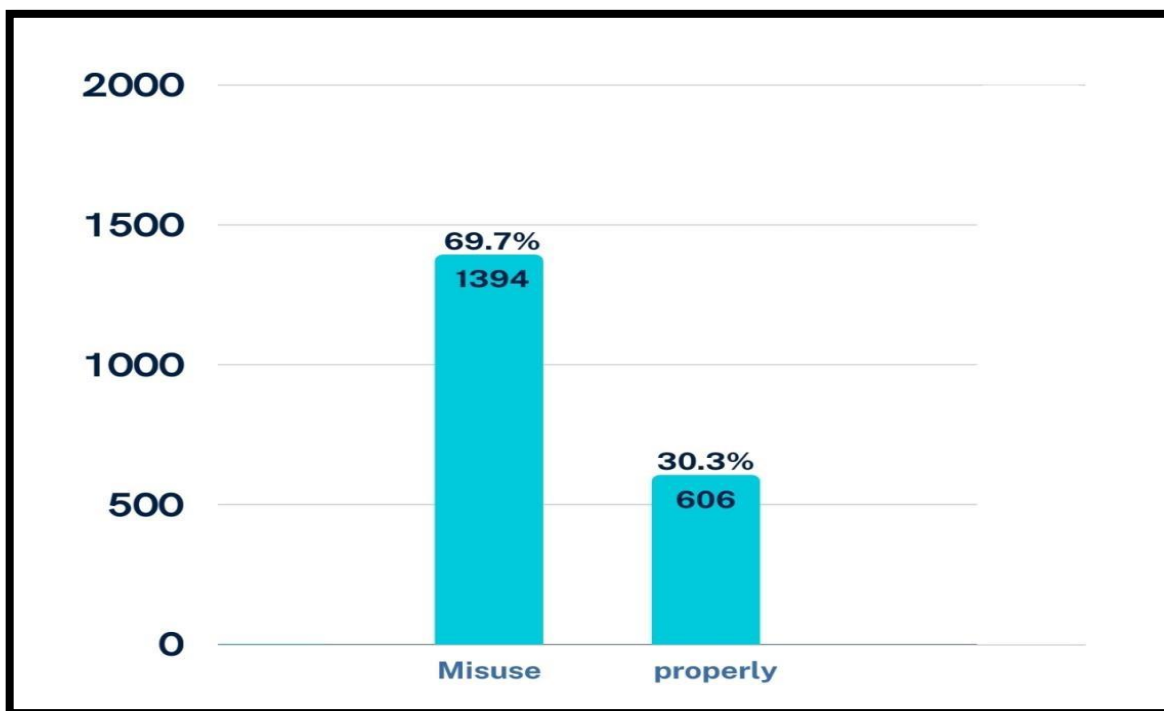


Figure 1. Distribution of cases by percent %

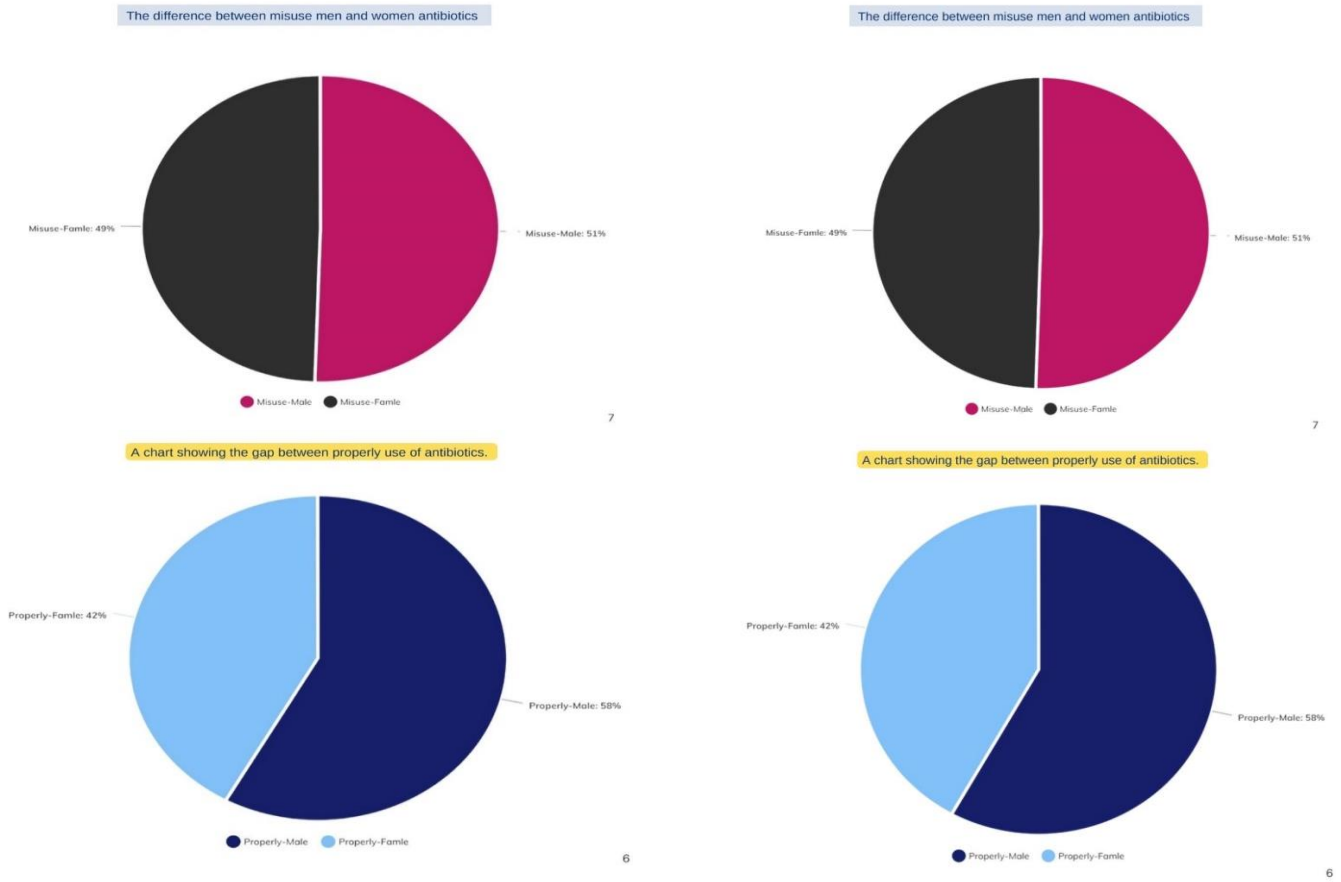


Figure 2. Men and Women misuse of antibiotics

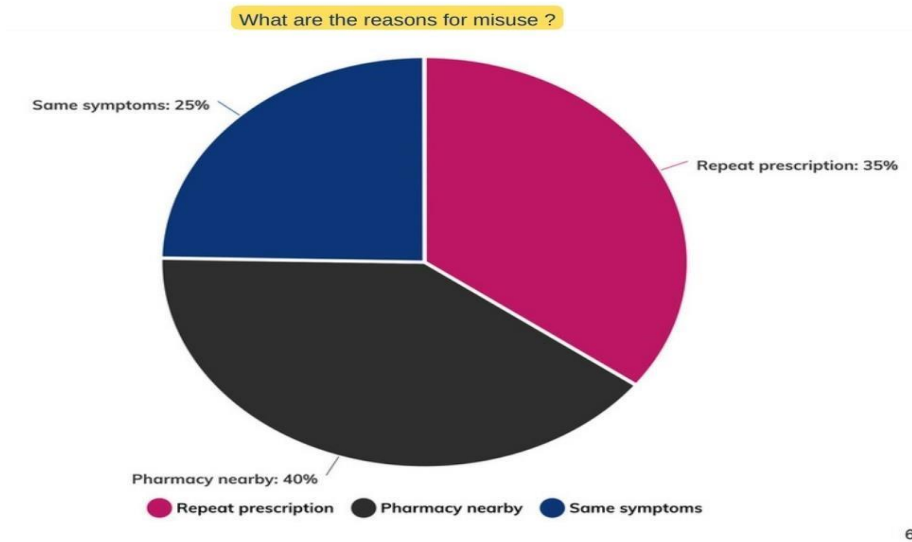
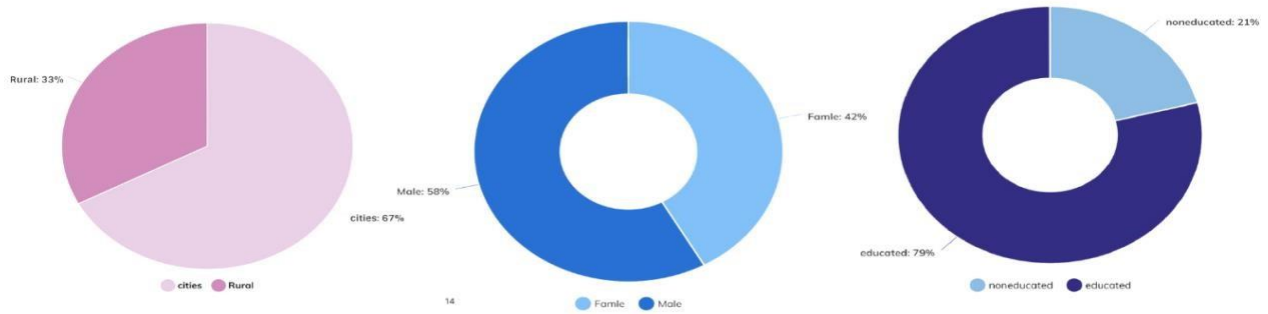
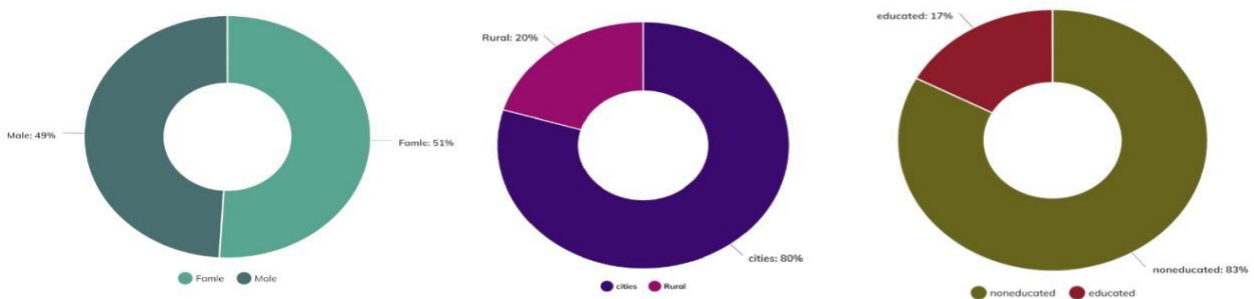


Figure 3. Distribution of antibiotics Misuse

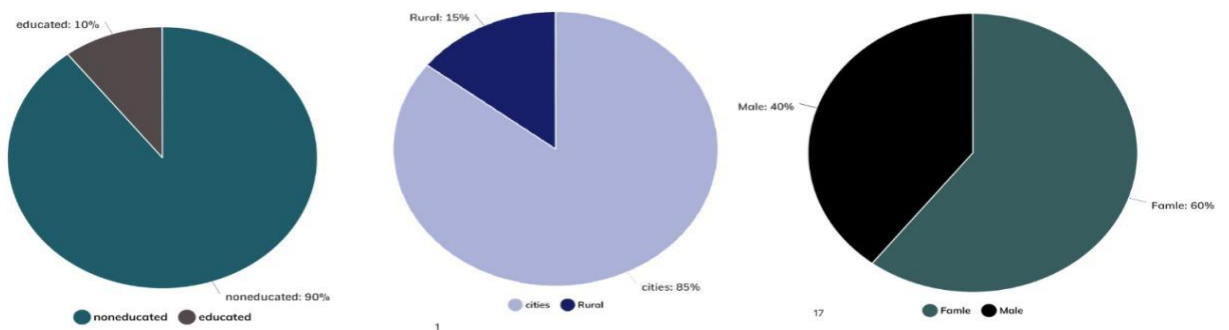
**Percentage of males, females, educated and uneducated, and residents of cities and districts who use antibiotics randomly due to the presence of a nearby pharmacy :**



**Percentage of males, females, educated and uneducated, and residents of cities and districts who use antibiotics randomly due to the presence of a Repeat prescription:**

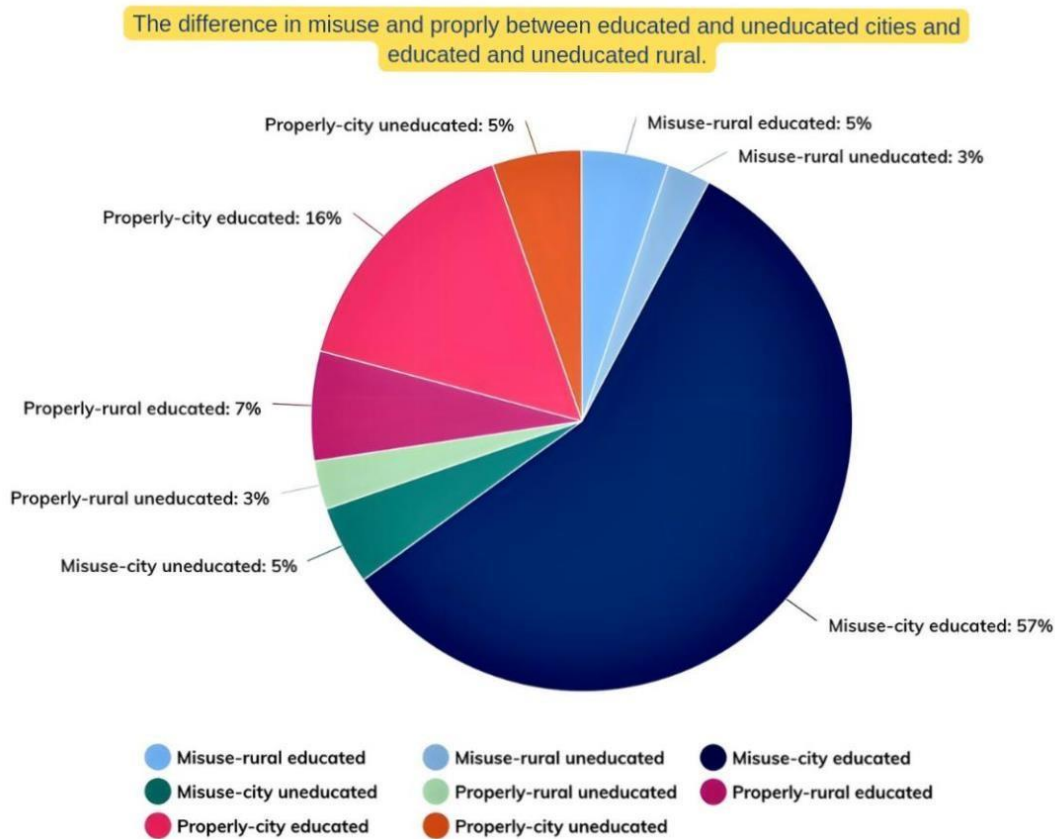


**Percentage of males, females, educated and uneducated, and residents of cities and districts who use antibiotics randomly due to the presence of a Same symptoms :**



**Figure 4.** Distribution of misuse according to education and locals.





**Figure 5.** Distribution of misuse according to rural and cities people.

## Discussion

In examining the misuse and proper use of antibiotics, we Explore the variances in gender, education, age, and Geographical distribution, along with the underlying reasons for such misuse. A survey involving 2,000 individuals revealed that a significant Majority—approximately two-thirds misused antibiotics. 69.7% took antibiotics without a prescription, whereas 31.3% Adhered to proper usage, following a doctor's prescription. According to a

2014 study by the International Journal of Clinical Pharmacy, 63% of participants were found to misuse Antibiotics.

Contrastingly, a 2019 U.S. study titled "Non-prescription Use of Antibiotics in the United States Population" discovered That misuse rates fluctuated between 1% and 66% Nationwide. This rate starkly differs from that in Babylon,

Where the variance could be linked to stringent health Regulations and the implementation of prescription Medication laws. Focusing on

antibiotic misuse, we delve deeper into the Behavior of individuals taking antibiotics without medical Guidance.

Male users constituted 51% of this group, with female users Slightly less at 49%, indicating misuse. Alarmingly, the educated majority—62.4%—felt confident, enough to self-medicate without a doctor's advice, while a Mere 7.3% lacked formal education. Moreover, 57.6% of urban residents self-administered Antibiotics, primarily due to the convenience of pharmacy Access, as opposed to just 12.1% in rural locales.

Age disparities also painted a telling picture: those in their Twenties were the most prevalent misusers at 35%, likely due to a deficit in awareness and education. Conversely, Individuals in their thirties represented 23%, and those in Their forties 13%, presumably more conscientious owing to Life experience and maturity. The impetus for misuse included: easy pharmacy access (40%), recycling old prescriptions (35%), and symptom Similarity (25%). A 2014 Baghdad survey by the College of Pharmacy, University of Baghdad, indicated that two-thirds of the community misused antibiotics based on prior treatment Familiarity. Advisors on antibiotic misuse were predominantly family Members (44%) or pharmacists (56%). It is troubling that 55.2% failed to complete their prescribed course of treatment, while 44.8% did.

The study also assessed public knowledge of antibiotics, revealing that 59.2% were oblivious to antibiotic resistance, And 75.3% accurately recognized antibiotics' role against Bacterial infections. Nonetheless, 39.5% erroneously, believed antibiotics could combat viral diseases a common Pharmacological misconception.

Furthermore, 54.4% ceased medication prematurely, Assuming the infection had resolved, 20.1% stopped upon Depleting their supply, and 25.5% concluded treatment with the prescribed dosage.

The reasons for medication varied, including fever (15.7%), Headaches (17.5%), flu (24.7%), colds and runny noses (17.4%), toothaches (13%), among other ailments (11.7%). The study also uncovered that 63.8% self-prescribed, while 15.9% medicated their children, 9.1% treated relatives, and 11.7% assisted friends. Regarding avoidance of medical consultation, the Predominant reason was a disinclination to visit doctors (36.5%), followed by self-assuredness in personal health Literacy (25.8%). Time constraints (25.7%) and financial limitations (12.1%) were also cited.

Lastly, a 2020 Beirut study titled "Antibiotic Use Among Parents" found that 64% of participants bypassed medical Advice when sick due to financial constraints (8.9%), lack of Time (34%), or the belief that frequent doctor visits were unnecessary (27%).

Also, an investigative study in the capital Baghdad, published in 2014 and conducted at the University of Baghdad College of Pharmacy, found that the main reason for misuse in Baghdad (twothirds of the community) was experience and knowledge of treatment from previous illnesses. In Babylon, the factor of having sufficient health knowledge to self-prescribe treatment was (25.8%), and the repetition of drug prescription was (80%) for urban cities and (20%) for rural cities (**Bhuvaraghan, A., et al., 2021, Mohammadi, S., et al., 2016**). These corresponding percentages were similar and close to the rates of the research conducted in the city of Babylon,

Iraq, due to the similarity of factors contributing to the misuse of drugs in the Arab region. Meanwhile, in a study conducted in the United States titled 'Nonprescription Antibiotic Use Among US Residents' and published in 2019, we found that misuse across the United States ranged from (1%) to (66%). This variance from the rate of misuse in Babylon is due to reasons including community awareness about antibiotic resistance and its impact, as well as health regulation in the country and the inclusion of laws for dispensing drugs by prescription (Tanna, J. A., et al., 2011).

## Recommendations

The public also plays a role in antibiotic stewardship. You can help reduce the development of antibiotic resistance if you:

- 1) Avoid pressuring your health care provider to give you an antibiotic prescription. Ask your health care provider for advice on how to treat symptoms.
- 2) Wash your hands regularly with soap and water for at least 20 seconds. Clean any cuts or wounds to avoid bacterial infections that need antibiotic treatment
- 3) Spreading the health awareness & culture through the responsible medical institutions using the visual, audio media & the communications sites to clarify the real benefit of antibiotics, & the right way of usage, especially the diseases that managed by the antibiotics.
- 4) Spreading the health awareness to clarify the side effects of antibiotics, especially the bacteria-antibiotics resistance & the extent of this side effect on the patient & the society.
- 5) Ensure the physicians to prescribe the antibiotics to the bacterial infection diseases only & according to the scientific way
- 6) MOH should issue strict guide lines to force the physicians to follow
- 7) Force the pharmacists not to dispense antibiotics unless there is a true medical prescription
- 8) Periodic & sudden inspection by the regulatory medical institutions responsible, for doctors & pharmacists to monitor the methods of prescription & dispensing the antibiotics, the extent to which they follow the scientific & ministerial instructions
- 9) Inspect the persons & sites that sale the medications outside the medical governmental & private institutions.
- 10) MOH, doctors, pharmacists & nursing associations should undertake a strict awareness & inspections about the abuse of of prescription & dispensing of antibiotics
- 11) It is possible to impose sanctions on those who violate the scientific guide lines

## Conclusion

This study clarified that many Iraqi patients can easily access a wide range of medications; even those that are only prescribed medically can be dispensed for self-treatment purposes, in addition to over-the-counter drugs, to manage a broad spectrum of medical conditions. This was based on various sociodemographic factors among the patients. The factors that contributed to the misuse of drugs included: Firstly, and primarily, the culture and beliefs of the educated and working patients, both male and female, to

prescribe treatment randomly or regularly, especially among the youth with their awareness of antibiotic resistance and its importance. Secondly, the ease of patient access to pharmacies and the dispensing of drugs by pharmacy staff without a valid prescription or health guidance. They relied on repeating antibiotic prescriptions for previous illnesses or similar disease symptoms with others. While other factors such as difficulty accessing the healthcare system and hospitals, the costs of doctor visits, and long waiting periods in clinics did not have a clear impact on the patients' misuse of antibiotics. In a study parallel to ours conducted in Saudi Arabia and published in 2014 by the International Journal of Clinical Pharmacy, we found that (63%) of the participants used antibiotics randomly, while in our research conducted in Babylon, the percentage was (69.7%). Similarly, in a study conducted in Beirut titled 'Antibiotic Use Among Parents' and published in 2020, we found that (64%) of the participants did not consult a doctor when they fell ill, (8.9%) for financial reasons, (34%) due to lack of time, and (27%) believed there was no need for constant doctor visits. These percentages are also close to those in our research, where (69.7%) of the participants did not consult a doctor when ill, (12.1%) for financial reasons, (25.7%) to save time, and (36.5%) avoided doctor visits.

## Conflict of Interest

The authors declare no conflict of interest.

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