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Research Article

Dispensing of Antimicrobial Agents Without a Prescription in Iraq: A Call for Upholding the Legislations to Change Long-Standing Practices

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Abstract

Background: Antimicrobial prescribing patterns have an important role in the emergence of resistance, and community pharmacists have a substantial influence on this issue. ***Objective***: To assess community pharmacists' behaviors and attitudes toward antimicrobial dispensing, determine their proportion and categories, and examine the underlying rationales for this practice. ***Methods***: A descriptive cross-sectional survey of community pharmacists in Iraq was conducted from June to August 2023, using a self-administered validated questionnaire. The attitudes, practices, and motivations driving the distribution of antimicrobials without a prescription (AWP) were explored in three areas. ***Results***: A sizable proportion (61.6%) of respondents rejected dispensing AWP at community pharmacies. Patients primarily seek antibacterials from community pharmacies owing to budget constraints, according to 82.7% of respondents, rather than for consultation and diagnostic services. The most powerful element in a pharmacist's decision to administer AWP is that patients will seek antimicrobials from another pharmacy if they are not dispensed by the pharmacist, owing to the pharmacist's experience in infection management. The study found that 50%-74% of patients who visited community pharmacies sought AWP. Antimicrobials are most commonly provided without a prescription for cold and flu and urinary tract infections (37.3% and 27.7%, respectively). ***Conclusions***: The majority of pharmacists regularly dispense AWP. To guarantee compliance with Iraqi legislation and laws governing AWP distribution, ongoing training programs should be created to educate the public on the most effective methods.

Keywords: Antibiotic dispensing practice, Antibiotic resistance, Community pharmacy, Antimicrobials without a prescription.

صرف الأدوية المضادة للميكروبات دون وصفة طبية في العراق: دعوة لدعم التشريعات لتغيير الممارسات القديمة

الخلاصة

الخلفية: ان طريقة صرف المضادات الحيوية تلعب دوراً حاسماً في تطور مقاومة مضادات الميكروبات. يمكن لصيادلة المجتمع إدارة هذه العمليات في صيدلياتهم. **الهدف:** تقييم مواقف وممارسات صيادلة المجتمع فيما يتعلق بصرف المضادات الحيوية، وكذلك تحديد نسبة وأنواع مضادات الميكروبات التي يتم صرفها بدون وصفة طبية وتقييم أسباب هذه الممارسة. **الطرق:** تم إجراء مسح وصفي مقطعي على عينة من صيادلة المجتمع في الفترة ما بين يونيو وأغسطس 2023 بين عينة من صيادلة المجتمع في العراق، باستخدام استبيان تم التحقق منه ذاتيًا. أجريت دراسة استقصائية من ثلاثة أجزاء تتكون من المواقف والممارسات والأسباب الكامنة وراء صرف مضادات الميكروبات دون وصفة طبية (AWP). **النتائج:** في هذه الدراسة، 61.6% لا ينصحون بممارسة الـ AWP في صيدليات المجتمع. السبب الرئيسي الذي يدفع المريض لزيارة صيدلية المجتمع للحصول على مضاد حيوي هو أن 82.7٪ غير قادرين على دفع تكاليف خدمات الاستشارة والتحليلات المختبرية. ولأن الصيادلة على دراية بعلاج العدوى وإذا لم يصرف الصيدلي مضادات الميكروبات فسيحاول الحصول عليها من صيدلية أخرى هي أهم العوامل المؤثرة على قرار الصيدلي بالصرف AWP . في هذه الدراسة وجد أن 50% إلى 74% من المراجعين لصيدليات المجتمع كانوا يطلبون AWP. ووجدت الدراسة أن الحالات الطبية الشائعة التي يتم صرف مضادات الميكروبات لها دون وصفة طبية هي نزلات البرد والأنفلونزا والتهابات المسالك البولية (37.3%، 27.7%) على التوالي. **الاستنتاجات:** توضح هذه الدراسة أن معظم الصيادلة يصرفون AWP بشكل شائع. تسلط هذه الدراسة الضوء على الحاجة إلى دعم القوانين والتشريعات العراقية لمنع بيع مضادات الميكروبات والحاجة إلى برامج تدريب مستمرة لرفع مستوى الوعي حول أفضل الممارسات لتوزيع مضادات الميكروبات.

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INTRODUCTION

Increasing antibiotic use may lead to increasing resistance in patients as well as in the community, nation, and region, thereby harming individual patients [1]. Even though federal regulations prohibit the sale of antimicrobials without a medical prescription, this is nonetheless common practice at community pharmacies in European countries such as Spain. In addition, antibiotic dispensing is common in adjacent countries such as Syria [2,3]. According to the Centers for Disease Control and Prevention, antibiotic resistance costs the United States $55 billion each year, with $20 billion spent on health care and around $35 billion lost productivity [4]. Iraqi pharmacists operating in community pharmacies lack the clinical and communication skills required to counsel and train patients on how to take their given medications correctly. This leads to irrational antibiotic prescriptions and inadequate patient education [5]. The results of the study conducted in Iraq revealed that the ratio of antibiotic consumption was higher than that of European countries, but nevertheless comparable to that of its neighbors. The three most common antibiotics were quinolones, cephalosporins, and penicillins [6]. Another qualitative study in Iraq found that community pharmacies routinely provided antibiotics without a prescription. Furthermore, a lack of awareness of antibiotic resistance and ignorance of antibiotic stewardship resulted in poor distribution procedures [7]. Another study in Iraq discovered that Duhok community pharmacies commonly provide medications for upper respiratory tract infections. Because viruses are the most common cause of upper respiratory tract infections, antibiotics should be avoided, and over-the-counter medicines to ease symptoms should be recommended [8]. Another study in China discovered that antibiotic prescriptions were given to patients in China for upper respiratory tract illnesses at an alarmingly high rate, with overuse of these treatments particularly prevalent in lower-level facilities [9]. The Iraqi public has little understanding, practice, and attitudes on the usage of antibiotics. Dispensing AWP is common in community pharmacies in several nations, including Iraq [10]. The study's value lies in identifying the conditions that lead to the sale of antibiotics without a prescription in Iraqi community pharmacies. Thus, more research and in-depth analysis are needed to investigate the important components that contribute to the emergence of this exceedingly harmful practice. This study intends to acquire insight into antibiotic dispensing procedures in Iraqi community pharmacies, as well as to investigate community pharmacists' attitudes on non-prescription antimicrobial dispensing.

METHODS

Study design and setting

A descriptive cross-sectional study was conducted with a sample of Iraqi community pharmacists. The Raosoft sample size calculator indicates that the minimum sample size is 340 community pharmacists, with a 95% confidence interval (CI) and 5% margin of error. However, only 300 pharmacists took part in the study.

Ethical approval

The Central Scientific Committee at the College of Pharmacy, University of Baghdad approved the research proposal. Consent is obtained from each participant via a consent section in the questionnaire, in which they affirm their willingness to participate in the study.

Study tools

An online pretested questionnaire in English with closed-ended questions was created after analyzing and adapting tools from three prior studies [2,11,12] on AWP dispensing. The study was conducted in 2023, between June and August. Before usage, the questionnaire was face validated. The final version of the questionnaire was provided to five clinical pharmacy experts from the University of Baghdad for comment, and the suggested changes were implemented. Following that, a pilot research was undertaken to assess the Cronbach alpha's validity and reliability, and the pilot study sample was excluded from the final data analysis. The questionnaire is divided into four sections, the first of which collects respondents' social and demographic information. The second section assessed pharmacist attitudes toward administering AWP. The final component of the questionnaire looked into the reasons for prescribing AWP. The fourth portion looked at how community pharmacists dispensed AWP. The second section of the questionnaire assessed participants' views using a five-point Likert scale. To determine the ultimate level of attitude, we assigned numerical values to each sentiment level (strongly agree = 5, agree = 4, neutral = 3, disagree = 2, strongly disagree = 1). A higher score suggested an appropriate and optimistic attitude.

Inclusion criteria

All pharmacists who work in community pharmacies for at least one year.

Exclusion criteria

Pharmacists do not work in a community pharmacy or have less than one year's experience.

Statistical analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 26. Continuous variables were expressed as mean ± SD. The display of categorical variables required the use of percentages and frequencies. A probability of less

than 0.05 was considered statistically significant. A Pearson correlation was conducted between sociodemographic characteristics and pharmacist attitudes about dispensing antibiotics without a prescription.

RESULTS

Three hundred pharmacists participated in the study. The highest proportion consisted of females (86.3%), those with a bachelor degree in pharmacy (88.3%), and those with between one and five years of work experience (86%) (Table 1).

Table 1: Sociodemographic characteristics of participants

Parameter		Value
Age (year)		26.59±4.93
Gender	Female	259 (86.3)
	Male	41(13.6)
Education level	Bachelor	265 (88.3)
	Diploma	10 (3.3)
	Master	19 (6.3)
	PhD	6 (2.0)
Job-status	Owner	55(18.3)
	Dispenser	243 (81.0)
Practice duration (year)	1-5	258 (86.0)
	11-15	6(2.0)
	6-10	26 (8.7)
	> 15	9 (3.0)
	Anbar	8(2.7)
Place of work	Babylon	38(12.7)
	Baghdad	127 (42.3)
	Basra	4(1.3)
	Thi-Qar	9(3)
	Diyala	10(3.3)
	Dohuk	1(0.3)
	Kerbala	10(3.3)
	Kirkuk	9(3)
	Maysan	1(0.3)
	Muthanna	3(1)
	Najaf	36(12)
	Nineveh	13(4.3)
	Qadisiya	6(2)
	Saladin	5(1.7)
	Wasit	18(6)

Data are presented as frequency, percentage, and mean±SD; *n*=300.

The Cronbach's alpha for the attitude was 0.78, indicating a good level of internal consistency. The normality of the results was assessed using a Shapiro-Wilk test, and the data was normally distributed. This study primarily demonstrates an agreement among pharmacists, with a high percentage (37.3%) concurring that they do not recommend dispensing AWP in community pharmacies in Iraq. Secondly, a significant percentage of participants (56.3%) strongly agree that dispensing AWP contributes to developing antimicrobial resistance. Thirdly, 45% of the pharmacists agree that the Iraqi Ministry of Health should prohibit dispensing antimicrobials without a prescription in Iraq, while none of the participants strongly disagree with this statement. The pharmacists expressed a notable consensus, with a substantial percentage (34%–35.3%) strongly agreeing and agreeing with stopping dispensing antimicrobials without a prescription. Regarding the statement emphasizing the role of community pharmacists in encouraging patients to consult physicians and obtain prescriptions, 47.7% of pharmacists express their agreement. Then, a considerable proportion of participants (approximately 44%–44.7%) expressed a high level of agreement, either strongly or simply agreeing, that dispensing AWP can lead to patients inappropriately utilizing antimicrobials instead of treating their infections effectively. Finally, pharmacists demonstrated a high level of support when considering the necessity of incorporating continuing education programs to increase the awareness of graduate pharmacists regarding the importance of refraining from dispensing antimicrobials without a prescription. Approximately 44% agreed with this notion, while 40% strongly agreed, as shown in Table 2. The findings indicate that most responses (82.7%) show that patients cannot afford the expenses associated with consultations and laboratory tests. Another important cause (71.4%) is that patients don't go to see a doctor unless the infection is serious. More than half of the pharmacists (59.5%) state that patients purchase the same AWP based on their experience. Furthermore, 42.2% of patients rely on their media expertise while choosing and purchasing AWP. Additionally, 35.9% of the pharmacists say that patients trust pharmacists' ability to choose the appropriate AWP for their condition. Other causes are the fear of needing many hours to finish the medical process for a prescription, the unavailability of physicians on holidays (Fridays), and other causes (25.6%, 17.9%, and 8%, respectively). There are many factors that affect pharmacists' decisions about dispensing AWP. In this survey, pharmacists can choose more than one factor. In this study, the highest number (63%) of responses indicated that pharmacists are knowledgeable about infection treatment and antimicrobials; they can sometimes dispense without a prescription after thoroughly examining the patient's condition. About 57.8% of pharmacists are dispensing antimicrobials because if they don't, they will try to obtain them from another pharmacy. Additionally, 51.5 % of the pharmacists prescribe antibiotics for fear of losing customers. Conversely, the smallest percentage of responses suggested that increased sales, owner-imposed profit pressure, and about 13% of other factors could affect a pharmacist's decision to dispense antibiotics. The highest percentage (38%) of pharmacists practice dispensing AWP in the range of 50% to 74% of patients who come to community pharmacies asking for antibiotics without a prescription per day, based on the total number of patients who visit the pharmacy, whereas the lowest percentage (12.7%) practice dispensing antimicrobials in the range of 75% to 100%.

Table 2: Pharmacists' attitude towards dispensing AWP

No.	Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Attitude score
1	I do not recommend dispensing antimicrobial without a prescription in community pharmacies in Iraq.	73(24.3)	112(37.3)	92(30.7)	18(6)	5(1.7)	3.77±0.94
2	Dispensing antimicrobial without prescription contributing to the development of antimicrobial resistance	169(56.3)	105(35)	20(6.7)	4(1.3)	2(0.7)	4.45±0.73
3	Iraqi Ministry of Health must prohibit Dispensing AWP in Iraq.	106(35.3)	135(45)	39(13)	20(6.7)	0(0)	4.1±0.86
4	Community pharmacists should stop dispensing antimicrobial without a prescription.	102(34)	106(35.3)	66(22)	23(7.7)	3(1)	3.93±0.97
5	Community pharmacists must encourage patients to consult the physician and get a prescription.	116(38.7)	143(47.7)	30(10)	8(2.7)	2(0.7)	4.21±0.78
6	Dispensing AWP can contribute to the inappropriate use of antimicrobial by patients rather than treating infections.	134(44.7)	132(44)	26(8.7)	7(2.3)	1(0.3)	4.3±0.75
7	Continuing education programs must be included to raise graduate pharmacists' awareness of the importance of not dispensing AWP without a prescription.	120(40)	134(44)	35(11.7)	6(2)	1(0.3)	4.23±0.76
	Total attitude						4.13±0.54

Data are presented as frequency, percentage, and mean±SD.

More than one-third of the participants dispense AWP for respiratory tract infections, including cold and flu cases (37.3%) and cough (5%), while for urinary tract infections (27.7%), the other conditions are toothache, diarrhea, rhinitis and sexually transmitted disease (12%, 1.4%, 1%, and 1.3%, respectively). As seen in Table 3, the results showed no correlation between age, gender, years of experience, and qualification with attitude towards dispensing antibiotics without a prescription.

Table 3: Correlation between sociodemographic parameters and pharmacists' attitudes towards dispensing antibiotics without a prescription

Parameter	*r*	*p*-value
Age	-0.089	0.43
Gender	-0.072	0.38
Years of experience	0.044	0.44
Education level	-0.063	0.280

r: Pearson's correlation coefficient.

Most antimicrobials dispensed without a prescription were broad-spectrum, with a percentage of 50.7%. While there is a 9.3% percentage of pharmacists who dispense narrow-spectrum antimicrobials, the remaining 38.3% dispense broad and narrow-spectrum antimicrobials. Penicillins and macrolides are the most commonly prescribed antimicrobials for patients with suspected respiratory tract infections (57.6% and 30.3%, respectively). In contrast, tetracyclines, sulfonamides, and aminoglycosides exhibit relatively reduced rates of dispensing in these circumstances. The highest percentage of antibiotics dispensed to patients without a prescription who are suffering from suspected UTIs are fluoroquinolones (58.3%) and cephalosporin (16.3%). In contrast, the lowest percentage of pharmacists dispense cefixime, nitrofurantoin, amikacin, and Lincomycin without a prescription for individuals with suspected UTIs. More than half of the participants (51.7%) stated that they do not dispense antibiotics without a prescription to patients with suspected GIT infections. However, only 14% of the participants dispense sulphonamides. Less than 10% of pharmacies give penicillin, cephalosporins, and fluoroquinolones. Most participants dispense oral antibiotics (84.9%) and topical antibiotics (5.3%), while other dosage forms are dispensed rarely. Based on the data presented in Figure 1, it can be observed that a significant proportion of the participants, specifically over one-third, reported amoxicillin as the most frequently provided antibiotic without a prescription for adult patients.

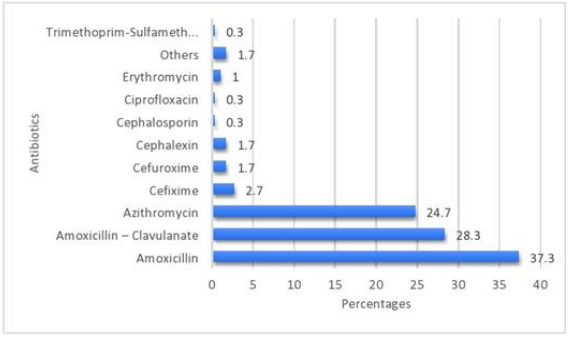

Figure 1: The most dispensed antibiotics without prescription for adult patients. n=300.

Following this were azithromycin at 24.7% and amoxicillin-clavulanate at 28.3%. Over one-third of the participants dispense amoxicillin (37.3%) or cefixime (35%); other antimicrobials are azithromycin (12%) and amoxicillin-clavulanate (11%) without a prescription for pediatric patients in their pharmacies (Figure 2).

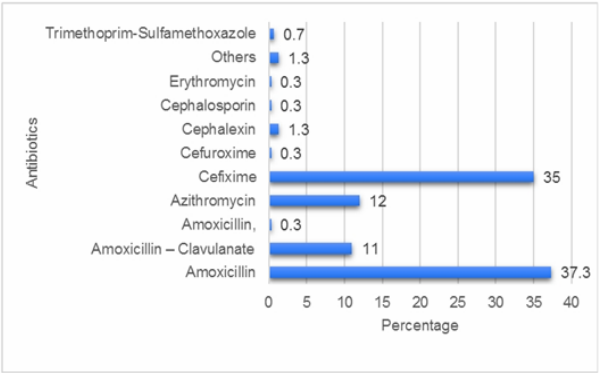

Figure 2: Antibiotics without prescription, which pharmacists most dispense for pediatrics. n=300.

DISCUSSION

This is allegedly one of several recent studies undertaken in Iraq to analyze attitudes, procedures, and causes for incorrect antibiotic dispensing, as well as to establish which antibiotic classes are most regularly supplied. In this survey, the majority of community pharmacists are aware and do not recommend dispensing AWP, instead advising consumers to see a doctor and receive a prescription. This demonstrates a considerable propensity among pharmacists to prevent the dispensing of AWP. Similarly, prior studies on community pharmacists in Thailand [13] and Jordan [14] found that pharmacists were knowledgeable of the appropriate administration of antibiotics. This originated from the college curriculum, which emphasizes that antimicrobial medications should not be dispensed without a prescription, and these drugs are not available over the counter. Every year, there are numerous conferences and workshops on bacterial resistance, as well as volunteer efforts to raise community awareness of the apparent danger of antibiotic-resistant bacteria. All of these play a significant role in raising awareness. In this study, despite having appropriate knowledge and awareness, they continue to provide antimicrobials in huge quantities. Financial incentives and other variables may impact how antimicrobials are administered. According to this survey, the majority of pharmacists strongly believe that administering AWP contributes to the evolution of antimicrobial resistance (AMR). The overall findings were consistent with those of a previous study conducted in Iraq, where the majority of participants (84.3%) had a solid understanding of antibiotic resistance [15]. A study in Iraq [16] found that antibiotics can be supplied inconsistently. It was also observed that just 28% of patients underwent culture and sensitivity testing, and that all patients were resistant to ampicillin, amoxicillin, and 90% of third-generation cephalosporins. The study, which was conducted at Iraq's AL-Elweyia Pediatric Teaching Hospital [17], discovered a misuse of antibiotics across all hospital departments. Another study by Al-Tukmagi *et al*. [18] found that the majority of non-medical university workers in the Iraqi population (88%) utilized antibiotics for self-medication. In a research on community pharmacies in Pakistan conducted by Waseem *et al*., 48.1% of participants saw AMR as a global concern [19]. Furthermore, a greater proportion (83.5%) of Jordanian community pharmacists agreed on this perspective and awareness of AMR [13]. The development of resistance mechanisms in microbes frequently outpaces the discovery of new, effective antibiotics. Scientists struggle to discover and manufacture novel antimicrobial medications capable of combating microbes' rapidly evolving resistance mechanisms; as a result, it is critical to highlight the proper use of antimicrobials. To address these concerns, adequate prescribing practices, public and healthcare professional awareness, and patient education are essential. The findings revealed no relationship between age, gender, years of experience, education level, and attitude toward administering AWP. Similar to a study conducted in Iraq [20], there was no correlation between gender, years of experience, or education level. However, there was a significant association between attitude toward AWP and age. However, the research suggests that these qualities had no meaningful effect on views toward antibiotic delivery. More research is needed, and investigations into additional factors that can influence perceptions about antibiotic distribution could give critical data for antimicrobial stewardship campaigns. Baghdad University pharmacy students showed very low and unexpectedly low knowledge of antibiotics, according to a 2019 study by Mikhael *et al*. [21]. According to the findings of this survey, a large number of community pharmacists desired the inclusion of continuing education programs to increase graduate pharmacist awareness. While a previous study conducted in Iraq found that nearly 47% of participants believe that attending continuous pharmacist education programs can help them improve their counseling practice, the majority of them are optimistic about the importance of these programs for their future careers [22]. The majority of participants reported that pharmacists are informed about antibiotic use and will occasionally distribute without a prescription after thoroughly analyzing the patient's health. In addition, the fear of losing clients was a major motivator for discontinuing the AWP. In Iraq's Al-Najaf governorate, the total cost of antibiotics consumed exceeded $9 million [6]. One possible explanation is that self-assured pharmacists do not want to look uninformed about the patient's condition or to have limited knowledge in front of the patient when delivering antibiotics. In comparison, a Nigerian study found that patients' evaluations of their

illnesses as light are the primary drivers of self-medication [23]. Furthermore, the Sabry *et al*. investigation confirmed the prior findings, revealing that antibiotics are frequently prescribed from local pharmacies in Egypt without proper prescriptions or for inappropriate indications [24]. Another study found that pharmacists' attitudes on dispensing antibiotics without a prescription were unacceptable among the Iraqi community [7]. Antibiotics may be dispensed without a prescription for a variety of reasons, including patient requests for specific medications in emergency situations, frequent client visits to pharmacies, pharmaceutical company marketing, time and cost savings for visiting physician clinics and laboratory tests, and insufficient healthcare services. Financial incentives, like as bonus payments to pharmacies for meeting sales targets, may influence antimicrobial dispensing. The current study results demonstrated that antimicrobials are prescribed for the treatment of suspected illnesses, which is consistent with studies in Jordan [14], Saudi Arabia [25], and Duhok Province, Kurdistan Region of Iraq [26]. Penicillins and cephalosporins were the most commonly administered AWP, followed by fluoroquinolones and macrolides. Similar to earlier research, penicillin was found to be the most often used antibiotic in Egypt and 19 European countries [24,27]. Penicillins have a long history of safe use and are often well tolerated. Penicillins have a well-established safety profile and are relatively affordable, so patients may feel more comfortable asking for them than other antibiotic classes. In Iraq, 85.3% of the population received antibiotics from neighborhood pharmacies [28], compared to 97.9% in a Saudi research [25]. They gave out antibiotics right away without a prescription. Pharmacists primarily dispense antimicrobials for respiratory tract illnesses, which are typically caused by viruses. By actively immunizing against influenza, we can reduce the number of antimicrobials prescribed. Providing influenza vaccines is an important part of public health. This entails educating the public about the importance of vaccination. A notable finding in the Iraqi study [29] was that the available culture and sensitivity tests (C/S) did not include all prevalent antibiotics. The diagnosis of bacterial illness is based on the identification of bacteria in microbiological cultures, which is regarded the current gold standard in antibiotic prescription. As a result, it is critical to emphasize the importance of providing bacterial culture and sensitivity testing in all healthcare settings, as well as raising awareness about their use before prescribing antibiotics. In this study, around 38% of pharmacists reported that 50% to 74% of patients who visit community pharmacies on a regular basis seek antibiotics without a prescription. This was the most intriguing conclusion of the current study, which revealed that the vast majority of antibiotics in Iraqi community pharmacies were sold with no prescription. Similarly, Haddadin *et al*. [30] found that a significant proportion of antibiotics are provided without a prescription in Jordan, whereas in Saudi Arabia [25], the percentage of antibiotics dispensed without a prescription was 77.6%. This suggests that the settings for distributing and using antibiotics in community pharmacy in many countries are inadequate and often unregulated. Community pharmacists should keep track of their daily prescriptions, and the guidelines must be followed strictly to avoid inappropriate antibiotic prescriptions in the private sector. Furthermore, Iraqi pharmacy institutions should improve its curriculum, notably for the hospital training course, in order to improve graduate pharmacists' practical abilities and raise professionalism in pharmaceutical care [31]. The current study's limitations included a limited sample size, which was mostly owing to a low participation rate among pharmacists in the online survey. Furthermore, the majority of the participants were from the capital, which has the biggest number of community pharmacies.

Conclusion

The study reveals how antibiotics are widely used for self-medication in contemporary society. Patients utilized antibiotics without a prescription primarily to save money on medical visits and laboratory tests. The most common conditions related with AWP dispensing were colds and the flu. The study underlines the importance of strengthening pharmacy school curricula, focusing on improving dispensing methods, and boosting public knowledge of the risks of antibiotic abuse. Furthermore, this study gives additional evidence to decision-makers on the importance of establishing national policies and legislation governing the over-the-counter selling of antibiotics, which will help improve antibiotic utilization and reduce antibiotic resistance.

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Conflict of interests

No conflict of interests was declared by the authors.

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Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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