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The Magnitude of Dispensing Unprescribed Antibiotics in Community Pharmacies in Duhok Province; Kurdistan Region of Iraq

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Abstract

Objectives: The study aims to provide a descriptive overview about the magnitude and frequency of dispensing the unprescribed antibiotics UABs. It furthermore aims, to specify the most dispensed UAB types, the most common infections, signs and symptoms that require dispensing the UABs in community pharmacies of Duhok city and its districts.

Methods: A cross sectional cohort study had been conducted from September to October 2022, private community pharmacies of Duhok province were included in this study. A standardized questionnaire platform was utilized to complete the survey, it included 2 sections, the first of which was related to demographic data and the second part included details of the dispensing unprescribed antibiotics UABs like: what are the most common dispensed UABs, what are the most common illness and symptoms of patients who require dispensing UABs.

Results: One hundred fifty pharmacies have been included in this study. The majorities were from Duhok city 46%, and Zakho 28.7%. The prevalence of dispensing UABs was 100%, the three most common dispensed UABs were Amoxicillin 77%, followed by azithromycin 16% and cefixime 7%. The most infections and conditions requiring dispensing UABs were tonsilitis (69.3%), followed by flu and common cold (58.7%), and lower respiratory tract infection (48.7%).

Conclusion: This study concluded that dispensing UABs is a frequent practice in Duhok community pharmacies. Viruses are the most common cause of upper respiratory tract infections; hence, antibiotics must be avoided and OTC medicines should be encouraged to alleviate the symptoms. Continuing medical education through training pharmacists on dispensing antibiotics by adhering to the regulations of antibiotic stewardship is crucial.

Keywords: Unprescribed antibiotics, community pharmacies, infections, Kurdistan Region, Iraq

Introduction

Antibiotic resistant crisis is the main issue that threatens global health security as it causes morbidity, mortality and magnifies the economic loss.[1] In 2019, the World Health Organization (WHO) had declared that "Antimicrobial Resistance (AMR)" is one of the most urgent health risks of our time and it is named the "invisible pandemic". Since then, serious actions had been taken worldwide to detract this scourge, i.e., using The AWaRe online tool developed by the WHO Essential Medicines List to contain rising resistances and make antibiotics safer and more effective.[2,3]

Currently, it is estimated that more than 50% of antibiotics in numerous countries are dispensed without prescriptions and have been utilized inappropriately such as; usage for virus treatments, wrong (broader spectrum) antibiotics used, and wrong dose and duration of treatment course, thus contributing to the spread of AMR.[4,5]

Signs of post antibiotic era had already been discovered worldwide, especially in low- and middle-income countries (LMIC).[6,7] The inferior living ambience, inadequate sanitation, poor infection control, and the non-adherence to the prescribed course of antibiotics had been associated with AR in LMICs.[8,9] However, lack of antibiotic dispensing policies in these settings and the availability of low quality of antibiotic brands are the major contributors behind this condition.[10,11]

Dispensing antibiotics without prescription had become a common practice in LMICs, including Iraq.[11-13] Several factors contributed to this situation: the inadequate knowledge about antibiotic resistance and lack of awareness about antibiotic stewardship among community pharmacists in Iraq.[13] Furthermore, Iraq has no community pharmacy chains meaning all community pharmacies are private independent pharmacies usually owned by licensed pharmacists. Although, it is unwarranted by law, selling antibiotics without prescription is a common practice. On the other hand, numerous community pharmacies employ pharmacy technicians who also commonly dispense antibiotics without prescriptions.[14]

To our knowledge, there is no antibiotic dispensing survey conducted in community pharmacies of Duhok province, therefore, this study aims to provide a descriptive overview about the magnitude and frequency of dispensing the UABs. It furthermore aims, to specify the most dispensed UAB types, the most common infections, signs and symptoms that require dispensing the UABs in community pharmacies of Duhok city and its districts.

Materials and Methods

Study Design and Setting

A cross sectional cohort study had been conducted from September to October 2022 in Duhok province, Kurdistan region of Iraq. Private community pharmacies of Duhok city and its districts (Zakho, Akre, Bardaarash, Amedy, Semel and Shekhan) were studied. Governmental hospital inpatient

and outpatient pharmacies had been excluded as the antibiotics are dispensed by prescription.[14]

Study Sampling Process

A standardized questionnaire platform was utilized to complete the survey, face to face interviews were performed by the authors and the pharmacists to precisely fill the requested questions. The interviews took place in pharmacies or any other place convenient to them. All pharmacy workers, including pharmacists and their assistants, were clearly informed about the aim of study and that the data will be kept confidential and used for research purposes only. The questionnaire included 2 sections, the first of which were questions regarding demographic data like: place, type of pharmacy (whether it is a by hand pharmacy, a medical complex pharmacy, or a private hospital pharmacy), age of the pharmacist, experience years, and the scientific degree of the pharmacist. The second part included details about the nature of the dispensing UABs like: what the three most common dispensed antibiotics are, what are the most common illness and symptoms of patients who require dispensing UABs, and the frequency of dispensing each type of antibiotic class were asked, whether it is commonly dispensed (everyday), often dispensed (once to twice a week), rarely dispensed (once a month), or never dispensed.

Scientific and Ethical Approval

Ethical approval was obtained from the Syndicate of Kurdistan Pharmacists Duhok branch before conducting this study. This study was reviewed and approved by the scientific and Ethics Committee of the College of Pharmacy at the University of Duhok on August 7, 2022 (Reference No. 122). Written informed consent was obtained from the participants before starting the interview.

Statistical Analysis

All data were analyzed by Statistical Package for the Social Sciences software version 22. Descriptive statistics were carried out for the demographic variables, the most prevalent types of dispensed antibiotics, and to obtain the incidence of dispensing each type of antibiotic individually.

Results

One hundred fifty pharmacies have been included in this study. The majorities were from Duhok city 46%, followed by Duhok's biggest district Zakho 28.7%, 4.7% were from Semel, other 14.7% included Shekhan, and Bardarash. Most of the included pharmacies were independent (by hand) ones (66%). The scientific degree of most of the interviewed pharmacists was bachelor degree (96.7%); only 5 participants had higher degrees (MSc and PhD). The mean age of the pharmacists was (28.78) ± SD 6.157, and the mean years of experience of pharmacists was (5.67) ± SD 4.874 as shown in Table 1.

In the descriptive analysis, it appeared that the three most common dispensed UABs were Amoxicillin, followed by azithromycin and cefixime respectively, as shown in Figure 1.

The most infections and conditions requiring dispensing UABs were tonsilitis (69.3%), followed by flu and common cold (58.7%), and lower respiratory tract infection (LRTI) (48.7%) as shown in Figure 2.

Table 1. **Demographic characteristics of study population**

Variables	Number	Percentage
Place of pharmacy		
Duhok	69	46
Akre	6	4
Zakho	43	28.7
Amedy	3	2
Semel	7	4.7
Other	22	14.7
Type of pharmacy		
Medical complex pharmacy	39	26
Private hospital pharmacy	12	8
Independent (by hand) pharmacy	99	66
Scientific degree of the pharmacist in charge		
Bachelor	145	96.7
MSc	4	2.7
PhD	1	0.6
Age (mean) SD = (28.78) 6.157		
Years of experience (mean) SD = (5.67) 4.874		

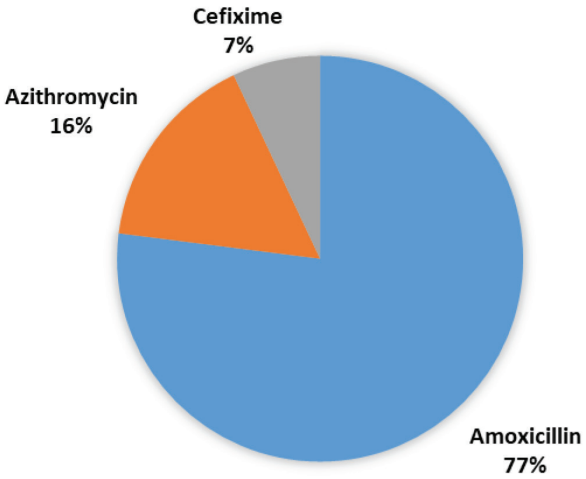

Fig. 1 **The most frequent dispensed unprescribed antibiotics.**

On the other hand, the most frequent signs and symptoms that require dispensing UABs were fever, cough, sore throat, and diarrhea (68.7%, 64.7%, 51.3% and 46.7%), respectively (Figure 3).

In this study, penicillin, macrolides, 3rd generation cephalosporins and quinolones were among the most common dispensed antibiotics. Fourth and 5th generation cephalosporins, linconsamide, streptogramine, linezolid, daptomycin, lefamulin, monobactam, fosfomycin, nitrofurantoin, sulphonamids, and chloramphenicol were the antibiotic classes that fall among those which rarely to never dispensed without a prescription (Table 2).

Discussion

The antibiotic resistance continuously spreads worldwide, particularly in LMIC, including Iraq. There is an urgent need

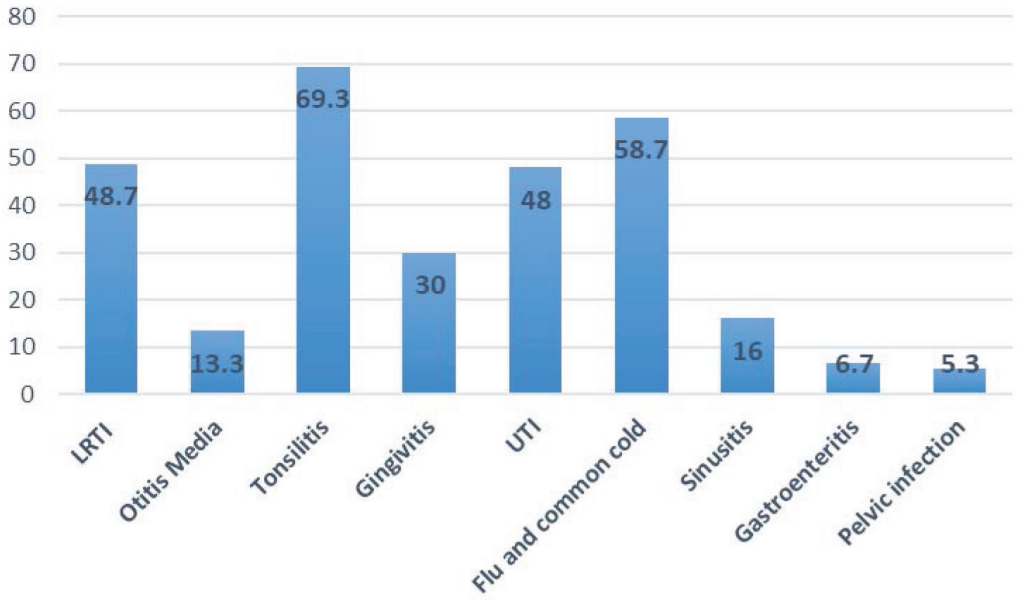

Fig. 2 **The most frequent conditions that require dispensing unprescribed antibiotics.**

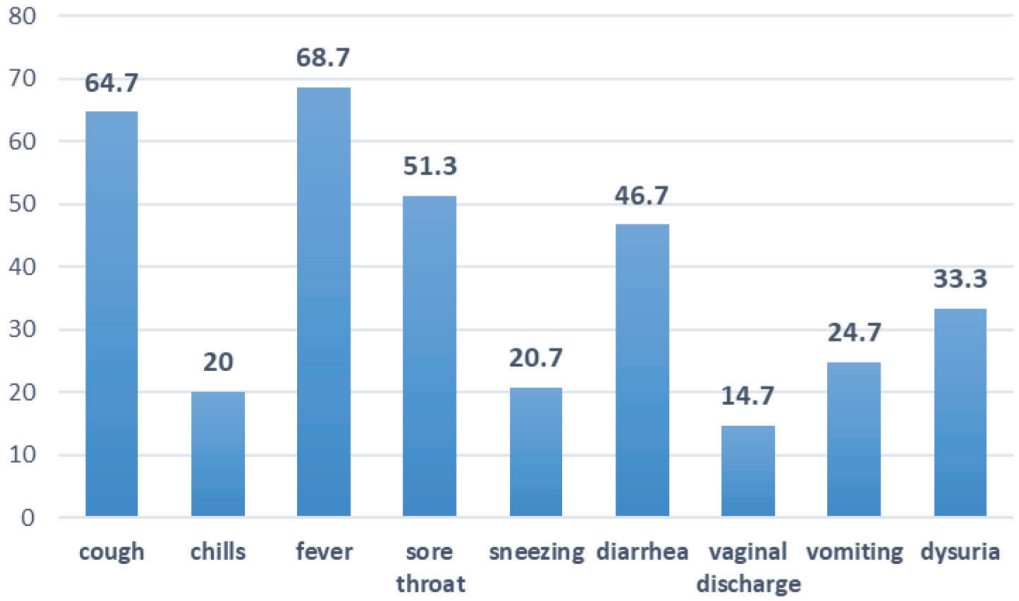

Fig. 3 **The most common signs and symptoms that require dispensing unprescribed antibiotics.**

to set an antibiotic dispensing policy and improve prescription practices through incorporating treatment recommendations into the national guidelines, and consolidation of the awareness of this public health problem.[15]

In our study, the dispensing of UABs was high, which is in line to studies from Syria, Egypt, and Saudi Arabia.[16,17] However, studies from Qatar and other high-income countries like, North America, Europe, and Australia showed a low prevalence of dispensing UABs.[11,18-20] The irresponsible malpractice of frequent UAB uses in Duhok community pharmacies is threatening the community health security outcome in the region. Moreover, the high prevalence (93.7%) of antibiotic misuse in Kurdistan hospitals perplexed the emergence of antibiotic resistance.[21] Therefore, it is crucial to encourage dispensing prescribed antibiotics and to avoid dispensing UABs by pressing charges through the pharmacy council against the pharmacist who do not adhere to rational uses of antibiotics.

In our study, we found that the most frequent dispensed UABs in the private health sector were amoxicillin with or without clavulanic acid, followed by azithromycin, and cefixime. The prevalent use of unprescribed amoxicillin has been well documented in several LMICs countries.[22-24] In Iraq, the wrong belief of using specific antibiotics such as amoxicillin and azithromycin for treating respiratory tract infections including viral in origin is a challenging consequence of increasing antibiotic resistance. The increase of such antibiotic consumptions in winter is well recognized[14] It is worthy to mention that the use of azithromycin has increased dramatically after COVID-19 pandemic, particularly in the early phase of the pandemic as it was used in the treatment guideline of COVD-19 patients.[25,26] This finding rationalizes the extreme pathogen resistance to these antibiotics in the region.[27-29] While other studies from the same region showed a high rate of inappropriate 3rd generation cephalosporin

Table 2. **The frequency of dispensing antibiotics in community pharmacies**

The antibiotics	The dispensing (%)			
	Commonly	Often	Rarely	Never
Sulphonamides	1.3	10	24.7	64
Penicillin	94	6	–	–
1st generation cephalosporin	16	35.3	22	26.7
2nd generation cephalosporin	5.4	15.3	17.3	62
3rd generation cephalosporin	46	32.7	9.3	12
4th generation cephalosporin	–	–	6.7	93.3
5th generation cephalosporin	–	–	–	100
carbapenem	1.3	2	12	84
Glycopeptide	–	–	7.3	92.7
Monobactam	–	–	2	98
Aminoglycosides	7.3	20.7	28	44
Macrolides	66	30	2.7	1.3
Chloramphenicol	1.3	9.3	11.3	78
Quinolone	33.3	36.7	16	14
Fosfomycin, nitrofurantoin	0.7	2	17.3	80
Linconsamide	1.3	5.3	6	87.3
Streptogramine	–	–	0.7	99.3
Linezolid	–	–	–	100
Daptomycin	–	–	–	100
Lefamulin	–	–	–	100

prescriptions in the governmental sector,[21] which increases the magnitude of AMR in our region. Overall, continuing medical education through training of pharmacists on antibiotics dispensation by adhering to the regulations of antibiotic stewardship is crucial.

In the present study, the unprescribed quinolones, in particular ciprofloxacin was used often (2–3 times a week); whereas, other studies reported metronidazole and quinolones as most frequent dispensed UAB.[24,30,31] It is noteworthy that 80% and 44% of Duhok community pharmacies never dispense unprescribed nitrofurantoin and aminoglycoside class, respectively, that elucidates to the lowest rate of resistance of these antibiotics for treating urinary tract infection (UTI).[32] The higher rate of broad-spectrum antibiotic such as ciprofloxacin for treating UTI, instead of narrow-spectrum antibiotic such as nitrofurantoin, is malpractice in enhancing AMR. Therefore, clinical pharmacists should play a pivotal role in avoiding the use of broad-spectrum antibiotics, consequently encouraging the use of narrow-spectrum antibiotics for specific infections.

In the current study, UABs were dispensed for the treatment of tonsilitis (23.4%), flu and common cold (19.8%), and other upper respiratory tract infection (URTI) (16.4%). This finding was concordant with a study from China where URTIs were the most frequent reason for UABs.[11] On the contrary, a study from Nigeria reported that UTIs, typhoid fever, and sexually transmitted diseases (STD) were the most infections that require dispensing UABs.[33] While in Saudi Arabia, pharmacists dispense UABs for pharyngitis and UTI most commonly[34] In general, the differences of dispensing UABs between different countries is guided by local epidemiology infections. Concerning high rates of antibiotic misuse for URTIs, community pharmacists should be involved actively in avoiding dispensing UABs by offering over the counter (OTC) medicines that alleviate upper respiratory symptoms of viral origin such as painkillers for fever and aches, and antihistamines for sneezing and an itchy nose.

The main limitation of the study was the slight possibility of having imprecise data, as this method "pharmacy interviews" may be exposed to the Hawthorne effect (changes in the behavior of the studied pharmacists because they feel observed).[15] Another limitation was that our study was confined to one province. Hence, we recommend larger studies at national level to better understand the magnitude of UBA dispensations.

Conclusion

This study concluded that dispensing UABs is a frequent practice in Duhok community pharmacies. Amoxicillin, azithromycin, and cefixime are the most widely dispensed antibiotics. Tonsilitis, flu and common cold, and other URTI are the conditions requiring the most dispensations of UABs; while fever, cough and sore throat are the most reported signs and symptoms for UAB dispensations. Viruses are the most common cause of URTIs, hence, antibiotics must be avoided and OTC medicines should be encouraged to alleviate the symptoms. Continuing medical education through training pharmacists on dispensing antibiotics by adhering to the regulations of antibiotic stewardship is crucial.

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Conflict of Interest

The authors declare no conflict of interest.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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