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Prevalence and Implications of Non-Prescription Antibiotic Dispensing in Baghdad Community Pharmacies

Jingyi Qiao[1,2*], Bingxing Luo[1,2], Jian Ming[1,2], Shanyan Zhou[1,2], Yingyao Chen[1,2], Xinhua Zhang[3]

[1] School of Public Health, Fudan University, Shanghai, China.
[2] National Health Commission Key Laboratory of Health Technology Assessment, Fudan University, Shanghai, China.
[3] Department of Hematology, 923rd Hospital of the People's Liberation Army, Nanning, Guangxi, China.

***E-mail** ✉

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ABSTRACT

The purpose of the present investigation was to assess the pattern of distributing antibiotics without an order at a Baghdad community pharmacy, as well as to better comprehend the variables that influence antibiotic dispensing without authorization. A cross-sectional survey of community pharmacists was conducted to explain antibiotic distribution practices in community pharmacies. To collect the requisite sample, the convenience sampling approach was used at a Baghdad community pharmacy. The participants' data were collected using a self-administered questionnaire. Most community pharmacists (94.2%) provided antibiotics without authorization at their community pharmacy. The majority of them (59.6%) stated that the most often prescribed nonprescription antibiotics were oral ones. In addition, 23.6% of respondents said they provide parenteral antibiotics without a prescription. Antibiotics prescribed without a prescription were most commonly for earaches (70.3%), sore throats (70.9%), and UTIs (94.2%). Amoxicillin (96.9%), amoxicillin/clavulanate (88.2%), cephalexin (70.6%), ceftriaxone (61.2%), cefixime (67.7%), ciprofloxacin (87.4%), azithromycin (94.2%), and metronidazole (85.6%) were the most common prescription antibiotics that were given out without a prescription. According to this study, community pharmacists frequently gave away antibiotics in community pharmacies without a prescription. Therefore, strict regulations are needed to regulate the sale of antibiotics at neighborhood pharmacies.

Keywords: Antibiotics, Dispensing, Pattern, Prescription

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Introduction

One of the main causes of the improper use of antibiotics that leads to the development of antibiotic resistance is the nonprescription dispensing of antibiotics [1]. In addition to the overuse of broad-spectrum antibiotics, which is thought to be the primary cause of antibiotic resistance globally, the irrational use of antibiotics is a complex issue consisting of unimportant and unacceptable use of antibiotics regarding indication, improper dose, duration, and frequency [2]. The increase in the unregulated selling of antibiotics has been strongly linked to antibiotic resistance [3, 4]. Although it is difficult to evaluate the overall effects of antibiotic resistance, the non-prescription sale of antibiotics is constantly questioned in middle- and lower-income areas [5–10]. Additionally, reports have shown that community pharmacists view the distribution of non-prescription antibiotics as a major public health problem [5, 6, 9, 10], which reduces antibiotic efficacy and therapeutic failure [11]. They also have adequate knowledge of and perceptions about this topic. Other community pharmacists subsequently reported that patients were frequently more anxious about getting antibiotics if they had received them and believed they were necessary for their condition, or if they couldn't pay the cost of the doctor's appointment [5, 9–11]. Furthermore, a major

factor in doctors prescribing antibiotics, particularly for viral illnesses that raise antibiotic resistance rates, is patient pressure [12, 13]. Antibiotics are frequently dispensed without a prescription due to several factors, including insufficient regulation, pharmacists' ignorance of infectious diseases, consumer demand, the commercial impact of pharmacies, and financial incentives from pharmaceutical companies [6, 14, 15]. The use of antibiotics is widespread among Iraqis, particularly in the winter. Antibiotics are widely thought to be effective in treating respiratory infections, including those brought on by viruses like the flu and cough [16]. According to research by Darwish *et al.* [17], 29% of Iraqis agreed to use antibiotics after being recommended to do so by friends and family, and 62% of them did so without a prescription. In Iraq, neighborhood pharmacies, governmental hospitals, and outpatient clinics all provide antibiotics. Prescription drugs are frequently filled by the local community pharmacy because private hospitals lack their pharmacies. In Iraq, community pharmacies are privately operated by licensed pharmacists as independent businesses; there are no chain pharmacies [18]. Even though it is illegal, antibiotics are commonly given out without a prescription. Additionally, a lot of community pharmacies employ technicians who frequently offer over-the-counter antibiotics. Accordingly, public prescription and use of antibiotics are often unregulated and suboptimal. However, to prevent the improper distribution of antibiotics in the private sector, community pharmacists should keep an eye on the daily dosage of antibiotics that are prescribed [16]. Furthermore, practically all Iraqi hospitals, outpatient clinics, and community pharmacies still employ paper-based prescriptions and records and lack electronic health records or dispensing systems. Consequently, there is a dearth of yearly statistical health data about the use of antibiotics in Iraq. On the other hand, not much research has been done on community-level antibiotic use. The purpose of the present investigation was to assess the pattern of distributing antibiotics without an order at a Baghdad community pharmacy, as well as to better comprehend the variables that influence antibiotic dispensing without authorization.

Materials and Methods

Study Design

A cross-sectional study was conducted to describe the pattern of antibiotics dispensed without a prescription in a community pharmacy in Baghdad, Iraq.

Sampling and Sample Size

A convenience sampling method was used to select the pharmacists from a community pharmacy in Baghdad, the capital city of Iraq. All community pharmacists in Baghdad were eligible to take part in this study. Community pharmacists who declined to participate were excluded from the study. Raosoft sample-size calculator was used to generate the required sample based on the total number of registered pharmacists in Baghdad, which was 6220. The calculated sample size was 362 subjects. For the possibility of missing data or non-response, 20% was added to the sample size to be in total of 435 subjects.

Questionnaire Development

The questionnaire was developed based on relevant published studies on antibiotic dispensing in community pharmacy settings. After consulting experts in pharmacy practice, the questions were then reviewed and included in the questionnaire. A pretest assessment was carried out among five pharmacists to ensure the suitability of the questions and to obtain their suggestions for improving the questionnaire. The content validity of the questionnaire was assessed by two lecturers to ensure the measurement was related to the concept of the study. For the reliability of the questions, a pilot study was carried out to ensure the inter-correlation between questions and the feasibility of data collection. The participants who were included in the pilot study were excluded from the main study. The final version of the questionnaire included two parts, including demographic characteristics of participants and the pattern of dispensing of antibiotics.

Data Collection

A self-administered questionnaire was used to obtain the data from community pharmacists throughout their working hours at the community pharmacy. Before any data collection, all participants were informed of the study's purpose to given their verbal consent for participation in the survey.

Data Analysis

The data were analyzed using the Statistical Package for Social Sciences (SPSS) program version 18.0 and relevant descriptive and inferential statistics tests. A bar chart was used to explain the distribution of participants' responses. The chi-square test was computed to find the association between variables. All statistical calculations were done with a 95% confidence level and an alpha level of 0.05.

Results and Discussion

Demographic Characteristics of the Participants

An 87.85% response rate was obtained from the 381 community pharmacists who effectively the survey out of the 435 community pharmacies that were visited. 73% of the participants were under the age of thirty-one, according to **Table 1**'s sociodemographic details. Male participants made up 55.9% of the total, while female participants made up 44.1%. The majority of participants (86.6%) held a bachelor's degree in pharmacy, with 1.8% having completed postgraduate studies, 5.8% having a diploma in pharmacy, and 5.8% having other degrees. Among the participants, pharmacists made up most of them (88.5%), with associate pharmacists making up 11.5%. About the participants' years of experience, 32.5% have three to five years of experience in community pharmacy, while 31.8% have less than three years. Furthermore, 43.3% of the participants worked in independent pharmacies, whereas 56.7% of them were employed by medical complex pharmacies.

Table 1. Socio-demographic characteristics of the participants

Variable		N (%)
Age	Mean ± (SD)	30.82 ± (8.37)
	Median	28.0
Gender	Male	213 (55.9)
	Female	168 (44.1)
Education	Diploma of pharmacy	22 (5.8)
	B.Sc. in pharmacy	330 (86.6)
	Postgraduate (MSc or Ph.D)	7 (1.8)
	Others	22 (5.8)
Position	Pharmacist	337 (88.5)
	Assistant pharmacist (non-pharmacist)	44 (11.5)
Years of experience	< 3 years	121 (31.8)
	3–5 years	124 (32.5)
	6–10 years	70 (18.4)
	> 10 years	66 (17.3)
Type of pharmacy	Medical complex pharmacy	216 (56.7)
	Independent pharmacy	165 (43.3)

Dispensing of Antibiotics in Community Pharmacy

The participants were questioned about whether or not their neighborhood pharmacy administered antibiotics without a prescription. Only 22 individuals (5.8%) did not distribute antibiotics without a prescription, while the majority of participants (n = 359, 94.2%) did so at their neighborhood drugstore. The spread of prescription-free antibiotic dispensing is seen in **Figure 1**.

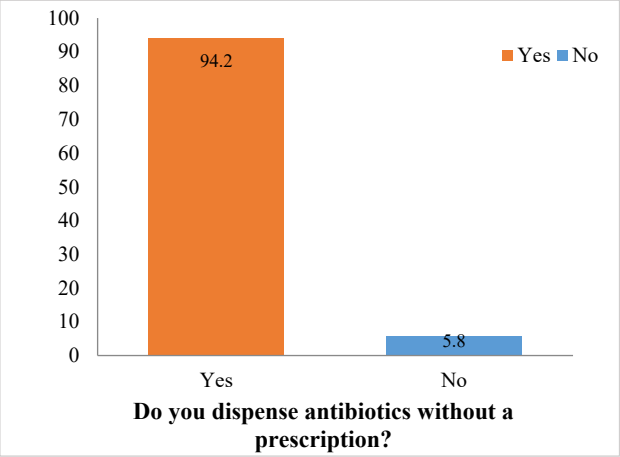

Figure 1. Dispensing of antibiotics without a prescription

According to **Table 2**, older age groups and more seasoned years were statistically linked to the nonprescription administration of antibiotics. Antibiotics are not prescribed without a prescription by participants who are younger and have less expertise. Nevertheless, there was no correlation found between the distribution of antibiotics without a prescription and gender, job, qualification, or pharmacy type.

Table 2. Dispensing of antibiotics without a prescription

Dispensing of antibiotics without a prescription		Yes (n = 359, 94.2%)	No (n = 22, 5.8%)	P-value
Age group (years)	≤ 30	96.0	4.0	0.000*
	31-40	77.1	22.9	
	≥ 41	100	0	
Gender	Male	94.8	5.2	0.660
	Female	93.5	6.5	
Qualification	Diploma of pharmacy	100	0	0.307
	B.Sc. in pharmacy	93.3	6.7	
	Postgraduate (MSc or Ph.D)	100	0	
	Others	100	0	
Position	Pharmacist	93.5	6.5	0.092
	Assistant pharmacist (non-pharmacist)	100	0	
Years of experience	< 3 years	83.3	16.7	0.000*
	3–5 years	91.1	8.9	
	6–10 years	100	0	
	> 10 years	100	0	
Type of pharmacy	Medical complex pharmacy	94.9	5.1	0.516
	Independent pharmacy	93.3	6.7	

Forms of Antibiotics Dispensed Without Prescription

The majority of participants (59.6%, n= 227) stated that the most often prescribed nonprescription forms of oral antibiotics at their community pharmacy were tablets, capsules, and suspensions. In contrast, without a prescription, topical antibiotics (47.2%, n= 180) and drop antibiotics (35.2%, n= 134) were also often provided. Parenteral antibiotics were also often dispensed without a prescription at their neighborhood pharmacy, according to 23.6% (n= 90) of individuals. The most popular dose type given out without a prescription at community pharmacies is seen in **Figure 2**.

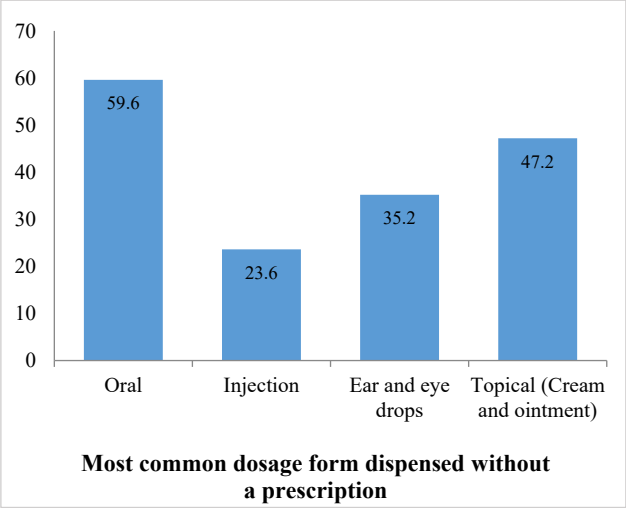

Figure 2. The most common dosage form dispensed without a prescription in community pharmacies

Dispensing of Antibiotics Without Prescription Based on Medical Conditions

From **Table 3**, the participants showed that antibiotics were dispensed without prescription for various medical conditions. The highest percentage of antibiotics were dispensed without prescription for UTIs (94.2%), sore throat (70.9%), and earache (70.3%) conditions. However, other individuals (34.9%) also received antibiotics without a prescription for viral diseases like the flu or the common cold.

Table 3. Dispensing of antibiotics without a prescription based on medical conditions

Medical condition	N (%)
Cold or Flu	133 (34.9)
Sore throat	270 (70.9)
Diarrhea	167 (43.8)
Toothache	210 (55.1)
Otitis media	268 (70.3)
UTIs	359 (94.2)
Skin infections	227 (59.6)

Types of Antibiotics Dispensed Without Prescription

According to **Table 4**, the most often prescribed antibiotics without a prescription at community pharmacies were amoxicillin (96.9%), amoxicillin/clavulanate (88.2%), cephalexin (70.6%), ceftriaxone (61.2%), cefixime (67.7%), ciprofloxacin (87.4%), azithromycin (94.2%), and metronidazole (85.6%). Nevertheless, interviewees revealed that additional antibiotics were offered as well without a prescription at their neighborhood pharmacy.

Table 4. Most common antibiotics dispensed without a prescription

Class of antibiotics	Antibiotics	N (%)
Beta lactam[a]	Ampicillin	122 (32.0)
	Amoxicillin	369 (96.9)
	Amoxicillin/Clavulanate	336 (88.2)
Cephalosporins	Cephalexin	269 (70.6)
	Cefuroxime	143 (37.5)
	Cefotaxime	101 (26.5)
	Ceftriaxone	233 (61.2)
	Cefixime	258 (67.7)
Aminoglycoside	Gentamycin	200 (52.5)
	Amikacin	156 (40.9)
Tetracycline	Doxycycline	167 (43.8)
	Tetracycline	145 (38.1)
Quinolones	Ciprofloxacin	333 (87.4)

	Levofloxacin	222 (58.3)
Macrolides	Erythromycin	121 (31.8)
	Azithromycin	359 (94.2)
Other antibacterials	Metronidazole	326 (85.6)
	Trimethoprim	181 (47.5)

The majority of community pharmacists dispense antibiotics without a prescription by ignoring the rules and regulations of dispensing antibiotics in their community pharmacy. Community pharmacies were shown to have a significant prevalence of distributing antibiotics without a prescription, according to recent investigations [6, 19, 20]. According to research by Feng *et al.* [19], over half of the pharmacists authorized the sale of antibiotics to patients without a prescription [19]. According to different research, pharmacists who stated that they were aware of the limitations on the prescription dispensing of antibiotics and the usage and resistance of antibiotics were less likely to distribute antibiotics without a prescription [21]. According to Saudi Arabian research, 55% of community pharmacists believed that giving out antibiotics without a prescription was a common practice in community pharmacies, even though most of them knew that doing so caused antibiotic abuse and the development of antibiotic resistance [6]. One possible explanation for the high observed percentage of antibiotic sales that are not prescriptions is the failure to execute national rules [22, 23]. Furthermore, community pharmacists may give out antibiotics without a prescription because they want to make money and as part of their business objectives [6]; moreover, they may stockpile expensive drugs [5]. To enhance antibiotic usage, it is necessary to quantify the number of antibiotics that are often administered in community pharmacies [24]. Additionally, additional studies are required to discuss the economic benefits and the way that community pharmacists now dispense antibiotics [25].

In terms of dose types administered without a prescription, this study found that oral antibiotics (tablets, capsules, and suspension) were the most popular given out at their neighborhood drugstore without a prescription. Approximately 86% of antibiotics that were prescribed without a prescription were oral dose forms, according to research conducted in Saudi Arabia [6]. In contrast, topical antibiotics (47.2%) and drop antibiotics (35.2%) were often dispensed at the community pharmacy. Moreover, 23.6% of respondents stated that their neighborhood pharmacy frequently dispensed parenteral antibiotics without a prescription.

This survey also found that a large proportion of community pharmacies prescribed antibiotics without a prescription for UTIs (94.2%), sore throats (70.9%), and earaches (70.3%). On the contrary, 34.9% of patients received antibiotics without a prescription for viral diseases like the common cold or flu. A similar conclusion was observed by research in Portugal, which found that neighborhood pharmacists distribute antibiotics to patients struggling with urinary tract infections and tooth infections due to the anticipated doctors recommending the same antibiotic for both diseases [9]. Nevertheless, dispensers are motivated to expand antibiotic sales to gain income. Given various antibiotic stewardship programs and law enforcement, this calls into doubt the viability of this business model [26]. According to this study, illogical antibiotic prescribing was facilitated by the actions of pharmacists. Antibiotics may be more frequently dispensed without a prescription due to a lack of clinical expertise and understanding of antibiotic resistance. Antibiotic dispensing may also be caused by other variables, such as profit incentives, public pressure to supply antibiotics, a lack of laws about antibiotic supply, inadequate regulatory enforcement, a lack of knowledge about antibiotic dispensing laws, and the potential for losing clients. [6].

The antibiotics that were most commonly supplied without a prescription at community pharmacies were azithromycin, ciprofloxacin, cephalexin, ceftriaxone, cefixime, amoxicillin, amoxicillin/clavulanate, and cephalexin. This is consistent with previous research that found the most commonly prescribed antibiotics in community pharmacies were beta-lactams, such as cephalosporins and penicillins [27]. The increasing prevalence of bacteria that generate beta-lactamase was caused by high rates of beta-lactam antibiotic distribution [28].

Limitations

The present research has several issues. Since no information was gathered on the dosage or duration of the antibiotics administered, the pattern of nonprescription antibiotic dispensing is based on the prevalent type of antibiotics dispensed at community pharmacies. Therefore, the daily dose specified by the antibiotic prescribed cannot be evaluated in the current investigation. The most popular antibiotics used without a prescription for illnesses seen in community pharmacies were also the subject of this investigation. Antibiotics prescribed for

various medical issues may be more common than the high percentage of antibiotics provided without a prescription.

Conclusion

This study revealed that in a community pharmacy in Baghdad, Iraq, community pharmacists frequently give out antibiotics without a prescription. Therefore, strict regulations are required to regulate the sale of antibiotics at neighborhood pharmacies. The laws and regulations that limited the selling of antibiotics without a prescription were either disregarded or not properly communicated to community pharmacists. The high prevalence of illogical antibiotic dispensing may be due to ignorance. Education-based initiatives should be developed to encourage community pharmacists to follow professional standards. Additionally, increasing access to reasonably priced healthcare in Iraq may lessen the incidence of self-medication and the illogical prescription of antibiotics, which will lessen the emergence of antibiotic resistance in the nation.

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