

Utilization of Drug Information Resources Among Community Pharmacists in Baghdad: A Cross-Sectional Study

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Abstract

Background: Drug information resources include discovering, utilizing, and managing medication usage information

Objective: This research examines the characteristics of drug information utilization for practicing pharmacists in Baghdad, Iraq, and identifies the main barriers that impede their ability to use it.

Methods: The study included 100 community pharmacists and was designed as a cross-sectional observational study. A structured questionnaire was designed to address the drug information resources in a community pharmacy setting.

Results: Overall, prescriptions and over-the-counter medication prescriptions are similar in their dispensation pattern, with 56 to 60% of the dispensations having less than 40 prescriptions daily, followed by 41 – 60 dispensations daily. Regarding patients asking for information about OTC medications, 51% of the pharmacists indicated that 10 – 25 % of their patients asked about OTC medication information. In comparison, 37% indicated that less than 10 % of patients asked about OTC medication information. Regarding patients who ask for general information, 37% of them indicate that 10 – 25% of their patients asked about general information. In comparison, 21% of the pharmacists indicate that more than 50% of their patients asked about general information.

Conclusions: Iraqi community pharmacists highly adopt electronic drug information resources, and the frequency of drug information resources was independent of pharmacist age, pharmacist degree, work settings, and other pharmacist-related variables.

Keywords

electronic resources, prescription, community pharmacist, private sector.

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INTRODUCTION

Drug information resources include discovering, utilizing, and managing medication usage information [1]. With the continuous development of the healthcare information exchange industry, pharmacists have crossed some traditional boundaries, positioning them as important figures in disseminating and managing medical knowledge [2]. Broadly defined, drug information resources encompass various tools, materials, and platforms that provide comprehensive, accurate, and current information regarding medications [2, 3], which includes but is not limited to, pharmaceutical databases, drug monographs, clinical guidelines, scientific journals, and advanced digital platforms like mobile applications and online portals [2]. The essence of these resources lies in their ability to provide

pertinent information ranging from drug composition and pharmacokinetics to therapeutic uses, side effects, interactions, and clinical trial data [4, 5].

The great development of drug information resources changed the way pharmacists use such resources [5]. From traditional printed manuals to sophisticated interactive digital databases accessible through various electronic devices with efficient user interfaces, the modality by which these resources are used has transformed significantly [2-5]. This transformation has given healthcare practitioners, pharmacists in particular, new opportunities and problems in addition to broadening the scope of accessible information [5]. Print resources, such as textbooks and drug reference books, are the gold standard in

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pharmaceutical education and practice [3, 5, 6]. Printed materials are often considered reliable and thoroughly reviewed but may quickly become outdated [2, 5, 6]. The rapid advancement of technology has led to a paradigm shift towards electronic information resources [2]. Although some include reliable online databases like PubMed, clinical drug information systems, and even mobile applications designed for quick reference, each resource type has unique advantages and limitations [7]. However, electronic resources benefit from instant updates and ease of use; nevertheless, they require some computer skills and digital literacy, and the accuracy and consistency of the information they provide may differ. [2].

Community pharmacists are responsible for the effective use of drugs through informed decision-making, extending their responsibilities beyond medication dispensation; hence, they represent the frontline professionals in pharmaceutical care [8]; this calls for paying attention to proper and efficient use of drug information resources and experience in managing them [2, 6, 8]. Pharmacists are required to evaluate the resources' information quality, applicability, and accuracy, customize it to patients' requirements and needs, and use it to guide pharmacists are also to indulge in clinical practice by educating patients, addressing their queries, and mitigating medication-related problems [3, 8]. As a result, an important part of their professional responsibility is the capacity to efficiently exchange and interpret drug information using their most reliable resources [2, 5]. Such practice will provide the patients with the most reliable knowledge, and pharmacists will also critically analyze and scrutinize information before being provided to patients and other healthcare professionals [3, 6].

The relationship between pharmacists and drug information resources is dynamic [3, 5]. Since pharmacists rely on these resources for their daily practice and continual learning in clinical settings [6], the feedback and needs of pharmacists drive the evolution and update of these resources [2, 7]; this adds another burden on pharmacists as errors in feedback can be magnified to include a wider range of information resources hence the

interdependent fashion of developing them [8]. Different factors can affect the way pharmacists use drug information resources, including language, accessibility, cultural relevance, and technical infrastructure of healthcare facilities and those that are familiar to the end consumer [9]. Central to this role is the utilization of drug information resources, which has garnered increasing importance and scrutiny, especially in the context of community pharmacists in settings like Baghdad [8]. This research examines the characteristics of drug information utilization for practicing pharmacists in Baghdad - Iraq and identify the main barriers that impede their ability to utilize them, examine the effect of workload on the frequency of drug information system use by pharmacists and examine the relation between the use of work experience of pharmacists on the use of drug information system.

METHODS

Study Design

The study included 100 community pharmacists and was designed as a cross-sectional observational study. A structured questionnaire was designed to address the drug information resources in the setting of community pharmacy; the questionnaire includes age, sex, Pharmacist degree, Place of graduation, Work setting, Main working shift, experience in practicing pharmacy, Duration of work in current pharmacy setting, "How many registered pharmacists are available to serve patients in a single shift?", "On average, how many prescription medications (Rx) does your pharmacy dispense daily?" "On average, how many OTC medications does your pharmacy dispense daily?" "What is the estimated percentage of patients who ask for information about OTC medications?" "What is the estimated percentage of patients who ask for information about prescription medications (Rx)?" What resources do you use to counsel and answer their queries? (more than one answer can be selected), Most commonly used drug information databases, If a new drug becomes available in your pharmacy, which drug information resources do you use to gain or increase knowledge about it? (more than one answer can be selected) How often do you use drug information resources? What are the barriers

to using drug information resources? (more than one answer can be selected).

Study settings

The study was conducted in Baghdad Province (Al-Rasafa district) and examined community pharmacies. It started on 1st November 2023 and was completed on 1st January 2024.

Inclusion criteria

- Graduated pharmacist
- Community pharmacy settings

Exclusion criteria

- Pharmacist refusal to participate
- Other health care providers than pharmacists

Ethical considerations

The study was approved by the Research Ethical Committee of Al-Mustafa University (ID: AP017, date: 1st October 2023), and written informed consent was obtained from all participants.

Statistical analysis

Continuous variables are presented as mean $\pm$ standard deviation, while categorical variables are presented as numbers and percentages. Fisher-Freeman-Halton exact test of independence is

used for the $n \times k$ table (an extension for classical 2x2 Fisher exact test) if the expected frequency is less than 5% [10]. All analysis carried out GraphPad Prism version 10.1.0 for Windows,

RESULTS

The study examined 100 pharmacists in community settings in Iraq; pharmacists usually work in two settings in the community pharmacy, either part-time (in which the pharmacist works in the morning [from 8:00 AM to 2:00 PM in a governmental institute) and then, according to Iraqi governmental regulation can work after that in community pharmacy (from 2:00 PM till 12:00 AM), or full time (at any time of the day, if the pharmacist not working in a governmental institute).

The mean age was 27.1 ± 4.9 years (72% were less than 28 years), 62% were males, and 96% had only a bachelor's education. In contrast, 4% had higher education (either a master's or Ph.D. degree), 32% of the pharmacists worked in a governmental hospital, while 68% worked only in independent pharmacies; the rest of the pharmacist characteristics are illustrated in Table 1.

Table 1: Sociodemographic and participant characteristics

Parameters	Value
Age (year)	27.1 $\pm$ 4.9
<28 years	72 (72%)
$\geq$ 28 years	28 (28%)
Sex	
Female	38 (38%)
Male	62 (62%)
Pharmacist degree	
Bachelor	96 (96%)
Higher education	4 (4%)
Place of Graduation	
Local privet university	71 (71%)
Local governmental university	23 (23%)
Foreign university	6 (6%)
Work settings	
Independent community pharmacist	68(68.0%)
Governmental hospital	32(32.0%)
Main working shifts	
Full time	71 (71%)
Morning shifts only	11 (11%)

Evening shifts only	18 (18%)
Duration of work in current pharmacy setting	
Less than one year	11(11.0%)
1-2 years	46(46.0%)
3-5 years	24(24.0%)
5-10 years	10(10.0%)
More than ten years	9(9.0%)
How many registered pharmacists are available to serve patients in a single shift?	
One pharmacist	33(33.0%)
1 - 2 pharmacists	53(53.0%)
2 - 3 pharmacists	14(14.0%)

Overall, prescriptions (question 1) and over-the-counter (OTC) medications (question 2) have similar dispensation patterns, with 56 to 60% of

the dispensations having less than 40 prescriptions daily, followed by 41 – 60 dispensations daily, as illustrated by Figure 1.

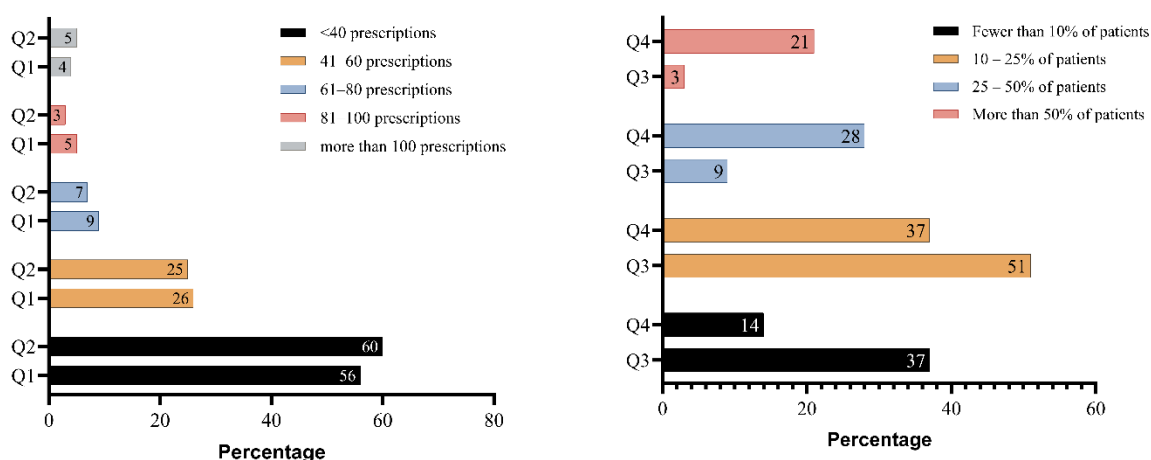


Figure 1. Assessment of prescription-related outcomes; Q1: On average, how many prescription medications (Rx) does your pharmacy dispense daily? Q2: On average, how many OTC medications does your pharmacy dispense daily? Q3: What is the estimated percentage of patients who ask for information about OTC medications? Q4: What is the estimated percentage of patients who ask for general information [Q: question]

Regarding patients asking for information about OTC medications (Question 3), 51% of the pharmacists indicated that 10 – 25 % of their patients asked about OTC medication information, while 37% of the pharmacists indicated that less than 10 % of their patients asked about OTC medications information, as illustrated by Figure 1.

Regarding patients who ask for general information (question 4), 37% of them indicate that 10 – 25% of their patients asked about general information. In comparison, 21% of the pharmacists indicate that more than 50% of their patients asked about general information, as illustrated by Figure 1.

Regarding the resources the pharmacist uses for counseling patients (question 5), 97% rely on

their memory, 36% use electronic applications and databases, and 17% use drug leaflets, as illustrated by Figure 2B.

Regarding the source of information when a new drug becomes available in your pharmacy

(question 6), 92% of the pharmacists used drug leaflets as the primary source of information, 47% used electronic applications and databases, while 12% used pharmacy reference like books, as illustrated by figure 2B.

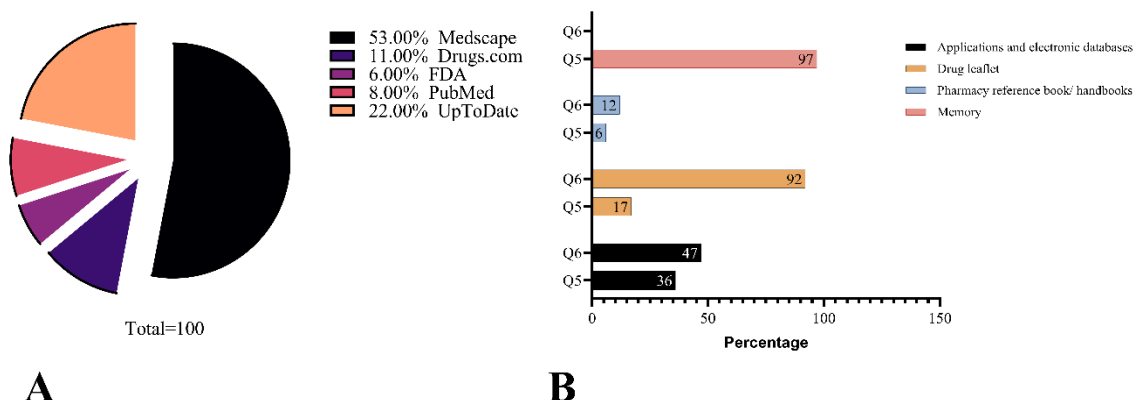


Figure 2. A: pie chart of Most commonly used drug information databases, B: histogram of patients counseling and new drug information related data (Q5: What resources do you use for counseling patients and answering their queries?; Q6: If a new drug becomes available in your pharmacy, which drug information resources do you use to gain or increase knowledge about it?), [Q: question]

Regarding the most commonly used drug information databases, Medscape takes the lead with 53%, followed by 22% using UpToDate, as illustrated by Figure 2A.

A similar percentage of pharmacists' frequency of using drug information resources was seen in two groups: less than five times per week and 6 – 10 times per week, as seen in Table 2.

Table 2: Frequency of using drug information resources

Answer	Number (%)
Fewer than five times per week	42(42.0%)
6 – 10 times per week	41(41.0%)
6 – 10 times per week	13(13.0%)
16 – 20 times per week	4(4.0%)

Table 3 illustrates no association between the frequency of drug information resources and age, pharmacist degree, work settings, and other variables.

Table 3: Association between frequency of using drug information resources and various sociodemographic and pharmacist characteristics.

	Fewer than five times per week	6 – 10 times per week	6 – 10 times per week	16 – 20 times per week	p-value
Age					
<28 years	27(37.5%)	31(43.1%)	11(15.3%)	3(4.2%)	0.476
≥28 years	15(53.6%)	10(35.7%)	2(7.1%)	1(3.6%)	
Pharmacist degree					
Bachelor	40(41.7%)	40(41.7%)	12(12.5%)	4(4.2%)	0.699
Higher education	2(50.0%)	1(25.0%)	1(25.0%)	0(0.0%)	
Work settings					

Independent community pharmacist	28(41.2%)	28(41.2%)	9(13.2%)	3(4.4%)	0.999
Governmental hospital	14(43.8%)	13(40.6%)	4(12.5%)	1(3.1%)	
Main working shifts					
Full time	26(36.6%)	31(43.7%)	11(15.5%)	3(4.2%)	0.352
Morning shifts only	4(36.4%)	5(45.5%)	1(9.1%)	1(9.1%)	
Evening shifts only	12(66.7%)	5(27.8%)	1(5.6%)	0(0.0%)	
Duration of work in current pharmacy setting					
Less than one year	4(36.4%)	5(45.5%)	1(9.1%)	1(9.1%)	0.222
1-2 years	20(43.5%)	16(34.8%)	9(19.6%)	1(2.2%)	
3-5 years	8(33.3%)	12(50.0%)	3(12.5%)	1(4.2%)	
5-10 years	8(80.0%)	2(20.0%)	0(0.0%)	0(0.0%)	
More than ten years	2(22.2%)	6(66.7%)	0(0.0%)	1(11.1%)	
How many registered pharmacists are available to serve patients in a single shift?					
One pharmacist	18(54.5%)	14(42.4%)	0(0.0%)	1(3.0%)	0.065
1 – 2 pharmacists	19(35.8%)	21(39.6%)	11(20.8%)	2(3.8%)	
2 – 3 pharmacists	5(35.7%)	6(42.9%)	2(14.3%)	1(7.1%)	

The most common barrier to utilizing the drug information resources was lack of time (all the pharmacists), followed by lack of access and necessary skills, as seen in Table 4.

Table 4: Barriers to using drug information resources

Barrier type	Details
Lack of time	100 (100%)
Lack of access	9 (9%)
Lack of necessary skills	1 (1%)

DISCUSSION

The present study sought to investigate the attributes of medication information use among practicing pharmacists in Baghdad and identify the primary obstacles that hinder their capacity to utilize such information. In Iraq, community pharmacies are the primary healthcare facilities that are easily accessible to the public. In Iraq, the field of pharmacy is a five-year undergraduate curriculum that grants a Bachelor's degree in pharmacy rather than a Doctor of Pharmacy (PharmD) degree [11]. Recently, certified pharmacists have enrolled in the Syndicate of Iraqi Pharmacists (SIP), which serves as the counterpart of the Board of Pharmacy [12]. Pharmacists can work in government positions in several sectors, such as the public health sector and academics. They can also work in private roles, such as community pharmacies, drug wholesalers, scientific drug bureaus, and private

educational institutions [13]. These occupations are not coupled; instead, a pharmacist can take a governmental position during the morning and engage in private sector activity during the afternoon. It is important to mention that community pharmacies in Iraq are privately owned and operated only by pharmacists. Additionally, there are no pharmacy chains in existence [14].

There has been a substantial rise in the number of pharmacists in recent years, with a growth rate of 217.5% in the number of registered pharmacists over five years [15]. This growth is largely due to the rise in pharmacy colleges, particularly private ones. In 2013, there were 16 such colleges (12 public and 4 private) [13] and 39 (14 public and 25 private) in 2019 [15]. As of 2019, Iraq has 22,120 registered pharmacists, an increase from 11,374 in 2013 [13]. The significant rise in pharmacists has resulted in heightened rivalry, particularly in private-sector employment opportunities. As of 2019, the number of independent pharmacies in Iraq had increased to almost 9000, up from 5336 community pharmacies in 2013 [15]. Despite the significant increase in growth rates, there has been a lack of studies assessing the pharmacy practice environments [14].

In the current study, 68% of the pharmacists worked only in independent pharmacies; this aligns with another Iraqi study, where less than

half (44.8%) of the pharmacists opted for dual employment. Approximately 19.5% of pharmacists choose to resign from a government position and instead work two shifts in the private sector. A significant proportion, 35.8%, preferred to work only one shift by maintaining either a government job or an evening position in the private sector; this attributed to an increase in their income in the private sector and a better job environment [14].

In the current study, regarding the resources the pharmacist uses for counseling patients (question 5), 36% used electronic applications and databases, and 17% used drug leaflets. Additionally, the source of information when a new drug becomes available in your pharmacy (question 6), 92% of the pharmacists used drug leaflets as the primary source of information, 47% used electronic applications and databases, while 12% used pharmacy references like books; this indicates the use of electronic drug resources is becoming more important, and a lot of community pharmacist become adept at it. This movement towards electronic resources is a global trend related to the ease of obtaining and handling information electronically compared to hardcopy versions of such information [16-23].

In the current study, 83% of the community pharmacists had up to 10 times per week using the drug information resources in their practice, independent of their age, sex, pharmacist degree, work settings, and other variables. Few studies examined the effect of pharmacist sociodemographics and their educational background on the frequency of utilizing drug information resources, and most did not examine such association [19, 20, 24]; in one study, the investigators noted that females exhibited a greater frequency of usage in textbooks ($P = 0.009$), Internet ($P = 0.045$), databases ($P = 0.039$), and drug information centers ($P = 0.026$) compared to males [23]. Another American study found that females preferred using electronic resources more than males ($p < 0.01$). Additionally, younger practitioners showed a greater preference for electronic resource utilization compared to older practitioners. In contrast, male and older pharmacists were more

aware of the specific drug information resources that need to be maintained per state law [25].

Of interest, there is a similarity between overall prescriptions and OTC medications prescriptions in their dispensation pattern, with 56 to 60% of the dispensations having less than 40 prescriptions daily, followed by 41 – 60 dispensations daily. It can be inferred that patients on long-term drugs have a good understanding of their medications, which are given to them every month; also, there is a good standard of education for the patients of this observation.

In the current study, the most commonly used drug information database, Medscape, takes the lead with 53%, followed by 22% using UpToDate, which aligns with other studies [16, 20].

Study Limitations

The limited number of participants and the study's observational nature are major limitations.

CONCLUSIONS

Iraqi community pharmacists highly adopt electronic drug information resources, and the frequency of drug information resources was independent of pharmacist age, pharmacist degree, work settings, and other pharmacist-related variables.

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