



## Original article

## Dispensing errors and self-medication practice observed by community pharmacists in Jordan

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## ABSTRACT

**Background:** Drug dispensing is the major function of community pharmacists, the pharmacists should have the ability to counsel the patients and be aware of dispensing errors. Self-medication is a universal phenomenon that is widely practiced in developing countries and it may lead to irrational usage of drugs. **Objectives:** The objectives of this study were identifying the factors that associated with dispensing errors and how to minimize them and identifying patients' reasons for self-medication, drugs purchased as Over-The-Counter drugs, patients' source of drug information.

**Methods:** A cross-sectional survey of a stratified random sample of three hundred registered community pharmacists in all Jordanian regions (north, middle and south). Statistical analysis was done by using SPSS software version 17.0.

**Results:** The majority of respondents were female (72.7%). Poor doctor's handwritten prescription was the major identified factor that associates with despising errors (3.78 out of 5) and improving doctor handwritten or using printed prescription was the most appreciated factor in reducing these errors (4.62 out of 5). Regarding community pharmacists' opinions toward self-medication practice, the majority said that it is not acceptable (4.12 out of 5) and most of the time it leads to bad sequences. Financial problem was the major reason behind self-medication (4.72 out of 5), analgesics/antipyretics were most drug groups that dispensed as OTC drugs (4.85 out of 5) and the pharmacists were a major source of patient' drug information.

**Conclusion:** Drugs dispensing errors and self-medication practices are widespread in Jordan and they should be regulated and restricted throughout applying strong policies and laws. They should be strictly enforced among pharmacies and there is a great responsibility to increase community awareness regarding appropriate drugs using.

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## 1. Introduction

Community pharmacists nowadays are urged to provide a wide variety of professional activities that are essential in the health care system. Since medications are prescribed, there is a consequent risk of human errors. Several different studies have shown that the pharmacist's interventions can help to improve patient safety as a source of drug information (De Oliveira et al., 2017) and they have the potential to make a huge impact in reducing

the incidence of the risk associated with dispensing and self-medication errors.

Dispensing error is defined as “a discrepancy between a prescription and the medicine that the pharmacy delivers to the patient or distributes to the ward on the basis of this prescription, including the dispensing of a medicine with inferior pharmaceutical or informational quality” (Cheung et al., 2009).

Different studies have investigated the factors behind dispensing errors. A study performed in Saudi Arabia reported that the major identified factor for dispensing errors were pharmacist assistants followed by a high workload and these errors can be mainly reduced by improving doctor's handwriting and reduce the load of working (AL-arifi, 2014). Misreading the prescription and confusing similar names or packaging were the main causes of dispensing errors in the UK (National Patient Safety Agency, 2005). Other previous studies reported that pharmacy design, interruptions and other pharmacy environmental factors play an important role in

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increasing the incidence of dispensing errors (Ashcroft et al., 2005a; Aldhwaihi et al., 2016).

Self-medication is an element of self-care that has traditionally been defined as “the taking of drugs, herbs or home remedies on one’s own initiative, or on the advice of another person, without consulting a doctor” (Hernandez-Juyol and Job-Quesada, 2002). Self-medication is a universal phenomenon which is widely practiced in developing countries as many drugs are prescribed over the counter without the guidance of physician (Shah et al., 2018). Previous studies reported that self-medication is commonly practiced in Jordan (Yousef et al., 2008; Alshogran et al., 2018). Hamel et al. (2001) have reported that the patients who medicate themselves were in a higher incidence of false diagnosis and treatment complications as compared to patients who were consulted by the physician.

Self-medication, when practiced appropriately may relieve mild pain and saving many and time (James et al., 2006). However, if it is adopted inappropriately it may be harmful, increases the risk of adverse reactions and wastage of recourses (James et al., 2006). Developing drug resistance, drug toxicity, loss of the drug effectiveness, drug abuse and prolong the morbidity are serious potential risks that are associated with the continuous use of Over-The-Counter (OTC) drugs (Pal et al., 2017; Yousef et al., 2008; Bagewadi et al., 2018).

A previous study performed in Nigeria reported that the reasons behind the prevalent use of OTC medications were the following: the desire to save money, presence of mild health, previous experience with drug efficacy and long waiting time at physician clinic or hospitals (Pal et al., 2017). Different studies reported that the most commonly used drugs as self-medication were anti-acid, analgesic, antibiotics, antipyretic, decongestant, cough suppressants and vitamins (Alshogran et al., 2018; Shah et al., 2018; Yousef et al., 2008). According to a study conducted earlier in Amman, the capital city of Jordan it is found that the families and pharmacists were the most common sources of self-medication (Yousef et al., 2008).

As little data are available about dispensing errors and self-medication practice in Jordan, the aims of this study were: 1-Identifying the factors associated with dispensing errors and how to minimize them. 2-Identifying patients’ reasons for self-medication, drugs purchased as Over-The-Counter drug, patients’ source of drug information.

## 2. Method

A cross-sectional survey conducted among a convenient sample of community pharmacists in different cities of Jordan. A stratified sample of three hundred registered community pharmacists all over the regions of Jordan was randomly chosen to respond to the survey. This study was conducted for more than 2 months by using a questionnaire. The questionnaire was translated into Arabic language and then the draft was also piloted on the convenience of 20 community pharmacists to receive feedback about readability and clarity of questions and the pilot results were not included in the statistical analysis of the study. Reliability was ensured for all questionnaire items by calculating Cronbach’s  $\alpha$  which was  $>0.75$  and validity ensured by measuring Pearson’s  $r$  for each item which was between 0.35 and 0.80. The community pharmacists who participate in this survey were informed that their responses would be anonymous and confidential.

The questionnaire consisted of a series of questions about dispensing errors and self-medication. The questionnaire consisted of 3 parts; Part A: consisted of (close-ended) questions about demographic data (gender, years of experience, pharmacy location according to region); Part B: included series of (Likert type) ques-

tions about pharmacists’ opinions in respect to dispensing errors, the causes behind the occurrence of dispensing errors and the most important factors in minimizing these errors; Part C: included series of (Likert type) questions about the common reasons for self-medication, the most commonly used medication in this practice, sources of patients’ drugs information and the pharmacists’ opinions about the consequences of self-medication.

### 2.1. Data collection and analysis

The completed questionnaire was collected, coded and the data were analyzed using SPSS© software version 17.0. Descriptive statistics (mean, percentage, stander deviation, p-value) were used to represent characteristics and respondents appropriately. Significance was reached when  $p < 0.05$ .

## 3. Result

The total number of pharmacists who participated in this study was 300 community pharmacists. As shown in Table 1 the sample was evenly distributed among the regions of Jordan, slightly less than three quarters (72.7%) of the respondents were female. When splitting the sample by years of experience in community pharmacies; the majority was in less than 5 years of experience (44.4%) followed by more than 10 years (36%) and the lowest percentage of participants who their experience was 5–10 years (19.7%). The investigations of dispensing errors and self-medication are measured from the five-point Likert scale which is statistically expressed by the mean of respondents’ answers frequencies (out of 5) and the standard deviation.

Drug dispensing is a major function of community pharmacist and it is a complicated process which requires the pharmacists to be more aware and recognized. Table 2 summarizes the factors that contributing to the dispensing errors which mainly were: Poor handwritten prescription > Similar or confusing drugs names > High workload and lack of time for patients counseling > Pharmacy dispensary area design > Pharmacist fatigue > Interruptions (phone, television, patients, ...) and finally Pharmacy assistants were sometimes the associated reason.

According to Table 3 improving doctor’s handwritten or using printed prescription was the most appreciated factor that may minimize the risk of dispensing errors and the other factors were: Keeping Pharmacist up-to-date knowledge > reducing pharmacist workload > improving pharmacy environment > reducing pharmacy interruptions > presence more than one pharmacist in the same time > improving pharmacy dispensary area. This study reported that the majority of respondents perceived that dispensing errors are widespread in Jordan (4.08 out of 5). These errors are more observed by patients (3.12 out of 5) and patients become more aware and alerted from these errors (2.91 out of 5).

**Table 1**  
Community pharmacists’ demographic characteristics.

Criteria	Number n = 300	Percent (%)
Gender		
Male	82	27.3
Female	218	72.7
Place of pharmacy according to region		
North region	100	33.3
Middle region	100	33.3
South region	100	33.3
Pharmacist experience		
Less than 5 years	133	44.4
From 5 to 10 years	59	19.7
More than 10 years	108	36

**Table 2**  
Factors that associated in increasing the risk of dispensing errors.

Factors	Mean (out of 5)	Standard deviation
Poor handwritten prescription	3.78	1.10
High workload and lack of time for patients counseling	3.27	1.17
Similar or confusing drugs names	3.48	0.93
Pharmacy dispensary area design	3.20	1.15
Interruptions (phone, television, patients, ...)	2.75	0.92
Pharmacy assistants	2.5	1.13
Pharmacist fatigue	2.82	0.99

**Table 3**  
The important factors that associate in reducing the incidence of dispensing errors.

Factor	Mean (out of 5)	Standard deviation
Improving doctor' hand written or using printed prescription	4.62	0.69
Keeping Pharmacist up-to date knowledge	4.56	0.67
reducing pharmacist workload	4.31	0.97
presence more than one pharmacist at the same time	3.71	1.08
improving pharmacy dispensary area	3.5	1.15
improving pharmacy environment and reducing pharmacy interruptions	4.2	0.79
	3.8	1.12

Self-mediation is another important medical problem and it is a common practice among Jordanians (Yousef et al., 2008; Alshogran et al., 2018). This study identified patients' potential reasons to self medicate (Table 4), which were mainly: Financial reasons > Previous similar complaint > Trusting pharmacists and pharmaceutical services > Time-saving > Fear from physician visit and finally, the ailment is minor.

As shown in Table 5 different classes of medication were mis-used and dispensed without prescription in Jordan, analgesics and antipyretics drugs were the most dispensed OTC drugs. Other dispensed drugs groups as OTC were anti-cold and flu drugs, anti-cough drugs, anti-acid and anti-allergic drugs. Antibiotics drugs were the least drugs which dispensed as OTC drugs. The primary sources of patient's drug information were pharmacists, neighbors, and friends, social media and internet websites or medical journals. These data are listed in Table 6.

The majority of respondents (4.12 out of 5) said that self-medication is not acceptable and most of the time leads to bad sequences. (3.92 out of 5) reported that self mediation masking a wrong diagnosis which delays the curing and (3.45 out of 5) reported that self-medication causes increasing in microbial resistance and the incidence of misuse and abuse (3.11 out of 5).

Tables 7 and 8 show the result of the One-way ANOVA test when comparing the regions where the community pharmacists are working at with respect to dispensing errors and self-medication respectively. The significant difference when p-value < 0.05. (4.68

**Table 4**  
Reasons reported for self- medication.

Reason	Mean (out of 5)	Standard deviation
Minor ailment	3.18	0.78
Previous similar complaint	4.22	0.76
Fear from physician visit	3.24	1.14
Financial reasons	4.72	0.59
Time-saving	3.65	0.99
Trusting pharmacist and pharmaceutical services	4.06	0.73

**Table 5**  
Drugs groups that dispensed at community pharmacies as OTC drugs.

Drugs groups	Mean (out of 5)	Standard deviation
Antibiotics	4.31	0.81
Analgesics and Antipyretics	4.85	0.38
Anti allergic	4.33	0.73
Anti cough	4.56	0.99
Anti cold and flu	4.76	0.54
Anti- Acid	4.52	0.60

**Table 6**  
Sources of patients' drug information.

Source of drugs information	Mean (out of 5)	Standard deviation
Pharmacist	4.12	0.72
neighbors and friends	3.81	0.82
medical journals	2.25	0.84
social media and internet websites	2.55	0.86

**Table 7**  
Correlation between the regions where pharmacists are working and their views on dispensing errors.

Variable	Mean Square	Variance ratio	p-value
Factors contributing in the dispensing errors	0.400	0.819	0.442
Factors contributing in reducing the dispensing errors	0.204	0.445	0.641

**Table 8**  
Correlation between the regions where pharmacists are working and their views on self-medication.

Variable	Mean Square	Variance ratio	p-value
Reasons for self medication	0.581	1.130	0.187
Drugs groups that are dispensed as OTC	0.246	1.526	0.219
Source of drugs information	0.166	0.784	0.458
Un favorable sequences of self medication	0.811	0.329	0.101

out of 5) of respondents said that self-medication practice and drug dispensing should be regulated and strongly restricted.

#### 4. Discussion

Most of the study respondents were female (72.7%) and this is because the majority of pharmacy students are female and the male work in other sectors than they do in community pharmacies.

This study reported that the majority of respondents perceived that dispensing errors are widespread in Jordan. These errors are observed by patients and they become more aware and alerted from these errors. These findings also are in agreement with the findings of a study performed among Danish community pharmacists (Knudsen et al., 2007). In consistence with other studies, the results of this study showed that poor handwritten doctor's prescription that leads to misreading was the most important factor associated with dispensing errors (National Patient Safety Agency, 2005; Knudsen et al., 2007; Ashcroft et al., 2005b; AL-Worafil, 2018). Similar/confusing drugs name was the second factor associated with despising errors and this might be due to the high numbers of marketed medicines with similar trade names in Jordan. This was a significant factor that contributes to dispensing

ing errors in the United Kingdom, Saudi Arabia and Yemen (Al-Arifi, 2014; Ashcroft et al., 2005b; AL-Worafil, 2018).

In agreement with previous studies, High workload due to multiple duties that pharmacists perform and pharmacy design are important factors that contribute to the occurrence of dispensing errors (Al-Arifi, 2014; Beso et al., 2005). This may not provide enough time and suitable dispensary sites for pharmacists to communicate and counsel the patients with sufficient privacy. In consistency with previous studies, tired pharmacists and loss of concentration by interruptions (phone, television, patients, ...) were considered other factors that associated with dispensing errors (Ashcroft et al., 2005a,b; The Chief Pharmaceutical Office, 2004). These factors were respectively the second and third factors associated with dispensing errors in United Kingdom (Beso et al., 2005).

The responding community pharmacists mentioned a group of factors that may minimize the risk of dispensing errors. Inconsistent with a study performed in Saudi Arabia printed or obvious handwritten doctor' prescription was the most important reported factor in reducing dispensing errors in Jordan (Al-Arifi, 2014). This is only done by improving the regulatory function of the ministry of health. Keeping Pharmacist up-to-date knowledge was the second important factor that contributes to minimize dispensing errors. This is the responsibility of the Jordanian Pharmacists Association to associate the pharmacists with conferences and workshops.

According to study results, improving the pharmacy environment, reducing pharmacist workload and reducing pharmacy interruptions were contributing factors in minimizing the risks of dispensing errors. Additionally, the presence of more than one pharmacist at the same time to re-check the prescription and suitable pharmacy dispensary area which optimizes the counseling process were important factors in reducing dispensing errors. "Counseling can reduce the number of errors, as it allows the pharmacist to formally identify the products and ensure that the correct drugs are dispensed to the right person separating drugs with a similar name or appearance, Keeping interruptions in the dispensing procedure to a minimum and maintaining the workload of the pharmacist at a safe and manageable level" (Al-Arifi, 2014).

Self-mediation practice is another important medical problem and it is common among Jordanians (Yousef et al., 2008; Alshogran et al., 2018). As shown in Table 4 this study identified the reasons for self-medication. The majority of respondents mentioned that the most important one was the financial reason; this is related to the Jordanians low monthly income with relatively large family members in comparison to the high cost of the physician's visit. This finding was supported by the previous Jordanian study which reported that poor patients were at high risk of inappropriate drug use (Haddad and Ebada, 2017). Another important cause for purchasing drugs without prescription that the patients have used them before for the same symptoms depending on their experiences and these drugs are good and successfully relieve the symptoms or patients regularly purchase them to manage the chronic diseases.

Patients' trusting in community pharmacists and pharmaceutical services are common reasons that drive the patient to seek pharmacist advice without going to physicians. Patients have no time for waiting in the physician's clinic, patients' fear from discovering serious diseases if they visit doctors and the ailment is minor that doesn't deserve physician's visit are other reasons for self-medication that reported in this study. These findings are similar to the findings of studies performed earlier in Amman the capital of Jordan and the western area of Saudi en Arabia (Yousef et al., 2008; Isa et al., 2017).

In agreement with other previous studies, this study found that analgesics and antipyretics were the most drugs dispensed without

prescriptions followed by anti-cough, anti-acid and anti-allergy drugs (Yousef et al., 2008; Alshogran et al., 2018; Knudsen et al., 2007; Lukovic et al., 2014). The study findings are consistent with nother previous studies which revealed that the patients were more dependent on the advice received by pharmacists, friends and neighbors, internet when they purchase medications (Alshogran et al., 2018; Helal and Abou-Elwafa, 2017).

Regarding the community pharmacists' opinions toward self-mediation, the majority said that it is not acceptable and most of the time it leads to bad sequences. Masking a wrong diagnosis which delays the curing, increasing microbial resistance and increasing the incidence of misuse and abuse are some of self-medication sequences and these findings were similar to previous studies findings (Yousef et al., 2008; Pal et al., 2017; Bagewadi et al., 2018). Finally there were no significant differences in community pharmacists' responses in respect to dispensing errors and self-medication practice when comparison the regions where they working at.

## 5. Conclusion

The majority of community pharmacists reported that dispensing errors are widespread in Jordan and self-medication is often practiced inappropriately which leads to bad sequences. Self-medication practice and drug dispensing should be regulated and restricted through applying strong policies and laws that should be strictly enforced among community pharmacies and this will not happen unless there is real cooperation between the Jordanian Ministry of Health and Jordanian Pharmacists Association.

## Declaration of Competing Interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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## Limitations

The sample size may be relatively small but it is a covenant and it provided solid bases for future intervention that could be patronized by real cooperation between Jordanian Pharmacists Association and Ministry of Health. A recall bias is possible as the pharmacists were asked about things occurred before they answered the questionnaire.

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