

Evaluating the Professional Practice of Pharmacists Working at Pharmacies in Dealing with Drug Prescriptions

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Abstract

Introduction: Pharmacists as the link between the patient and the physician to optimize drugs' use play an important role in public health and the role of them in giving information and prevention medical errors is undeniable. In this regard, it is important to assess the scientific skills and precision of the pharmacists in diagnosing and correcting the possible medication errors. The aim of this research is to know how many pharmacists have been successful in performing their duties and providing medical services and what factors can influence this issue.

Method: In this study, 120 pharmacies were selected to be assessed on their performance (giving information about Drug use, Drug interactions, Maintenance drug, etc.) in dealing with the prescription of the wrong medication (that is took by an unknown person) as well as the implementation of trade rules.

Results: The results of this study indicated that pharmacists were present only in 65.83% of pharmacies of the whole sample. Although a small percentage of pharmacists were active in scientific fields, 69.17% of prescriptions are delivered by the staff. Moreover, patients were informed about 7.5% of drug interactions and 2.5% of side effects of drug and 19.16% of drug maintenance conditions. However, the accuracy of orders written in compliance with prescribed medication was 100%.

Discussion: Although the improvement of medical services is of any pharmacist's concern, this study manifests that providing the wrong medications or not expressing the required information about the medicines to the patient still happens in the pharmacies and obviously this issue must be regarded deeply.

Keywords: Pharmacist; Drug interactions; Education; Pharmacy

Introduction

Pharmacists play an important role in the public health, as they are the link between the physician and the patient for the optimal use of medicines by the patients. In this regard, it is important to assess the scientific skills and precision of the pharmacists in diagnosing and correcting the possible medication errors. Possible errors in drug prescription such as drug interactions and inappropriate drug prescription (although it may be inevitable) can sometimes lead to serious consequences [1].

Amongst medical specialties, pharmacists, who are the final link with patients and confirm the precision and accuracy of the prescription, must have proper professional information in order to be able to provide the medicines correctly with precise medical instructions and prevent possible medication errors [2].

In this regard, in WHO statement in 2006 November 26th, it was specifically expressed that pharmacists are an indispensable part of the treatment chain, therefore pharmacist's activity is considered a therapeutic activity. According to this statement, duties have been determined for pharmacists, from which we express the related items to our research project:

- 1) Controlling the physician's prescription before handing over the medication.
- 2) Consulting the physician, if required.
- 3) Overlooking the process of reading the prescription and giving the right instruction for drug administration.
- 4) Expressing the warnings, side effects and possible drug interactions.

Medication error, i.e. drug misuse, is a critical problem in treatment [2] and can lead to serious and dangerous results, such as prolongation of the treatment and additional tests, and may even lead to death [3].

These errors are common and occur in all countries in spite of their level of development. According to reports, approximately 1.5 million avoidable medication errors happen in US every year [4]. In Denmark, the level of these medication errors has been reported 4.3% and the most common cause has been mentioned to be the dosage of the medications [5]. Tam et al. reported that regarding the medication errors in Canada, 67% of the medication errors were due to the wrong prescription of medications [6]. Furthermore, in a study conducted in Japan in 43 hospitals, 221 terrible adverse drug effects have been reported in neurology and psychiatry departments. In study conducted

in Saudi Arabia with reference to 26270 cases, 3963 medication errors were reported [7].

In Iran, despite the fact that healthcare officials claim that medication errors are considered to be critical problems in treatment, but due to the absence of a robust system to record these items, there is no detailed statistics on this field [1]. Scattered studies have been conducted in this field. In a study done by Dr. Dabagh et al. in a population of physicians and pharmacists, it was found that both groups of physicians and pharmacists regarded pharmacies as a constant and significant link in treatment chain and both groups agreed that consultation between physicians and pharmacists leads to rational use of medicines and also reduces the errors and costs of the treatment [8]. In this regard, a study was conducted by Dr. Mahdalian et al. in Qazvin in 1388 that evaluated the knowledge, attitude and practice of the pharmacists in relation to OTC drugs in Qazvin [9]. Furthermore, in study conducted by Dr. Mostafavi et al. in the same year, the performance of pharmacists in Esfahan was evaluated [10]. Also in study conducted in Sanandaj the errors in drug prescriptions were reported 7.16% [11].

In the majority of the studies above, the cause of the errors in prescription or drug administration has been presented not only to be the patient, but also to be the lack of experience of the medical staff such as physician, pharmacist and nurse. These errors can be due to Carelessness, unawareness or inexperienced of the prescriber or Lack of information on the side of the prescriber about new drugs' profiles [12]. Considering the experience and knowledge of pharmacists on this matter, they are capable of preventing these errors by relying on their science and knowledge and accuracy in examining the prescription, and also prevent their consequences which can be death or lifelong disability [13,14].

Due to the items above and the importance of medication errors and the role of pharmacists in diagnosis and correction of possible errors in prescriptions, the purpose of this study is to evaluate:

1. Pharmacists' skills about adverse drug effects, the inappropriate amount of a drug for a hypothetical patient, drug interactions in prescriptions and drug administration, etc. and also their consideration of these items.

2. That to what extent they are properly performing their duties in the pharmacy and in dealing with the patients.

Methods

The current study is an observational – analytical study done in order to review the level of performing the duties assigned to pharmacists in urban pharmacies. The Population of the study includes the pharmacists that are supervisors working in pharmacies in mentioned cities.

1. Number of urban pharmacies under study including governmental and private pharmacies are 200, according to statistics reported by pharmaceutical department of the University of Medical Sciences. Sample size was calculated 120 pharmacies with 95% confidence based on Morgan table. For sampling, the mentioned city was divided into 4 sections and the number of pharmacies in each section was determined and then according to this ratio, the surveyed pharmacies were randomly selected.

2. For this purpose, a trained hypothetical patient referred to the pharmacy and typically presented the prescription and then in order to

obtain objective and comparable information in this regard, he/she filled out the pre-prepared questionnaire about the approach of the pharmacy to evaluating the prescription. The questionnaire consists of questions such as the condition and the type of the pharmacy, the presence of the pharmacist, the active involvement of the pharmacist, the way of distinguishing the pharmacist from the other staffs and questions about the scientific performance of the pharmacist such as identifying drug interactions and their response to it, providing proper medication instructions, expressing significant drug complications, expressing the drug storage conditions and the best time to take the medicine. Also in this questionnaire, there were questions about the bureaucratic and trading performance of the pharmacy such as inserting the pricings, giving the right number of medications and receiving the correct amount of money from the patients. At the end, the patient requested the physician to re-check the prescription and express the food and drug interactions of the prescription and identify the best time to take them (Questionnaire is given in the appendix).

1) This questionnaire has been assessed scientifically and in terms of research by five professors of pharmacy school and it was examined after the suggested reforms.

2) The written prescription was written as a new prescription not as a recurred one.

3) Overall in this study, we used one trained hypothetical patient to take the uniformity of the study into account and fill out the questions uniformly. The hypothetical patient was trained on how to reply to the questions that the pharmacist asked and also to ask him specific questions.

4) In order to assess the pharmacy, the visiting hour for the urban pharmacies was 7 to 9 PM and in suburb pharmacies was 10 to 12 AM.

5) The hypothetical patient would tell the mentioned pharmacy that it's the first time he takes that medicine and has no previous experience with it.

The following prescription has been used in the study:

- a) Aspirin tablet 80 once a day
- b) Lovastatin tablet 20 once a day
- c) Insulin ampoule NPH 30 units once a day
- d) Sildenafil tablets according to the instructions
- e) Gemfibrozil capsule 2 caps in the morning, 2 at night
- f) Nitrocantin tablet 2.6 twice a day

In this prescription there are several items that the pharmacist was supposed to notice, such as the drug interactions. The pharmacist should pay attention and advise the patient about following items: drug administration, drug complications, patient's history, drug storage conditions, and the possibility of referral to the physician for the prescribed medication errors.

Results

The number of studied pharmacies was 120 which their status on terms of the gender of the supervisor and the management are given in Table 1.

		Number		Percentage		
Gender of the supervisor	Female	37	30.80%	Male	83	69.20%
Management of the pharmacy	Founder supervisor	80	66%	Non founder supervisor	40	34%

Table 1: Number of studied pharmacies with their status on terms of the gender of the supervisor and the management.

Assessing the pharmacist status

Pharmacist presence: The pharmacist’s presence in studied pharmacies is given in Table 2 based on the gender and the

management of the pharmacy. Overall from 120 studied pharmacies, the supervisor was present in 79 pharmacies (65.83%).

Total		Management of the pharmacy				The gender of the supervisor				
		Founder supervisor		Non founder supervisor		Male		Female		
Number/Total	%	Number/Total	%	Number/Total	%	Number/Total	%	Number/Total	%	
79/120	65.83	51/80	63.75	28/40	70	58/83	69.87	21/37	56.75	Presence of the pharmacist
29/120	21.66	16/80	20	13/40	32.5	20/83	24.1	9/37	24.32	Active involvement of the pharmacist
37/120	30.83	19/80	23.75	18/40	45	21/83	25.3	16/37	43.24	Prescription delivering by the pharmacist

Table 2: The presence of the pharmacist, the active involvement of the pharmacist, the person assessing the prescription and delivering the prescription based on the gender of the supervisor and the management of the pharmacies.

Active involvement of the pharmacist: In some pharmacies, despite the presence of the supervisor, the prescription was not assessed by him. The percentage of the active involvement of male and female pharmacist, founder and un-founder is given in Table 2. Overall from 120 studied pharmacies, in 29 pharmacies (21.66%) they had active involvement.

The person assessing and filling the prescription: The percentage of assessing and delivering the prescription being done by the pharmacist or the prescription reader is given in Table 2 based on the gender and the management of the pharmacy. Overall from 120 studied pharmacies, in 30.83% the assessing and delivering of the prescription was done by the pharmacist and in the other 69.17% it was done by the prescription reader.

Distinguishing the pharmacist from the other staffs: Among 79 pharmacies in which the pharmacists were present, in 33% the pharmacist was distinguished from the other staffs. The pharmacists were distinguished by having etiquette or sitting in a specific position or wearing a uniform with specific color or design. (Specific color or design: 10%, sitting in a specific position: 3.8%, having etiquette: 17.7%).

Evaluation of the scientific performance of the Pharmacist

Identifying the drug interactions in the prescription: 2 of 37 pharmacies (5.4%) with female supervisor and 7 of 83 pharmacies (8.43%) with male supervisor mentioned the interactions in the prescription. Among 80 pharmacies which were run by the founder, only one pharmacy (1.25%) and among 40 pharmacies which were not run by the founder, 8 pharmacies (20%) mentioned the interactions.

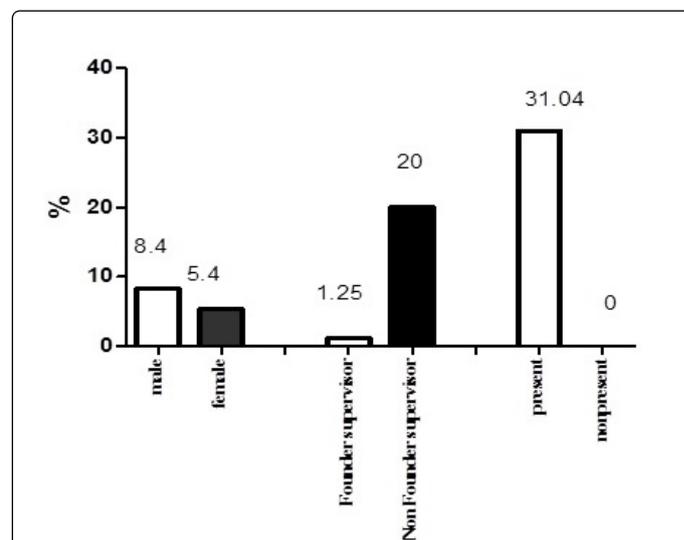


Figure 1: Identifying the interactions based on the gender of the supervisor, the management of the pharmacy and presence of the pharmacist. The percentage of each column represents the ratio of the pharmacy that identified the interactions to the entire studied pharmacy.

Generally, among 120 studied pharmacies, only 9 pharmacies (7.5%) mentioned the interactions in all of which the supervisor had an active

involvement. Among 29 pharmacies in which the supervisor had an active involvement, 9 pharmacies (31.03%) and among pharmacies in which the pharmacist didn't have an active involvement, 0 pharmacies (0%) identified the interactions (Figure 1). Among 9 pharmacies which mentioned the interactions, 8 pharmacies mentioned the interaction between sildenafil and nitroglycerine and only one pharmacy mentioned the interaction between gemfibrozil and lovastatin. Among these pharmacies, one pharmacy contacted the prescriber. Mentioning the existed interactions, one pharmacy refused to give the medicines and requested the patient to refer to his physician and correct the prescription; other pharmacies recommended the patient to use the interactive drugs with time intervals.

Expressing to the patient the best time to take the medicine:

Explaining the administration guides and the best time to take the medicines is one of the pharmacists' main responsibilities [13] and taking the drugs out of the schedule can lead to drug poisoning or prescribing less drug than needed and not reaching the therapeutic levels. In this study, among 120 pharmacies only in 14 pharmacies (11.66%) the best time to take the medicines was told to the patient. The percentage of expressing the best time to take the drugs is given in Figure 2.

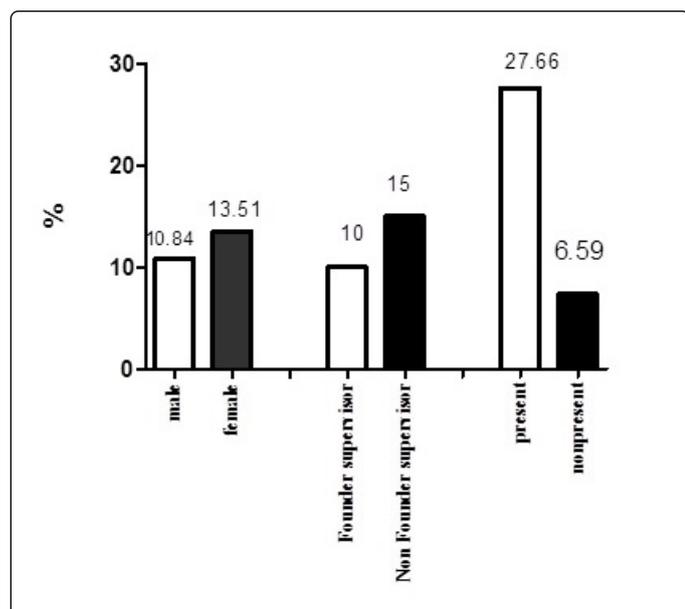


Figure 2: Total percentage of expressing the best time to take the medicines based on the gender of the supervisor and the management of the pharmacy and the presence of the pharmacist. The percentage of each column represents the ratio of the pharmacy that expressed the best time to take the medicines to the entire studied pharmacy.

Overall, among 29 pharmacies in which the pharmacist had an active involvement, 8 pharmacies mentioned the best time to take the medicines (27.66%) and among 91 pharmacies in which the pharmacist didn't have an active involvement, 6 pharmacies (6.59%) mentioned the best time to take the medicines. Among 37 pharmacies with female supervisor 5 pharmacies (13.51%), and among 83 pharmacies with male supervisor 9 pharmacies (10.84%) mentioned the best time and among 80 pharmacies which were run by the founder, 8 pharmacies (10%) and among 40 pharmacies which were

not run by the founder 6 pharmacies (15%) mentioned the best time to take the medicines.

Expressing the drug adverse effects: One of the pharmacists' main responsibilities is to notify the patient about the adverse effects, especially the ones that can lead to acute complications. In the prescription presented in this study there were some drug adverse effects, that among 120 pharmacies only 3 pharmacies (2.5%) mentioned 1 to 3 adverse effects orally. In all these 3 pharmacies the supervisor was present.

Expressing the storage conditions: Insulin NH ampoule should be stored in specific conditions. This ampoule can be kept out of the fridge for a month but it is better to keep it in the fridge. According to the drug dose and instructions in the prescription, the time to take the medicine is more than the mentioned period of time and it should be refrigerated. The percentage of mentioning the storage conditions is summarized in Figure 3. Overall, in 120 studied pharmacies 23 pharmacies (19.16%) mentioned the storage conditions. It is also noteworthy that among 29 pharmacies in which the pharmacist had an active involvement, 18 pharmacies (62.06%) mentioned the storage conditions and among 91 pharmacies in which the pharmacist didn't have an active involvement, 5 pharmacies (5.49%) mentioned the storage conditions. Among 37 pharmacies with female supervisor, 13 pharmacies (35.13%) and among 83 pharmacies with male supervisor 10 pharmacies (12.04%) mentioned the drug storage conditions. Among 80 pharmacies which were run by the founder, 15 pharmacies (18.75%) and among 40 pharmacies which were not run by the founder, 8 pharmacies (20%) mentioned the drug storage conditions.

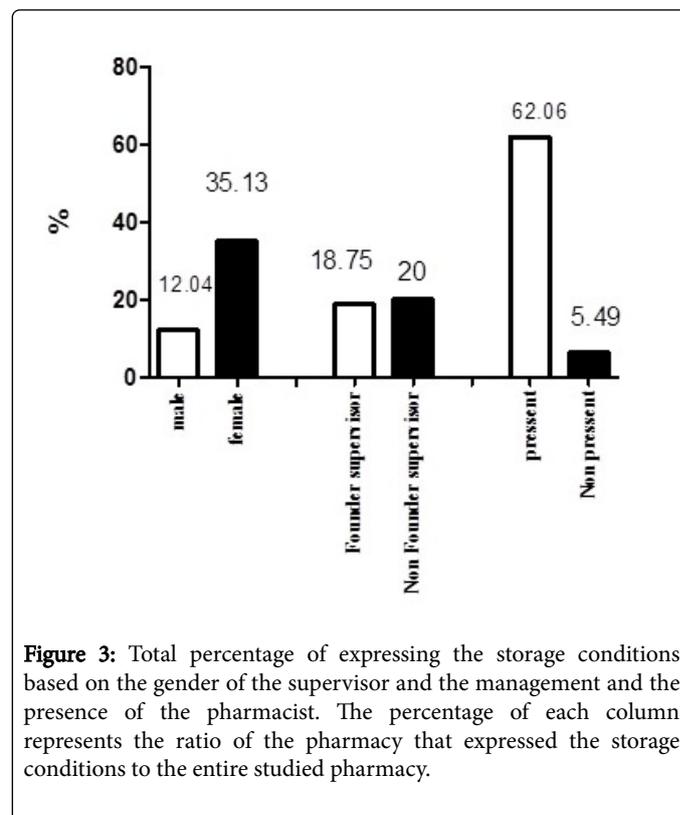


Figure 3: Total percentage of expressing the storage conditions based on the gender of the supervisor and the management and the presence of the pharmacist. The percentage of each column represents the ratio of the pharmacy that expressed the storage conditions to the entire studied pharmacy.

Giving the right medicines according to the prescription: 105 of 120 studied pharmacies (87.5%) gave the right medicines. In 15 pharmacies one item of the prescription was given incorrectly. It is

noteworthy that among these 15 pharmacies, in 11 pharmacies the pharmacist wasn't present and in 4 pharmacies the pharmacist was present but didn't have an active involvement.

Assessing the bureaucratic and trading performance of the pharmacy

Stamping the prescription: One of the bureaucratic and trading responsibilities of the pharmacists that helps tracking prescription is

stamping the prescription by the pharmacy. Overall in 40% of the 120 studied pharmacies the prescriptions were stamped. Among 79 pharmacies in which the pharmacist was present, 41 pharmacies (51.89%) and among 41 pharmacies in which the pharmacist was not present, 7 pharmacies (17.07%) the prescriptions were stamped (Table 3).

Effect of the pharmacist on the correct performance				Correct performance		Incorrect performance		
Presence of the pharmacist		Absence of the pharmacist		Number/total number	%	Number/total number	%	
Number/Total number	%	Number/Total number	%					
41/79	51.89	7/41	17.07	48/120	40	72/120	60	
33/79	41.77	10/41	24.39	43/120	35.83	77/120	64.16	Inserting the pricings
75/79	95	30/41	73	105/120	87.5	15/120	12.5	Receiving the correct amount of money
65/79	82.27	28/41	68.29	93/120	77.5	27/120	22.5	Giving the right number of medication
79/79	100	41/41	100	120/120	100	0/120	0	Inserting the medication orders in the drug

Table 3: The performance of the pharmacist regarding stamping , inserting the pricings, receiving the correct amount of money, giving the right number of medication according to the prescription and inserting the medication orders in the drug.

Inserting the pricings: Inserting the pricings is one of the bureaucratic and trading responsibilities of the pharmacist that respects the patients' rights and gains their trust and satisfaction. Generally among 120 studied pharmacies, 43 pharmacies (35.83%) the pricings were inserted. In 41.77% of pharmacies in which the pharmacist was present and in 24.39% of pharmacies in which the pharmacist was not present, the pricings were inserted (Table 3).

Receiving the correct amount of money: 105 of 120 studied pharmacies (87.5%) the received money was correct and in 15 pharmacies (12.5%) more money was received. Among these pharmacies in 75 pharmacies (95%) the supervisor was present and in 30 pharmacies (73%) the supervisor was not present. However in these 15 pharmacies the received money was more than 20% of the final price (Table 3).

Giving the right number of medications according to the prescription: 93 of 120 studied pharmacies (77.5%) gave the right number of drugs to the patient according to the prescription and 27 pharmacies (22.5%) gave more than the prescription to the patient that is probably due to the packaging of the drugs. Among 79 pharmacies in which the pharmacist was present, 65 pharmacies (82.27%) and among 41 pharmacies in which the pharmacist was not present, 28 pharmacies (68.29%) gave the right number of drugs (Table 3).

Inserting the medication orders on the drugs: Among 120 studied pharmacies, all 120 pharmacies (100%) inserted the exact prescribed medication order and no pharmacy made any change in the medication order (Table 3).

Food and drug interactions

In the last step of the study, the hypothetical patient requested the pharmacy to recheck the prescription and consult about the food and drug interactions. Among 37 pharmacies in which the female supervisor was present, 18 pharmacies (48.65%) mentioned 1 to 4 food and drug interactions. Among 83 pharmacies in which the male supervisor was present, 43 pharmacies (51.80%) mentioned one or more items. Among 80 pharmacies which the founder supervisor was present, 36 pharmacies (45%) mentioned one or more food and drug interactions and among 40 pharmacies in which the non-founder supervisor was present, 19 pharmacies (47.5%) mentioned these interactions. Among 79 pharmacies in which the supervisor was present, 61 pharmacies (77.22%) mentioned one or more food and drug interactions (Figure 4). In general, in 79 pharmacies in which the pharmacist was present, 27.65% mentioned one item, 43.33% mentioned two items, 6.24% mentioned more than two items and 22.78% didn't mention any food and drug interactions.

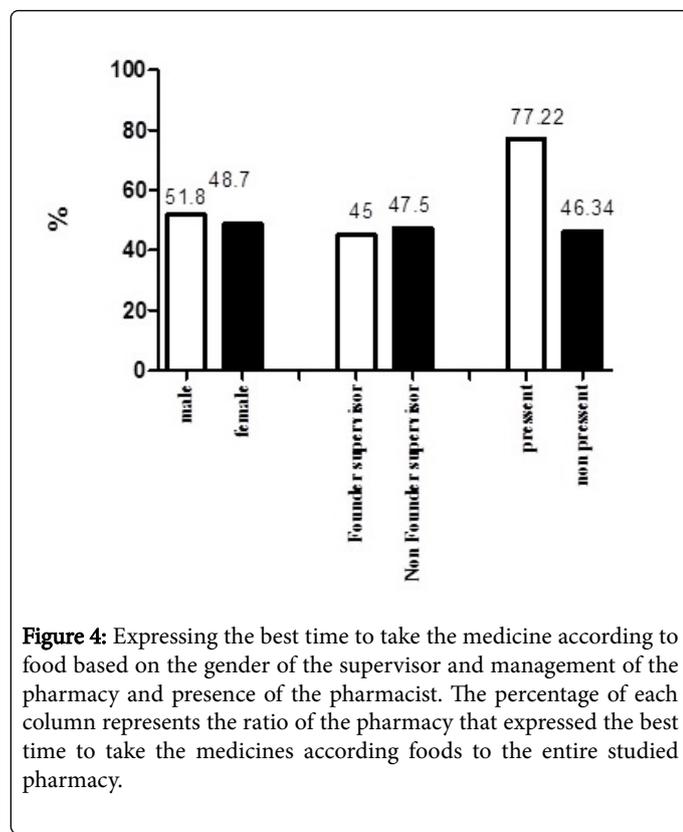


Figure 4: Expressing the best time to take the medicine according to food based on the gender of the supervisor and management of the pharmacy and presence of the pharmacist. The percentage of each column represents the ratio of the pharmacy that expressed the best time to take the medicines according foods to the entire studied pharmacy.

Discussion

Assessing the professional performance of the healthcare staff is an important issue in the world. Pharmacists as the final link with patients are experts that should precisely evaluate the prescriptions in order to provide the prescriptions correctly and express the required information properly.

Medical errors cause many deaths of drug users each year [1]. Among the discussed errors are errors in prescription or in drug administration that are common all over the world regardless of the level of development [3].

Active involvement of the pharmacist in the prescription filling hours is one of their essential professional requirements and it's an important factor to prevent unpleasant incidents. In the current study in 65.83% of the studied pharmacies the pharmacist was present; however only in 34.16% of them the pharmacist had an active involvement. According to the rules of the regulation of medical, pharmaceutical, food and beverage products, technical issues of the pharmacy should be done by the person who is introduced as the supervisor pharmacist and his presence and active involvement in the determined hours is necessary according to the supervisor's license. First negligence that occurs regarding the medication errors is due to this absence of the supervisor, therefore special attention should be paid to this issue. The absence of the supervisor in the pharmacy undermines their professional performance. As the results of this study shows, the drug interactions were identified only in pharmacies in which the supervisor was present. Also In pharmacies in which the pharmacist was present, the rate of expressing the best time to take the medicine, the drug adverse effects, the storage conditions and giving the correct medicine were more than the pharmacies with no

pharmacist's active involvement. On the other hand, the professional performance of the pharmacy including giving the correct number of medicine, inserting the pricings, stamping the prescription and receiving the correct amount of money, was better in the pharmacies in which the pharmacist was present.

According to patients' bill of rights in relation to the pharmacy, which has been issued by the Food and Drug Administration, patient has the right to make sure of pharmacist's presence before presenting the prescription and the pharmacist is obliged to express the required drug information such as drugs administrations to the patient. Explaining how to use and timing of the medications is an essential task of the pharmacists [8] and taking the drugs out of the schedule can lead to drug poisoning or prescribing less than therapeutic goal. In this study only 11.6% of the pharmacies mentioned the timing of the drug consumption. On the other hand, the pharmacist is obliged to precisely evaluate the prescription and indentify the drug interactions and take the required measures to guide the patient, however in the current study only 7.5% of the pharmacies mentioned the drug interactions. Another important responsibility of the pharmacist is to consult the patient about a drug's use cases and its pros and cons, and the patient has the right to require his pharmacist to provide information on the drug's pros and cons; expressing the drug's adverse effects is of pharmacists' responsibilities. But in the current study, only 2.5% of the pharmacies mentioned the drugs adverse effects. One of the other responsibilities of pharmacists is expressing the drug storage conditions especially for drugs with low stability which need special storage conditions. In current study only 19.16% mentioned these storage conditions. Finally maybe the most important responsibility of the pharmacists is to provide right medicines for the patients. In the current study in 12.5% of the cases the drug was given wrongly which in 73% of pharmacies, the pharmacist was not present and in the other 27% the pharmacist was present but didn't have an active involvement. It is obvious that not paying attention to these issues can cause serious and irreversible consequences for the patient and its damages would be borne by the supervisor of the pharmacy. According to the results above it seems that either pharmacists do not have enough knowledge on this field or they don't have required motivation to do their responsibilities and don't feel obliged to do them. Despite their professional performances, pharmacists should also be aware of their bureaucratic and trading responsibilities such as being distinguishable from other staff, inserting the pricings, stamping the prescriptions, and receiving the correct amount of money from the patients, all of which were better accomplished in pharmacies where the supervisor was present. For example, about receiving the correct amount of money it was observed that in 12.5% of the pharmacies an additional 20% of the price was received, for which in 70.48% of the cases the supervisor did not have an active involvement. Although the improvement of medical services is of any pharmacist's concern, this study manifests that providing the wrong medications or not expressing the required information about the medicines to the patient still happens in the pharmacies and pharmacists should pay more attention regarding the prescriptions. Still, it seems that different factors may lead to inadequate medical services including:

- Deficiency and shortages in the curriculums at school of pharmacy for the students on the matter of dealing with prescriptions and proper performance in this regard.

- Deficiency and shortages in educational programs for pharmacy graduates and raising their awareness in order to provide proper services in pharmacies.

- The low rate of research and information updates by graduates of pharmacy.

- The low rate of drug profits (margins) and the high number of visits to each pharmacy, so that the pharmacist often doesn't have the opportunity to review the prescriptions carefully and present the required instructions to the patient.

- The culture in which the role of the pharmacist is not well defined. And if the pharmacist wants to fully perform the scientific role regarding a prescription, he will often be questioned by people and physicians.

- The most important factor is the lack of wage for presenting scientific services by the pharmacist. This factor caused pharmacists not to feel responsible to present these services and caused negligence in this regard.

At the end it seems that to support the patient and the pharmacist, the ministry of healthcare should make major changes in educational and executive programs. In this study, it was observed that pharmacies in which the supervisor was not the founder and didn't have the concerns regarding the insurance, taxes, ... he/she has better performance as a pharmacist and it seems that the Ministry of Healthcare must take measures to reduce the concerns, the multiple visits, the pharmacy's low profitability, the insurance problems, taxes, ... and above all, the Ministry should conduct a general revision of the actual value of the scientific consultations should be made so that the pharmacist, either a founder or non-founder, can review the prescription, detect its errors and consult the patients with more motivation and in sufficient time.

Limitations of the Study

Given that this study was done with a particular prescription, it's not possible to generalize it to all prescriptions. Also this study was conducted in a city with its specific characteristics and it is to conclude that similar results may be achieved all over the county. But it's noticeable as a start for discussing about the errors that may occur in pharmacies. Moreover in this research the prescription was not selected randomly, but the selected drugs were drugs which are commonly prescribed or can cause serious complications if not presented correctly.

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