



Open Access Article



<https://doi.org/10.55463/issn.1674-2974.50.3.6>

Assessment of Community Pharmacists' Response to Patients with PCOS with Adverse Drug Events in Qatar: Simulated Client Approach

S. Ali, A. Osman, M.I. Mohamed Ibrahim, A. Shalash*

College of Pharmacy, QU Health, Qatar University, Doha, Qatar

* Corresponding author: alaa.a.shalash@gmail.com

Received: January 15, 2023 ▪ Review: February 10, 2023 ▪ Accepted: March 8, 2023 ▪ Published: March 31, 2023

Abstract: The public considers community pharmacists the most accessible healthcare providers. Services provided by pharmacists such as dispensing, counseling, and monitoring of adverse drug reactions have positive effects on patient health. The aim of this study was to evaluate the Qatari community pharmacists' data gathering, labeling, dispensing, and counseling practices in response to patients with adverse drug events (ADE). This study is a simulated client (SC) observational descriptive study. Thirty community pharmacies were chosen at random and placed in one of the two groups with 15 interactions over the phone and 15 interactions in person. The case is about a patient with PCOS taking metformin who presented with bothersome diarrhea and sought assistance from a pharmacist. Simulated clients used the Data Collection Tool to gather data. Each simulated client completed forty interactions with community pharmacists. Ninety percent of pharmacists dispensed medication, mostly antibiotics (37.5%) and antidiarrheal (67.5%). A total of 7 pharmacists (17.5%) made referrals. The majority of pharmacists (87.5% and 82.5%, respectively) failed to obtain crucial patient information, such as the frequency and duration of diarrhea. The SC had to remind all the pharmacists that this is an ADE from metformin. More than one-third of pharmacists (43.75%) who dispensed medication did not label any of it. No significant difference was found between groups in data gathering and dispensing (P -value >0.05). Current community pharmacy consultation, labeling, and counseling practices on ADEs are inconsistent with evidence-based practice and need to be improved. Such a study is scarce, and it is the first simulated client approach assessing the community pharmacy responses to ADE in the State of Qatar. This topic is important for minimizing the practice gap and to develop professional training programs that are desperately needed to advance the profession.

Keywords: patient, pharmacies, adverse drug events, Poly Cystic Ovarian Syndrome, Qatar.

评估社区药剂师对患者的反应卡塔尔多囊卵巢综合征与不良药物事件：模拟客户方法

摘要：公众认为社区药剂师是最容易获得的医疗保健提供者。药剂师提供的服务，如配药、咨询和药物不良反应监测，对患者健康有积极影响。本研究的目的是评估卡塔尔社区药剂师针对药物不良事件患者的数据收集、标签、配药和咨询实践。本研究是一项模拟客户观察性描述性研究。随机选择了 30 家社区药房，并将其置于两组中的一组，其中 15 次是通过电话进行的互动，15 次是面对面的互动。该案例是关于一名服用二甲双胍的多囊卵巢综合征



患者，该患者出现令人烦恼的腹泻并寻求药剂师的帮助。模拟客户使用数据收集工具来收集数据。每个模拟客户完成了与社区药剂师的 40 次互动。90%的药剂师配药，主要是抗生素(37.5%)和止泻药(67.5%)。共有 7 名药剂师(17.5%)进行了转诊。大多数药剂师 (分别为 87.5%和 82.5%) 未能获得重要的患者信息，例如腹泻的频率和持续时间。模拟客户不得不提醒所有药剂师这是二甲双胍的药物不良事件。超过三分之一(43.75%)的配药药剂师没有贴上任何标签。在数据收集和分配方面，各组之间未发现显著差异 (P 值 > 0.05) 。目前的社区药房咨询、标签和不良药物事件咨询实践与循证实践不一致，需要改进。这样的研究很少见，而且它是第一个评估卡塔尔国社区药房对不良药物事件反应的模拟客户方法。该主题对于最大程度地减少实践差距和制定推进该行业急需的专业培训计划非常重要。

关键词：患者、药房、不良药物事件、多囊卵巢综合征、卡塔尔。

Introduction

The public considers community pharmacists the most approachable healthcare providers [1]. They offer a wide range of services, including drug dispensing, counseling, and drug monitoring. Managing adverse drug events using evidence-based practice is a part of drug monitoring. The term "adverse drug events" (ADE) refers to unpleasant reactions or harm brought on by medicinal products used for medical intervention [2]. Over 3.5 million physician office visits and approximately 125,000 hospital admissions in the United States are attributed annually to ADEs, according to the Office of Disease Prevention and Health Promotion [3]. As a result, health agencies offered plans and measures to cut down on the number of ADEs and avoid the negative consequences that come with them. Detection is the first step in managing ADEs [4]. Since the pharmacist is typically the patient's first point of contact, he or she is well-positioned to recognize ADEs and provide appropriate treatment. The involvement of community pharmacists can significantly enhance patient safety.

There is a need for more studies in developing countries that evaluate the actual practice of community pharmacists when dealing with patients who present with ADEs. However, the ability of community pharmacists to treat minor ailments was the subject of numerous published articles [5-7]. A study conducted in Saudi Arabia examined at how community pharmacists handled patients who presented with sudden cardiac symptoms [5]. The investigation revealed poor pharmacy practice as well as insufficient counseling and assessment skills among pharmacists. Two published studies were conducted in Qatar to assess the responses of community pharmacists to patients who presented with minor ailments, such as acute gastroenteritis and acute respiratory condition [6-7]. These studies revealed an inconsistency between current evidence-based practice

and community pharmacy practice. As a result, community pharmacist practices and standards must be improved.

Poly Cystic Ovarian Syndrome (PCOS) is one of the known conditions that affect women. Metformin is now commonly used to treat various conditions such as PCOS [8]. Metformin is not labeled by the FDA, but there is evidence that it is effective. Metformin can cause diarrhea as an ADE in 53.2% of patients if taken as immediate release [9]. Metformin gastrointestinal side effects can be prevented, according to the New Zealand Medicines and Medical Devices Safety Authority, by counseling patients to take it with meals and by gradually increasing the dosage [10].

Continuous professional development of healthcare providers was defined by the Qatar National Health Strategy (QNHS 2011–2016) as a commitment toward patients in Qatar [11]. To find practice gaps and inform training programs, the current practice should be evaluated before making modifications and implementing improvements. This study intends to assess the data collection, labeling, dispensing, and counseling methods used by community pharmacists in Qatar in response to patients with PCOS with ADEs.

1. Research Methods

1.1. Study Design

In this study, the observational descriptive simulated client method was used to assess community pharmacists' responses to ADEs. This method is based on direct observation and provides accurate information about actual behavior. This approach has the advantages of giving a fair representation of standard practice and how to be quick [12].

To reduce inter-rater variability, two pharmacy students in their final year served as SCs while visiting the same pharmacies one week apart.

1.2. Study Subjects and Sampling

A list of community pharmacists in Qatar was retrieved from the Ministry of Public Health. Thirty community pharmacies were chosen at random using the numbers generated by the SPSS program. They were then divided into two groups for 15 in-person interactions and 15 phone calls using simple randomization. The exclusion criteria were community pharmacies outside Doha (for convenience reasons), community pharmacies affiliated with SCs' rotation sites, and community pharmacies involved in the piloting of the data collection process.

1.3. Ethics Considerations

Ethical approval was obtained from Qatar University's Institutional Review Board, QU-IRB. All the data gathered were kept confidential during the study and afterward at the College of Pharmacy, Qatar University.

1.4. Study Tool Development

Two pharmacy students in their final year developed the scenario- and data-collecting form, which was then approved by two pharmacy professors. The appendix contains the scenario and the data collection form. A female with PCOS who has been taking metformin 500 mg three times a day for 3 days arrived at the pharmacy seeking ADE from metformin (diarrhea for 2 days about 4 times daily) and she try nothing to relieve her diarrhea. Demographics of the pharmacy and pharmacist, data collecting points, counseling points, labeling, and medications prescribed are all included in the data collection form.

In the four community pharmacies, the scenario- and data-collecting tool were piloted and improved after two in-person contacts and two phone calls. The final standardized scenario and data collection form were used in the actual study

1.5. Data Collection Method

There were several sections to the data collection tool: demographics, data collection, labeling, counseling, and dispensed medications. Except for the demographics and medications administered sections, each section involved points answered by the simulated client with yes/no. To reduce recall bias, the tool was completed immediately following the interaction in a private space. All data were transferred to excel during collection and then exported to SPSS for analysis.

1.6. Outcome Measures

Data collection and procedures, labeling requirements, counseling practice, and dispensing procedures in response to patients presenting with diarrhea from metformin are the key outcomes of this study. The results were evaluated in comparison to evidence-based medicine. Secondary outcomes include

the duration of interaction with the pharmacist and the cost of medications dispensed.

1.7. Data Analysis

Data were analyzed using statistical software SPSS version 22 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp.). Descriptive statistics were used to obtain the frequencies and percentages.

A normality test was performed on the continuous variable. Quantitative data were analyzed using inferential statistics. Fisher's-exact test and McNemar's test for categorical data were employed for paired and unpaired groups, respectively. An independent t-test was used for continuous data. The alpha level was set at 0.05.

2. Results

A total of 40 interactions were performed over a three-week data collection period: 16 face-to-face interactions and 24 telephone calls.

2.1. The Participants' Demographics

Table 1 displays the characteristics of the participants. Phone calls constituted a majority of interactions (60%). Chain pharmacies make up 70% of the community pharmacies contacted. Only 7.5% of pharmacists were female, whereas 92.5% of pharmacists were men. More than half of the pharmacists interacted with were Arabic (57.5%).

Table 1 Background profiles of the community pharmacists
(Elaborated by the authors)

Demographics	Frequency	Percent (%)
Group	Face to Face	16
	Telephone Call	24
Type	Chain	28
	Independent	12
Gender	Male	37
	Female	3
Ethnicity	Arabic	23
	Non-Arabic	17

2.2. Data Gathering

All community pharmacists in both groups were unable to collect data on allergies in terms of data collection. 15 and 23 pharmacists in face-to-face and in the telephone calls groups, respectively, did not ask the patient if she is pregnant or not. Thus, thirty-eight pharmacists (95%) did not inquire about the pregnancy status. In fact, only two pharmacists inquired about pregnancies: one in the face-to-face group and one in the telephone call group.

There was no significant difference between the face-to-face group and the telephone call group ($p = 0.649$) in data gathering about patients' current medications. Twelve pharmacists in the face-to-face group did not ask about current medications and four did. On the other hand, in the telephone call group,

eighteen did not inquire about current medications and six of the pharmacists did. Only five pharmacists (12.5%) requested to know about the medication regimen (metformin) and 35 (87.5%) pharmacists requested it. With regards to query about the medical conditions and trials to relieve diarrhea, no significant differences ($p=0.456$) were found between the two groups for each parameter. Three pharmacists in each group for both parameters asked about the medical conditions and trials to relieve diarrhea (15%). 13 and 21 pharmacists in face-face and telephone call groups respectively asked about it (85%).

More than two thirds of the pharmacist 33 (82.5%)

asked the patient about the frequency of the diarrhea. A total of 7 (17.5%) pharmacists asked about the number of times the patient had diarrhea (2 and 5 pharmacist in face-to face and telephone call groups, respectively). More than half of the pharmacists 31 (77.5%) did not obtain data about the presence of other symptoms or not. One pharmacist in the face-to-face group questioned the patient about the presence of other symptoms while 8 pharmacists in the telephone call group questioned (22.5%). Surprisingly, all the pharmacists (100%) in both groups needed prompted to realize that the cause is an ADE.

Table 2 Data gathering points (Elaborated by the authors)

Data Gathering Point		Group		Total (%)	P-value
		Face to Face	Telephone Call		
Allergies	Yes	0	0	0 (0%)	NA
	No	16	24	40 (100%)	
Pregnancy	Yes	1	1	2 (5%)	0.646
	No	15	23	38 (95%)	
Current Medications	Yes	4	6	10 (25%)	0.649
	No	12	18	30 (75%)	
Medication regimen (metformin)	Yes	2	3	5 (12.5%)	0.692
	No	14	21	35 (87.5%)	
Medical Conditions	Yes	3	3	6 (15%)	0.456
	No	13	21	34 (85%)	
Frequency of Diarrhea	Yes	2	5	7 (17.5%)	0.408
	No	14	19	33 (82.5%)	
Duration of Diarrhea	Yes	1	4	5 (12.5%)	0.323
	No	15	20	35 (87.5%)	
Trials to Relieve Diarrhea	Yes	3	3	6 (15%)	0.456
	No	13	21	34 (85%)	
Other Symptoms	Yes	1	8	9 (22.5%)	0.048
	No	15	16	31 (77.5%)	
Prompting to Realize ADE	Yes	16	24	40 (100%)	NA
	No	0	0	0 (0%)	

2.3. Labeling Standards

Because the simulated clients did not visit pharmacy in the telephone call group, labeling was only documented for the face-to-face group (Table 3).

Giving information labels, such as dose and frequency were included in 31.3% and 56.3% of face-to-face interactions, respectively. Eleven (68.8%) and seven (43.8%) of the pharmacists excluded the drug dose and frequency, respectively, in the medication label. The strength and duration of medications were excluded from the medication label at all (100%).

Table 3 Medication labeling points (Elaborated by the authors)

Labeling Points	Face-to-Face Group		Total
	Yes	No	
Dose	5 (31.3%)	11 (68.8%)	16 (100%)
Frequency	9 (56.3%)	7 (43.8%)	16 (100%)
Strength	0 (0%)	16 (100%)	16 (100%)
Duration	0 (100%)	16 (100%)	16 (100%)

2.4. Patient Counseling

Counseling about the medication (drug name, strength, length, and frequency) and its ADEs was one of the counseling points. One pharmacist in the face-to-

face group and 21 pharmacists in the telephone call group mentioned the medication's name (55%). Thus, the difference between the two groups was statistically significant ($p\text{-value} \leq 0.05$). In neither of the group did the pharmacists mention the strength of the medication. Four (10%) of the pharmacists obtained information about the duration of medication intake (1 and 3 pharmacists in face-to face and telephone call groups respectively). More than two-thirds of the pharmacists ($n = 30$, 75%), asked about the medication quantity. Indeed, ten and twenty pharmacists in face-to-face and telephone call groups, respectively ($p = 0.132$). Medication frequency was significantly different between the two groups ($P = 0.003$), in which, eleven pharmacists in the face-to-face group and five pharmacists in the telephone call group ($n = 16$, 40%) inquired about the number of times the medication is taken. Thirty-four (85%) of the pharmacists did not counsel the patients about the time for ADE to disappear ($p = 0.544$). On the other hand, a total of six pharmacists (15%) did counsel. Advice regarding ADE was not significantly different between the two groups. In which 2 pharmacists in the face-to-face group and 9

pharmacists in the telephone call group gave advice (27.5%). Seven pharmacists (17.5%) referred the

patient to the physician, and thirty-three (82.5%) did not ($p = 0.408$).

Table 4 Counseling points (Elaborated by the authors)

Counseling Points		Group		Total	P-value
		Face to Face	Telephone Call		
Medication name	Yes	1	21	22 (55%)	0.000
	No	15	3	18 (4%)	
Medication strength	Yes	0	0	0 (0%)	NA
	No	16	24	40 (100%)	
Medication duration	Yes	1	3	4 (10%)	0.471
	No	15	21	36 (90%)	
Medication quantity	Yes	6	4	10 (25%)	0.132
	No	10	20	30 (75%)	
Medication frequency	Yes	11	5	16 (40%)	0.003
	No	5	19	24 (60%)	
Time for ADE to disappear	Yes	2	4	6 (15%)	0.544
	No	14	20	34 (85%)	
Advice regarding ADE	Yes	2	9	11 (27.5%)	0.083
	No	14	15	29 (72.5%)	
Referral	Yes	2	5	7 (17.5%)	0.408
	No	14	19	33 (82.5%)	

2.5. Medications Dispensed

A list of medications made from the prescriptions given by community pharmacists is shown in Table 5. Loperamide, an antidiarrheal, was prescribed by eleven (57.9%) of pharmacists in the face-to-face group and thirteen (50%) in the telephone call group. Loperamide was the most commonly prescribed medication in both the groups. The antibiotic nifuroxazide was the second most frequently prescribed medication 10 (22.2%). Nifuroxazide, were dispensed five times (26.3%) in both face-to face groups as well as in the telephone call group (19.2%). Metronidazole was dispensed 3 times in the telephone call group and 2 times in face-to -face group, resulting in a total of 5 (11.1%). Kaolin/pectin was recommended one time by a pharmacist (5.3%) in a face-to-face group and twice (7.7%) in the telephone call group. The probiotic (Enterogermina) and the oral rehydrating salts (ORS) were advised only in the telephone call group (3.8%) and (7.7%), respectively.

Table 5 Dispensed/advised medications (Elaborated by the authors)

Medication Name	Group		Total
	Face to Face	Telephone Call	
Loperamide	11 (57.9%)	13 (50%)	24 (53.3%)
Nifuroxazide	5 (26.3%)	5 (19.2%)	10 (22.2%)
Metronidazole	2 (10.5%)	3 (11.5%)	5 (11.1%)
Kaolin/pectin	1 (5.3%)	2 (7.7%)	3 (6.7%)
Probiotic (Enterogermina)	0 (0%)	1 (3.8%)	1 (2.2%)
ORS	0 (0%)	2 (7.7%)	2 (4.4%)

2.6. Duration of Interaction and Total Cost of Medicines

In either the phone call group or the face-to-face group, interactions with the pharmacist lasted on average two minutes (IQR: 1-2). The minimum interaction lasts for 0.5 min, while the maximum interaction lasts for 4 minutes. In both groups, the

average (mean $\pm$ sd) total cost was QAR22.00 (6.72). The minimum and maximum total costs were QAR 9.5 and 30.5, respectively.

Table 6 Duration of interaction and total cost (Elaborated by the authors)

Statistics	Total cost (QR)*	Duration of interaction (min.)**
Average	22 QR (+/- 6.72)	2 min (1-2)
Minimum	9.5	0.5
Maximum	30.5	4.0

* Mean (+/-SD) because it is normally distributed.

** Median (Q1-Q3) because it is not normally distributed.

3. Discussion

The aim of this study was to evaluate Qatar community pharmacists' data gathering, labeling, dispensing, and counseling practices in response to patients with PCOS with ADEs. The results of the study revealed that the overall process of case management of ADEs in community pharmacies in Qatar is not satisfactory. This is because of poor data gathering, and low-quality counseling services pertaining to pharmacists' responses to ADEs.

The mystery shopper method was used in this study to determine the actual level of practice of community pharmacists. The study revealed that the majority of pharmacists have poor data collection skills and are frequently missing to ask about highly crucial information (allergies 100%, pregnancy 95%, duration 87.5%, frequency 82.5%, other symptoms 77.5%, and trials to treat diarrhea 85%). Similar findings were obtained from a cross-sectional simulated client study in Saudi Arabia that assess the community pharmacist competencies. In which most pharmacists did not inquire about previous medication use (12%), concurrent use of other drugs (14%), or any history of drug allergies (11%) [13]. Similar findings were found in [14]. Overall, less than 25% of interactions included

obtaining patient history. Indeed, just a few pharmacists inquired about concurrent medical issues (10%; 25/242), any previous actions (8%; 20/242), and concomitant drug usage (4/242) (1.7%) [14].

In our study, despite the SC prompting all pharmacists to realize that this is an ADE from metformin, 75% did not inquire about the current medications. In Nigeria, a cross-sectional study using three SCs visiting 36 chosen community pharmacies was conducted. Thirty-two (88.9%) of the pharmacists failed to identify the side effect as being related to drug therapy intake, although the patient is taking additional medications to treat the avoidable side effect [15]. In fact, when dispensing loperamide, a medicine that might harm the fetus, very few pharmacists inquired about pregnancy status. Loperamide is an FDA pregnancy category C. There are additional choices that may be risk-free for pregnant women. In a study, using simulated patients visiting community pharmacies in Riyadh with symptoms of particular clinical conditions, comparable findings were obtained in which antibiotics were prescribed without asking about related symptoms and only 23% of pharmacists asked about the patient's pregnancy status [16].

In our study, labels including information about dose and frequency were provided in 31.3% and 56.3%, respectively, of face-to-face interactions. The dosage strength or duration of use were not mentioned by any pharmacist at all. Thus, in Qatar, medications labeling is extremely inadequate. In cases where labeling was done, pharmacists just need a pen to draw lines showing the frequency of daily intake without printing labels. Thus, in Qatar, standard labeling was not fulfilled by community pharmacists. Satisfaction with medication counseling offered by community pharmacies was assessed in a cross-sectional survey, in which only 3.5% of pharmacists label the dispensed medication [17]. In Turkey, an interventional study found that 43.0% of medicine packages had appropriate labels, whereas 10.0% lacked any labels at all. Additionally, 47.0% of the products with labels were incorrectly or insufficiently labeled [18].

Two aspects distinguished the face-to-face and telephone call groups significantly. The first aspect is counseling about medication name, which was higher in telephone calls (1 versus 21 respectively, p -value < 0.001). This could be because of the method of interaction as in telephone calls SCs were asking about the name of the medication to gather the data for the research, but not in the face-to-face interaction. The second significantly different aspect is medication frequency, which was higher in face-to-face communications (11 versus 5 respectively, p -value = 0.003). This may also be attributable to the method of interaction. Pharmacists on the phone calls may be waiting for the SC to come before advising her or him on how frequently to take the medications. A cross-

sectional comparison study conducted in North Dakota found that remote telepharmacy sites had a slightly higher rate of medicine dispensing errors (1.3%) than standard community pharmacy sites (0.8%) [19].

The results of the medications recommended by phone calls were disappointing. In our study, around two-thirds of pharmacists (67.5%) prescribed antidiarrheal medications. While slightly more than a third (37.5%) of them dispensed antibiotics without a prescription, even though many of them realized that metformin was a cause for the diarrhea. Two antibiotics for metformin-induced diarrhea were given by one pharmacist simultaneously. Unfortunately, this may increase the use of unnecessary medications and in the inappropriate use of a medication to treat an adverse effect. Additionally, the patient may be burdened financially. Only four pharmacists (10%) refused to give the SC any medication, and three of them referred the SC to the doctor. The SC was instructed by one pharmacist not to administer the medication and to wait for the side effect to subside. Similar results were discovered from a mystery shopper study, conducted in Australia. In which, 96% of the pharmacists provided a medication product, and the remaining (4%) directed patients to a doctor. In 42% of cases, non-pharmacological guidance was given for [20]. Findings from a cross-sectional online survey in Finland found that estimates of pharmacists' abilities to identify potential medication-adverse events while dispensing medications in the workplace has the lowest proportion in "good competence, especially anticholinergic, sedative, and serotonergic adverse drug events" [21].

The recommended treatment for diarrhea due to metformin intake includes advising the patient to take the prescription with meals, gradually increasing the dose, and/or switching to an extended-release form of metformin. Thus, dispensing of any additional medication is not required. Ideally, metformin is initiated as 500 mg once daily, then increased to 500 mg twice daily after one week, and then to 500 mg three times daily after another week [8]. If three times daily dose is not tolerable, a twice daily dose can be used.

Demographically, more than 90% of pharmacists who spoke Arabic were Egyptian, whereas more than 80% of pharmacists who did not speak Arabic were Indian. Thus, expatriates made up a major portion of the sampled community pharmacists, which indicates that many pharmacists working in the nation are foreign-trained professionals. This indicates that the community pharmacy practice in Qatar depends mostly on Egyptian and Indian pharmacy curriculum background. Similar findings were obtained in a study conducted in other Gulf countries [22].

The average patient-community pharmacist conversation lasts for two minutes, according to estimates. Also, the average cost of medications was

QAR22 per interaction, although the management should be advice and referral for dose modification. Yang et al.'s study found that the majority of patients claimed that drug counseling took less than a minute, while the majority of pharmacists believed they spent 1 to 5-minute counseling patients. The levels of patient and pharmacist satisfaction considerably rose as the counseling time increased [17]. Improved levels of information have been linked to higher levels of satisfaction [23-24]. As a result, pharmacists should make an effort to allocate sufficient time for patients to receive effective medication counseling. In KSA, Al Qarni et al, performed cross-sectional research aimed at assessing simulated patient visits to observe actual counseling techniques used by the pharmacist in the Bisha region. The average time for counseling prescription-only medicine was 110 s (1.83 min) and 73.4 s (1.22 min) for an OTC medicine [25]. Whereas in Turkey, although the pharmacists reported 287 s (4.78 min) in the questionnaires, the average dispensing time for a single medicine was 149 seconds (2.48 min) in the simulated situations [18].

4. Conclusion

The study assessed the community pharmacist's competencies in terms of data gathering, labeling, and counseling skills for treating patients with PCOS complaining from ADEs (diarrhea) due to metformin intake. The study found poor data gathering, incomplete labeling technique, weak counseling, and dispensing practices that imposed an immediate improvement to rescue the practice. The poor data collection was found because few pharmacists asked the crucial questions that would have provided a detailed picture of the patient's case. Unfortunately, pregnancy status and medication allergies had the least number of inquiries. Medication labeling practices did not adhere to any regulations or standard as many labeling details, including strength and duration, were missing. Insufficient and inadequate counseling practice as the majority of pharmacists did not address much counseling information. In fact, pharmacists' counseling on ADE varied greatly and depended on their familiarity with metformin-related adverse events. With a high percentage of antibiotic prescriptions being filled, the dispensing practice needs to be improved. This practice might expose the patient to unnecessary medications and place a cost burden on the patient. In conclusion, community pharmacists' practices in Qatar need to be enhanced to fulfill QNHS strategies. More continuing educational and training programs need to be provided to them.

We believe that this study is one of the most demanding assessments of community pharmacists in Qatar. Our study employed the simulated client methodology, which has been shown to be an efficient way to derive reliable and valid results that are

challenging to acquire by any other approach in pharmacy practice research [26]. This assessment brought attention to the areas where not much research has been done. Our study provided strong supporting evidence of how the current practice of community pharmacists is poor in response to ADE across different aspects (dispensing, counseling, and monitoring of adverse drug reactions). It also provided a framework for developing effective instructional approaches for addressing practice behavior inadequacies and fostering continuing professional development.

4.1. Implications of the Study

Based on this study results and previous studies, the Continuous Professional Development (CPD) program for community pharmacists should upgrade the practice program and implement changes in the training courses of the new joined pharmacists and workshops for those already in practice. To promote and achieve optimal pharmacist practice, community pharmacies should be encouraged to upgrade their software systems. To encourage future changes in pharmacists' performance, additional SP studies should be conducted highlighting the counseling and dispensing practices of community pharmacists. These studies should be followed with performance feedback.

4.2. Strengths and Limitations

This study design (i.e., SMC) provided a framework for creating effective instructional approaches to address practice behavior inadequacies and improve ongoing professional development. The sample size, which was limited by budget and time constraints, is a limitation and it affects the generalizability of the study. The current study only assessed the practice of pharmacists regarding ADEs for one drug (metformin); many other drugs with important ADEs were not investigated.

4.3. Recommendations

The findings of this study necessitate immediate action to enhance current community pharmacy practice. To start, community pharmacists need to be kept up to date on the most recent evidence-based practices through continuing education programs. Second, yearly license renewal after passing a comprehensive exam can also help the pharmacists improve their knowledge and skills and ensuring their competency in the real world. Third, community pharmacists' engagement in enhancing patient safety should be aided by the implementation of a patient safety program to identify, manage, and report ADEs. Finally, performing comprehensive research with a respectable sample size to compare community pharmacy practices before and after the aforementioned actions are taken. All of these suggestions can dramatically improve Qatar's community pharmacy

practice.

Acknowledgment

The APC of this article was supported by a QU Student Grant (QUST-1-CPH-2023-780).

Funding

The funding for this research was supported by a QU Student Grant (QUST-CPH-SPR-15/16-13).

References

- [1] WORLD HEALTH ORGANISATION. The role of the pharmacist in the health care system: preparing the future pharmacist: curricular development: report of a third WHO Consultative Group on the Role of the Pharmacist, Vancouver, Canada, 27-29 August 1997. WHO IRIS, 1997. <http://apps.who.int/medicinedocs/en/d/Jh2995e/1.6.2.html>
- [2] BATES D. W., CULLEN D. J., LAIRD N., PETERSEN L.A., SMALL S.D., SERVI D., LAFFEL G., SWEITZER B.J., SHEA B.F., and HALLISEY R. Incidence of Adverse Drug Events and Potential Adverse Drug Events: Implications for Prevention. *JAMA*, 1995, 274(1): 29-34. <https://pubmed.ncbi.nlm.nih.gov/7791255/>
- [3] U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES. Adverse Drug Events. Office of Disease Prevention and Health Promotion, 2022. <http://health.gov/hcq/ade.asp>
- [4] GLIKLICH R. E., DREYER N. A., and LEAVY M. B. Adverse Event Detection, Processing, and Reporting. In: LEAVY M. B. (ed.) *Registries for Evaluating Patient Outcomes*. Agency for Healthcare Research and Quality, Rockville, 2014. <http://www.ncbi.nlm.nih.gov/books/NBK208615/>
- [5] KASHOUR T., JOURY A., ALOTAIBI A., ALTHAGAFI M., ALMUFLEH A. S., HERSI A., and THALIB L. Quality of assessment and counselling offered by community pharmacists and medication sale without prescription to patients presenting with acute cardiac symptoms: a simulated client study. *European Journal of Clinical Pharmacology*, 2015, 72(3): 321-328. <https://doi.org/10.1007/s00228-015-1981-1>
- [6] IBRAHIM M. I., PALAIAN S., AL-SULAITI F., and EL-SHAMI S. Evaluating community pharmacy practice in Qatar using simulated patient method: Acute gastroenteritis management. *Pharmacy Practice*, 2016, 14(4): 800. <https://doi.org/10.18549/PharmPract.2016.04.800>
- [7] MOHAMED IBRAHIM M. I., AWAISU A., PALAIAN S., RADOUI A., and ATWA H. Do community pharmacists in Qatar manage acute respiratory conditions rationally? A simulated client study. *Journal of Pharmaceutical Health Services Research*, 2018, 9(1): 33-39, <https://doi.org/10.1111/jphs.12204>
- [8] ADVANCED FERTILITY CENTER OF CHICAGO. Polycystic Ovarian Syndrome Treatment with Metformin, PCOS & Fertility. *Advanced Fertility Center of Chicago*, 2016. <http://www.advancedfertility.com/metformin-pcos-pregnancy.htm>
- [9] MERATIVE US. Merative Micromedex, 2016. <https://www.micromedexsolutions.com/micromedex2/librarian/deeplinkaccess?institution=31u5n877i33c6a9r5t42a1g1e6n5a210105%5E1466j%5E0f9h23&source=deepLink>
- [10] APOTEX. New Zealand - data sheet. *Medsafe*, 2015. <http://www.medsafe.govt.nz/profs/datasheet/m/metformintab.pdf>
- [11] NASSER AL-MISSNED S. M. Qatar's National Health Strategy 2011-2016. *Extranet*, 2011. <https://extranet.who.int/nutrition/gina/sites/default/filesstore/QAT%202011%20National%20Health%20Strategy.pdf>
- [12] HARDON A. P., HODGKIN C., and FRESLE D. *How to investigate the use of medicines by consumers*. World Health Organization, Geneva, 2004. <https://apps.who.int/iris/handle/10665/68840>
- [13] ALAQEEL S., & ABANMY N. O. Counselling practices in community pharmacies in Riyadh, Saudi Arabia: a cross-sectional study. *BMC Health Services Research*, 2015, 15(1): 557. <http://dx.doi.org/10.1186/s12913-015-1220-6>
- [14] ZAWAHIR S., LEKAMWASAM S., and ASLANI P. Community pharmacy staff's response to symptoms of common infections: a pseudo-patient study. *Antimicrobial Resistance & Infection Control*, 2019, 8: 60. <http://dx.doi.org/10.1186/s13756-019-0510-x>
- [15] SEGUN S. J., & DAMILOLA L. S. Drug therapy-related problem management in Nigeria community pharmacy - process evaluation with simulated patient. *BMC Health Services Research*, 2022, 22(1): 209. <http://dx.doi.org/10.1186/s12913-022-07535-z>
- [16] BIN ABDULHAK A., AL TANNIR M., ALMANSOR M., ALMOHAYA M. S., ONAZI A. S., MAREI M. A., ALDOSSARY O. F., OBEIDAT S. A., OBEIDAT M. A., RIAZ M. S., and TLEYJEH I. M. Non prescribed sale of antibiotics in Riyadh, Saudi Arabia: a cross sectional study. *BMC Health Services Research*, 2011, 11(1): 538. <http://dx.doi.org/10.1186/1471-2458-11-538>
- [17] YANG S., KIM D., CHOI H. J., and CHANG M. J. A comparison of patients' and pharmacists' satisfaction with medication counseling provided by community pharmacies: a cross-sectional survey. *BMC Health Services Research*, 2016, 16(1): 131. <http://dx.doi.org/10.1186/s12913-016-1374-x>
- [18] TOKLU H. Z., AKICI A., OKTAY Ş., CALI S., SEZEN S. F., and KEYSER-UYSAI M. Türkiye'de serbest eczacilerin eczacılık uygulamaları. *Marmara Pharmaceutical Journal*, 2010, 14(1): 53-60. <http://dx.doi.org/10.12991/201014464>
- [19] FRIESNER D. L., SCOTT D. M., RATHKE A. M., PETERSON C. D., and ANDERSON H. C. Do remote community telepharmacies have higher medication error rates than traditional community pharmacies? Evidence from the North Dakota Telepharmacy Project. *Journal of the American Pharmaceutical Association*, 2003, 2011, 51(5): 580-590. <http://dx.doi.org/10.1331/JAPhA.2011.10115>
- [20] KIPPIST C., WONG K., BARTLETT D., and SAINI B. How do pharmacists respond to complaints of acute insomnia? A simulated patient study. *International Journal of Clinical Pharmacy*, 2011, 33(2): 237-245. <http://dx.doi.org/10.1007/s11096-011-9482-5>
- [21] KALLIO S., ESKOLA T., AIRAKSINEN M., and POHJANOKSA-MÄNTYLÄ, M. Identifying Gaps in Community Pharmacists' Competence in Medication Risk Management in Routine Dispensing. *Innovations in Pharmacy*, 2021, 12(1). <https://doi.org/10.24926/iip.v12i1.3510>
- [22] ALSHAHRANI A. Knowledge, attitudes, and practice

of community pharmacists towards providing counseling on vitamins, and nutritional supplements in Saudi Arabia. *American Institute of Mathematical Sciences Public Health*, 2020, 7(3): 697–712.

<https://doi.org/10.3934/publichealth.2020054>

[23] LEON F. R., MONGE R., ZUMARAN A., GARCIA I., and RIOS A. Length of counseling sessions and the amount of relevant information exchanged: A study in Peruvian clinics. *International Family Planning Perspectives*, 2001, 27(1): 28. <http://dx.doi.org/10.2307/2673802>

[24] ANNUNZIATA M. A., FOLADORE S., MAGRI M. D., CRIVELLARI D., FELTRIN A., BIDOLI E., and VERONESI A. Does the information level of cancer patients correlate with quality of life? A prospective study. *Tumori*, 1998, 84(6): 619–623.

<http://dx.doi.org/10.1177/030089169808400601>

[25] AL QARNI H., ALRAHBINI T., ALQARNI A. M., and ALQARNI A. Community pharmacist counselling practices in the Bisha health directorate, Saudi Arabia - simulated patient visits. *BMC Health Services Research*, 2020, 20(1): 745. <http://dx.doi.org/10.1186/s12913-020-05554-2>

[26] CAAMAÑO F., RUANO A., FIGUEIRAS A., and GESTAL-OTERO J. J. Data collection methods for analyzing the quality of the dispensing in pharmacies. *Pharmacy World and Science*, 2002, 24(6): 217–223. <http://dx.doi.org/10.1023/a:1021808923928>

参考文献:

[1] 世界卫生组织. 药剂师在卫生保健系统中的作用：培养未来的药剂师：课程开发：第三次世界卫生组织咨询小组关于药剂师作用的报告。加拿大温哥华，1997年8月27日至29日。世界卫生组织综合风险信息信息系统, 1997.

<http://apps.who.int/medicinedocs/en/d/Jh2995e/1.6.2.html>

[2] BATES D. W., CULLEN D. J., LAIRD N., PETERSEN L.A., SMALL S.D., SERVI D., LAFFEL G., SWEITZER B.J., SHEA B.F., 和 HALLISEY R. 药物不良事件的发生率和潜在的药物不良事件：对预防的影响。

美国医学会杂志，1995年，274(1)：第29-34页。
<https://pubmed.ncbi.nlm.nih.gov/7791255/>

[3] 美国卫生与公众服务部. 不良药物事件。疾病预防与健康促进办公室, 2022. <http://health.gov/hcq/ade.asp>

[4] GLIKLICH R. E., DREYER N. A., 和 LEAVY M. B. 不良事件检测、处理和报告。在：LEAVY M. B. (版) 评估患者结果的登记处。医疗保健研究与质量局，罗克维尔, 2014. <http://www.ncbi.nlm.nih.gov/books/NBK208615/>

[5] KASHOUR T., JOURY A., ALOTAIBI A., ALTHAGAFI M., ALMUFLEH A. S., HERSE A., 和 THALIB L. 社区药剂师提供的评估和咨询质量以及无处方药物销售给出现急性心脏症状的患者：一项模拟客户研究。欧洲临床药理学杂志，2015年，72(3)：第321-328页。<https://doi.org/10.1007/s00228-015-1981-1>

[6] IBRAHIM M. I., PALAIAN S., AL-SULAITI F., 和 EL-SHAMI S. 使用模拟患者方法评估卡塔尔的社区药房实践：急性胃肠炎管理。药学实践, 2016, 14(4): 文章800. <https://doi.org/10.18549/PharmPract.2016.04.800>

[7] MOHAMED IBRAHIM M. I., AWAISU A., PALAIAN S., RADOUI A., 和 ATWA H. 卡塔尔的社区药剂师是否合理管理急性呼吸道疾病？模拟客户研究。药物健康服务研究杂志，2018年，9(1)：第33-39页。
<https://doi.org/10.1111/jphs.12204>

[8] 芝加哥高级生育中心. 用二甲双胍治疗多囊卵巢综合征，多囊卵巢综合征和生育能力。芝加哥高级生育中心, 2016. <http://www.advancedfertility.com/metformin-pcos-pregnancy.htm>

[9] 参考我们. 衍生的微医疗，2016. <https://www.micromedexsolutions.com/micromedex2/librarian/deeplinkaccess?institution=31u5n877i33c6a9r5t42a1g1e6n5a210105%5E1466j%5E0f9h23&source=deepLink>

[10] APOTEX. 新西兰 - 数据表。医疗安全，2015. <http://www.medsafe.govt.nz/profs/datasheet/m/metformintab.pdf>

[11] NASSER AL-MISSNED S. M. 卡塔尔 2011-2016 年国家卫生战略。外联网，2011. <https://extranet.who.int/nutrition/gina/sites/default/files/store/QAT%202011%20National%20Health%20Strategy.pdf>

[12] HARDON A. P., HODGKIN C., 和 FRESLE D. 如何调查消费者的药品使用情况。世界卫生组织，日内瓦, 2004. <https://apps.who.int/iris/handle/10665/68840>

[13] ALAQEEL S., 和 ABANMY N. O. 沙特阿拉伯利雅得社区药房的咨询实践：一项横断面研究。生物医学中央卫生服务研究，2015, 15(1): 第557条。
<http://dx.doi.org/10.1186/s12913-015-1220-6>

[14] ZAWAHIR S., LEKAMWASAM S., 和 ASLANIP. 社区药房工作人员对常见感染症状的反应：一项伪患者研究。抗菌素耐药性和感染控制，2019, 8: 第60条。
<http://dx.doi.org/10.1186/s13756-019-0510-x>

[15] SEGUN S. J., 和 DAMILOLA L. S. 尼日利亚社区药房的药物相关问题管理-模拟患者的过程评估。生物医学中央卫生服务研究，2022年，22(1)：第209条。
<http://dx.doi.org/10.1186/s12913-022-07535-z>

[16] BIN ABDULHAK A., AL TANNIR M., ALMANSOR M., ALMOHAYA M. S., ONAZI A. S., MAREI M. A., ALDOSSARY O. F., OBEIDAT S. A., OBEIDAT M. A., RIAZ M. S., 和 TLEYJEH I. M. 沙特阿拉伯利雅得的非处方抗生素销售：一项横断面研究。生物医学中心健康服务研究，2011, 11(1): 第538条。
<http://dx.doi.org/10.1186/1471-2458-11-538>

[17] YANG S., KIM D., CHOI H. J., 和 CHANG M. J. 患者和药剂师对社区药房提供的药物咨询满意度的比较：一项横断面调查。生物医学中心卫生服务研究，2016, 16(1): 第131条。
<http://dx.doi.org/10.1186/s12913-016->

1374-x

[18] TOKLU H. Z., AKICI A., OKTAY Ş., CALI S., SEZEN S. F., 和 KEYER-UYSAL M. 土耳其独立药剂师的药学实践。马尔马拉药学杂志, 2010, 14(1): 第 53-60 页

. <http://dx.doi.org/10.12991/201014464>

[19] FRIESNER D. L., SCOTT D. M., RATHKE A. M., PETERSON C. D., 和 ANDERSON H. C. 远程社区远程药房的用药错误率是否高于传统社区药房? 来自北达科他州远程药房项目的证据。美国药学协会杂志, 2003 年,

2011 年, 51(5): 第 580-590 页

. <http://dx.doi.org/10.1331/JAPhA.2011.10115>

[20] KIPPIST C., WONG K., BARTLETT D., 和 SAINI B. 药剂师如何应对急性失眠的投诉? 模拟患者研究。国际临床药学杂志, 2011, 33(2): 第 237-245 页

. <http://dx.doi.org/10.1007/s11096-011-9482-5>

[21] KALLIO S., ESKOLA T., AIRAKSINEN M., 和 POHJANOKSA-MÄNTYLÄ, M. 确定社区药剂师在常规配药中的药物风险管理能力方面的差距。药学创新, 2021, 12(1). <https://doi.org/10.24926/iip.v12i1.3510>

[22] ALSHAHRANI A. 沙特阿拉伯社区药剂师提供维生素和营养补充剂咨询的知识、态度和实践。美国数学科学研究所公共卫生, 2020 年, 7(3): 第 697-712 页

. <https://doi.org/10.3934/publichealth.2020054>

[23] LEON F. R., MONGE R., ZUMARAN A., GARCIA I., 和 RIOS A. 咨询时间的长短和相关信息的交换量: 秘鲁诊所的一项研究。国际计划生育展望, 2001, 27(1): 第二十八页

. <http://dx.doi.org/10.2307/2673802>

[24] ANNUNZIATA M. A., FOLADORE S., MAGRI M. D., CRIVELLARI D., FELTRIN A., BIDOLI E., 和 VERONESI A. 癌症患者的信息水平与生活质量是否相关? 一项前瞻性研究。图莫里, 1998, 84(6): 第 619-623 页

. <http://dx.doi.org/10.1177/030089169808400601>

[25] AL QARNI H., ALRAHBINI T., ALQARNI A. M., 和 ALQARNI A. 沙特阿拉伯比夏卫生局的社区药剂师咨询实践-模拟患者就诊。生物医学中心卫生服务研究, 2020, 20(1): 第 745 条

. <http://dx.doi.org/10.1186/s12913-020-05554-2>

[26] CAAMAÑO F., RUANO A., FIGUEIRAS A., 和 GESTAL-OTERO J. J. 用于分析药房配药质量的数据收集方法。药学世界与科学, 2002, 24(6): 第 217-223 页

. <http://dx.doi.org/10.1023/a:1021808923928>