

Pharmaceutical care and telemedicine during COVID-19: A cross-sectional study based on pharmacy students, pharmacists, and physicians in Jordan

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Abstract

Lack of access to the patient medical record (90.6%) was the major barrier for the integration of pharmaceutical care into practice. The majority of participants (93.0%) encouraged creating a website that provides pharmaceutical care. Furthermore, 45.1% would pay for such a service if present. Moreover, the majority (89.8%) agreed that creating a comprehensive database for patients' data will help in decreasing medical errors. Among the four aspects of pharmaceutical care (technical, psychosocial, communication and administrative) that were assessed for students and pharmacist's, general weakness in all aspects was noticed. This study highlights that absence of proper documentation of patient medical information raises the risk of medical problems and is considered the most documented barrier for the integration of pharmaceutical care. This emphasizes the future role of telemedicine and the availability of a specialized website and database repository that stores patient's information to ensure the continuity of care even during pandemics.

Keywords

Electronic Medical Files, Pandemic, Pharmaceutical Care

Introduction

Improving the responsiveness of healthcare systems to the demands of its patients is a major task for all healthcare systems (Sacristán 2013; Mohammed et al. 2019). Consequently, researchers are more interested in improving the healthcare experiences in a way that matches expectations of the patients (Merks et al. 2014; Geurts et al. 2015; Alsayed et al.

2022b). Besides, because patients play a crucial role in setting priorities within the healthcare system, it is important to increase patient role in the pharmaceutical care (PC) process (Geurts et al. 2015). Hence, as patients, healthcare professionals, and health authorities have different ideas about what constitutes high-quality healthcare (Pomey et al. 2015), patients' acceptability of care considered an important component of quality evaluation (Fox and Reeves 2015).

For decades, pharmacists have worked diligently to broaden their job beyond basic drug dispensing and PC services in Jordan have been growing over the past years. Clinical pharmacists increasingly work collaboratively with healthcare providers in hospitals and other clinical settings to achieve optimal patient outcomes and therapy management (Bulatova et al. 2007; Bradley 2009; Aburuz et al. 2013; Toklu and Hussain 2013; Basheti et al. 2016; Farha et al. 2016; Khader et al. 2021). However, such PC services in Jordan and majority of other Arabic countries are currently being provided free of charge. Thus, commissioned services should be evaluated by patients, stakeholders (who provide direct patient care), and policymakers.

Patient satisfaction is affected by many aspects, including pharmacist professionalism and communication, counseling, service speed, and pharmacy location. The convenience of the pharmacy and the pharmacist's free advice were the main reasons for Jordanians to visit the pharmacy (Wazaify et al. 2008; Basheti et al. 2014). Similarly, in Saudi Arabia, proximity to a community pharmacy and the presence of a competent pharmacist were the top reasons for people to visit the pharmacy (Wazaify et al. 2008; Al-Arifi 2012). As a result, global research showed positive patient perceptions but also substantial hurdles for PC optimization, particularly in community pharmacies (Kassam et al. 2010; El Hajj et al. 2011; Perepelkin 2011; Aburuz et al. 2012; Al-Arifi 2012). Many studies showed that patients are satisfied with the various accessible PC services (Teh et al. 2001; Al-Arifi 2012; Fahmi Khudair and Raza 2013). In a developing country like Jordan, awareness of people's attitude and consent to pay for PC services might assist pharmacists to serve their patients' needs better. Additionally, in Jordan, patients appreciate the pharmacy profession and recommend the expansion of PC services (Aburuz et al. 2012; Basheti et al. 2016).

Telemedicine is defined as the utilization of medical information communicated between distant sites using electronic way of communications, to enhance a patient's clinical health status when a patient is receiving a remote clinical service (also known as telehealth) (Kvedar et al. 2014). Numerous patients continue to favor telemedicine modes of treatment due to the convenience the cost savings, and the reduced travel time (Kruse et al. 2017; Orlando et al. 2019).

Since chronic disease treatment is especially important during a pandemic of coronavirus disease 2019 (COVID-19), telemedicine has been shown to be very useful in ensuring continuity of treatment for at-risk individuals while also allowing for social distancing and reducing the chance of infection (Kuperman et al. 2018; Eberly et al. 2020; Lakkireddy et al. 2020; Wosik et al. 2020; Kakani et al. 2021).

For this study, the goal was to gather information about how pharmacy students, pharmacists, and physicians in Jordan viewed PC services and telemedicine during the COVID-19 pandemic. The second objective was to ascertain perceived obstacles to patients seeking pharmacist consultation and assess pharmacy students' and pharmacists' perceptions preparedness to provide PC.

Methods

Study design and participants

This descriptive cross-sectional study targets the health care providers (physicians and pharmacists) in addition to the pharmacy students attending the Faculty of Pharmacy at Applied Science Private University (ASU) in Jordan. The pharmacy students included in this study were in the fourth and fifth years of their studies regardless of their nationalities. Exclusion criteria included all non-health care providers and students in their first, second, or third year of study.

The participants were surveyed over four months in the period between November 2020 and February 2021. The institutional review board at ASU (2021-PHA-3) provided the ethical approval of this study.

Survey development and administration

The survey was designed using Google Forms as an efficient and convenient alternative to traditional methods of data collection. Web-based surveys can shorten the time needed for data collection of responses, save researcher time and cost, in addition to assuring anonymity of responses (El Hajj et al. 2014).

Sample size was determined via convenience sampling technique. Pharmacy students were recruited from their online lectures during COVID-19 pandemic restrictions using Microsoft Teams, while physicians and pharmacists were approached using social media (Facebook / WhatsApp).

A self-administered online questionnaire was employed in this investigation. Subsequently, the questionnaire included a brief overview of the study, inclusion criteria, and informed consent for individuals who volunteered to take part. Moreover, the survey was completed anonymously for all participants in order to reduce the possibility of bias and to maintain participant confidentiality during the process.

Data collection tool

A comprehensive literature review was performed to develop the questionnaire (Shafie and Hassali 2010; Perraudin et al. 2011; El Hajj et al. 2014; Katoue et al. 2014a; Abd Ghani and Jaber 2015; Baral et al. 2019; Jaber et al. 2019; Alsayed et al. 2022a). Before being sent to participants, an initial draft of the questionnaire was produced in English language using variables derived from the literature. Afterwards, a validation process was carried out and the final version of the survey was content-validated by subject-matter experts, who offered insightful input and feedback.

The survey comprises the following parts. The first part addresses the participants' demographic and clinical characteristics. A Likert scale with five possible responses was utilized to assess participant's attitudes towards different PC services that can be delivered by pharmacist/ pharmacy student. Rating ranged from 1 (strongly disagree) to 5 (strongly agree). A Likert scale with four responses was

used instead to express participants' perceptions toward pharmacist ability to perform different PC services, rating ranged from 1 (unimportant) to 4 (very important).

In the second part, we examined the primary obstacles that prevent the delivery of PC services in practice. The third part of the questionnaire assessed participants' perceptions of economic considerations linked with PC and telemedicine. The questions in this section were aimed to ascertain participants' consent to pay for telemedicine and PC services. Moreover, participants were asked whether they encourage the concept of a website that distributes PC and whether they believed this service should be with charge.

Additionally, there are questions about the reasons of medical errors. Particularly, the questions explore if they believe that having a database for patient's personal information and medical records may help to reduce medical errors or not. Consequently, to assess factors playing a role in medical errors, a five-point Likert scale for level of agreement was used, rating from 1 (strongly disagree) to 5 (strongly agree).

The survey included a set of specific questions for pharmacy students. Trained students were asked about the type of PC services they delivered through their training and their degree of confidence to deliver PC services. A Likert scale with five possible levels was used to assess students' level of preparedness to deliver PC, rating started from 1 (poor) to 5 (excellent). Then we calculated a score by giving one point for poor, two for average, three for good, four for very good and five for excellent. This scale was first developed by Ried et al (Ried et al. 2002) and then modified by Scott et al (Scott et al. 2010).

The survey contains questions directed to pharmacists as well; pharmacists were asked about the time they spend in average with each patient and if they have electronic files for their patients. Pharmacists were also asked about their action when they figure out an error in a prescription and about the physician acceptance of their recommendations. Pharmacists' preparedness to implement the various aspects of PC was also assessed using a five-point Likert scale with rating started from 1 (poor) to 5 (excellent) with the same principle used for pharmacy students.

The survey included a question specific for the physicians which asked them about their acceptance of pharmacist's recommendations regarding prescribing errors.

Data analysis

Online survey data were first downloaded to an Excel (Microsoft Corporation, Redmond, WA, USA) spreadsheet, and imported into IBM SPSS (Statistical Package for Social Sciences version 25.0) for Windows (IBM Corporation, Armonk, NY, USA) for descriptive and inferential analysis. The Shapiro-Wilk test was used to determine the normality of all continuous variables, and the results were provided as means, standard deviations (SD), medians, and interquartile range (IQR) for Likert items, as applicable. Categorical variables were reported as the number with percentage of individuals in each category for categorical variables.

Abbreviations

PC Pharmaceutical care.

Results

This questionnaire was completed by a total of 541 respondents, most of them were females (67.3%), medically free (90.4%), with an average age of 24.7 (± 7.20) years. As most of the respondents were students (70.2%), 301 (55.6%) had no income, and the majority were not working (76.2%) (Table 1). All of the respondents had a medical background, including pharmacy students, 380 (70.2%), pharmacists working in a community pharmacy, 62 (11.5%), pharmacists not working in a community pharmacy, 49 (9.1%), and physicians, 50 (9.2%). During the participants' lifetime, around half of them experienced at least one medical error (Table 1).

Table 1. Basic characteristics of the study responders (N = 541).

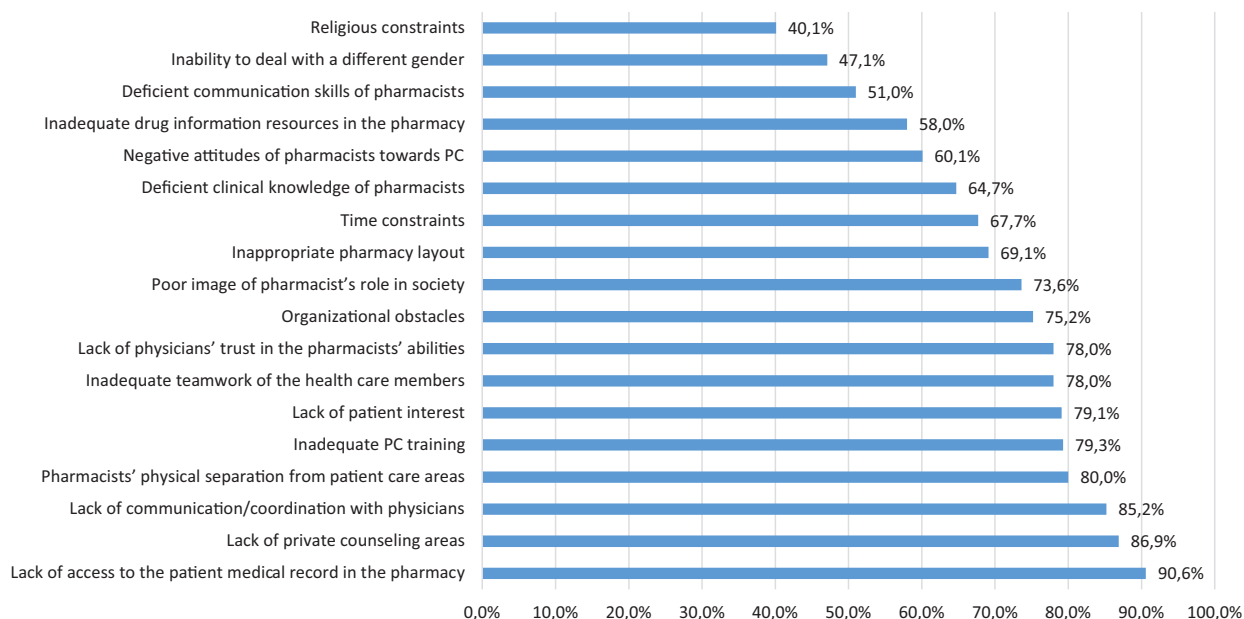
Characteristic	Frequency (percentage) or mean (\pm SD)
Pharmacy student	380 (70.2)
Pharmacist in a community pharmacy	62 (11.5)
Pharmacist not working in a community pharmacy	49 (9.1)
Physician	50 (9.2)
Gender	
Male	177 (32.7)
Female	364 (67.3)
Age (years)	24.7 (± 7.20)
Occupation	
Not Working	412 (76.2)
Working	129 (23.8)
Insurance type	
Ministry of health	60 (11.1)
Government	38 (7.0)
Private sectors	135 (25.0)
University	308 (56.9)
Income	
No income	301 (55.6)
< 500 \$	78 (14.4)
500–1000 \$	100 (18.5)
> 1000 \$	62 (11.5)
Having chronic diseases	52 (9.6)
Medical errors experienced during the participants lifetime	
None	292 (54.0)
1–2 times	205 (37.9)
3–4 times	32 (5.9)
More than 4	12 (2.2)

Upon evaluating the attitude of respondents towards PC, we found that most respondents (89.1%) strongly agreed or agreed that all pharmacists should perform PC and that it should be the pharmacist's primary responsibility (81.1%). Indeed, the majority believed that PC would improve patients' health (91.3%) and would be professionally rewarding (77.2%). Nevertheless, 372 (68.8%) thought that providing PC takes long time and effort and is not worth the additional workload that it places on the pharmacist (63.6%) (Table 2).

Table 2. Responders' attitudes towards PC (N = 541).

Statement	Frequency (percentage)					Mean ± SD	Median (IQR)
	5*	4*	3*	2*	1*		
Pharmacists have to perform PC	285 (52.7)	197 (36.4)	54 (10.0)	5 (0.9)	0 (0.0)	4.409 ± 0.705	5 (1)
The primary responsibility of pharmacists must be PC	228 (42.1)	211 (39.0)	91 (16.8)	10 (1.8)	1 (0.2)	4.211 ± 0.798	4 (1)
Pharmacy students can provide PC during their experiential training	192 (35.5)	186 (34.4)	136 (25.1)	27 (5.0)	0 (0.0)	4.004 ± 0.899	4 (2)
Practicing PC takes much effort and time	148 (27.4)	224 (41.4)	123 (22.7)	45 (8.3)	1 (0.2)	3.874 ± 0.914	4 (2)
PC improves patients' health	276 (51.0)	218 (40.3)	44 (8.1)	1 (0.2)	2 (0.4)	4.414 ± 0.679	5 (1)
PC is professionally rewarding	202 (37.3)	216 (39.9)	103 (19.0)	19 (3.5)	1 (0.2)	4.107 ± 0.843	4 (1)
PC is the appropriate direction in which the provision should proceed	238 (44.0)	224 (41.4)	75 (13.9)	4 (0.7)	0 (0.0)	4.287 ± 0.726	4 (1)
The additional workload imposed on pharmacists as a result of delivering PC is not worth the effort	159 (29.4)	185 (34.2)	148 (27.4)	44 (8.1)	8 (0.9)	3.830 ± 0.974	4 (2)

*5: strongly agree; 4: agree; 3: neutral; 2: disagree; 1: strongly disagree.

**Figure 1.** Major barriers to the integration of PC into practice according to the study participants (N = 541).

The potential barriers to the integration of PC into practice are shown in Fig. 1. Lack of access to the patient medical record in the pharmacy (90.6%), followed by lack of private counseling areas (86.9%), lack of communication/coordination with physicians (85.2%), pharmacists' physical separation from patient care areas (80.0%) were cited as the major barriers to the integration of PC into practice by the respondents (Fig. 1).

There were only 83 (15.3%) respondents had an electronic patient file as patients at the pharmacy. However, the majority of respondents (93.0%) encouraged the idea of creating a website that provides PC and 244 (45.1%) of respondents would pay for such a service if present. Almost one-third (33.3%) were ready to pay 20\$ or less per year for those services (Table 3).

The failure of proper documentation for patient medical information (89.3%) and patient difficulty in remembering the details of their medical history (84.7%) were two major factors that could increase medical errors. Moreover, the majority (89.8%) agreed that creating a comprehensive database for patients' data will help in decreasing medical errors (Table 4).

Table 3. Participants' consent to pay for PC services and telemedicine.

	n (%)
Having an electronic file as a patient in the pharmacy	83 (15.3)
Do you support the notion of a website that provides PC?	
Yes	503 (93.0)
Will you pay for the website if it is a paid service?	
Yes	244 (45.1)
No, I am not interested	95 (17.6)
I don't know. I want to know how the website will help me, so	77 (14.2)
No, I ask my GP	41 (7.6)
No, for other reasons	84 (15.5)
What is the most money you may accept to pay for that website per year?	
Nothing	103 (19.0)
20 \$	180 (33.3)
40 \$	60 (11.1)
60 \$	33 (6.1)
80 \$	16 (3.0)
100 \$	14 (2.6)
150 \$	11 (2.0)
I do not know	124 (22.9)

Table 4. Some of factors related to increasing or decreasing medical errors.

Statement	5*	4*	3*	2*	1*	Mean ± SD	Median (IQR)
Failure to document medical information connected to the patient is one of the most important causes for the high prevalence of medical error	251 (46.4)	232 (42.9)	53 (9.8)	4 (0.7)	1 (0.2)	4.35 ± 0.70	4 (1)
It is common for patients to have difficulty recalling their medical history and drug details	177 (32.7)	221 (32.7)	103 (19.0)	32 (5.9)	8 (1.5)	3.97 ± 0.94	4 (2)
Forgetting and neglecting to document the patient's medical history increases the likelihood of the healthcare practitioner making a medical error	244 (45.1)	214 (39.6)	75 (13.9)	8 (1.5)	0 (0.0)	4.28 ± 0.76	4 (1)
In order to prevent medical errors, it is necessary to create a database that contains patient personal information as well as diseases, drugs, laboratory tests, medical reports, x-rays, and other information	344 (63.6)	142 (26.2)	48 (8.9)	7 (1.3)	0 (0.0)	4.52 ± 0.71	5 (1)

*5: strongly agree; 4: agree; 3: neutral; 2: disagree; 1: strongly disagree.

As more than the half of students were at their last year of studying (63.9%), only 47 (12.4%) did not start their training yet, and more than half of students (55.2%) had completed at least 720 training hours out of the required 1440 credit hours. Community pharmacies were the most frequent training location (78.2%), as for the feedback provided by students on their training location. More than three-quarters of community pharmacies (76.6%) provided some counseling to patients and only 116 (30.5%) had electronic medical files for patients (Table 5). Students' participation in PC consisted mainly of justifying the drug indication (89.5%), providing information on proper use and dose (88.4%), and warning the patients about side effects (82.1%). Since most of the students were approaching the end of their studies, they were asked if they feel prepared to start practicing PC, and the majority reported that they weren't sure if they were (47.6%) (Table 5).

Among 62 pharmacists working in a community pharmacy, all gave advice to patients while providing the medication (100%). The time spent giving advice to patients was reported as: less than five minutes by 24 (38.7%) respondents, five to nine minutes by 24 (38.7%) respondents, while no one reported spending more than fifteen minutes. To further assess existing PC practices, respondents were asked whether they had electronic medical files for patients, to which only 26 (41.9%) confirmed. Nevertheless, most respondents felt prepared to implement various aspects of PC 38 (61.3%) (Table 6). About three quarters (71%) thought that this service should be paid: by number of patients (45.5%), by minutes spent with each patient (22.7%), by number of prescriptions (22.7%), and by other methods (9.1%).

Respondents were asked what they usually do if they encounter any problem in a prescription, their responses were as following: calling the doctor (71.0%), changing the drug to another better alternative (19.4%), dispensing the drugs even if they are not appropriate (6.5%), or refusing to dispense (3.2%). As for the response of physicians to comments provided by pharmacists, most participants agreed that physicians only sometimes (87.1%) accept the comments (Table 6).

Among the four aspects of PC (technical, psychosocial, communication and administrative) that were assessed for students and pharmacist's extent of preparedness to sever-

Table 5. Pharmacy students' opinion about PC (N = 380).

Statement	Frequency (percentage)
What was the source of motivation for the pharmacy education?	
Self-motivation	228 (60.0)
Family preference	63 (16.8)
Influence by friends or seniors	18 (4.7)
Others	68 (17.9)
Did you start your final year of studying?	
Yes	243 (63.9)
Where did you start your training?	
I did not start	47 (12.4)
Community Pharmacy	297 (78.2)
Hospital	14 (3.7)
Pharmaceutical company	19 (5.0)
Industry	3 (0.8)
How many hours did you finish from the training program?	
0	42 (11.1)
1–359	42 (11.1)
360–719	86 (22.6)
720–999	82 (21.8)
1000–1440	127 (33.4)
Is there any kind of patients counseling in the pharmacy you are training in?	
Yes	291 (76.6)
Is there an electronic file for the patients in the pharmacy you are training in?	
Yes	116 (30.5)
What are the main elements of patients counseling you apply in your training?	
Justify the cause of drug use	340 (89.5)
Dose and how to use information	336 (88.4)
Mention the drug's side effects	312 (82.1)
Drug-drug interactions	286 (75.3)
Monitor the treatment outcome	276 (72.6)
Do you feel prepared to implement the various aspects of pharmaceutical care?	
Yes	167 (43.9)
No	32 (8.4)
Not sure	181 (47.6)

al statements by a scale, general weakness in all aspects was noticed (Table 7). Among technical aspects the lowest skills appeared in monitoring pharmacokinetic parameters in both students and pharmacists. Among psychosocial aspects the lowest skills were appeared in using computers and data in professional practice for both students and pharmacists. Regarding communication aspects, the

Table 6. Community pharmacy dispensing services and practices (N = 62).

Statement	Frequency (percentage)
How many prescriptions per day do you dispense	
< 5	14 (22.6)
5–10	24 (38.7)
> 10	24 (38.7)
When you give the medicine in the prescription, do you give any advice for the patient?	
Yes	62 (100)
How much time do you spend for each patient?	
<5 minutes	24 (38.7)
5–9 minutes	24 (38.7)
10–15 minutes	14 (22.6)
>15 minutes	0 (0.0)
Do you think your advice about the treatments should be paid?	
Yes	44 (71.0)
If yes, what will be the appropriate way to pay you?	
By minute with each patient	10 (22.7)
By number of patients	20 (45.5)
By number of prescriptions	10 (22.7)
Others	4 (9.1)
Do you have electronic files for the patients in the pharmacy?	
Yes	26 (41.9)
If you have a patient with prescription, and you have something wrong with the drugs written what do you do?	
Call the doctor	44 (71.0)
Change the drug to another one you think it's better	12 (19.4)
Dispense the drugs even if they are not appropriate	4 (6.5)
Refuse to dispense	2 (3.2)
If you tell the doctors about your opinion for a wrong or inappropriate drug, do they accept your comments?	
All the time	8 (12.9)
Sometimes	54 (87.1)
Never	0 (0.0)
Do you feel prepared to implement the various aspects of pharmaceutical care?	
Yes	38 (61.3)
No	6 (9.7)
Not sure	18 (29.0)

lowest skills appeared in providing the medical records information to health professionals. Finally, considering administrative/management aspects there were general weakness in all aspects (Table 7).

The survey included a question for the physicians which asked them about their response if a pharmacist tells him/her about a wrong or inappropriate prescription, half of them (50%) sometimes accept the pharmacist recommendation, while 19 physicians (38%) always accept and 6 (12%) do not accept the recommendations.

Discussion

This is the first study to address the perspectives of healthcare providers and pharmacy students about PC and telemedicine during COVID-19 pandemic and the barriers to the integration of PC into practice in Jordan. This study highlights the need for the presence of electronic medical files for patients to be accessed easily by healthcare providers. Most of the participant (93.0%) encouraged the idea of a

website that contains patients' medical files which abridge PC process with around half (45.1%) of them were willing to pay for it. Most participants agreed that absence of proper documentation of patient medical information and patient difficulty to remember his medical history increases the risk of medical errors and creating a database that contains all related patients' medical information decreases such risk.

Participants in this study had positive attitudes toward PC; most believed it is the primary pharmacist's responsibility and would improve patients' health. Subsequently, this complies with several studies conducted to explore pharmacists' and pharmacy students' opinions in Saudi Arabia (Mohammed Basheeruddin Asdaq et al. 2021), Qatar (El Hajj et al. 2016), Iraq (Mohammed et al. 2019), Malaysia (Loh et al. 2021), United Arab Emirates (Tawfiq et al. 2021), France (Perraudin et al. 2011), as well as in Jordan (Aburuz et al. 2012). The top perceived barriers to the integration of PC in this study were lack of access to the patient medical record in the pharmacy (90.6%), lack of private counselling areas (86.9%), and lack of communication/ coordination with physicians (85.2%). The first two was also reported by patients to be the main barriers to the integration of PC in a very recent study conducted in Jordan (submitted paper). Findings from studies in other countries have reported several barriers such as inconvenient access to patient medical information, lack of staff and time, inadequate training in PC, lack of PC models, lack of interaction with patients and healthcare providers, absence of private counselling area, poor image of the pharmacist's role, organizational obstacles, lack of remuneration, and pharmacists' physical separation from patient care areas (Perraudin et al. 2011; El Hajj et al. 2016; Awaisu et al. 2018; Loh et al. 2021; Tawfiq et al. 2021).

The lack of access to the patient medical record was the most documented barrier for the integration of PC and one of the factors that may increase the incidence of medical problems according to this study. This is consistent with findings in studies conducted in other countries (El Hajj et al. 2016; Loh et al. 2021; Tawfiq et al. 2021) as well as previously in Jordan (Aburuz et al. 2012). The availability of electronic medical records is not common in community pharmacies in Jordan. Although the main pharmacy chains keep electronic records for their patients (Nazer and Tuffaha 2017), the proportion of community pharmacies that have electronic medical records in Jordan is not clear. In this study, different responses were reported by the different participants categories regarding the use of the electronic files for the patients. In 2009; the Jordanian government implemented a nationwide e-health system to connect all the public hospitals and clinics under the name HAKEEM (Nazer and Tuffaha 2017). However, there is no such an official source for documentation of patients' demographic and medical information in community pharmacies, as well as for those who do not have the governmental insurance. The availability of a database that connect community pharmacies will help in improving PC and decreasing medical errors. In addition to the clinical benefit, the economic benefit of PC is well established in the literature (Westerlund and Marklund 2009; De Oliveira et al. 2010).

Table 7. Pharmacy students' and pharmacists' perceptions of their preparedness to provide PC.

	Pharmacists (n = 62)							Pharmacy students (n = 380)						
	1	2	3	4	5	Mean ± SD	Median (IQR)	1	2	3	4	5	Mean ± SD	Median (IQR)
Technical aspects														
Identify/collect information to prevent or resolve a drug therapy problem	18 (29.0)	16 (25.8)	14 (22.5)	4 (6.4)	10 (16.1)	2.810 ±1.140	3 (2)	59 (15.5)	85 (22.4)	139 (36.6)	67 (17.6)	30 (7.9)	2.548 ±1.399	2 (2)
Evaluate laboratory tests for a specific patient	22 (35.4)	16 (25.8)	8 (12.9)	2 (3.2)	14 (22.5)	2.737 ±1.130	3 (1)	53 (13.9)	115 (30.3)	122 (32.1)	59 (15.5)	31 (8.2)	2.516 ±1.555	2 (2)
Calculate/evaluate pharmacokinetic properties	24 (38.7)	16 (25.8)	14 (22.5)	2 (3.2)	6 (9.6)	2.579 ±1.174	3 (1)	83 (21.8)	95 (25.0)	132 (34.7)	39 (10.3)	31 (8.2)	2.194 ±1.265	2 (2)
Evaluate information from patient's history and assessment	22 (35.4)	10 (16.1)	18 (29)	6 (9.6)	6 (9.6)	2.976 ±1.149	3 (2)	38 (10.0)	96 (25.3)	128 (33.7)	73 (19.2)	45 (11.8)	2.419 ±1.325	2 (2)
Make reasonable conclusions when data is incomplete	18 (29.0)	14 (22.5)	20 (32.2)	6 (9.6)	4 (6.4)	2.713 ±1.185	3 (1)	66 (17.4)	105 (27.6)	114 (30.0)	62 (16.3)	33 (8.7)	2.419 ±1.195	2 (2)
Recommend appropriate drug therapy	20 (32.2)	12 (19.3)	14 (22.5)	10 (16.1)	6 (9.6)	2.932 ±1.172	3 (2)	48 (12.6)	91 (23.9)	119 (31.3)	83 (21.8)	39 (10.3)	2.516 ±1.352	2 (2)
Evaluate patient pharmacotherapeutic regimens to prevent or resolve treatment-related problems	20 (32.2)	12 (19.3)	14 (22.5)	10 (16.1)	6 (9.6)	2.9 ±1.181	3 (2)	52 (13.7)	88 (23.2)	127 (33.4)	72 (18.9)	41 (10.8)	2.516 ±1.352	2 (2)
Determine the appropriate drug delivery system	22 (35.5)	10 (16.1)	12 (19.3)	12 (19.3)	6 (9.6)	2.958 ±1.215	3 (2)	51 (13.4)	90 (23.7)	108 (28.4)	86 (22.6)	45 (11.8)	2.516 ±1.400	2 (3)
Recommend medication doses /dose schedules	26 (41.9)	6 (9.6)	10 (16.1)	14 (22.5)	6 (9.6)	2.939 ±1.202	3 (2)	51 (13.4)	91 (23.9)	109 (28.7)	84 (22.1)	45 (11.8)	2.484 ±1.468	2 (3)
Provide counseling to patients	22 (35.5)	10 (16.1)	14 (22.5)	10 (16.1)	6 (9.6)	2.879 ±1.209	3 (2)	59 (15.5)	88 (23.2)	111 (29.2)	84 (22.1)	38 (10.0)	2.484 ±1.376	2 (2)
Recommend methods to seek patient compliance/adherence	18 (29.0)	16 (25.8)	14 (22.5)	10 (16.1)	4 (6.4)	2.716 ±1.202	3 (2)	72 (18.9)	95 (25.0)	114 (30.0)	67 (17.6)	32 (8.4)	2.452 ±1.250	2 (2)
Monitor therapeutic plan for a patient	24 (38.7)	14 (22.5)	16 (25.8)	4 (6.4)	4 (6.4)	2.452 ±1.302	3 (1)	68 (17.9)	96 (25.3)	114 (30.0)	67 (17.6)	35 (9.2)	2.452 ±1.302	3 (2)
Document information, assessment, care plan and patient education	24 (38.7)	2 (3.2)	24 (38.7)	8 (12.9)	4 (6.4)	2.355 ±1.294	3 (2)	49 (12.9)	99 (26.1)	142 (37.4)	52 (13.7)	38 (10.0)	2.355 ±1.294	2 (2)
Overall						2.765 ±0.199	3 (0)						2.451 ±0.093	2 (0)
Psychosocial aspects														
Identify the appropriate information to decide a course of action for a problem	24 (38.7)	8 (12.9)	18 (29)	8 (12.9)	4 (6.4)	2.452 ±1.276	3 (2)	39 (10.3)	103 (27.1)	139 (36.6)	65 (17.1)	34 (8.9)	2.452 ±1.276	3 (2)
Contribute opinions/insights to health care team	22 (35.5)	6 (9.6)	22 (35.5)	8 (12.9)	4 (6.4)	2.323 ±1.265	3 (2)	41 (10.8)	85 (22.4)	137 (36.1)	68 (17.9)	49 (12.9)	2.194 ±1.099	2 (2)
Promote public awareness of health	22 (35.5)	14 (22.5)	14 (22.5)	8 (12.9)	4 (6.4)	2.194 ±1.099	3 (1)	47 (12.4)	98 (25.8)	123 (32.4)	65 (17.1)	47 (12.4)	2.323 ±1.156	2 (2)
Data/computer use in professional practice	22 (35.5)	16 (25.8)	14 (22.5)	10 (16.1)	0 (0.0)	2.323 ±1.156	3 (1)	46 (12.1)	98 (25.8)	152 (40.0)	41 (10.8)	43 (11.3)	2.387 ±1.246	2 (2)
Overall						2.323 ±0.105	3 (1)						2.339 ±0.110	2 (0)
Communication aspects														
Communicate medical records information to health professionals	22 (35.5)	10 (16.1)	18 (29.0)	12 (19.3)	0 (0.0)	2.387 ±1.246	3 (1)	47 (12.4)	94 (24.7)	147 (38.7)	55 (14.5)	37 (9.7)	2.387 ±1.246	2 (2)
Communicate medical records information to patient	22 (35.5)	10 (16.1)	16 (25.8)	12 (19.3)	2 (3.2)	2.548 ±1.250	3 (2)	34 (8.9)	91 (23.9)	166 (43.7)	48 (12.6)	41 (10.8)	2.548 ±1.250	3 (2)
Identify/collect information to respond to health professional drug information request	22 (35.5)	6 (9.6)	22 (35.5)	8 (12.9)	4 (6.4)	2.323 ±1.265	3 (2)	41 (10.8)	85 (22.4)	137 (36.1)	68 (17.9)	49 (12.9)	2.194 ±1.099	2 (2)
Respond to information request from a patient	20 (32.3)	6 (9.6)	20 (32.3)	14 (22.5)	2 (3.2)	2.355 ±1.103	3 (1)	40 (10.5)	85 (22.4)	156 (41.1)	58 (15.3)	41 (10.8)	2.355 ±1.103	2 (2)
Overall						2.403 ±0.099	3 (1)						2.371 ±0.145	2 (0)
Administrative/Management aspects														
Evaluate, select, and purchase pharmaceuticals	18 (29.0)	14 (22.5)	22 (35.5)	6 (9.6)	2 (3.2)	2.484 ±1.198	3 (1)	51 (13.4)	109 (28.7)	141 (37.1)	52 (13.7)	27 (7.1)	2.484 ±1.198	3 (2)
Develop/implement a pharmacy inventory system	18 (29.0)	10 (16.1)	24 (38.7)	6 (9.6)	4 (6.4)	2.323 ±1.098	3 (1)	40 (10.5)	121 (31.8)	140 (36.8)	50 (13.2)	29 (7.6)	2.323 ±1.098	2 (2)
Manage fiscal and human resources	18 (29.0)	16 (25.8)	20 (32.3)	6 (9.6)	2 (3.2)	2.355 ±1.216	3 (1)	45 (11.8)	111 (29.2)	141 (37.1)	56 (14.7)	27 (7.1)	2.355 ±1.216	2 (2)
Develop/implement drug formulary service	20 (32.2)	14 (22.5)	18 (29)	6 (9.6)	4 (6.4)	2.355 ±1.216	3 (1)	54 (14.2)	107 (28.2)	135 (35.5)	54 (14.2)	30 (7.9)	2.355 ±1.216	2 (2)
Overall						2.379 ±0.071	3 (1)						2.379 ±0.071	2 (0)

1 = Poor; 2 = average; 3 = good; 4 = very good; 5 = excellent.

Increasing the awareness of public and healthcare providers about this economic benefit may also increase their willingness to have and to pay for a service that facilitate PC.

Moreover, the lack of private counselling area was the second most documented barrier for integration of PC. This barrier was also reported in studies conducted in Qatar (Awaisu et al. 2018), Kuwait (Katoue et al. 2014a; Awaisu et al. 2018), and the United Arab Emirates (Tawfiq et al. 2021). The regulations in Jordan do not necessitate the presence of special counselling area in community pharmacies. Furthermore, the design of most community pharmacies does not allow for the presence of actual private area for counselling. However, the Jordan Pharmaceutical Association (JPA) started the Good Pharmacy Practice (GPP) program which recommends offering a private counselling area for patients and the main pharmacy chains are implementing this feature (Nazer and Tuffaha 2017). The presence of counselling area with high level of privacy increases the counselling practice and encourage patients which are integral part in PC process to ask about their medical issues (Kimberlin et al. 2011).

Lack of communication / coordination, the third barrier, was one of the top perceived barriers and it has been reported in other similar studies (El Hajj et al. 2016; Loh et al. 2021). Interprofessional collaboration is crucial for implementing PC (Zielińska-Tomczak et al. 2021; Alsayed et al. 2022c). Several studies have explored the factors that may influence interprofessional collaboration and barriers to implementing it in Arab countries (El-Awaisi et al. 2018; Hasan et al. 2018; Albassam et al. 2020). These factors include patient and physician acceptance, logistic and financial issues and perceived pharmacist competence (Hasan et al. 2018), role conflict, and hierarchical differences between healthcare professionals (Albassam et al. 2020). Lack of time and financial compensation, lack of face-to-face communication, the possible fragmentation of patient care by the involvement of multiple healthcare professionals are some other factors (Albassam et al. 2020). The implementation of official channels of communication which can be achieved by telemedicine may enhance interprofessional collaboration, improves PC, and decreases medication errors.

While 61.3% of participated pharmacists and 43.9% of pharmacy students felt prepared to implement various aspects of PC, general weakness in all aspects of PC (technical, psychosocial, communication, and administrative) among them had been noticed in this study based on their self-assessment of their competencies. However, students usually overestimate themselves in self-assessment tools (Austin and Gregory 2007). The weakest competencies were in the administrative aspect of PC which is in line with other studies conducted in the United States of America (Scott et al. 2010), Kuwait (Katoue et al. 2014b), and Turkey (Okuyan et al. 2016). This is not surprising knowing that the administrative pharmacy courses in pharmacy schools' curricula is limited. With the GPP recommendations of extending continuing training programs to enhance pharmacists' role in delivering healthcare services (Nazer and Tuffaha 2017), these

results emphasize the need to concentrate on continuing education as well as pharmacy undergraduate education that improves readiness of pharmacists and future pharmacists to implement various aspects of PC and especially the administrative aspects (Alsayed et al. 2022d).

Another important aspect of this study is the introduction and emphasizing the future role of telemedicine. Telemedicine and the availability of specialized website that contains patient's information ensure the continuity of care when patients move from one care setting to another (inpatient to outpatient) especially in the absence of specialized care in the second location (Le et al. 2020). Moreover, the benefit of telemedicine was obvious recently during the COVID-19 pandemic where the people worldwide are facing several lockdowns and the access to medical help is difficult (Hong et al. 2020; Margusino-Framiñán et al. 2020). Although all pharmacists participated in this study documented giving advice to their patients upon prescribing, most of them (75.4%) spend less than ten minutes for each patient and none spends more than 15 minutes. This was explained due to workload, time concern, and no reimbursement for such PC. About 71% thought that they should be paid for their advice. Therefore, the idea of telemedicine and the presence of a website that provides PC can be a solution for this problem. In our study, 93% of participants encourage telemedicine websites and 60% were willing, to a varying degree, to pay for this service.

The medical services in Jordan are provided by either governmental or private organizations. Patients seeking governmental sector pay much less amount of money compared to those who are seeking private sectors. Due to financial constraints the Jordanians face, most of them prefer to attend the governmental one. This makes a lot of demand and pressure on health workers and leads to less time spent with patient and more medication related problems. All of that induces the desire in people and health care providers to adopt web-based telemedicine and PC. Similar trend was seen in previous studies in Iraq (Abd Ghani and Jaber 2015) and Canada (Gagnon et al. 2003) where the benefits of telemedicine affected not only the patients and health providers, but also the entire healthcare organization.

Consequently, the management of chronic diseases (Spethmann and Köhler 2022), adherence to medications, and patient self-management were positively affected by telemedicine services (Niznik et al. 2018). The participants are willing to pay for such services but further education on the role of telemedicine and PC is needed to increase the acceptance of this idea in all levels of the community. Cost-benefit analysis of services provided by telemedicine, and clarification for methods of payment for these services and the role medical insurance coverage will make the people and policy makers more appreciative to adopt telemedicine in the healthcare system (Shafie and Hassali 2010).

Finally, this study has some limitations such as the small sample size of pharmacists who participated in this study compared to pharmacy students. This may

skew the results to more perceived opinions than actual ones seen in real practice and the self-assessment of preparedness of providing PC which overestimates results and may not evaluate actual competencies. Moreover, participants were asked to estimate the payment that may offer to a website that facilitate PC and telemedicine without thorough explanation of its content and without pre-knowledge about the economic benefit of PC and this may underestimate the willingness to pay for this service.

Conclusion

This is the first study to address the perspectives of healthcare providers and pharmacy students about PC and telemedicine during COVID-19 pandemic in Jordan. This study highlights that absence of proper documentation of patient medical information and patient difficulty to remember his medical history increases the risk of medical problems and is considered the most documented barrier for the integration of PC. This emphasizes the future role of telemedicine and the availability of a specialized website that contains patient's information to ensure the continuity of care even during the pandemics. Creating an electronic database, to be easily accessed by healthcare providers, that contains all related patients' medical information should decrease the risk of medical problems.

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All authors declare no conflict of interest related to this article.

Authors' contributions

A.R.AL.: Idea; Protocol; Literature Searching; Formal analysis; Investigation; Methodology; Project administration; Resources; Supervision; Validation; Roles/Writing - original draft; Writing - review & editing. H.A.K.: Writing - review & editing. L.H.: Writing - review & editing. D.A.: Literature Searching; Validation; Writing - review & editing. D.A.: Data collection; Validation. T.N.AL.: writing- review & editing. A.S.: Literature Searching, review & editing.

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