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RESEARCH ARTICLE

Physicians' perceptions, expectations, and experiences of clinical pharmacists in Jordan-2017

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Abstract

Background A decade ago, clinical pharmacy was a new concept in hospital settings in Jordan, as evidenced in our 2006/2007 study. Changes in the perceptions, expectations, and experiences of physicians regarding the role of clinical pharmacists need to be investigated. *Objective* To document physicians' perceptions and expectations of, and experiences with, clinical pharmacists in hospital settings in 2017, and to assess differences in these areas between the 2017 and the 2006/2007 samples. *Setting*: The study was conducted at four hospitals in the north of Jordan. *Method* Physicians completed a self-administered questionnaire similar to the one used in our 2006/2007 study, which recorded demographics and assessed physicians' perceptions, expectations, and experiences regarding clinical pharmacists. Data of the 2017 sample were analyzed and compared descriptively to those of the 2006/2007 sample. *Main outcome measure* Physicians' perceptions, expectations, and experiences of pharmacists in hospital settings in 2017. *Results* Two hundred and ninety-five physicians completed the questionnaire. Physicians in the 2017 sample were most comfortable with pharmacists suggesting the use of prescription medications such as antibiotics (53.6%). Physicians in the 2017 cohort agreed with the eight expectations stated in the questionnaire. Physicians' experiences with clinical pharmacists improved in 2017 from 2006/2007 in all eight areas evaluated. *Conclusion* Physicians' perceptions, expectations, and experiences towards the professional role of pharmacists have changed over the past 10 years in Jordan.

Keywords Expectations · Jordan · Perceptions · Pharmacists · Pharmacist role · Physicians

Impacts on Practice

- Implementing clinical pharmacy services in hospital settings in Jordan is expected to improve physicians' appreciation of the role of pharmacists and foster interprofessional patient care.
- Health authorities in Jordan are encouraged to appoint more clinical pharmacists in health facilities to gain the expected positive impacts of their service

Introduction

In Jordan, clinical pharmacy is a relatively new concept. Historically, the main responsibilities of pharmacists have been dispensing and procurement. Other employment opportunities have included marketing, inventory, research and development, as well as various functions in the pharmaceutical industry [1–3].

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Several studies have investigated physicians' perceptions and expectations of the role of clinical pharmacists in the Middle East [1, 4–9]. A survey of 205 physicians in Qatar found that 82 (40%) were comfortable with pharmacists providing patient education. However, only 40 physicians (20%) felt comfortable with pharmacists suggesting the use of certain prescription medications to physicians. In terms of expectations, 98 physicians (48%) wanted pharmacists to take personal responsibility for resolving drug-related problems identified in their patients; and 92 physicians (45%) appreciated pharmacists assisting them in designing drug therapy treatment plans for their patients [4].

A descriptive cross-sectional study in Saudi Arabia evaluated physicians' perceptions and expectations regarding the role of clinical pharmacists in a healthcare team. Participants agreed that clinical pharmacists were essential members of the healthcare team and found them helpful in providing advice regarding managing drug interactions, selecting appropriate medications during pregnancy, and educating other healthcare providers [5].

An observational study in the United Arab Emirates investigated the perceptions of 285 physicians of the role of clinical pharmacists. Two-thirds of the respondents believed that pharmacists could be a reliable source of general drug information. However, only about a quarter thought that pharmacists were a reliable source of clinical information and medication cost-effectiveness. Of note, 80% of the surveyed hospitals did not have clinical pharmacy services; nevertheless, about 90% of the participants were aware of the concept of clinical pharmacist and clinical pharmacy services [6].

A cross-sectional study in Kuwait investigated physicians' perceptions, expectations, and experiences in two governmental hospitals. The majority of participants (92.5%) were comfortable with pharmacists detecting and preventing prescription errors. While 74.1% felt comfortable with pharmacists suggesting the use of prescription medications to physicians, 43.1% were uncomfortable with pharmacists doing so to patients. In addition, three quarters of the participants agreed that pharmacists are a reliable source of general drug information [7].

In 2006/2007 we investigated physicians' perceptions, expectations, and experiences of pharmacists in hospital settings in Jordan [1]. Among the 245 physicians who completed the questionnaire, 53.9% of them were most comfortable with pharmacists providing patient education (n = 132). However, 44.5% of physicians were uncomfortable with pharmacists suggesting the use of prescription medications to them (n = 109). With regard to physicians' expectations of the professional role of pharmacists, 62.5% expected pharmacists to educate patients about safe and appropriate use of drugs (n = 153). On the other hand, 33.9% of did not expect pharmacists to be available for consultation during rounds. Concerning physicians' actual experiences with pharmacists, about half of physicians (53.5%) stated that pharmacists were always a reliable source of general drug information; but only 28.2% stated that pharmacists approached them frequently to clarify the proposed drug-therapy objectives for their patients [1].

Significant changes have occurred in the status of clinical pharmacy in Jordan since the publication of our study [1]. For example, more pharmacists have graduated with PharmD degrees and are registered with the Jordan Pharmaceutical Association (JPA), which is required to legally practice pharmacy in Jordan. In 2016, there were 18,573 registered pharmacists in Jordan, of which 1066 held a PharmD degree [Jordan Pharmaceutical Association, personal communication, August, 2016]. Moreover, in 2016, 29 pharmacists with a Master's degree (MSc) in Clinical Pharmacy and 34 pharmacists with a PharmD degree were appointed in Jordan Ministry of Health (MOH) facilities in 2016 [Department of Employees Affairs, Jordan Ministry of Health, personal communication, August, 2016]. This is a marked increase from 2007 when 3 pharmacists with a MSc in Clinical Pharmacy and 2 with a PharmD degree were appointed in MOH facilities [Department of Employees Affairs, Jordan Ministry of Health, personal communication, August, 2007]. In addition, departments of clinical pharmacy and pharmaceutical care were established in the two teaching hospitals in Jordan where clinical pharmacy services are provided [10, 11], thus formalizing both the service and the role in these leading facilities. Considering these changes in the profession, there is a need to evaluate current perceptions, experiences, and expectations of physicians towards the role of pharmacists in the hospital setting and to compare these to those of physicians surveyed a decade ago.

Aim of the study

The objectives of this study were to assess physicians' perceptions, expectations, and actual experiences with pharmacists in hospital settings in Jordan in 2017, and to descriptively compare these findings with physicians' perceptions, and actual experiences in 2006/2007.

Ethics approval

The study protocol was approved by the Jordan University of Science and Technology Institutional Review Board (Research Number 13/99/2016) on October 10, 2016 and the Jordan Ministry of HealthEthics of Research on Humans Committee (Research Number MOHREC170043) on April 5, 2017.

Method

This study was conducted prospectively at four hospitals in the north of Jordan: King Abdullah University Hospital (Irbid; KAUH), Princess Basma Teaching Hospital (Irbid; PBTH), Princess Rahma Hospital (Irbid; PRH), and Princess Badea Hospital (Irbid; PBH).

Research assistants (one PharmD and two senior PharmD students) invited available physicians in the four hospitals to participate in the study. Those who agreed to participate had the research goals and methods explained to them. Research assistants delivered the self-administered questionnaires by hand on different working days of the week to the physicians on duty and waited for them to be completed. Our goal was to recruit a sample similar in size to that of our 2006/2007 study [1].

We used the same instrument as in our 2006/2007 study [1], which was a modified version of the questionnaire used by Matowe et al. [7] in their Kuwaiti study. The questionnaire used in our prior and current study consists of four parts. In the first part, physicians are queried about demographics, current positions, current areas of practice, frequency and purpose of interactions with pharmacists, and similar relevant information. In the second part, physicians rate eight items assessing their level of comfort with pharmacists carrying out various clinical duties and services. The third part includes eight items evaluating physicians' expectations of the role of clinical pharmacists. The final part consists of eight items evaluating physicians' experiences with pharmacists. Data collection took place from January to November 2017.

Microsoft Excel and STATA/IC version 15.1 were used to analyze the data. For the items related to expectations and experiences, the "strongly agree" and "agree" responses were merged into an "agree" response and the "strongly disagree" and "disagree" responses into a "disagree" response. Descriptive statistics were used to characterize the sample and to report the frequency and purpose of interactions with pharmacists; with central tendency measures for continuous variables and counts and percentages for discrete variables. In support of our second objective to descriptively compare the findings for the 2017 cohort of physicians with the findings for the 2007 cohort of different physicians in terms of demographics and relevant characteristics as well as physicians' interactions with pharmacy, we report for both cohorts baseline demographics and relevant characteristics, physicians perception of their interactions with pharmacists, and their comfort with clinical pharmacy services.

Results

Of the 356 physicians approached, 295 completed the questionnaire for a response rate of 82.9%. Results are reported for the 2017 cohort and aligned with parallel data for the 2006/2007 cohort (Tables 1, 2, 3). The mean ± SD age of respondents was 30.5 ± 8.15 years; 32.9% were female; and 73.9% qualified as physicians in Jordan. The majority of physicians (69.4%) interacted at least once weekly with pharmacists; about half of whom (33.3% of total sample) interacted once daily or more frequently with pharmacists.

Physicians in the 2017 sample were most comfortable with pharmacists suggesting the use of prescription medications to patients, such as antibiotics (53.6%), followed by treating minor illnesses such as headaches (52.4%), and suggesting prescription medications to physicians (50.5%). Four in ten (39.9%) physicians felt comfortable with pharmacists providing patient education, and half of them felt moderately comfortable with pharmacists doing so (51.2%). On the other hand, clinical pharmacy services that physicians felt less comfortable with included monitoring outcomes of pharmacotherapeutic regimens (24.5%), detecting and preventing prescription error (24.5%), and suggesting use of nonprescription medication (15.2%).

Table 4 shows physicians' expectations of the professional role of pharmacists. In descending order, physicians expected pharmacists to educate their patients about safe and appropriate medication use (77.0%), to be knowledgeable drug-therapy experts (71.2%), to know the indications of drugs (70.6%), to be available for consultation when physicians see their patients (67.7%), to monitor and report on patients' response to drug therapy (66.6%), to take responsibility for drug-related problems (63.6%), to assist patients in selecting non-prescription medications (61.6%), and to assist physicians in designing drug-therapy treatment plans (61.2%).

Table 5 presents physicians' actual experiences with pharmacists. In descending order, physicians found pharmacists to be a reliable source of general drug information (66.4%), reported pharmacists to inform them routinely about clinical problems with prescriptions (65.0%), found pharmacists to be a reliable source of clinical drug information (62.4%), observed pharmacists to routinely counsel patients regarding safe and appropriate medication use (58.5%), noted pharmacists to take responsibility for resolving drug-related problems (54.6%), observed pharmacists to report frequently on patients experiencing problems with their medication (54.1%), acknowledged pharmacists to inform them on cost-effective drug alternatives (53.8%), and recognized that pharmacists frequently ask for clarification of drug-therapy objectives (52.0%).

Table 1 Participants' demographics and relevant characteristics

Variable	2006–2007 (n = 245)	2017 (n = 295)
Age		
≤ 35 yr, no. (%)	190 (77.6)	238 (87.5)
36–47 yr, no. (%)	33 (13.4)	20 (7.4)
More than 47 yr, no. (%)	22 (9.0)	14 (5.1)
Mean ± S.D. age, yr	31.9 ± 8.6	30.5 ± 8.15
Median age, yr	29	28
Range age, yr	23–66	23–69
Female, no. (%)	76 (31.0)	96 (32.9)
Nationality, no. (%)		
Jordanian	210 (85.7)	265 (94.6)
Non-Jordanian	35 (14.3)	15 (5.4)
Country where medical qualification was obtained, no. (%)		
Jordan	140 (57.1)	212 (73.9)
USA	19 (7.8)	6 (2.1)
Asia ''eastern''	26 (10.6)	13 (4.5)
Western Europe	16 (6.5)	18 (6.3)
Eastern Europe (including Russia)	24 (9.8)	21 (7.3)
Other	20 (8.2)	17 (5.9)
Place of work, no. (%)		
King Abdullah University Hospital	157 (64.1)	174 (59.8)
Princess Rahma Hospital	33 (13.5)	35 (12)
Princess Basma Hospital	43 (17.5)	69 (23.7)
Princess Badea Hospital	12 (4.9)	13 (4.5)
Current position, no. (%)		
Trainee (first year of training after graduation)	33 (13.5)	5 (1.7)
Junior (first and second year resident)	91 (37.1)	152 (51.7)
Senior (third and fourth year resident)	46 (18.8)	96 (32.7)
Fellow	23 (9.4)	6 (2)
Consultant	52 (21.2)	35 (11.9)
Current area of practice, no. (%)		
Internal Medicine	92 (37.6)	49 (16.6)
Pediatrics	66 (26.9)	71 (24.1)
Surgery	46 (18.8)	78 (26.4)
Obstetrics & Gynecology	20 (8.2)	33 (11.2)
Ear, nose, and throat	13 (5.3)	18 (6.1)
Dermatology	2 (0.8)	12 (4.1)
Other	6 (2.4)	34 (11.5)

We examined whether the presence of clinical pharmacy services in a hospital was associated with the degree of physicians' comfort with pharmacists providing different clinical pharmacy services in the 2017 sample. Physicians working in hospitals that provide clinical pharmacy services (KAUH and PRH) were significantly more comfortable with pharmacists providing patient education ($p = 0.048$) and designing and monitoring pharmacotherapeutic regimes ($p = 0.007$) compared to hospitals that do not provide clinical pharmacy services (PBTH and PBH). However, comfort with other services such as suggesting the use of nonprescription medications, monitoring outcomes of pharmacotherapeutic regimens, detecting and preventing prescription errors, treating minor illnesses, and suggesting the use of prescription medications to physicians and patients did not differ between hospitals with and without clinical pharmacy services (all $p > 0.05$).

Discussion

The findings of our study underscore the marked progress in the image, expectations, and acceptance of clinical pharmacy by physicians in Jordan over the past decade.

Table 2 Frequency and purpose of interactions between participating physicians and pharmacists

Variable	2006–2007 (n = 245)	2017 (n = 295)
Frequency of interactions, no. (%)		
Never/rarely	96 (39.2)	89 (30.6)
Once a week	92 (37.5)	105 (36.1)
Once a day/more	57 (23.3)	97 (33.3)
Never/rarely	96 (39.2)	89 (30.6)
Reasons for interactions[a] (more than 1 choice can be checked), no. (%)		
Drug-availability queries	149 (29.0)	85 (17.5)
Side-effects queries	62 (12.1)	73 (15.0)
Drug-alternative queries	120 (23.3)	110 (22.6)
Drug-dosage queries	93 (18.1)	129 (26.5)
Drug-interaction queries	54 (10.5)	86 (17.7)
Other	36 (7.0)	4 (0.8)

[a]Percentage calculated on the total numbers of queries

Qualitatively, physicians' degree of comfort with clinical pharmacy services increased significantly from what we observed in 2006/2007 [1]. This improvement in the perception of clinical pharmacy is thought to have occurred in parallel with the growth and innovation in pharmacy education in Jordan [12], including the graduation of the first cohorts of PharmD and MSc in Clinical Pharmacy students in 2006 and 2001, respectively [13]. Another likely reason is the increase in the number of hospitals providing clinical pharmacy services over the past 10 years [3, 14].

As Tables 2, 3, 4 and 5 show, there were notable (numerical) differences in physicians perceptions, expectations and experiences with clinical pharmacists. We were discouraged from statistical testing for differences between the 2006/2007 and 2017 cohorts and therefore appraise the results from both studies qualitatively. Compared to their colleagues in the 2006/2007 cohort, the physicians in the 2017 cohort were comfortable with pharmacists suggesting prescription medicines to them and to patients, and treating various minor illnesses. Similarly, with regards to their expectations of pharmacists' professional role, the 2017 cohort agreed

Table 3 Physicians' degree of comfort with pharmacists providing different clinical pharmacy services

Pharmacists' duties	2006–2007 (n = 245)	2017 (n = 295)	2006–2007 (n = 245)	2017 (n = 295)	2006–2007 (n = 245)	2017 (n = 295)
	Comfortable no. (%)	Comfortable no. (%)	Moderately comfortable no. (%)	Moderately comfortable no. (%)	Uncomfortable no. (%)	Uncomfortable no. (%)
Providing patient education, no. %	132 (53.9)	116 (39.9)	91 (37.1)	149 (51.2)	22 (9.0)	26 (8.9)
Suggesting use of nonprescription medications	108 (44.1)	121 (41.7)	102 (41.6)	125 (43.1)	35 (14.3)	44 (15.2)
Monitoring outcomes of pharmacotherapeutic regimens	95 (38.8)	111 (38.3)	116 (47.3)	108 (37.2)	34 (13.9)	71 (24.5)
Designing and monitoring pharmacotherapeutic regimes	82 (33.5)	119 (40.6)	110 (44.9)	131 (44.7)	53 (21.6)	43 (14.7)
Detecting and preventing prescription errors	80 (32.7)	98 (33.3)	109 (44.4)	124 (42.2)	56 (22.9)	72 (24.5)
Treating minor illnesses, e.g., headaches	61 (24.9)	154 (52.4)	102 (41.6)	110 (37.4)	82 (33.5)	30 (10.2)
Suggesting use of prescription medications to physicians	40 (16.3)	147 (50.5)	96 (39.2)	103 (35.4)	109 (44.5)	41 (14.1)
Suggesting use of prescription medications to patients, e.g., antibiotics	35 (14.3)	157 (53.6)	92 (37.5)	101 (34.5)	118 (48.2)	35 (11.9)

Table 4 Physicians' expectation of pharmacists' professional role

Physicians' expectations	2006–2007 (n = 245) Agree	2017 (n = 295) Agree	2006–2007 (n = 245) Neutral	2017 (n = 295) Neutral	2006–2007 (n = 245) Disagree	2017 (n = 295) Disagree
I expect pharmacists to educate my patients about the safe and appropriate use of their medication	153 (62.5)	224 (77.0)	71 (29.0)	39 (13.4)	21 (8.5)	28 (9.6)
I expect pharmacists to be knowledgeable drug-therapy experts	144 (58.8)	210 (71.2)	79 (32.2)	47 (15.9)	22 (9.0)	38 (12.9)
I expect pharmacists to know the specific indication of each drug I prescribe, even when drugs have more than 1 approved or recognized indication	121 (49.4)	207 (70.6)	73 (29.8)	45 (15.4)	51 (20.8)	41 (14.0)
I expect pharmacists to monitor my patients' response to drug therapy and let me know if a patient encounters any drug-related problem	117 (47.8)	193 (66.6)	78 (31.8)	63 (21.7)	50 (20.4)	34 (11.7)
I expect pharmacists to take personal responsibility for resolving any drug-related problems they discover involving patients.	115 (47.0)	187 (63.6)	64 (26.1)	50 (17.0)	66 (26.9)	57 (19.4)
I expect pharmacists to assist my patients in selecting appropriate nonprescription medications	95 (38.8)	180 (61.6)	89 (36.3)	58 (19.9)	61 (24.9)	54 (18.5)
I expect pharmacists to assist me in designing drug-therapy treatment plans for my patients	85 (34.7)	177 (61.2)	87 (35.5)	63 (21.8)	73 (29.8)	49 (17.0)
I expect pharmacists to be available to me for consultation when I see patients (e.g., during rounds)	77 (31.4)	199 (67.7)	85 (34.7)	48 (16.3)	83 (33.9)	47 (16.0)

with the 8 expectations stated in the questionnaire. For example; physicians expected pharmacists to educate their patients about safe and appropriate medication use, to be knowledgeable drug-therapy experts, and to know the indications of drugs. Lastly, regarding their actual experiences with clinical pharmacists, physicians in the 2017 cohort agreed with the 8 actual experiences stated in the questionnaire. For example; physicians found pharmacists to be a reliable source of general drug information, reported that pharmacists inform them routinely about clinical problems with prescriptions, and found pharmacists to be a reliable source of clinical drug information. Thus, there are marked (qualitative) shifts for the better in perceptions, expectations and experiences with clinical pharmacists among the physicians in the 2017 cohort relative to the physicians in the 2006/2007 study.

Our sample in 2017 was comparable to that in 2006/2007 in terms of age and gender, although slightly more physicians under the age of 35 participated in 2017. This could also be a contributing factor to the shift towards more accepting perceptions, expectations, and experiences with regards to the role of the clinical pharmacist—something also observed in the Qatar study on the emerging role of the clinical pharmacist in that country [9].

Physicians in Jordan have become more aware and more familiar with the role that clinical pharmacists actively and

Table 5 Physicians' actual experience with pharmacists

Physicians' experiences	2006–2007 (n = 245) Agree	2017 (n = 295) Agree	2006–2007 (n = 245) Neutral	2017 (n = 295) Neutral	2006–2007 (n = 245) Disagree	2017 (n = 295) Disagree
In my experience, pharmacists are a reliable source of general drug information	131 (53.5)	196 (66.4)	83 (33.8)	66 (22.4)	31 (12.7)	33 (11.2)
Pharmacists routinely counsel my patients regarding the safe and appropriate use of their medications	122 (49.8)	172 (58.5)	87 (35.5)	68 (23.1)	36 (14.7)	54 (18.4)
In my experience, pharmacists are a reliable source of clinical drug information (i.e., information regarding the clinical use of drugs in specific situation	104 (42.5)	184 (62.4)	105 (42.9)	75 (25.4)	36 (14.6)	36 (12.2)
Pharmacists routinely inform me about more cost-effective alternatives to the drugs I prescribe	89 (36.3)	157 (53.8)	104 (42.5)	62 (21.2)	52 (21.2)	73 (25.0)
In my experience, pharmacists appear willing to take personal responsibility for resolving any drug-related problems they discover	78 (31.9)	161 (54.6)	87 (35.5)	64 (21.7)	80 (32.6)	70 (23.7)
Pharmacists routinely inform me if they discover clinical problems with my prescriptions	72 (29.4)	191 (65.0)	103 (42.0)	49 (16.7)	70 (28.6)	54 (18.4)
Pharmacists frequently ask me to clarify for them the drug-therapy objectives I have in mind for my patients	69 (28.2)	153 (52.0)	92 (37.5)	76 (25.9)	84 (34.3)	65 (22.1)
Pharmacists frequently let me know that my patients have experienced some problem with their medication	69 (28.2)	159 (54.1)	90 (36.7)	66 (22.4)	86 (35.1)	69 (23.5)

potentially can play in identifying, preventing, and managing treatment-related problems. This might be due to the recently published papers from Jordan that describe the increase in and positive impact of clinical pharmacy services on health services in general and the provision of assistance to physicians in particular in Jordan [15–19]. Another factor is the rise in the number of physicians obtaining their medical degrees in Jordan instead of other countries, especially the USA, and thus seeing much earlier in their careers the professional and patient care benefits of clinical pharmacists as part of the treatment team. The involvement of physicians in the clinical training of pharmacists is another critical factor in physicians' perceptions of clinical pharmacy [20, 21].

As to physicians' expectations of clinical pharmacists, five professional role functions of pharmacists improved from 2006/2007 to 2017 (all $p < 0.05$), while high 2006/2007 ratings remained so in 2017 for three role functions. This is a remarkable achievement for clinical pharmacists as this reflects a change from physicians' prior perceptions of pharmacists as a possible threat to the conventional physician role [22] to pharmacists contributing uniquely and significantly to improving treatment outcomes. Further, physicians' appreciation of pharmacists providing patient education on

nonprescription drugs reflects physicians' recognition of their limited knowledge in this area. Note in this regard that pharmacists are the only healthcare practitioners who receive formal, university-based education regarding self-care and non-prescription pharmacotherapy [23].

One of the main strengths of our study is that it provides a longitudinal analysis of how physicians' perceptions, expectations, and experiences regarding pharmacists are evolving as a result of changes in the Jordanian pharmacy education system, the translation of these changes into new and expanding professional roles for pharmacists, and their structural integration as departments into hospitals [24]. Admittedly, as the study was conducted in northern Jordan, its findings may not be generalizable to the country at large. More importantly, the findings may instead signal how changes in pharmacy education and practice and the creation of new professional roles for pharmacists will, in time, be recognized and valued by physicians.Note in this regard that this region of Jordan is anchored by the city of Irbid—where Jordan University of Science and Technology (JUST) and King Abdullah University Hospital are located –has been a driving force of innovation in pharmacy education and practice. JUST was the first Jordanian University to offer PharmD and MSc in Clinical Pharmacy programs [3]. KAUH was among the first academic healthcare centers in Jordan to adopt the clinical pharmacy model and to formalize it as a hospital department [10].

With the growing number of physicians graduating from Jordanian universities and the emerging new roles of pharmacists [25], less resistance to expanded and unique roles of the pharmacist is expected in the future. This bodes well for the evolving interprofessional collaboration between physicians, clinical pharmacists, and other disciplines. This development that should be encouraged actively as it has been shown that pharmacist-provided direct patient care has favorable effects across various patient outcomes, health care settings, and disease states [26]. Thus, interprofessional education and training across health professions schools should be implemented to complement profession-specific education. Likewise, interprofessional collaborative models should be grafted onto profession- and discipline-specific clinical care.

The current study has limitations. Non-response bias is a possibility; it is unknown whether non-respondents differed from those who responded. The relatively lengthy questionnaire may have led some physicians to refusing participation. The analysis compared two samples, not the same physicians over time. We may not know how individual physicians evolved over time in their perceptions, expectations, and experiences. However, conversely, we now know how the next generation of physicians appraises and values clinical pharmacy services. Many physicians were relatively young and therefore perhaps more open to advances in the pharmacy profession. This as well as the 2006/2007 study [1] were both conducted in the same area in the north of Jordan. This precludes generalization to the rest of the country and similar studies are indicated in the capital region around Amman as well as other regions of the country.

Conclusion

Most physicians' perceptions, expectations, and experiences towards the professional role of pharmacists improved over the past 10 years in Jordan and underscore the progress being made. The role of the clinical pharmacist is likely to continue to grow, as is the recognition of this role by other health care practitioners. The evolving collaboration between physicians and clinical pharmacists should be fostered intensively. Regulatory authorities need to refine the role of clinical pharmacists and formalize their scope of practice, which subsequently will lead to their empowerment.

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