湖南大学学报（自然科学版）
Journal of Hunan University (Natural Sciences)

第 50 卷 第 9 期
2023 年 9 月

Available online at http://jonuns.com/index.php/journal/index

Vol. 50 No. 9
September 2023

Open Access Article

https://doi.org/10.55463/issn.1674-2974.50.9.4

Role of Pharmacists in Clinical Pharmacy Services in Saudi Arabia: A Survey of Knowledge, Attitude, and Practice

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Received: June 14, 2023 / Revised: July 10, 2023 / Accepted: August 8, 2023 / Published: September 29, 2023

Abstract: Clinical pharmacy services significantly impact patient care and rapidly progress in the Saudi healthcare system. This study aimed to assess hospital pharmacists' knowledge, attitude, and practice regarding clinical pharmacy services using a cross-sectional study design at seven government hospitals in Qassim, Saudi Arabia. In total, 236 hospital pharmacists were present in the Qassim region, where 176 reported providing clinical pharmacy services invited to participate. Out of 176 distributed questionnaires, 174 returned, giving a response rate of 98.86%. The number of clinical pharmacists in Qassim hospitals was only 5 (5.7%). The mean knowledge, attitude, and practice scores were 8.72±3.0, 29.39±4.1, and 16.3±3.1, respectively. Most pharmacists had a low level of knowledge about clinical pharmacy services 46 (52.3%). Knowledge scores were significantly associated with the highest academic qualification (p=0.02). Most pharmacists agreed that clinical pharmacists can provide 84 (95.5%) drug information and monitor patient response to drug therapy 82 (93.2%). Attitude scores were significantly associated with age (p=0.001). Practice scores were significantly associated with age (p=0.001) and nationality (p=0.001). Most services provided in hospitals were patient counseling 82 (93.2%). The most common barriers identified were lack of staff, training, and time. Recognizing the importance of clinical pharmacy services and the role of clinical pharmacists in healthcare settings is an essential step toward improving patient safety. Therefore, pharmacists need proper training in clinical pharmacy services to gain confidence.

Keywords: knowledge, attitude, practice, pharmacists, clinical pharmacy services, Saudi Arabia.

沙烏地阿拉伯藥劑師在臨床藥學服務中的作用：知識、態度和實踐調查

摘要：臨床藥學服務極大地影響了病患照護並促進了沙烏地阿拉伯醫療保健系統的快速發展。本研究旨在透過沙烏地阿拉伯卡西姆七家政府醫院的橫斷面研究設計，評估醫院藥劑師在臨床藥學服務方面的知識、態度和實踐。卡西姆地區共有 236 名醫院藥劑師參加，其中 176 名報告提供臨床藥學服務，並受邀參加。共發放問卷 176 份，回收 174 份，回收率為 98.86%。卡西姆醫院臨床藥師人數僅 5 人（5.7%）。知識、態度和實踐的平均分數分別為 8.72±3.0、29.39±4.1 和 16.3±3.1。大部分藥劑師對臨床藥學服務的了解程度較低 46（52.3%）。知識分數與最高學歷有顯著相關（p=0.02）。大多數藥劑師認為臨床藥劑師可以

提供藥物資訊 84 (95.5%)並監測患者對藥物治療的反應 82 (93.2%)。態度分數與年齡有顯著相關（p=0.001）。實踐分數與年齡（p=0.001）及國籍（p=0.001）有顯著相關。醫院提供的服務大多是病人諮詢 82 (93.2%)。最常見的障礙是缺乏人員、訓練和時間。認識到臨床藥學服務的重要性以及臨床藥師在醫療保健環境中的作用是提高病人安全的重要一步。因此，藥師需要接受適當的臨床藥學服務訓練才能獲得信心。

关键词：知識、態度、實踐、藥劑師、臨床藥學服務，沙烏地阿拉伯。

1. Introduction

Clinical pharmacy can be defined as a health science discipline that focuses on providing patient care that optimizes medication therapy and promotes health, fitness, and disease prevention [1]. The objective of clinical pharmacy in practice includes but is not limited to administering a systematic, comprehensive, and consistent quality of service to individual patients, optimizing not only the outcomes that improve patient's quality of life but also the efficiency of the healthcare system on a broader level [2]. It focuses on patient-oriented pharmaceutical services rather than product-oriented approaches [3]. In 1994, the World Health Organization (WHO) policy documents stressed the significance of joint participation between pharmacists and all other healthcare professionals [4]. The International Pharmaceutical Federation has also emphasized the necessity for national pharmacy professional associations to come together and take measures to support and encourage pharmacists in their countries [5]. Within hospital settings, pharmacists are in a unique position to improve the quality of care by reducing adverse drug reactions (ADRs), medication errors (MEs), rational use of medications, dosing, and counseling. A recent study conducted among post-surgical patients highlighted that, in two weeks, pharmacists could make 218 interventions, including anticoagulant and antimicrobial optimization, which signifies their importance in a hospital setting [6]. As reported, clinical pharmacists significantly impacted dose optimization and reduced mortality among patients with heart failure [7]. Another study reported that pharmacist involvement in multidisciplinary teams decreases the mortality rate among ICU patients [8].

A clinical pharmacist holds a pivotal and integral position in patient care; however, challenges such as poor awareness among patients and the general population regarding their role within the healthcare system disregard and trivialize the contributions and impact of clinical pharmacists in patient care. The general population continues to underutilize pharmacists primarily as drug dispensers, frequently ignoring the direct patient care components and being largely uninformed of evolving pharmacy activities. One of the reasons reported is a lack of patient understanding of the scope of services pharmacists can provide in disease management [9]. Similarly, specific to chronic care, clinical pharmacists' involvement positively affected therapeutic goal attainment [10]. From the physician's and other health care provider's perspectives, possible barriers may be a lack of understanding of pharmacists' professional standing, their competence, lack of authority, and communication gaps between pharmacists and physicians [11, 12]. Within the Saudi context, studies exploring physicians' perceptions and expectations regarding clinical pharmacists reported that physicians may find it difficult to assess the value of a clinical pharmacist because of their lack of experience with clinical pharmacists [13, 14].

For the past three decades, the Saudi healthcare system significantly contributed to recognizing the role of pharmacists and establishing clinical pharmacy services in hospital settings. Several standardized initiatives at educational and training levels have been taken to improve clinical pharmacy services throughout the kingdom [15]. The PharmD degree has generated attention in many nations worldwide as patient-centered care becomes a rising emphasis for professional pharmacists. The Nanjing Statements serve as an international standard for pharmacy academicians and leaders to pinpoint areas where pharmacy education needs improving. By standardizing pharmacy education and, as a result, the skill set for all graduating pharmacists, regardless of their location or practice situation, pharmacists can be prepared potentially more consistently and diversely in their training [16], which is very important for countries like Saudi Arabia where multinational patients are seeking care. At the beginning of the 21st century, clinical pharmacy education emphasized clinical residency programs introduced in the Saudi pharmacy education system [17]. Pharmacy graduates in Saudi Arabia are expected to have core competencies in optimized medication care and outcomes emphasizing evidence-based practice [18]. Clinical pharmacy services are crucial in Saudi Arabia's healthcare system for

enhancing medication safety, optimizing medication management, and promoting reasonable use of medicines. The significant role of clinical pharmacists has been recognized, and several hospitals are offering clinical pharmacy services with the assistance of trained clinical pharmacists. However, in particular regions of Saudi Arabia, such as Qassim, the presence of experienced, trained hospital pharmacists is scarce. Although many hospitals today offer clinical pharmacy services in the region, the system still lacks competent clinical pharmacists. Data on clinical pharmacists' knowledge, attitude, and practice are inadequate in hospitals in Qassim. This study aimed to evaluate pharmacists' knowledge, attitude, and practice (KAP) regarding clinical pharmacy services at general hospitals in the Qassim region, and identify challenges and barriers to providing clinical pharmacy services.

2. Research Methods

2.1. Study Setting and Design

This study involved a cross-sectional questionnaire-based survey conducted among pharmacists in general hospitals in Qassim, Saudi Arabia. We targeted seven government hospitals in the Qassim region that provide primary clinical and diagnostic services to its population. All targeted hospitals had hospital pharmacy divisions established to provide clinical pharmacy services to their patients. Questionnaires were distributed among all pharmacists working at these hospitals between October 2019 and January 2020.

2.2. Study Participants

As per the 2018 Ministry of Health of Saudi Arabia, 236 pharmacists worked in government hospitals in the Qassim region [19]. During the three months of data collection, all hospital pharmacists working in seven selected hospitals were invited to participate. A total of 174 pharmacists reported that they were involved in providing clinical pharmacy services to patients. To increase the response rate, this study used two follow-ups with reminders to the participants sent one week after the questionnaire distribution to return their completed questionnaires. After two reminders, the questionnaires were categorized as "no-response."

2.3. Ethical Approval

The Qassim Region Research Ethics Committee (QREC) provided its Ethical approval (1441-1080855) for this study.

2.4. Study Tool

A self-administered questionnaire was in English based on similar studies and pre-validated surveys [20, 21]. It consisted of 42 multiple-choice and three open-ended questions that aimed to identify demographic data, knowledge of pharmacists about clinical pharmacy services, attitude toward clinical pharmacy services, practice toward clinical pharmacy services, challenges and barriers to providing clinical pharmacy services, and an open-ended question about future recommendations to improve clinical pharmacy services. Three clinical pharmacy experts from the Unaizah College of Pharmacy, Qassim University, validated the questionnaire and then examined it for content validity with further modifications based on their comments. Moreover, five pharmacists working in hospitals assessed its face validity. The final version of the questionnaire considered all comments by the pharmacists and clinic pharmacy experts. Table 1 describes each section of the questionnaire in detail.

Table 1 Description of each section of the survey

Section title	Description of sections
Section 1: Demographic characteristics	This section contains eight questions, including age, nationality, gender, professional grade, highest academic qualification, having an SCFHS license, total working experience in years, and the name of the hospital worked on.
Section 2: Knowledge of pharmacists about clinical pharmacy services	This section contained sixteen questions that needed answers Yes, No, Don't know. We merged No and Don't know to ease scoring. Each correct answer got 1 point, whereas the wrong answer got 0. The sum score was from a minimum of 0 to a maximum of 16 for each responder. The median of the total score of knowledge was eight. The minimum score was zero, and the maximum was 16. Pharmacists who received a score between 1 and 5 were considered to have poor knowledge, while 6-9 – low knowledge, 10-12 – moderate knowledge, and 13-16 – high knowledge.
Section 3: Attitude toward clinical pharmacy services	This section contained thirteen questions on a Likert scale of 5 from strongly agree to strongly disagree and attitude statement with choices as strongly agree, agree, neutral, disagree, and strongly disagree with scores 5, 4, 3, 2, and 1, respectively.
Section 4: Practice of clinical pharmacy services	Five added questions recorded clinical pharmacy services practice of clinical pharmacists with statements of choices always, often, sometimes, rarely, and never with scores 5, 4, 3, 2, and 1, respectively.
Section 5: Challenges, barriers, and future	Three added open-ended questions allowed the participants to provide their

recommendations for improving clinical pharmacy services

answers.

2.5. Data Analysis

Descriptive statistics illustrated the respondents' demographic characteristics with categorical variables measured as percentages, whereas continuous variables were expressed as mean ± standard deviation. The Kolmogorov–Smirnov test was applied to determine data distribution. Data analysis used the Statistical Package for the Social Sciences Software (SPSS version 23). The chi-square test examined the association between knowledge and sociodemographics. A p-value of < 0.05 was considered statistically significant.

3. Results

3.1. Demographic Characteristics of the Participants

A total of 176 questionnaires were sent to the targeted hospitals, of which 174 returned, giving a response rate of 98.86 %. Most of the participants were males – 92 (52.89%). More respondents were in the age group between 25 and 34 years – 85 (48.85%) and were of Saudi ethnicity – 170 (97.7%). Most pharmacists held bachelor's degrees – 167 (95.9%) and had less than one year of working experience – 72 (41.3%). Table 2 depicts the demographic characteristics of the participants.

Table 2 Demographic characteristics of the participants (N=174)

Variable	Frequency	%
Age		
18-24	64	36.78
25-34	85	48.85
35-44	21	12.06
45-55	4	2.29
Gender		
Male	92	52.89
Female	82	47.1
Nationality		
Saudi	170	97.7
Non-Saudi	4	2.29
Professional grade		
Pharmacist	169	97.12
Clinical Pharmacist	5	2.87
Highest Academic Qualification		
Bachelors	167	95.9
Masters	7	4.02
Working hospital		
King Saud Hospital (KSH)	38	21.8
Buraidah Central Hospital (BCH)	26	14.9
Maternity and Children Hospital (MCH)	24	13.7
Alras General Hospital (RGH)	23	13.2
Qassim Armed Forces Hospital (QAFH)	21	12.06
Badaya General Hospital (BGH)	25	14.36
Mithnib General Hospital (MGH)	17	9.7
Experience		
<1year	72	41.3
1-4 years	37	21.2
5-9 years	24	13.7
≥10 years	41	23.5

3.2. Knowledge of Pharmacists Regarding Clinical Pharmacy Services

The 16 Yes and No answers assessed pharmacists' knowledge of clinical pharmacy services (Table 3). The first four questions were on ADR and medication error reporting, ambulatory care services, and drug usage evaluation services. Each Yes answer took one score, and each No/Don't know took zero with 16 scores. The median of the total score of knowledge was eight. The minimum score obtained was equal to three, and the maximum score reported was 16. Pharmacists who received a score between 1 and 5 had poor knowledge, while 6-9 – low knowledge, 10-12 – moderate knowledge, and 13-16 – high knowledge. Generally, the survey results showed that most pharmacists (46) had low knowledge regarding clinical pharmacy services.

Table 3 Pharmacists' knowledge of clinical pharmacy services

Questions	Yes	No	Don't know
ADR (Identification and Reporting)	155 (89.08%)	9 (5.17%)	10 (5.74%)
Ambulatory care clinic participation	97 (55.74%)	37 (21.2%)	40 (22.9%)
Medications errors preventing and monitoring	133 (76.43%)	21 (12.0%)	20 (11.9%)
Drug use Evaluation	74 (42.5%)	60 (34.4%)	40 (22.9%)
Perform clinical research and publish articles	132 (75.8%)	16 (9.1%)	26 (14.9%)
Provider of drug information	73 (41.9%)	76 (43.6%)	25 (14.3%)
Provider of poison information	84 (48.2%)	70 (40.2%)	20 (11.9%)
CPR team participation	71 (40.80%)	62 (35.6%)	41 (23.5%)
Admission drug history	64 (36.7%)	77 (44.2%)	33 (13.2%)
Cost reduction project (Pharmacoeconomics)	112 (64.3%)	41 (23.5%)	21 (12.0%)
Setting and evaluating therapeutic guidelines	155 (89.08%)	9 (5.17%)	10 (5.74%)
Patient counseling	58 (33.3%)	80 (45.9%)	36 (20.6%)
Home pharmaceutical care	76 (36.4%)	73 (41.9%)	25 (14.3%)
Pharmacokinetic consultation	79 (45.4%)	71 (40.8%)	24 (13.7%)
Nutrition support	70 (40.2%)	70 (40.2%)	34 (19.5%)
Residency or student training	74 (42.5%)	65 (37.3%)	35 (20.1%)

3.3. Attitude of Pharmacists Regarding Clinical Pharmacy Services

Most pharmacists have agreed that clinical pharmacists can monitor patient response to drug therapy for effectiveness. At the same time, the clinical pharmacist can provide drug information to healthcare

professionals, such as compatibility, stability, storage, and availability. In addition, clinical pharmacists should analyze patient treatment and propose changes in therapy when necessary – 152 (87.2%). Moreover, 143 (82.1%) agreed that clinical pharmacists should care about drug products and leave patient care to doctors, whereas 19 (10.8%) disagreed. Table 4 displays the attitude of pharmacists toward clinical pharmacy services.

Table 4 Attitude of pharmacists regarding clinical pharmacy services

Statements	SA	A	N	D	SD
CP participation in medical ward rounds is desirable	72 (41.3%)	52 (29.8%)	25 (14.3%)	25 (14.3%)	0
CP can play an essential role in patient education and counseling	94 (54.0%)	57 (32.7%)	23 (13.2%)	0	0
CP can monitor patient response to drug therapy from a toxicity/side effect perspective	99 (56.8%)	60 (34.4%)	0	14 (8.04)	1 (0.5)
CP can monitor patient response to drug therapy from an efficient perspective	85 (48.8%)	47 (27.0%)	21 (12.0%)	0	21 (12.0%)
CP can provide drug information to healthcare professionals, such as compatibility, stability, storage, and availability	96 (55.1%)	48 (27.5%)	29 (16.6%)	0	1 (0.1%)
CP service enhances patients' appreciation and satisfaction	95 (54.5%)	45 (25.8%)	17 (9.7%)	15 (8.6%)	2 (1.1%)
The CP should take the patient's medication history at admission.	90 (51.7%)	55 (31.6%)	20 (11.4%)	5 (2.8%)	4 (2.2%)
CP should have access to patients' charts and a place to document their service	92 (52.8%)	46 (26.4%)	26 (14.9%)	5 (2.8%)	5 (2.8%)
CP should analyze patient treatment and propose changes in therapy when necessary	96 (55.1%)	56 (32.1%)	15 (8.6%)	0	7 (4.02%)
CPs should care about drug products and leave patient care to doctors, health officers, and nurses	97 (55.7%)	46 (26.4%)	12 (6.8%)	18 (10.3%)	1 (0.5%)
The current setup (infrastructure and environments of your hospital are appropriate for the provisions of clinical pharmacy service)	98 (56.3%)	19 (10.9%)	43 (24.7%)	13 (7.4%)	1 (0.5%)
CP service initiation is desirable in the Saudi healthcare system	96 (55.1%)	55 (31.6%)	18 (10.3%)	5 (2.8%)	0
CP can improve overall patient outcomes and quality of patient care	96 (55.1%)	66 (37.9%)	10 (5.7%)	2 (1.1%)	0

Notes: SA - strongly agree, A - agree, N - neutral, D - disagree, SD - strongly disagree, CP - clinical pharmacy/pharmacist

3.4. Practice of Pharmacists Regarding Clinical Pharmacy Services

The most clinical pharmacy services practiced were counseling patients about their medications either during their stay or at discharge from the hospital 78 (44.8%) and concurrent, routine monitoring of drug therapy of the patients 87 (50%) while daily rounds with the medical and nursing staff 90 (50.1%) and pharmacokinetic or nutritional support consultations were less practiced by pharmacists 52 (29.8%). Table 5 depicts the practice of pharmacists regarding clinical pharmacy services.

Table 5 Practice of pharmacists regarding clinical pharmacy services

Issues	Always	Often	Sometimes	Rarely	Never
Preparation of written medication histories when the patient is admitted to the hospital.	89 (51.1%)	9 (5.1%)	51 (29.3%)	8 (4.5%)	17 (9.7%)
Counseling patients on their medications either during their stay or at discharge.	78 (44.8%)	24 (13.7%)	63 (36.2%)	5 (2.8%)	4 (2.2%)
Concurrent, routine monitoring of the drug therapy of the patients.	87 (50%)	24 (13.7%)	50 (28.7%)	4 (2.2%)	9 (5.1%)
Rounds with the medical and nursing staff.	90 (50.1%)	39 (22.4%)	10 (5.7%)	19 (10.9%)	16 (9.1%)
Pharmacokinetic or nutritional support consultations.	52 (29.8%)	16 (9.1%)	66 (37.9%)	18 (10.3%)	22 (12.6%)

3.5. Comparison of Demographic Characteristics and Mean KAP Scores

Table 6 shows the association between demographic characteristics and mean KAP scores. Among the demographic variables, only age and highest academic qualification were significantly associated with mean KAP scores ($p < 0.05$).

Table 6 Comparison of demographic characteristics and mean KAP scores

Description	N	Knowledge score (Mean ±SD)	p-value	Attitude score (Mean ±SD)	p-value	Practice score (Mean ±SD)	p-value
Nationality							
Saudi	170	8.7 (3.0)	0.93	29.3 (4)	0.77	16.3 (3.0)	0.001*
Non-Saudi	4	7.5 (2.3)		29.3 (4.1)		17.2 (3.8)	
Age							
18-24	64	9.31 (2.8)	0.798	28.2 (4.5)	<0.001*	16.3 (2.6)	<0.001*
25-34	85	8.11 (2.8)		29.3 (3.1)		16.5 (3.3)	
35-44	21	9.75 (3.5)		31.2 (4.8)		15.5 (2.3)	

Continuation of Table 6

45-55	4	6 (0.0)		37 (0.0)		25 (0.0)	
Gender							
Male	92	8.4 (3.0)	0.488	29.7 (3.5)	0.45	16.1 (3.2)	0.46
Female	82	9.10 (2.9)		28.9 (4.6)		16.5 (2.9)	
Professional grade							
Pharmacist	169	8.6 (3.0)	0.68	29.3 (4.1)	0.31	16.3 (3.1)	0.05
Clinical pharmacist	5	9.8 (2.5)		29.4 (3.3)		16.6 (3.2)	
Highest academic qualification							
Bachelor's	167	8.5 (3.0)	0.02*	29.3 (4.2)	0.39	16.4 (3.1)	0.12
Masters	7	10.1 (2.7)		29.7 (2.8)		15.8 (2.9)	
Working hospital							
King Saud Hospital (KSH)	38	9.4 (3.5)	0.66	27.5 (2.2)	0.52	17.1 (2.1)	0.47
Buridah Central Hospital (BCH)	26	8.5 (2.7)		28.8 (3.1)		16.6 (3.9)	
Maternity and Children Hospital (MCH)	24	8.8 (3.4)		31.4 (4.2)		15.8 (2.8)	
Alras General Hospital (RGH)	23	8.1 (1.8)		32.4 (1.3)		17.6 (2.1)	
Qassim Armed Forces Hospital (QAFH)	21	8.6 (3.8)		28.1 (2.9)		15.2 (4.6)	
Badaya General Hospital (BGH)	25	8 (2.7)		29.1 (4.3)		15.5 (2.5)	
Mithnab General Hospital (MGH)	17	9.3 (2.4)		27.6 (1.6)		15.8 (2.8)	
Experience							
<1year	72	9.02 (2.9)	0.48	28.4 (4.0)	0.16	16.3 (2.8)	0.078
1-4 years	37	8.0 (2.9)		29.5 (3.7)		16.7 (3.8)	
5-9 years	24	8.8 (3.6)		29.4 (2.9)		16.5 (2.8)	
≥10 years	41	8.6 (2.9)		31.8 (4.7)		15.9 (3.2)	
Total	174	8.7 (3.0)		29.3 (4.1)		16.3 (3.1)	

* Statistically significant

3.6. Challenges and Barriers to the Provision of Clinical Pharmacy Services

The main challenge that the pharmacists faced in providing clinical pharmacy services was a lack of cooperation from doctors and nurses, as they were not aware of the roles of clinical pharmacists. The study participants mentioned that doctors hardly accept pharmacists' clinical interventions. Other challenges were a lack of training, shortage of staff, and workload, which hindered their involvement in providing appropriate clinical services.

3.7. Recommendations for the Improvement of Clinical Pharmacy Services

Pharmacists made several recommendations to improve clinical pharmacy services. Most of them recommended having residency programs for pharmacists at local hospitals, enabling graduates of PharmD to practice their clinical role by the Saudi Commission for Health Specialties without requiring them to have a master's degree. More clinical pharmacists should be appointed, and more specialized training should be provided, especially in the ICU, psychiatric, and oncology.

4. Discussion

As far as we know, this is the first study from the Qassim region to evaluate knowledge, attitude, and practice toward clinical pharmacy services among pharmacists. Today, besides dispensing activity, pharmacists' role has been expanded to include more services such as patient counseling, ADR and medication errors (MEs) reporting, and medication therapeutic management [21, 22]. Generally, our findings showed that pharmacists had low knowledge scores, similar to studies conducted in Saudi Arabia and Kuwait [2, 23]. However, the knowledge scores about medication errors, adverse drug reactions, providing drug information, and counseling were higher than those in other studies [24, 25, and 26].

A nationwide survey in Saudi Arabia revealed that medication error prevention and monitoring were the most common clinical hospital services, followed by patient counseling and drug information [20]. A recent meta-analysis, which included 16 studies conducted to detect the rate of MEs in Saudi Arabia in hospitals, demonstrated that MEs are common in health facilities. Prescribing errors were the most common ME highlighted in this meta-analysis [27]. Another multiregional study among healthcare professionals in Saudi Arabia shows that only 28.3% of healthcare providers understand the stages of medication error reporting, and 58.8% never reported MEs at their workplaces, considering legal implications as a primary barrier [28]. In the context of low-and middle-income countries (LMICs) where the concept of clinical pharmacy services is comparatively new, a review conducted in Pakistan reported that clinical pharmacists improve humanistic outcomes such as patient knowledge, adherence, and health-related quality of life [29]. Moreover, few studies from India reported the impact of clinical pharmacists in improving the humanistic and economic outcomes of COPD patients, validating the role of clinical pharmacists in healthcare teams [30, 31, and 32]. These recent findings reflect the importance of clinical pharmacy services, which need strengthening by recognizing the role of CPs in health care management.

The most notable finding of this study is the gap between knowledge and attitude toward clinical pharmacy services, even though the majority had either a moderate or good attitude not reflected in their insufficient knowledge. These results hint at pharmacists' awareness of clinical pharmacy services. In general, many previous studies conducted in Riyadh, Pakistan, and Malaysia reported similar findings that healthcare providers had positive attitudes toward clinical pharmacy services [24, 33, and 34]. In terms of practice, despite limited roles in clinical pharmacy in the Qassim region, the results showed that pharmacists had moderate opportunities to practice these services. The most clinical pharmacy services practiced were counseling patients about their medications during their stay or discharge from the hospital and concurrent and routine drug therapy monitoring. Clinical pharmacist-led counseling on discharge medications is critical and should focus on post-hospital follow-up. Clinical pharmacists' contribution can ensure the continuity of medical treatment during transitions and increase the quality and satisfaction of medicine-related healthcare services delivered at hospital discharge [35].

Notably, most pharmacists in our study were novices with less than one year of working experience [2, 20, and 36].

The main challenges faced by pharmacists were the lack of cooperation between doctors and nurses. Additionally, lack of workforce, time, and necessary training were among the problems reported by the pharmacists that are somewhat similar to those reported before, where a shortage of staff, lack of confidence among clinical pharmacists, inadequacy of service promotions, and absence of cooperation with health workers were among the challenges identified by the interviewers [20, 34]. Inter-professional collaboration (IPC) between doctors and pharmacists is critical in patient care. In Turkey, a systematic review investigating the effect of clinical pharmacist-led intervention on patient outcomes reported decreased hospital stay, improved quality of life, and a positive attitude of other healthcare professionals to work with clinical pharmacists [37].

To overcome these challenges, we added questions for recommendations by the pharmacists to improve clinical pharmacy services. Most participants commented on the lack of residency opportunities at local hospitals. Residency opportunities for clinical pharmacists are highly challenging in the Saudi healthcare setting. There are currently 20 accredited sites, located mainly in large cities, for residency programs approved by the Saudi Commission for Health Specialties (SCFHS) that are perhaps insufficient to meet the requirements of many pharmacy residence applicants annually [15]. Residency program directors and preceptors recommend that candidates focus on training in clinical settings, participating in mock interviews and Saudi Pharmacist Licensure Examination (SPLE) tests, and involvement in clinical research among the recommendations made to increase pharmacy students' chances of securing residency positions [38, 23].

5. Conclusion

In conclusion, the study findings provide insights into pharmacists' knowledge, attitudes, and practices regarding clinical pharmacy services in Qassim, Saudi Arabia. Recognizing the importance of clinical pharmacy services and the role of clinical pharmacists in healthcare settings is an essential step toward improving patient safety. Therefore, pharmacists need proper training in clinical pharmacy services to gain confidence. Pharmacists should be encouraged to attend ward rounds more frequently to strengthen their clinical knowledge and to provide services to patients besides dispensing and counseling only. This study is the first cross-sectional study evaluating the knowledge, attitude, and practice (KAP) of pharmacists in Qassim, where there is a shortage of experienced, qualified hospital pharmacists. The findings help highlight the importance of the role of clinical pharmacists in providing clinical pharmacy services and understanding the obstacles they face. On the other hand, the study occurred in one province of Saudi Arabia; therefore, the research findings may not represent the KAP of pharmacists across Saudi Arabia.

Acknowledgments

The researchers would like to thank the Dean of Scientific Research, Qassim University, Saudi Arabia, for funding the publication of this project.

The authors also acknowledge all hospitals involved in data collection for supporting and facilitating this project, and special thanks to all participating pharmacists who have spent their valuable time filling out the questionnaire.

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