

# Yemeni Physicians' Attitudes and Perceived Barriers Toward Ward-Based Clinical Pharmacist in Hospital Settings

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**Background:** Clinical pharmacy services (CPSs) are still in their infancy in Yemen. Furthermore, pharmacists are not members of a multidisciplinary healthcare team, so their responsibilities are limited to drug dispensing and marketing. This study examines physicians' attitudes and perceived obstacles regarding the inclusion of clinical pharmacists in hospital medical wards.

**Methods:** A descriptive observational study was carried out using a validated, self-administered bilingual questionnaire. The study's questionnaire was conducted among physicians in three leading hospitals. Those hospitals were at the forefront of establishing clinical pharmacy units and embracing clinical pharmacy services. Data were analyzed using descriptive statistics.

**Results:** Sixty-five responses were included. Our data results indicated that physicians believed the most important contributions for clinical pharmacists to improve patient care were "attending medical rounds", followed by "order review". About 75% of physicians showed positive attitudes toward the clinical pharmacist role. However, more than 70% of physicians believed that clinical pharmacists should leave patient care to other healthcare professionals and focus on drug products. Not enough clinical pharmacist staff working in the health center was considered the top perceived barrier (83.1%), followed by "clinical pharmacist responsibilities were not clearly defined" and "clinical pharmacist recommendations are not properly documented".

**Conclusion:** Strategies to expand clinical pharmacy services in Yemen should focus on several key areas. Protocols must be established to clearly outline the collaboration between clinical pharmacists and physicians. Additionally, fostering inter-professional relationships is crucial to overcoming resistance and increasing awareness and understanding of CPS adoption among healthcare team members.

**Keywords:** clinical pharmacist, clinical pharmacy services, attitudes, physicians, collaboration, Yemen

## Background

Clinical pharmacy is described by the American College of Clinical Pharmacy as the "area of pharmacy concerned with the science and practice of rational drug use".<sup>1</sup> Clinical pharmacists offer patient-centered services that have evolved to ensure the most effective use of drugs for standard drug therapy.<sup>2</sup> Specifically, those services are designed to optimize therapeutic effect, minimize risks, save cost, and put the patient at the forefront of all acts.<sup>3,4</sup> Clinical pharmacy services (CPSs) are provided by pharmacists in the healthcare environment in collaboration with physicians and can include counseling and patient education, comprehensive medication management, chronic care management, and population health management for several disease states and infectious diseases like HIV and COVID-19.<sup>3-8</sup>

Yemen is an economically low-income, developing country in the Middle East. Clinical pharmacy services are still in their infancy in Yemen. Further, pharmacists are not members of a multidisciplinary healthcare team, and their

responsibilities are limited to drug dispensing and marketing. Although the current model of direct patient treatment still needs to be completely implemented, pharmacists' functions are evolving to keep up with the demands of a modern healthcare system.<sup>9</sup> Clinical pharmacy administration was established by the Ministry of Health (MOH) in 2019. Concurrently, the Ministry of Health released the first national clinical pharmacy guideline, outlining job responsibilities and allowing clinical pharmacists to register their interventions as part of clinical pharmacy services. Moreover, eight colleges offer clinical pharmacy programs; five of them established a 5-year bachelor of clinical pharmacy program, and the other three colleges provided a 6-year Pharm.D. program. However, the Ministry of Higher Education and the Ministry of Health consider all those who graduate from both programs to be bachelor's degree holders. In 2011, Hodeidah University became the first university to offer a clinical pharmacy program, and in 2013, it established the first independent college of clinical pharmacy.<sup>9,10</sup>

Previous research has indicated that there are some variations in how doctors see various types of CPSs<sup>11–21</sup> and that doctors seem to have an improved perception of CPSs if they interact with pharmacists more often.<sup>11,15–19</sup> Doctors in Sweden are skeptical of the expertise and understanding of clinical pharmacists.<sup>11</sup> Moreover, medical students from a Midwestern medical school in the United States do not believe that the duties of a pharmacist include patient screening and physical examination.<sup>22</sup> Concerns about a pharmacist's clinical competency continue to exist in Sierra Leone.<sup>15</sup> When it came to advanced clinical pharmacy tasks like interfering in prescriptions and pharmaceutical therapy, consultations, prescribing, etc., people in Pakistan were skeptical, and the concept of pharmacists joining an allied healthcare team was not well accepted by doctors.<sup>16</sup>

Hence, it is critical to highlight that successful clinical pharmacy service delivery primarily depends on physician collaboration. Hence, exploring physicians' attitudes toward clinical pharmacists is critical to implementing and moving clinical pharmacy forward. Furthermore, clinical pharmacists face numerous challenges when implementing their services; thus, it is critical to recognize the factors that impede clinical pharmacist interventions, as well as to address those challenges in the future and extend the scope of clinical pharmacist interventions.<sup>2</sup> At the time of writing this article, just three hospitals had introduced clinical pharmacy services and included clinical pharmacists in separate wards. Therefore, such research has yet to be undertaken to investigate physicians' attitudes and perceived obstacles to physicians working with ward-based clinical pharmacists in Yemeni hospitals. Further, we aimed to examine whether the attitudes of physicians were affected by socio-demographic factors among the respondents.

## Methodology

### Study Setting and Sample Size

This study was conducted at three leading hospitals. Those hospitals were at the forefront of establishing clinical pharmacy units and embracing clinical pharmacy services. At the time of preparing this paper, no other hospitals were providing clinical pharmacy services or employing clinical pharmacists in Yemen. The University of Science and Technology Hospital (USTH) is one of the most prestigious medical institutions in the country. The USTH is located in the capital of Yemen. No clinical pharmacists graduated from Yemeni universities when the clinical pharmacy unit was founded in 2013. Hence, the USTH and 48 Hospital hired clinical pharmacists who earned their master's degrees in clinical pharmacy outside Yemen. 48 Hospital is also located in Sana'a city, and it is the university hospital of the 21 September University. Al-Thowra Hospital was the first governmental hospital to provide clinical pharmacy services in 2017. Al-Thowra Hospital is located in Hodeidah city. Which is nearly 217 km from the capital. It began by hiring only those with a bachelor's degree in clinical pharmacy from Hodeidah University. Since it was the first governmental university to launch a clinical pharmacy program, it has led the field. The estimated total number of physicians working at the three hospitals was 150. Hence, our targeted sample size was to take in all physicians working in the sampled hospitals.

### Study Design and Study Tool

A descriptive observational study was conducted using a self-administrated questionnaire to determine physician attitudes and barriers toward clinical pharmacists in three leading hospitals. The questionnaire was adopted from previous quantitative studies with minor modifications ([Supplementary Materials](#)). The questionnaire will be introduced in both Arabic and English. The questionnaire consists of three parts. The socio-demographic information of physicians (age, gender, years of

experience in practice, and current area of practice) were represented in the first part. The second part used the 5-point Likert scale (strongly agree = 5, agree = 4, neutral = 3, disagree = 2, and strongly disagree = 1) to assess physicians' attitudes using 15 questions adopted from previous studies.<sup>19–21</sup> The third part was concerned with barriers that may hinder clinical pharmacists' contributions to the health care team; those questions were adopted from existing literature.<sup>12,13</sup> Two independent academic members from the faculty of pharmacy pre-tested the questionnaire for suitability and content relevance. The questionnaire was additionally reviewed by the other three physicians for relevance, clarity, conciseness, and simplicity of the items. The questionnaire's final version included feedback from experts.

## Ethical Approval

Before participating in the study, physicians were informed about the study's purpose, procedures, potential risks, and benefits. They had the opportunity to ask any questions they might have. Verbal consent was obtained from each participant to confirm their voluntary participation. The research and ethics committee at Hodeidah University accepted the study's design and methodology in compliance with the Declaration of Helsinki with Reference No. (REC-CCP-1255).

## Data Collection

After receiving permission from the hospital's administrators, three well-trained, non-pharmacy-related majors distributed questionnaires. They handed the questionnaires to physicians, who, due to their nature of work, left them with them. After three days, responses were gathered and forwarded to the lead researchers. The study was conducted between July 2021 and February 2022.

## Data Analysis

Data were first entered and coded in Excel to analyze the data, then imported into SPSS version 26.0 (SPSS, Chicago, IL, USA). To summarize categorical data, basic descriptive statistics, including frequency, percentage, mean, and standard deviations, were used. Cronbach's alpha was used to measure the overall reliability and internal consistency of the questionnaire. Its total value was 0.831, and each item scored more than 0.8.

## Results

Sixty-five responses were included (60% response rate). In [Table 1](#), more than three-quarters of them (76.9%) were males, and more than half were under 40 years old. Nearly 37% of physicians were specialists, and the majority had more than 15 years of practice. About 31% work on the internal medicine ward. Around one-third of the participants had either "never" (12.3%) or "rarely" (21.5%) working experience with a clinical pharmacist. 40% of physicians rated the clinical

**Table 1** Socio-Demographic Information of Participant Physicians

Variables	N	%
<b>Sex</b>		
Male	50	76.9
Female	15	23.1
<b>Age (years)</b>		
<30	15	23.1
30–39	20	30.8
40–49	21	32.3
≥50	9	13.8

(Continued)

**Table I** (Continued).

Variables	N	%
<b>Professional role</b>		
Consultant	12	18.5
Specialist	24	36.9
Resident	12	18.5
GP	17	26.2
<b>Experience (years)</b>		
0–3	18	27.7
4–7	11	16.9
8–11	5	7.7
12–15	7	10.8
> 15	24	36.9
<b>Area of Practice</b>		
Internal Medicine	20	30.8
Obstetrics and gynecology	7	10.8
Critical Care	3	4.6
Pediatrics	8	12.3
Surgery	17	26.2
Other	10	15.4
<b>Type of Hospital</b>		
Governmental	25	38.5
Private	21	32.3
Both	19	29.2

pharmacist services provided in the included hospitals as “acceptable” in terms of meeting the patient’s needs. Also, our data results indicated that physicians believed the most important contributions for clinical pharmacists to improve patient care were “attend medical rounds” (70.8%), followed by “order review” and “patient education” (58.5%), and (52.3%) respectively. More information can be found in [Table 2](#).

In [Table 3](#), most physicians showed positive attitudes toward clinical pharmacists, with a mean and standard deviation of  $4.06 \pm 0.43$ . More than 90% of physicians were positive in the following statements: “welcoming the clinical pharmacist to participate in the medical ward round”, “monitoring patients’ responses to drug therapy from a toxicity/side effects perspective”, and “believe that clinical pharmacists can improve the overall patient outcome and quality of patient life”. Moreover, 89.2% of physicians positively “strongly agree and agree” that “clinical pharmacists can provide drug information to other healthcare team members regarding compatibility, stability, storage, and availability”. However, more than 70% of physicians thought that clinical pharmacists should leave patient care to other healthcare members and care about drug products, and a significant proportion of physicians expressed skepticism regarding the involvement of clinical pharmacists in drug selection and their role in analyzing patients and treatment to suggest therapy changes when necessary. While the statement “the current setup is appropriate for the provision of clinical pharmacy services” received the lowest agreement at 49.3%, around 29% of physicians were “neutral”.

**Table 2** Physicians' Working Experience, Perception, and Contribution Area of Ward-Based Clinical Pharmacist

Variables	N	%
<b>Experience working with clinical Pharmacist</b>		
Never	8	12.3
Rarely	14	21.5
Sometimes	30	46.2
Often	10	15.4
Always	3	4.6
<b>Clinical pharmacist meets the needs in terms of patient care</b>		
Not at all	9	13.8
Poor	10	15.4
Acceptably	26	40.0
Adequately	16	24.6
Very adequately	4	6.2
<b>Most important contributions for clinical pharmacist to improve patient care</b>		
Attend medical rounds	46	70.8
Being available for consultation	32	49.2
Patient education	34	52.3
Order review	38	58.5
Staff education	27	41.5
Attend clinic	15	23.1

Among the 18 barriers that were included in the questionnaire (Table 4), not enough clinical pharmacist staff working in the health center was considered the top perceived barrier (83.1%), followed by clinical pharmacist responsibilities were not clearly defined", and "clinical pharmacist recommendations are not properly documented" (81.5%), and 53.8%, respectively. The statement that clinical pharmacists need more confidence to interact with other healthcare teams received the lowest agreement as a potential barrier.

**Table 3** Attitudes of Physicians Toward Ward-Based Clinical Pharmacist Role

Statement	Response, n (%)					Mean ± SD
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Clinical pharmacist participation in medical ward round is desirable.	31 (47.7)	28 (43.1)	4 (6.2)	2 (3.1)	–	4.35 ± 0.73
Clinical pharmacist can play important role in patient education and counseling.	28 (43.1)	26 (40.0)	11 (16.9)	–	–	4.26 ± 0.73
Clinical pharmacist can monitor patient response to drug therapy from toxicity/side effects perspective.	29 (44.6)	31 (47.7)	4 (6.2)	1 (1.5)	–	4.35 ± 0.67

(Continued)

**Table 3** (Continued).

Statement	Response, n (%)					Mean ± SD
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
Clinical pharmacist can monitor patient response to drug therapy from effectiveness perspective.	18 (27.7)	33 (50.8)	12 (18.5)	2 (3.1)	–	4.03 ± 0.77
Clinical pharmacist can involve in drug selection (drug, dosage form) based on patient and drug factors.	14 (21.5)	31 (47.7)	15 (23.1)	2 (3.1)	3 (4.6)	3.78 ± 0.97
Clinical pharmacist can provide drug information to health care professionals such as compatibility, stability, storage, availability.	22 (33.8)	36 (55.4)	7 (10.8)	–	–	4.23 ± 0.63
Clinical pharmacist can detect and prevent medication use errors.	20 (30.8)	37 (56.9)	7 (10.8)	1 (1.5)	–	4.17 ± 0.67
Clinical pharmacy service enhances patients' appreciation and satisfaction.	18 (27.7)	33 (50.8)	12 (18.5)	2 (3.1)	–	4.03 ± 0.77
Clinical pharmacist should take patients medication history at admission.	25 (38.5)	30 (46.2)	8 (12.3)	2 (3.1)	–	4.20 ± 0.77
Clinical pharmacist should have access to patients chart and have a place to document their service.	26 (40.0)	26 (40.0)	10 (15.4)	1 (1.5)	2 (3.1)	4.12 ± 0.94
Clinical pharmacist should analyses patient treatment and suggest changes of therapy when necessary.	20 (30.8)	30 (46.2)	9 (13.8)	3 (4.6)	3 (4.6)	3.94 ± 1.03
Clinical pharmacist should care about drug products and leave patient care to Doctors, Health Officers and nurses.	16 (24.6)	31 (47.7)	9 (13.8)	7 (10.8)	2 (3.1)	3.80 ± 1.03
The current setup (infrastructure and environments of your hospitals) appropriate for the provisions of clinical pharmacy service.	2 (3.1)	30 (46.2)	19 (29.2)	9 (13.8)	5 (7.7)	3.23 ± 0.99
Clinical pharmacy service initiation is desirable in Yemen health care system.	20 (30.8)	33 (50.8)	10 (15.4)	–	2 (3.1)	4.06 ± 0.86
Clinical pharmacist can improve overall patient outcome /quality of patient care.	24 (36.9)	36 (55.4)	4 (6.2)	1 (1.5)	–	4.28 ± 0.65
Overall attitude (mean ± SD)	4.06 ± 0.43					

**Table 4** Barriers That Can Hinder Ward-Based Clinical Pharmacist's Role with Physicians

Statement	Response, n (%)					Mean ± SD
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
The specific responsibilities of a clinical pharmacist are not clearly defined.	16 (24.6)	37 (56.9)	10 (15.4)	2 (3.1)	–	4.03±0.73
There are not enough number of clinical pharmacists staff in the health center that we are working in.	16 (24.6)	38 (58.5)	5 (7.7)	6 (9.2)	–	3.98±0.84
Administration does not supportively enough clinical pharmacist services.	12 (18.5)	22 (33.8)	22 (33.8)	7 (10.8)	2 (3.1)	3.54±1.02

(Continued)

Table 4 (Continued).

Statement	Response, n (%)					Mean $\pm$ SD
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	
The hospital that we work in is inconvenient.	4 (6.2)	12 (18.5)	17 (26.2)	25 (38.5)	7 (10.8)	2.71 $\pm$ 1.08
Clinical pharmacist does not have good knowledge on disease management.	4 (6.2)	19 (29.2)	23 (35.4)	11 (16.9)	8 (12.3)	3.00 $\pm$ 1.10
Clinical pharmacist does not have good knowledge on drug related issues.	4 (6.2)	11 (16.9)	22 (33.8)	19 (29.2)	9 (13.8)	2.72 $\pm$ 1.10
Clinical pharmacist does not have enough confidence to interact with the health care team.	6 (9.2)	21 (32.3)	15 (23.1)	18 (27.7)	5 (7.7)	3.38 $\pm$ 2.60
Clinical pharmacist is not interested to provide clinical pharmacy services.	3 (4.6)	16 (24.6)	15 (23.1)	22 (33.8)	9 (13.8)	2.72 $\pm$ 1.12
Clinical pharmacists have inadequate communication skills needed for interaction with physicians.	3 (4.6)	20 (30.8)	18 (27.7)	16 (24.6)	8 (12.3)	2.91 $\pm$ 1.11
Clinical pharmacist recommendations are not properly documented.	8 (12.3)	27 (41.5)	17 (26.2)	12 (18.5)	1 (1.5)	3.45 $\pm$ 0.98
There is no continuity in the services provided by the clinical pharmacist due to other non-clinical roles.	2 (3.1)	26 (40.0)	24 (36.9)	11 (16.9)	2 (3.1)	3.22 $\pm$ 0.92
Physicians are unaware of the benefits of having a clinical pharmacist on their team.	4 (6.2)	26 (40.0)	10 (15.4)	19 (29.2)	6 (9.2)	3.05 $\pm$ 1.15
Physicians are unable to judge the knowledge and level of skills of the clinical pharmacist.	6 (9.2)	20 (30.8)	12 (18.5)	19 (29.2)	8 (12.3)	2.95 $\pm$ 1.21
Physicians have low trust in the clinical pharmacist's abilities.	1 (1.5)	16 (24.6)	19 (29.2)	19 (29.2)	10 (15.4)	2.68 $\pm$ 1.06
Physicians have inadequate communication skills needed for interaction with the clinical pharmacist.	–	13 (20.0)	19 (29.2)	21 (32.3)	12 (18.5)	2.51 $\pm$ 1.01
Physicians do not support adequately the clinical pharmacist services.	–	15 (23.1)	22 (33.8)	17 (26.2)	11 (16.9)	2.63 $\pm$ 1.02
Physicians have no prior experience of working with a clinical pharmacist.	7 (10.8)	23 (35.4)	13 (20.0)	17 (26.2)	5 (7.7)	3.15 $\pm$ 1.16
Physicians believe that clinical pharmacists cannot be clinicians.	5 (7.7)	14 (21.5)	13 (20.0)	21 (32.3)	12 (18.5)	2.68 $\pm$ 1.22
Overall barriers (mean $\pm$ SD)	3.07 $\pm$ 0.66					

## Discussion

This is the first observational study in Yemen to highlight physicians' perceptions of clinical pharmacists' roles in direct patient care and their participation in healthcare teams. It also identifies significant barriers that could hinder clinical pharmacists in healthcare settings from a physician's perspective. The vast majority of physicians positively welcomed the clinical pharmacist's involvement in medical ward rounds and patient response monitoring. However, over 70% of physicians "strongly agree and agree" that clinical pharmacists should leave patient care to other healthcare members and focus on traditional tasks. The study revealed nine potential barriers, with the top two being the insufficient number of clinical pharmacists in health centers and the lack of clearly defined responsibilities for clinical pharmacists, as reported by physicians in the three hospitals.



Clinical pharmacy services (CPSs) do exist in the sample hospitals. However, clinical pharmacy is an entirely novel concept in the country's healthcare environment. CPSs in those hospitals are still in their early stages, confined to medication-related problem-solving and providing clinical suggestions for physicians on certain medical wards.<sup>3,9</sup> Physicians who responded to our survey rated the clinical pharmacist services provided in the included hospitals as "acceptable" in terms of meeting the patient's needs. Also, our data results indicated that physicians believed that pharmacists could improve patients' lives by performing extended patient-oriented roles such as attending medical rounds, order reviews, patient education, and being available for consultation. These findings are consistent with prior studies.<sup>14-16</sup>

## Attitudes Aspect

The results demonstrate that physicians show positive attitudes toward clinical pharmacists, with a mean and standard deviation of  $4.06 \pm 0.43$ . They positively welcomed

the clinical pharmacist's participation in the medical ward round, monitor patients' response to drug therapy from a toxicity/side effects perspective, and believe that clinical pharmacists can improve the overall patient outcome and quality of patient life.

Moreover, they thought clinical pharmacists could provide drug information to other healthcare team members. It was observed in this study that, physicians in Yemen encourage the clinical pharmacist's involvement in the clinical ward team, who may routinely seek guidance on patient medication. This finding is consistent with the findings of several earlier investigations.<sup>14,15,18</sup> In addition, physicians in this study indicated that clinical pharmacists may enhance overall health outcomes and patient quality of life. These views are in agreement with those expressed earlier by Saudis and US doctors, who pointed out that clinical pharmacists' participation and recommendations increased the quality of patient care.<sup>20,22</sup> Recent studies found that clinical pharmacist intervention and engagement in clinical decisions can reduce hospital stays, medication errors, patient satisfaction, and the impact of quality of care.<sup>23,24</sup>

However, the results from our study suggest that physicians view traditional tasks such as providing drug information regarding compatibility, stability, storage, and availability as the responsibility of clinical pharmacists. While most participants reported that clinical pharmacists should leave patient care to other healthcare members and care about drug products, this was expected since many low-income nations reported that the responsibilities of the clinical pharmacist have been defined as subordinate to those of physicians.<sup>13,25</sup> One probable explanation for these perceptions is that physicians are unaware of clinical pharmacists' expertise. When the clinical pharmacist and the physician continue to communicate and the pharmacist can share his or her expertise, physicians may see the clinical pharmacist's potential and significance to the health care team. International experience suggests that physicians' attitudes and acceptance of pharmacists' clinical duties have improved over time and have been attributed to physicians' interaction with pharmacists and continuous exposure to their services, with these negative attitudes often fading away.<sup>14,16-18</sup> Consequently, a clear line must be drawn between these skills and those of other medical professionals to maintain a successful working environment. In Yemen, the recently developed pharmacy curriculum included some instructions on analyzing patients' signs and symptoms, including physical examinations and complete assessments of patients' biomarker profiles to determine patients' medication demands.<sup>9,10</sup> These capacities are shared by other medical practitioners. Pharmacists as clinicians are not widespread in Yemeni pharmacy practice.<sup>9</sup> Hence, some physicians in this study showed doubt about clinical pharmacists' skills and preferred their conventional dispensing orientation.

Another contributing factor is the lack of inter-professional education (IPE), stemming from the absence of established protocols outlining how clinical pharmacists and physicians should collaborate. Developing inter-professional relationships is essential to overcome resistance and increase awareness and understanding of clinical pharmacy services (CPS) adoption among healthcare team members. Clearly defining and describing each healthcare professional's tasks and responsibilities is crucial when creating a multidisciplinary healthcare team. Furthermore, fostering a collaborative or multidisciplinary work environment during both medical and pharmacy undergraduate training programs is necessary to support this integration.

This study suggests the need for clinical pharmacists to interact effectively and often with physicians on the ward level in order to improve physicians' impressions of the role of CPSs in Yemeni hospitals.<sup>9</sup> It has also been revealed that decision-makers' support for CPSs enhanced implementation.<sup>26</sup> Hence, some schemes for incentives should be



established to encourage clinical pharmacists to make rational therapeutic decisions and to discuss medication selections during ward rounds with physicians deeply.

## Barriers

When trying to carry out clinical tasks, pharmacists face challenges such as a lack of time, a shortage of staff, and a heavy workload.<sup>14,26,27</sup> According to a report released in 2019, the total number of pharmacists in Yemen reached ≈ 18,000, with one pharmacist for every 1700.<sup>28</sup> Additionally, pharmacy technicians' professional actions are not regulated by any national or institutional policies. The evidence suggests that pharmacy technicians can assist pharmacists with logistical tasks, giving them time to spend on other patient care-related issues and to engage in more clinical activities.<sup>10</sup>

The current investigation suggests that the duties of clinical pharmacists are not well defined. Many studies conducted in other countries shared the same reported barrier.<sup>14,26,28</sup> Similar to this, in 2009, team members in a Canadian study of healthcare organizations pointed out that the lack of a defined role for pharmacists results in misconceptions and barriers that limit the provision of CPSs.<sup>24</sup> Currently, no clear model of care has included clinical pharmacists in the healthcare system in Yemen, and the traditional model of care is the predominant model, which is a triangle-like shape clearly stating that physicians are the only ones involved in clinical decision-making. Furthermore, a recent study in Yemen showed that only 11% of sampled pharmacists frequently offered medication therapy management MTM services, and formulating a medication treatment plan received the least MTM service among them.<sup>29</sup> Therefore, implementing clinical pharmacy services necessitates the integration of a new cross-disciplinary collaboration model where pharmacists engage in clinical decision-making, as well as the introduction of a new profession into the provision of healthcare. Additionally, in different parts of the world where CPSs are being implemented for the first time in the nation's health system, new care models and the measures that correlate with them should be used.<sup>16,25,30</sup> As a result, increasing contact is required to increase awareness of CPSs and their advantages. When the task of a pharmacist was clearly established, his performance in multidisciplinary patient-care teams improved. According to a previous investigation, an official statement of the duties assigned to each team member assists in promoting awareness of individual commitments and minimizing conflict that arises from a lack of established limits.<sup>15,16,20</sup> Hence, the growing acceptability of clinical pharmacists and their pharmaceutical care interventions, which improve the standard of healthcare, could continue if physicians' and nurses' awareness of clinical pharmacy services and attitudes toward the profession significantly improved.<sup>14–20,31</sup>

Clinical pharmacists can take on ever-expanding duties, including managing patients' pharmacotherapy and therapeutic drug monitoring, both of which considerably enhance patient care.<sup>2–4</sup> The nature of their contacts affects how well clinical pharmacists and doctors work together to provide care for patients.<sup>2,4,5</sup> Clinical pharmacists may answer questions on a range of topics, such as drug profiles, dosages, adverse drug reactions, patient management, drug interactions, drug usage during pregnancy and lactation, poisons, and suggestions for drug storage.<sup>1–3</sup> They collaborate with patients and other healthcare providers to encourage and help patients adjust their lifestyles to achieve better health results. Improvements in patient care, level of awareness, and illness management have the effect of reducing risk factors and healthcare costs.<sup>3–8</sup>

## Limitations

The relatively low response rate of 65 assessed surveys, was lower than our projected response rate. This was most likely affected by the research population's heavy workload. Another concern is social desirability bias: respondents may have given favorable comments to adhere to the more socially accepted viewpoint. Furthermore, because the survey was conducted at a given time and in certain hospitals, it does not account for any long-term changes in physicians' attitudes or perceived barriers concerning ward-based clinical pharmacists and their services. Despite these drawbacks, we think these findings offer insightful information about how doctors feel about clinical pharmacists and the barriers preventing them from offering their recently introduced services.

## A Call for Action

To advance the integration and effectiveness of clinical pharmacy services (CPS) in Yemen, a strategic and collaborative approach is necessary. Policymakers and healthcare administrators must prioritize the recruitment and training of clinical

pharmacists to address staffing shortages. Initiatives such as targeted recruitment campaigns, educational incentives like scholarships, and loan forgiveness programs can attract more students to clinical pharmacy programs, thereby increasing the workforce. Additionally, employing pharmacy technicians for routine tasks can allow clinical pharmacists to focus on patient-centered services, while telepharmacy can extend the reach of pharmacists to remote and underserved areas, ensuring broader access to pharmaceutical care.

Standardizing the roles and responsibilities of clinical pharmacists is crucial for their effective integration into healthcare teams. Developing national guidelines and incorporating them into hospital policies will provide clarity and consistency. Regular workshops and training sessions can further enhance understanding and collaboration between physicians and clinical pharmacists. Integrating clinical pharmacist documentation into the hospital's electronic health record (EHR) system and providing training on best practices for documentation will improve the recording and utilization of clinical pharmacist recommendations.

Promoting inter-professional education (IPE) programs in medical and pharmacy schools is essential for fostering early collaboration and understanding between future healthcare professionals. Joint clinical rounds and awareness campaigns within hospitals can highlight the value of clinical pharmacists' contributions and encourage a team-based approach to patient care.

Overcoming resistance to CPS adoption requires strong leadership and support. Hospital leaders should champion the integration of CPS, actively promoting its benefits and supporting initiatives that facilitate its adoption. Incentive programs to reward departments that effectively integrate clinical pharmacists can further motivate staff. Pilot projects in selected wards or departments can provide evidence of the value of CPS, supporting broader implementation across the hospital.

By implementing these strategies, Yemen can enhance the role of clinical pharmacists in healthcare, leading to improved patient outcomes and a more collaborative healthcare environment. This call to action emphasizes the need for a concerted effort to overcome barriers and fully integrate clinical pharmacy services into the healthcare system.

## Conclusions

The current study suggests that while Yemeni physicians value the role of clinical pharmacists in direct patient care, they prefer clinical pharmacists to focus more on drug product services, such as providing drug information and patient education, rather than on drug selection and treatment changes, which they believe should remain the responsibility of physicians. The most commonly reported barriers by Yemeni physicians include a limited number of clinical pharmacists in hospitals and unclear definitions of their roles. To address these issues, protocols should be established to outline collaboration between clinical pharmacists and physicians. Additionally, fostering inter-professional relationships is essential to overcome resistance and increase knowledge and awareness of clinical pharmacy services (CPS) among healthcare team members. Supporting and promoting a collaborative or multidisciplinary work environment during both medical and pharmacy undergraduate training programs is also crucial.

## Data Sharing Statement

The data that support the findings of this study are available from the first author, upon reasonable request.

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## Disclosure

The authors declare that they have no competing interests.

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