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RESEARCH ARTICLE

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Insights into participation in ward rounds in hospitals: A survey of clinical pharmacists' perceptions

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ABSTRACT

Introduction: Clinical pharmacists' participation in ward rounds (WRs) has been a great chance to contribute to team-based care in the hospital setting and significantly improve patient outcomes and quality of life. Hence, the objective of this investigation was to explore the perceptions of clinical pharmacists in Yemen regarding their participation in WRs and the factors influencing their involvement.

Methods: An online survey of Yemeni clinical pharmacists was conducted and lasted for two months. Descriptive statistics were used to analyse the survey responses.

Results: a total of 120 participants were involved. About 3 out of 10 pharmacists had not previously participated in WRs, with only 30% having always or most of the time participated in word rounds alongside physicians. The results showed a positive perception of WR participation, with a median and IQR of 5(4–5). However, a lack of awareness of WR roles and the time-consuming nature of participation were the reasons for non-involvement.

Conclusion: The study highlights the positive perceptions of Yemeni clinical pharmacists towards ward rounds, but emphasises the need to address awareness and time constraints. Emphasising patient-centered care and longer internship durations can improve clinical pharmacist involvement. Future research should focus on optimising clinical pharmacist participation for better patient outcomes and care quality.

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Background

Since ward rounds (WRs) are the primary approach used by the multidisciplinary team to review patients in hospitals, they are essential to the efficient progress of the patient journey (Cohn, 2014). During a ward round, each patient's current condition is determined, and the next steps in their treatment are planned (Cohn, 2014). Clinical pharmacists' contributions have been shown to significantly improve patient medication management, lower morbidity and mortality, decrease the frequency of adverse drug reactions, and reduce the cost of care (Campbell et al., 2023; Thomas et al., 2014; Bullock et al., 2019). Additionally, it has been shown that clinical pharmacist participation in the ward round WR increases the number of medication-related conversations and results in the prescription of more rational drugs upon discharge (Thomas et al., 2014). Ward rounds, where physicians and clinical pharmacists have been demonstrated to discuss and optimise patient medication management, are an outstanding opportunity for the detection and resolution of drug-related problems DRPs (Bullock et al., 2020; Kubas et al., 2020).

Clinical pharmacists play a crucial role in healthcare by enhancing patient care, managing medications, staying updated on therapeutic knowledge, and collaborating with healthcare teams (Thomas et al., 2014; Bullock et al., 2019). They must have a deep understanding of medications, their indications, dosages, interactions, and adverse effects, and be skilled in patient assessment and monitoring. They must also communicate complex medication information effectively and contribute to the advancement of pharmacy practice through research and quality improvement initiatives (Saseen et al., 2017). In Yemen, to become a clinical pharmacist, he or she must complete a bachelor's degree in clinical pharmacy (BClinPharm) or a doctor of pharmacy (PharmD) from a recognised university, which is the minimum requirement. However, pursuing higher education, such as a Master's or Doctorate degree in clinical pharmacy or a related field, can enhance the knowledge and skills of a clinical pharmacist. After obtaining the clinical pharmacy degree, graduates are required to complete a 6-month to one-year internship program in a recognised healthcare institution, and the duration of the internship is determined according to the clinical pharmacy program (BClinPharm), which requires six months. In contrast, the PharmD requires a one-year internship program. During the internship as a clinical pharmacist in Yemen, specific requirements may vary depending on the institution. However, common expectations include that interns may be required to rotate through different departments, including inpatient wards, outpatient clinics, and pharmacy dispensing areas, to gain exposure to various clinical settings. Interns work under the supervision of experienced clinical pharmacists or preceptors who provide guidance and mentorship and evaluate their

performance. The Yemeni Ministry of Health has restricted employment in any hospital setting to those who have completed at least six months of internship and passed the national clinical pharmacy licensing examination conducted by the Yemeni Medical Council to obtain a license to practice as a clinical pharmacist in Yemen.

The effect of clinical pharmacy service implementation may vary among countries and institutions. Clinical pharmacy services are only offered in a few selected public and private hospitals in Yemen. Furthermore, only three hospitals have officially adopted these services, and the majority of these services are concentrated in specific inpatient departments. With minimal services offered in the outpatient departments (such as the warfarin clinic), an endeavour was initiated by two colleges that began in 2011 by providing Pharm.D. (Hatem et al., 2023a) and bachelor's degree clinical pharmacy programs to promote the spread of clinical pharmacy services in the vast majority of healthcare facilities. Clinical pharmacy and medication management have drawn more attention in Yemen during the past ten years (Hatem et al., 2023b). According to a previous study conducted in Yemen, clinical pharmacists participated in ward-based pharmacy services (such as medication history and therapeutic drug monitoring), and approximately 62% of these interventions were considered accepted by physicians (Kubas et al., 2020). This relatively low acceptability was attributed to the limited number of clinical pharmacists in WR, as well as the shifted times of physicians' rotations; they might be unable to attend the discussion with physicians about their recommendations. In addition, there is a lack of institutional regulations defining the role and obligations of clinical pharmacists in a patient care context (Kubas et al., 2020).

A recent national study in Australia stated that only 26 (39%) of the studied pharmacists had attended the WR in the preceding two weeks, indicating that clinical pharmacist involvement in WRs in hospitals was low (Babu et al., 2023). A study by Schulz et al, found that in Germany, at least 22% of hospital pharmacists provide CPSs; further, there are significant differences between institutions (Schulz et al., 2023). In many Middle Eastern countries, there is no optimal and active implementation of clinical pharmacy services in hospitals (Obaid et al., 2023). Hence, this study is among a few in the literature that evaluated the level of perception among Yemeni clinical pharmacists' participation in WRs and factors influencing their perception to participate in WR.

Methodology

Study design and sample size

A cross-sectional online survey was conducted among Yemeni clinical pharmacists using convenience sampling. For this study, 'clinical pharmacists'

were recognised as trained health professionals who have graduated from one of the two authorised clinical pharmacy programs in Yemen. (1) Bachelor of clinical pharmacy (BClinPharm); (2) Doctor of Pharmacy (PharmD). Each program is considered a bachelor's degree in both the healthcare and educational systems in this country (Hatem et al., 2023a). There is no published information available about the number of clinical pharmacists in Yemen. On this basis, and given the absence of workforce statistics on the number of pharmacists doing clinical activity in Yemeni hospitals, we made a conservative estimate of no more than 7% (clinical pharmacists) of the total pharmacists (about 18,000) in the country (Al-Worafi. 2020), further as there were no recent published articles that involved more than 100 clinical pharmacists in their data results. Hence, a sample size of 10% or more clinical pharmacists would be a good sample.

Study tool

After reviewing Babu D et al, (Babu et al., 2023) and several other studies in the literature on offered services in ward rounds, clinical pharmacy, and medication treatment management, a structured questionnaire was created to address all of the essential key aspects of the study in an approach that was appropriate for the Yemeni community. Later, the questionnaire was evaluated by one assistant professor from the clinical pharmacy discipline and one general practitioner (a physician) at Aden University, and its content relevance and suitability were assessed. Minor changes were made in response to their feedback. Furthermore, the questionnaire was administered to three clinical pharmacists (one senior team leader, a clinical pharmacist active in WRs and two early career clinical pharmacists). The online survey's final version was in Arabic and was divided into three separate sections: section one stated the study's aim and objectives, and section two provided a welcoming message. Information on respondents' demographics and employment was gathered in Section 2. Section three presented 13 items designed to assess clinical pharmacists' perceptions of participation in WRs. We used a 5-Likert scale to measure pharmacists' level of agreement, with choices of strongly agree, agree, neutral, disagree, and strongly disagree, with scores of 5, 4, 3, 2, and 1, respectively. However, the scoring for item 12 was reversed, as the statement was negatively phrased.

Study participants and data collection

As long the study title points out that only licensed hospital pharmacists and/or clinical pharmacists working in hospitals are the targeted group to participate in the survey. However, to get a bird's eye view regarding Yemeni clinical pharmacists' perception of participation in WRs in Yemeni hospitals, we have

included any clinical pharmacist who had previously worked or trained in any Yemeni hospitals, as well as clinical pharmacy interns; all were eligible to participate in the survey. The survey was distributed online using *Google Forms* and posted in Yemeni clinical pharmacies' groups on Telegram, Facebook and WhatsApp, which were chosen for their considerable number of members. The post was regularly published in the selected groups to get more responses. The online survey was open for about two months during July to September 2023, and it was expected to take approximately 5 minutes to complete.

Consent and ethical approval

The consent was online on the opening page of the online survey. Participants provided informed consent before participating in this study. They were informed about the proposal of the study, their rights as participants, and the confidentiality of their data. Their voluntary participation was acknowledged, and they were assured that their identities would remain anonymous throughout the study. Then, participants were asked to participate in the study by choosing 'Yes, I agree to participate', so participants continue to fill out the online survey. Participants who chose 'I cannot participate' were directly turned to thank you message, and cannot continue participate in the study.

The study design and procedure were approved by the Research and Ethics Committee at Aden University, Yemen, (Research Code: REC-165-2023.) in compliance with the International Conference on Harmonisation (ICH).

Data analysis

The data were exported from *Google Sheets* to an Excel sheet, then imported, coded, and analysed using the statistical package for the social sciences (SPSS) version 26 (Armonk, NY: IBM Corp.). Frequencies, percentages, median, and interquartile range (IQR) were used to determine the respondents' demographics and WR characteristics. Perception results were provided as percentages of clinical pharmacists who strongly agreed, neutrally disagreed, or strongly disagreed with each statement. Furthermore, the median (IQR) Likert scale values for each statement were presented. Then, to categorise the 13 items and create scales for perception factors during analysis, four groups, or constructs, were hypothesised, and each of the 13 perception items was classified into one of the four constructs. *Goal*s (G) construct included perception elements 4, 5, and 7, *Professional Role* (PR) included items 1, 3, and 6, *Skills and Capabilities* (SC) included items 2, 8, 9, and 10, and *Social and Environmental Influence* (SEI) construct included items 11, 12, and 13. Cronbach's alpha for the perception items part was

0.832, and each item scored more than 0.8. The Shapiro–Wilk normality test was used to examine the distribution of perception data. To investigate clinical pharmacists' perceptions, nonparametric tests were used. The Mann–Whitney *U* test was used in comparisons involving two groups to determine the significance of differences in total perception scores, individual perception items, and the four perception constructs among different groups, while the Kruskal–Wallis test was used in comparisons involving more than two groups. A *p*-value of 0.05 was used to evaluate statistical significance throughout the analysis.

Results

120 clinical pharmacists responded and completed the online survey, primarily males (78.3%, 94). Both clinical pharmacists' ages and years of experience in practice were in three groups; the majority of them (68.3%, 82) were distributed among 25–30-year-olds, and about 65.8%, 79, had two or fewer years of experience in practice. Our data state that among the 10 clinical pharmacists who responded, six had a chance to participate in ward rounds. However, about half of the respondents were either never or 'rarely' involved in word rounds with physicians. Internship period (Clerkship) was categorised into two groups: '6 months or less' (72.5%, 87) or '12 months' (25.5%, 33); furthermore, our data results reported that 'internal medicine' and ICU/CCU were the top two preferred medical wards that respondents would involve in to participate in word rounds with (41.7%, 50) and (38.7%, 46), respectively (Table 1).

The results shown in Table 2, highlighted the fact that clinical pharmacists in Yemen showed a positive perception toward participation in ward rounds, with a median and IQR of 5 (4–5). Similarly, respondents agree or strongly agree with all statements in the perception section with more than 90%, except for statements 11 and 12. Most respondents considered participation in WR desirable, and their attendance at WR is vital to healthcare team members. With the assessment goals of participation in WR, about 98% of clinical pharmacists agree or strongly agree that attending WRs will enhance their job satisfaction and improve their inter-professional skills. Furthermore, a total of 94% of respondents highlighted the fact that clinical pharmacists can improve patient outcomes and the quality of patient care if they are involved in WR. Likewise, almost all respondents believed they could solve drug-related problems and perform clinical tasks, such as clinical review, during their WR. On the other hand, almost 96% of respondents stated a lack of awareness of their role regarding their participation in WRs. Similarly, in response to the fact that participation in WR would take too much time and effort, more than four-fifths of respondents agreed or strongly agreed. Moreover, around 38% of respondents did not agree or strongly

Table 1. Characteristics of clinical pharmacists.

Variables	*N*	%	*p* – value[a]
Sex			
Male	94	78.3	0.828[b]
Female	26	21.7	
Age (years)			
<25	24	20	0.935[c]
25–30	82	68.3	
>30	14	11.7	
Experience (years)			
0–2	79	65.8	0.279[c]
3–5	25	20.8	
≥6	16	13.3	
Period of clinical internship (Clerkship)			
6 months or less	87	72.5	0.060[b]
12 months	33	25.5	
Have you participated in word rounds WRs ?			
Yes	81	67.5	0.813[b]
No	39	32.5	
If Yes, To what extant you participate in word round alongside with physicians ?			
Always	11	9.2	0.690[b]
Most of Times	18	15	
Sometimes	30	25	
Rarely	21	17.5	
Never	40	33.3	
The preferred medical ward you would involve in, if you were given a chance to do WR.			
Internal Medicine (Male/Female)	50	41.7	0.230[c]
ICU/CCU	46	38.3	
Pediatrics / NICU	12	10	
Others (emergency, surgery, oncology)	12	10	

[a]*p*-values are showing differences between characteristics and overall respondents' perceptions.
[b]Mann-Whitney *U* test.
[c]Kruskal-Wallis test.

agree that their participation in WR would be acceptable to healthcare team members (physicians, nurses, etc.).

In Figure 1, the box plot represents the median scores of the constructs of perception explained earlier in the methodology part. The median for the four scales 'constructs' was: *Goal*s (G) was 15 (13–15) out of 3–15; *Professional Role* (PR) was 14 (13–15) out of 3–15; *Social and Environmental Influence* (SEI) was 10 (8–10) out of 3–15; and *Skills and Capabilities* (SC) was 19 (17–20) out of 4–20.

The Mann–Whitney and Kruskal–Wallis test did not demonstrate any statistically significant difference in perceptions' total scores associated with respondents' characteristics (Table 1). However, *Professional Role* and *Goal*s scores showed a statistically significant difference associated with the internship period (Mann–Whitney *U* test, $p = 0.029$, $p = 0.005$) respectively. In S1 Table, the median and IQR of *Professional Role* was 4.7(0.7) for six months or less and 5(0.3) for 12 months, while the median and IQR of *Goal*s was 5 (0.7) for six months or less and 5(0) for 12 months. Similarly S2 Table, shows the significance between perception statements and respondents'

Table 2. Clinical Pharmacists' perception toward participation in ward rounds (WRs) in Yemeni hospitals ($n = 120$).

Statements	Strongly agree/ Agree *n* (%)	Median (IQR)
My participation in WR is desirable.	112 (93.3)	5 (4–5)
I believe I have the professional confidence to contribute in a WR.	115 (95.8)	5 (4–5)
As a pharmacist I should practice to my full scope which includes participating in a WR.	118 (98.3)	5 (4–5)
Participating in a WR will provide me with job satisfaction.	118 (98.3)	5 (5–5)
Participating in a WR will strengthen my communication skills with other health care team.	118 (98.3)	5 (4–5)
My attendance during WR is important to the other health care members.	113 (94.1)	5 (4–5)
I believe I can improve overall patient outcome /quality of patient care during a WR	117 (97.5)	5 (4–5)
I believe I can play important role in patient education and counseling during a WR	115 (95.8)	5 (4–5)
I believe I can perform my clinical tasks such as clinical review during a WR.	119 (99.2)	5 (4–5)
I believe I can resolve medication-related problems during a WR.	119 (99.2)	5 (4–5)
My participation in patient care will be acceptable by physicians, nurses during WR	75 (62.5)	4 (3–5)
I believe participation in WR takes too much time and effort.[a]	105 (87.5)	1 (1–2)
I believe there is a lack of awareness of the role of the clinical pharmacist during his participation in WR.	108 (90)	5 (4–5)

[a]Scoring for this item is reversed, as the statement was negatively worded.

characteristics. The Mann–Whitney test showed a significant association with the internship period and three statements of perceptions toward participation in WR. 'I believe I have the professional confidence to contribute to a WR', 'As a pharmacist, I should practice to my full scope, which includes participating in a WR,' and 'I believe I can improve the overall patient outcome and quality of patient care during a WR.' Clinical pharmacists who had undergone 12 months of internship expressed a more positive perception than those who had experienced 6 months or less ($p = 0.036$, $p = 0.016$, $p =$

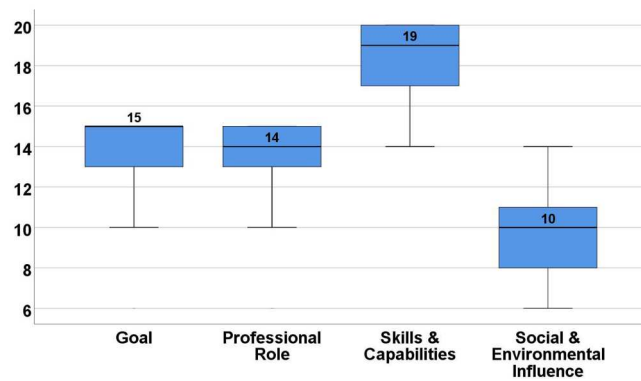

Figure 1. Box plot representation of median scores of the constructs of perception.

0.0025), respectively. Using the post-hoc test ($p < 0.05$), respondents who preferred ICU/CCU wards to participate in WR reported a more positive perception than the 'other' group in 'My participation in WR is desirable' and 'Participating in a WR will strengthen my communication skills with other health care teams'. Spearman's correlation test showed only statistically significant moderate positive correlations between perception scales *Goals*, *Professional Role*, and *Skills and Capabilities* with each other ($p < 0.001$).

Discussion

Considerations of the main findings

To the best of our knowledge, this was among a few articles in the literature to assess clinical pharmacists' perceptions toward participation in ward round WR and identify the characteristics that influence their participation in WR. Further, the current study is the first to compare the internship period (clerkship) undertaken by clinical pharmacists based on participation in WRs. The present study has demonstrated that about 67% of clinical pharmacists have previously participated in Ward rounds of WRs; among those involved in WRs, half of them were either never or 'rarely' involved in WRs alongside physicians. Most of the respondents had undergone an internship for six months or less. Overall, Yemeni clinical pharmacists show positive perceptions regarding their participation in WRs in hospitals. Further, almost all respondents reported positive perceptions of their skills and capabilities to improve patient outcomes and quality of patient care and to resolve drug-related problems during participation in WRs. Our results highlight the lack of awareness of clinical pharmacists' roles in WRs and the fact that participation in WRs was time-consuming and effort-intensive for clinical pharmacists. These were the reasons for participants' non-involvement in WRs. Interestingly, those who undergo an internship period of 12 months were more positive about their *Professional Role* and *Goals* in participating in WRs than those who experience six months or less.

Yemeni clinical pharmacists' characteristics

One strength of this research is that no other research in the literature has studied the effect of the duration of an internship on pharmacists' perceptions toward participation in WRs in hospitals. Internships at hospitals are essential for the transition from 'pharmacy students' to 'professional pharmacists.' It has been reported that pharmacy students' practical experiences (internships) would improve their understanding of the current profile of pharmacists and their responsibilities in various pharmacy practice settings, preparing them for patient care and fostering critical assessment and the

ability to propose improvements (Yao et al., 2022; Pitkä et al., 2014). Even though numerous training designs have been studied, studies have not mainly addressed the duration of internships in the pharmacy curriculum and its influence on learning outcomes. As a result, we have included internship duration as a contributing factor, suggesting that it may influence clinical pharmacists' perceptions of involvement in WRs. The clinical pharmacy education system in Yemen has adopted two types of undergraduate degree programs in clinical pharmacy at eight different universities. The first commonly adopted program is five years of Bachelor of Science in Clinical Pharmacy (BClinPharm), and the internship period varies among universities, with almost 6–3 months of clinical internship in hospitals such as Hodeidah University, which is considered the leader in the field, adopting a 6-month internship. The second program is a Doctor of Pharmacy (PharmD) six-year program with a 12-month internship (Hatem et al., 2023b). Our data results show that most respondents have been involved in an internship duration of 6 months or less.

Moreover, our data results show that 3 out of 10 clinical pharmacists have not previously participated in WRs. Yemen Clinical pharmacists' engagement in WR was limited, even though the majority agreed that 'participation in WR is desirable'. It may build their inter-professional relationships, give them job satisfaction, and be within their practice area. This implies that just becoming aware of the benefits of pharmacists engaging in the WR is inadequate to induce pharmacists to participate in the WR. To enhance pharmacist engagement in WR, time must be set aside for team building for WR team members, which must be supported by management.

Furthermore, this was unfortunate since clinical pharmacists are considered direct patient care professionals; again, the Yemeni clinical pharmacy educational system in all universities obliges students to spend most of their internship in hospital medical wards. We believe that there are two possible justifications for this low number. First, according to Hatem et al (Hatem et al., 2023b), most Yemeni universities have not yet established their educational hospitals. More than three colleges may use one or two hospitals as training locations, and this overload may affect the quality of supervision, which is also affected by the low number of clinical pharmacy preceptors in the country. There are also reasonable reasons why most students collect patients' histories by reviewing their medical profiles and discussing patients' cases in closed rooms with their preceptors and their mates without involving themselves in WRs or having direct contact with patients. Second, the lack of awareness about the benefits of clinical pharmacists participating in WRs may be insufficient to encourage WR participation by pharmacists. Besides, it has been reported that most final-year pharmacy students adopted pharmaceutical marketing and the pharmaceutical industry as their preferred pharmacy practice career after graduation (Hatem et al., 2023b).

Perceptions of participation in WRs

The results of this study show that clinical pharmacists expressed an overall positive perception of participation in ward rounds. This finding is consistent with similar studies conducted in Australia (Babu et al., 2023). In recent years, pharmacists' roles have evolved and expanded into many new positions around the globe. Clinical pharmacists have had the chance to contribute to team-based care in the hospital setting during ward rounds (WRs). Although the term 'WR' can be used to describe a variety of things, it is most frequently used to describe a method for inter-professional collaboration to discuss a patient's diagnosis, ongoing treatment plan, prognosis, discharge plan, and taking part as preceptors for junior colleagues (Cohn, 2020). This collaboration can occur in person or virtually and is not limited to bedside meetings or one ward. Hence, based on this study, recognising pharmacists' contributions to interdisciplinary teams enhances team dynamics by fostering interdependence among team members. Our survey adds to the body of literature that clinical pharmacists who chose to participate in the ICU/CCU ward were more favourable toward the idea that 'my participation in WR is desirable'. This may be attributed to the fact that most currently employed Yemeni clinical pharmacists are involved in these wards (Kubas et al., 2020; Hatem et al., 2023b). Besides, there is an excellent body of literature stating that most drug-related errors can be identified in the ICU or CCU due to many factors, such as poly-pharmacy and changes in patients' pharmacokinetics (Kubas et al., 2020; Albayrak et al., 2022). They are giving them an opportunity to be well recognised regarding their *Professional Role* in participation in WR. Our survey results contribute to the current body of literature by stressing that the internship period plays a factor that can influence clinical pharmacists' *Professional Roles*, as well as in the form of practicing their full scope, which includes their participation in WR. Stating that clinical pharmacists involved in 12 months of internship prove to be more positive. Hence, our study highlights the potential benefits of an extended internship period for clinical pharmacy students, and later on, as practitioners, this would improve their *Professional Role* in pharmacy practice sessions and widely increase their involvement in different activities, including participation in WRs.

The contact between prescribers and pharmacists, as well as ongoing exposure to their services, appears to have influenced prescriber acceptance of pharmacists' clinical responsibilities internationally (de Oliveira et al., 2023). Our results show that most clinical pharmacists were positive that participation in WRs would strengthen their inter-professional skills with other healthcare team members and provide them with job satisfaction. This is a good set of values and positive perceptions toward *Goals* of participation in WRs in hospitals that support the assumption of enhanced clinical

pharmacists' responsibilities for performing their clinical roles and being involved in WRs. The present study shows that well-recognised *Goals* of participation in WRs, with a median and IQR of 15 (13–15), and 'clinical pharmacists in the multidisciplinary team help improve overall patient outcome and quality of care during a WR,' were identified more positively among clinical pharmacists who participated in 12 months of internship. Clinical pharmacists' participation in hospital wards has led to improved clinical outcomes for patients with various diseases, including chronic non-communicable and infectious diseases (Campbell et al., 2023; Thomas et al., 2014; Bullock et al., 2020; Kubas et al., 2020). Recently, this was clearly supported by their participation during the COVID-19 pandemic and the critical role they played (Baudouin et al., 2023; Alshakka et al., 2022). Hence, we sincerely believe that the longer internship duration may have provided these clinical pharmacists with more opportunities to participate in multidisciplinary team discussions actively, contribute to treatment plans, and see the positive impact of their interventions. This first-hand experience could lead to a greater appreciation of the value that clinical pharmacists bring to patient care during WRs.

Our current survey expands on the understanding that clinical pharmacists' involvement in WR also requires special *Skills and Capabilities* in the form of professional confidence, and clinical pharmacists involved in 12-month internships reported having more professional confidence to contribute effectively to WR. A cornerstone of clinical pharmacists' participation in WRs is the identification, solving, and prevention of drug-related problems (Campbell et al., 2023; Thomas et al., 2014; Bullock et al., 2019; Bullock et al., 2020; Kubas et al., 2020). In the present survey, almost all Yemeni clinical pharmacists showed they could solve medication-related problems and perform this critical clinical task in WR.

Besides, our survey demonstrated that the top reason for non-participation in WRs was a lack of awareness of clinical pharmacists' roles in WRs. The fact that pharmacists are largely in charge of delivering prescriptions rather than actively taking part in direct patient care is one explanation for the result above (Hatem et al., 2023a). This perception can lead to a disconnect between the role and responsibilities of clinical pharmacists and the expectations of other healthcare professionals during their WRs. Hence, creating a working atmosphere that encourages open communication and recognises the expertise of clinical pharmacists can help bridge the gap and enhance their participation in WRs. By addressing this issue and promoting the active involvement of clinical pharmacists in WRs, we can leverage their expertise to optimise medication management and improve patient care.

Moreover, our results show that participation in WRs was time-consuming and effort-intensive for clinical pharmacists, which was also a second reason

for participants' non-involvement in WRs. A significant aspect of facilitating WR participation is likely to be resource allocation, which includes additional funding for other pharmacists or technicians to take on non-clinical responsibilities that help manage workload by letting the clinical pharmacist concentrate on clinical tasks like WR (Hatem et al., 2023a; Hatem et al., 2023b; Babu et al., 2023). Babu et al. have stated that interventions focusing on workflow restructuring and resource allocation will be successful in bridging the gap between the evidence demonstrating the benefits of participation in WRs and the practical implementation of pharmacists participating in WRs in hospitals without overwhelming clinical pharmacists with traditional tasks (Babu et al., 2023).

In the present study, physicians' acceptance to participate in patient care was another reason for clinical pharmacist non-participation. A previous Yemeni study evaluated physicians' acceptance of clinical pharmacist interventions in different medical wards for two years and reported only about 62% of the acceptance rate (Kubas et al., 2020). There is a long-standing hierarchical structure in many healthcare systems, with physicians typically holding positions at the top and other healthcare workers, such as pharmacists, playing subordinate responsibilities (Hatem et al., 2023b; Hatem et al., 2023a; Babu et al., 2023; Schulz et al., 2023). This established power dynamic can make it challenging for pharmacists to assert their expertise and actively participate in decision-making during WRs, leading to a feeling of exclusion. Hence, we sincerely believe that to overcome the current broad spread hierarchy. For greater involvement of pharmacists in WRs, there is an urgent need to clearly define the roles and responsibilities of clinical pharmacists within the context of WR and their role is not limited to identifying medication errors after prescriptions, besides fostering a culture of collaboration that encourages regular communication, joint decision-making, and shared responsibilities in WRs. By addressing these issues and working towards a shared goal of patient-centered care, it is possible to improve perceptions and enhance the integration of clinical pharmacists in WRs.

Study limitations and strengths

Our study had limitations, including a low response rate. However, this is the most extensive study to date and the second in the literature exploring clinical pharmacists' perceptions toward participation in WRs. The current response rate was sufficient to draw conclusions and provide good insights about Yemeni clinical pharmacists' participation in WRs because there is no publicly available data on how many clinical pharmacists there are in Yemen, and second, no published articles that involve more than 100 Yemeni clinical pharmacists. The current study is the first to compare clinical pharmacist internship periods depending on WR participation.

Study recommendations

(1) Raise awareness: Stakeholders in the healthcare system, including policymakers, hospital administrators, and healthcare professionals, should actively raise awareness about the benefits of involving clinical pharmacists in ward rounds. This can be done through educational campaigns, conferences, and workshops targeting clinicians and the general public.
(2) Policy support: Policymakers should develop and implement policies that explicitly recognise the role of clinical pharmacists in ward rounds. These policies should outline the responsibilities, scope of practice, and the impact of pharmacist involvement in patient care. Furthermore, policies should mandate the inclusion of clinical pharmacists in the multidisciplinary team during ward rounds.
(3) Collaborative approach: Promote a collaborative approach between healthcare professionals, emphasising the importance of teamwork and interdisciplinary communication. Encourage physicians and other healthcare providers to actively involve clinical pharmacists in ward rounds by recognising their expertise in drug therapy management and the prevention of drug-related problems.
(4) Training and education: Develop comprehensive training and education programs for clinical pharmacists to enhance their knowledge and skills in clinical decision-making, patient assessment, and medication management. Providing formal training opportunities, such as residency programs or advanced clinical pharmacy training, can increase their confidence and abilities in participating in ward rounds.
(5) Clear guidelines and policies: Establish clear guidelines and policies regarding the roles and responsibilities of clinical pharmacists in ward rounds. These guidelines should clearly outline the tasks they can perform, their authority in medication-related decision-making, and their involvement in patient care discussions. Such guidelines will help clarify expectations and ensure the effective integration of clinical pharmacists into the ward round process.
(6) Research and evidence: Encourage research and evidence-based practice in clinical pharmacy to demonstrate the positive impact of pharmacist participation in ward rounds on patient outcomes. Conducting local studies and publishing the results in national and international journals can provide evidence to support the integration of clinical pharmacists into ward round teams.
(7) Advocacy and leadership: Engage professional pharmacy organizations, regulatory bodies, and hospital administrators to actively advocate for the involvement of clinical pharmacists in ward rounds. Foster strong leadership within the pharmacy profession to drive these initiatives and promote the value of clinical pharmacy services in patient care.

(8) Peer support and mentorship: Establish peer support networks and mentorship programs for clinical pharmacists to share experiences, exchange best practices, and receive guidance on effective participation in ward rounds. This can help build confidence, promote professional growth, and foster a sense of belonging within the multidisciplinary team.

By implementing these recommendations, policymakers, pharmacists, and pharmacy schools can contribute to improving the integration and involvement of clinical pharmacists in ward rounds, ultimately leading to enhanced patient outcomes and the delivery of high-quality pharmaceutical care.

Conclusions

This study sheds light on the perceptions of clinical pharmacists regarding their participation in ward rounds (WRs) in hospitals. The findings demonstrate that clinical pharmacists hold positive perceptions regarding their involvement in WRs and recognise the potential benefits of their contributions in improving patient outcomes and resolving drug-related problems. However, participation in WRs is limited, primarily due to a lack of awareness among healthcare professionals about the roles of clinical pharmacists, and the time-consuming and effort-intensive nature of their involvement. The study emphasises the need to address these barriers and promote the integration of clinical pharmacists into WRs. Increasing awareness among healthcare professionals about the value and capabilities of clinical pharmacists in patient care can facilitate their active participation. Moreover, efforts should be made to optimise the duration and structure of internship and training programs for clinical pharmacists, allowing them to acquire the necessary skills, confidence, and positive perceptions to engage in clinical tasks actively.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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