Do Future Physicians Know a Clinical Hospital Pharmacist's Capabilities?

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Abstract:

Background: Physicians appear to positively perceive pharmacists, but the perception of future physicians on clinical hospital pharmacists is largely unknown. By identifying medical students' perceptions, educational efforts could be developed to target areas for improvement and allow for optimal utilization of pharmacists.

Objective: To identify medical students' perception of clinical pharmacists in the hospital setting.

Methods: A 27-item survey that analyzed medical students' knowledge and attitudes toward clinical hospital pharmacists was sent via email to students at eight medical schools in Ohio. Survey items assessed participant's past interactions with a pharmacist (5 items), understanding of clinical pharmacists' roles and responsibilities (7 items), and current perceptions of clinical pharmacists (7 items). Quantitative data were analyzed using descriptive statistics and qualitative data using thematic analysis.

Results: There were 124 participants across 3 medical schools. Students expressed that clinical pharmacists are essential on the healthcare team to support and maintain a patient's health (Mean ± SD = 4.47 ± 0.829). They were neutral or disagreed that clinical pharmacists are qualified to diagnose a variety of conditions (Mean ± SD = 2.62 ± 1.017) and were neutral or agreed that a clinical pharmacist's role differs from a community pharmacist's role (Mean ± SD = 3.95 ± 0.659). In the qualitative analysis, medical students reported that they perceive clinical pharmacists to be medication experts (N=28, 66.7%), important members of the healthcare team (N=23, 54.8%), and useful resources for answering drug-related questions (N=15, 35.7%).

Conclusions: Medical students reflected a positive attitude toward clinical pharmacists and affirmed the need for pharmacists to provide medication expertise in the hospital setting. However, many medical students were not fully aware of the responsibilities that a clinical pharmacist provides and could benefit from education on the scope of a pharmacist's practice.

Key Words: Medical student, perception, clinical pharmacist, roles and responsibilities, hospital pharmacist

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Background

Pharmacists are one of the most trusted healthcare professionals and are typically easily accessible within their respective communities.[1] However, the role of a pharmacist can be difficult to define and understand as there are numerous areas within the pharmacy profession for a pharmacist to practice that are quickly expanding, such as hospital, community, ambulatory care, informatics, and much more. As the pharmacist's role in patient care is quickly evolving, their collaboration with other health professionals also continues to expand.[2] Collaboration with other health professionals is essential as communication and a collaborative atmosphere can improve patient outcomes and allow the pharmacist to broaden their impact in their practices.[3] However, with the quick advancement of pharmacy practice, other health professionals may not be aware of a pharmacist's entire scope of practice.

In the hospital setting, the pharmacist's primary role is to be the medication expert by ensuring that patients are safely and effectively using their medications.[4] It is important for clinical hospital pharmacists to use the resources available to them, such as laboratory test results, to ensure patients are receiving

optimal medication therapy management.[4] Clinical hospital pharmacists must also be educators and collaborators within the healthcare system to educate other professionals about the appropriate use of medications and provide interventions for adequate patient care. Pharmacists are also responsible for providing the quality of medication of use and saving hospital costs by performing medication reconciliations.[5] A systematic review by Skjot-Arkil, et al. (2021) concluded that interventions led by pharmacists in the hospital setting improved the quality of medication use, which led to a reduction in hospital visits and length of stay.[6]

There may be variation in other healthcare professionals' perceptions of pharmacists. Focusing on a physician's perception could provide insight into how pharmacists are viewed in hospitals, as physicians are leading professionals and primary decision makers in this setting and work closely with pharmacists. In a study by Tarn et al. (2012), physicians stated that they do view pharmacists as medication experts especially in potential medication interactions, but expressed concern in a pharmacist's counseling skills.[7] Additionally, some physicians are unaware of a pharmacist's clinical knowledge and do not entirely trust their judgment.[8] Once a pharmacist's role is appropriately recognized by a licensed physician, other health professionals may notice the importance of a pharmacist in all healthcare settings.

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The perception of medical students can be a good indicator of how physicians and other health professionals will perceive hospital pharmacists in the future as well as reveal if they are learning how to interact with and utilize a pharmacist while in school; however, current medical student perceptions are not fully known. Current literature suggests that medical students do not have a complete understanding of what pharmacists can do. According to a study by Wolfe EM, et al. (2018), medical students did not think pharmacists were qualified to screen and examine patients or manage chronic disease states.[9] Similarly, a study by VanWinkle, et al. (2011) found that medical students were less likely to collaborate with other health care professionals in comparison to pharmacy students.[10] While both of these studies examined students' perceptions of pharmacists in general, our research will explore attitudes toward clinical hospital pharmacists in particular. It is relevant to look specifically at clinical hospital pharmacists because a portion of medical students practice in such a setting where they will interact and consult with clinical hospital pharmacists daily. Thus, the objective of this study was to identify medical students' perception of pharmacists by analyzing their knowledge and attitudes of clinical pharmacists in a hospital setting.

Methods

Cedarville University Institutional Review Board approval was obtained prior to initiation of this cross-sectional study. Participants were medical students of all years in the state of Ohio who agreed to participate. A faculty representative at each medical school (vice presidents, vice deans, or directors of the research department) was contacted via email to invite their students to participate in the study. If the representatives did not respond, a maximum of three additional follow-up emails every two weeks were sent. Once a medical school representative agreed to distribute the survey to their students, no reminder emails were sent again. Three medical schools out of eight agreed to distribute the survey to their current medical students. Upon receiving the email with the study survey that was forwarded to them by the contacted faculty member at their medical school, medical students had the option to participate in the study. At the time that the survey was developed, the survey tool was unable to limit the number of responses per participant without collecting identifying information. The survey remained open for responses from March 2021 through the end of April 2021.

The Medical Students' Perceptions of Clinical Hospital Pharmacists survey was developed by the research team. After a thorough review of the literature, it was found that no survey exists that assesses the perceptions of medical students towards pharmacists. Therefore, this survey was developed by the research team, which consisted of a pharmacist and pharmacy students, based upon their own interactions with medical students. No pilot testing was conducted for the survey. At the start of the survey, a definition of a clinical

pharmacist was provided, stating that a clinical pharmacist "works directly with physicians, other health professionals, and patients to ensure that the medications prescribed for the patient contribute to the best possible health outcomes."[11] It was also clarified that the survey was focusing on clinical pharmacists in the hospital setting. Voluntary consent and that the participant was at least 18 years of age was assumed if the medical student participated in the study which was stated at the beginning of the survey. The anonymous survey contained 6 demographic items, 5 items assessing the student's previous interactions with a pharmacist, 7 items assessing the student's perceptions of the roles and responsibilities of a clinical hospital pharmacist using a 5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree), 6 items assessing the student's current perceptions of clinical hospital pharmacists using a 5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree), and 2 open-ended questions to provide more in-depth feedback on their current perceptions of clinical pharmacists and to explain what the medical students wanted to know more about clinical pharmacists. Before distribution, the survey was validated for face and content validation through peer- and faculty-review. The validation team consisted of three clinical pharmacists who work in the hospital setting and one pharmacist specializing in research methodology. These pharmacists were all faculty at Cedarville University School of Pharmacy who hold a Doctorate of Pharmacy degree. The Medical Students' Perceptions of Clinical Hospital Pharmacists survey was entered into Qualtrics and sent via email to all invited medical schools, which was passed along to their medical students by the faculty contact.

Survey responses were stored and downloaded from Qualtrics into IBM[©] SPSS v. 26.0 (Armonk, NY, USA) and Dedoose version 7.0.23 (Dedoose, 2016) for qualitative and quantitative analysis. Descriptive statistics were conducted on all quantitative survey items to assess frequencies. No other statistical analysis tests were performed on the quantitative data.

Dedoose is an online qualitative analysis tool that allows users to analyze themes in multiple excerpts. In Dedoose, the 2 open-ended response questions were analyzed to determine common ideas and themes. After being uploaded to Dedoose, one member of the research team identified themes in the responses. Two other members of the research team independently reviewed and agreed with the identified themes for each item response. If there was disagreement on a theme between the research team, the Principal Investigator made the final decision. The thematic analysis results also recorded frequencies and percentages for the common themes identified.

Results

A total of 124 medical students participated in the study. Participants included 44 students from Ohio State University

(37.9%), 37 students from Wright State University (31.9%), and 35 students from Ohio University (30.2%). Responses were collected from all years of medical school, but most responses were received from students in their fourth year (N=46, 39.6%). Fifteen students (13%) stated that they often interact with a clinical pharmacist during medical school and 57 (49.6%) noted that they sometimes interact with a clinical pharmacist. More than half of the students (N=79, 63.7%) have interacted with pharmacists in the hospital. Additional details on the demographic characteristics of the participants can be found in Table 1.

Medical students strongly agreed that clinical pharmacists are essential on the healthcare team (Mean ± SD = 4.47 ± 0.829) and that input from clinical pharmacists leads to optimal patient care outcomes (Mean ± SD = 4.56 ± 0.623). Medical students were neutral or disagreed that clinical pharmacists are qualified to diagnose a variety of conditions (Mean ± SD = 2.62 ± 1.017), but were neutral or agreed that a community pharmacist's role differs from a clinical pharmacist's role (Mean ± SD = 3.95 ± 0.659) . The students strongly agreed that they would trust a clinical pharmacist to counsel and educate their patients (Mean ± SD = 4.59 ± 0.635). Additional perceptions of a clinical pharmacist's roles and responsibilities can be found in Tables 2 and 3.

When asked how they perceive a clinical pharmacist's roles and responsibilities in the open-ended responses, medical students commonly noted that they perceive clinical pharmacists to be medication experts (N=28, 66.7%), important members of the healthcare team (N=23, 54.8%), and useful resources for answering drug-related questions (N=15, 35.7%). When asked what medical students wanted to know about clinical pharmacists, they responded that they wanted to know more about the scope of pharmacy practice (N=22, 52.4%) and the education pharmacists receive (N=11, 26.2%). Direct quotations from the open-ended survey items are displayed in Figures 1 and 2.

Discussion
Medical students responded positively on the Medical Students' Perceptions of Clinical Hospital Pharmacists Survey. Survey responses indicated that medical students believe clinical hospital pharmacists are essential for the healthcare team and that they do trust clinical pharmacists to perform their duties of medication counseling, providing recommendations for alternative medications if necessary, and answering drug-related questions. Thus, medical students may be more inclined to utilize the medication expertise of clinical pharmacists to their fullest capability when collaborating with them in the healthcare practice setting. This positive outcome may be correlated to the previous interactions that students have experienced. Many of the participants stated that they sometimes or often have interacted with a clinical pharmacist at their practice site prior to completing the survey. With prior

exposure and interaction with a clinical pharmacist, medical students become more aware of the role and responsibilities of a clinical pharmacist while also gaining trust in a pharmacist's capabilities. Additionally, medical students may have interacted previously with clinical pharmacists through interprofessional education (IPE) within the curriculum of the medical university. In a systematic review by Spaulding et al. (2021) they demonstrated that IPE is effective in improving health care professional students and licensed professionals attitudes' towards other disciplines.[12] The study concluded that there is a positive effect on patient outcomes when utilizing a team-based approach, thus, IPE is helpful to improve collaboration skills.[12] IPE is important for future healthcare workers in order to equip students to communicate effectively with other healthcare disciplines, understand other professional roles and responsibilities, and to respect others on the healthcare team so that the best patient care may be provided.[13]

Students appeared to not confidently know that pharmacists cannot diagnose patients based on their answers to one of the survey items; however, students did know that a community pharmacist's role differs from a clinical pharmacist's role. Medical students may not be entirely aware of a pharmacist's full scope of practice and their limitations. If the medical university curriculum does not incorporate opportunities for students to interact with or learn about pharmacists' and other health professionals' scope of practice, medical students may not understand the roles and responsibilities of the individuals on the healthcare team. A systematic review by Bridges et al. (2011) found that a common theme for successful interprofessional collaboration is that a healthcare professional must understand their own role while also recognizing the role of other health professionals that they work closely with.[14] They continue to conclude that this is a critical component of IPE so that students can build a framework for best interprofessional communication early in their education and continue these practices into their role as a professional healthcare team member. It is important for medical schools to provide education on a clinical pharmacist's capabilities and limitations because medical students will work directly with clinical pharmacists in a variety of settings.

Medical students were not entirely aware of a clinical pharmacist's full scope of practice or limitations as noted. However, the results from the thematic analysis found that many medical students want to learn more about a pharmacist's education and training along with their scope of practice. It is encouraging to see that medical students are interested in understanding more about pharmacists' roles and responsibilities. Becoming more aware of a pharmacist's scope of practice prior to entering the field as a licensed professional may allow for better collaboration and communication between pharmacists and physicians in the healthcare setting. Again, incorporating IPE into the curriculum for medical students to interact with a clinical pharmacist (and other

healthcare professionals) is an important piece to improving patient care outcomes. Additionally, future studies could provide an educational presentation to medical students about the roles and responsibilities of a clinical pharmacist that discusses the training pharmacists receive during school and after graduation depending on the type of pharmacy.

Limitations

There are some limitations to this study. Even though the description of a clinical pharmacist was defined at the beginning of the Medical Students' Perceptions of Clinical Hospital Pharmacists Survey, participants may have interpreted "clinical pharmacist" differently. There are many different types of pharmacists and medical students may not be aware how the various types of pharmacy differ. A small sample size was also collected, which decreases the generalizability and external validity of the study. Social desirability bias may have also been a concern when participants were responding to the survey questions, especially in the open-ended questions. The Medical Students' Perceptions of Clinical Hospital Pharmacists Survey was not formally validated as it only received face and content validation through peer and faculty review. Lastly, the survey tool could not ensure that participants were limited to only one response without collecting identifying information.

Conclusion

Medical students expressed a positive attitude towards clinical pharmacists and recognized the benefit of utilizing pharmacists' medication expertise for patient counseling, therapy recommendations, and answering drug-related questions. However, medical students were not fully aware of a clinical hospital pharmacist's full scope of practice, their limitations, or their training and education.

Conflicts of Interest: We declare no conflicts of interest or financial interests that the authors or members of their immediate families have in any product or service discussed in the manuscript, including grants (pending or received), employment, gifts, stock holdings or options, honoraria, consultancies, expert testimony, patents, and royalties.

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Table 1. Demographic Characteristics

Item	N (%) N=126
Medical School	
Ohio State University	44 (37.9%)
Wright State University	37 (31.9%)
Ohio University	35 (30.2%)
Year of Medical School	
First year	26 (22.4%)
Second year	12 (10.3%)
Third year	26 (22.4%)
Fourth year	46 (39.7%)
Other (included Multiracial, Hebrew, Hispanic, and Middle Eastern)	6 (5.2%)
Age	
20-25 years	49 (42.2%)
26-30 years	56 (48.3%)
31-35 years	7 (6.0%)
36-40 years	2 (1.7%)
Older than 40 years	2 (1.7%)
Gender	
Male	43 (37.1%)
Female	70 (60.3%)
Hispanic, Latino, or Spanish Origin	
No	110 (94.8%)
Yes, Mexican	3 (2.6%)
Yes, other	3 (2.6%)
Race	
White	87 (75.0%)
Black or African American	4 (3.4%)
Asian	20 (17.2%)
Other	5 (4.3%)
Pharmacists as Family Members	
Yes	15 (12.9%)
No	101 (87.1%)
Learned About Pharmacists from Media Sources	
Yes	58 (50%)
No	58 (50%)
Media Source Where Learned About Pharmacists	
Television	25 (21.6%)
News articles	16 (13.8%)
Social media	23 (19.8%)
Forums	4 (3.4%)
Other	20 (17.2%)

Frequency of Interaction with a Pharmacist in Medical School	
Often	24 (20.7%)
Sometimes	55 (47.4%)
Rarely	29 (25.0%)
Never	7 (6.0%)
Frequency of Interaction with a Clinical Pharmacist during Medical School	
Often	15 (12.9%)
Sometimes	57 (49.1%)
Rarely	30 (25.9%)
Never	13 (11.2%)
Setting of Previous Interaction with a Pharmacist	
As a patient	38 (32.8%)
Hospital floor	79 (68.1%)
Ambulatory care (outpatient clinic) site	25 (21.6%)
Primary care clinic	25 (21.6%)
Pharmacy	40 (34.5%)
Other	33 (28.4%)

Table 2. Current Understanding of Clinical Pharmacists Roles & Responsibilities

Clinical Pharmacist's Roles & Responsibilities	Mean ± SD N=104
1. A clinical pharmacist's role differs from a community pharmacist's role	3.95 ± 0.659
2. Clinical pharmacists evaluate the appropriateness of a patient's medications based on a patient's diagnosis	4.07 ± 0.741
3. Clinical pharmacists are reliable for catching drug interactions and adverse events	4.45 ± 0.695
4. Clinical pharmacists give medication dosing and frequency recommendations	4.45 ± 0.621
5. Clinical pharmacists assess the appropriateness of medications based on patient-specific laboratory values	4.15 ± 0.868
6. Clinical pharmacists are qualified to diagnose a variety of conditions	2.62 ± 1.017
7. Clinical pharmacists provide medication-related counseling for patients	4.39 ± 0.630

5-point Likert-type scale: 1=Strongly Disagree, 5= Strongly Agree

Table 3. Current Perceptions of Clinical Pharmacists

Medical Student Perceptions of Clinical Pharmacists	Mean ± SD N=102
1. Input from clinical pharmacists leads to optimal patient care outcomes	4.56 ± 0.623
2. I would trust a clinical pharmacist if they gave an alternative medication recommendation	4.29 ± 0.863
3. I would trust a clinical pharmacist to counsel and educate patients on their medications	4.59 ± 0.635
4. A clinical pharmacist is an essential part of the drug research team	4.47 ± 0.829
5. A clinical pharmacist is capable of finding and reviewing relevant literature for research purposes	4.54 ± 0.608
6. Clinical pharmacists are essential in the healthcare team to support and maintain a patient's health	4.53 ± 0.741

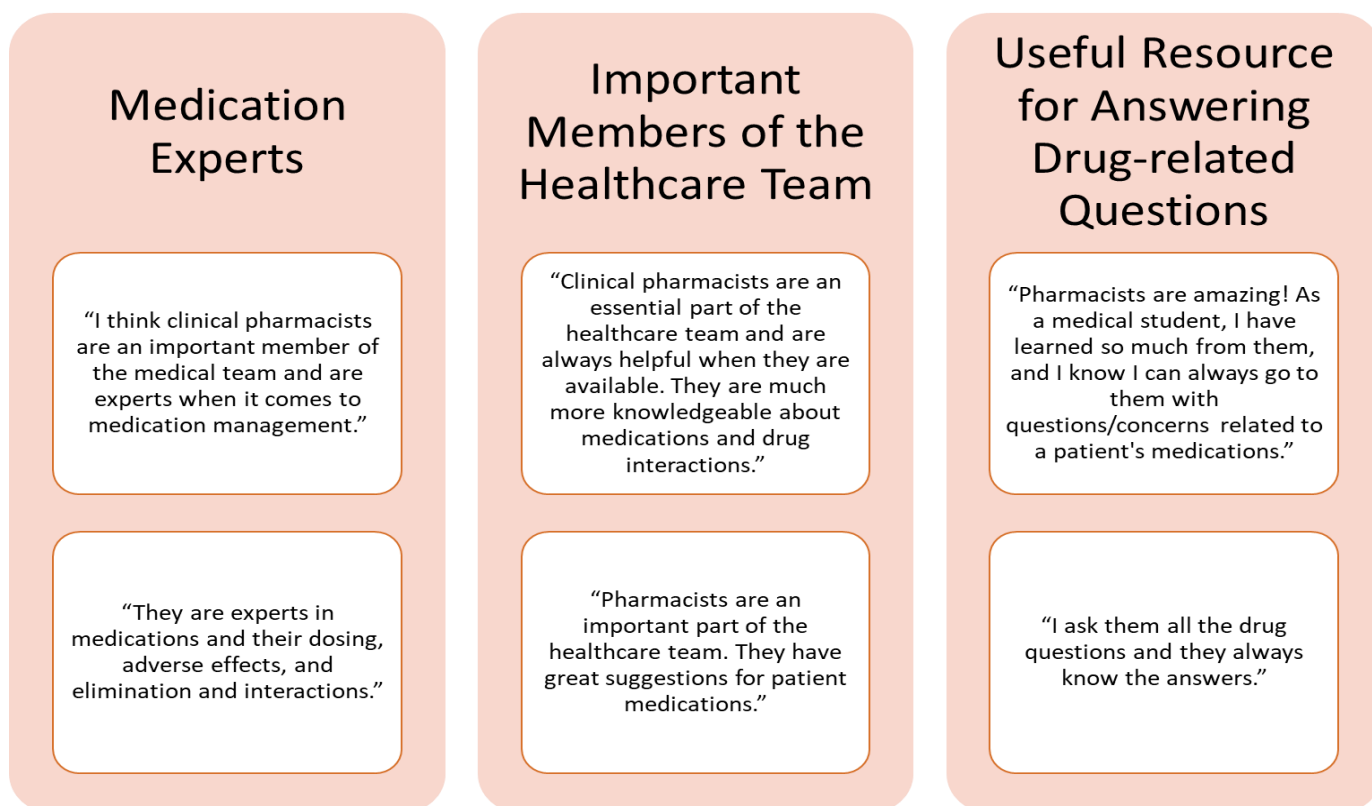5-point Likert-type scale: 1=Strongly Disagree, 5= Strongly Agree

Medication Experts

"I think clinical pharmacists are an important member of the medical team and are experts when it comes to medication management."

"They are experts in medications and their dosing, adverse effects, and elimination and interactions."

Important Members of the Healthcare Team

"Clinical pharmacists are an essential part of the healthcare team and are always helpful when they are available. They are much more knowledgeable about medications and drug interactions."

"Pharmacists are an important part of the healthcare team. They have great suggestions for patient medications."

Useful Resource for Answering Drug-related Questions

"Pharmacists are amazing! As a medical student, I have learned so much from them, and I know I can always go to them with questions/concerns related to a patient's medications."

"I ask them all the drug questions and they always know the answers."

Figure 1. Responses to How A Clinical Pharmacist's Roles and Responsibilities are Currently Perceived

Scope of Pharmacy Practice

"I wish I knew more about [a pharmacist's] scope. I feel like I probably don't know the full extent of contributions they can make."

"I wish I knew more specifics about [a pharmacist's] role and how they interact with the rest of the medical team."

Pharmacy Education

"How does [a pharmacist's] training differ from other pharmacists once they graduate from pharmacy school?"

"I wish to know more about their training process and how it differed from my own and that of a community pharmacist."

Figure 2. Responses to What Medical Students Would Like to Know More About Clinical Pharmacists