



# Transition of Clinical Pharmacy from Theory to Practice

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## Abstract

Since the 1960s, the world has witnessed a significant development in the role of clinical pharmacists, as the pharmacy profession has shifted toward improving drug treatment, promoting health, and preventing diseases. Clinical pharmacists are in high demand around the world and are now recognized as indispensable members of health care teams. Key competencies required in a clinical pharmacist include patient care, medical knowledge, collaboration with health care teams, professionalism, delivery of exceptional care, and ensuring the safe use of medications. Modern competency-based pharmacy education focuses on specific outcomes that graduates are expected to achieve, in alignment with professional standards. This curriculum prepares students to excel in changing and evolving health care delivery, ultimately leading to improved patient outcomes and more efficient health care delivery. Therefore, the future of clinical pharmacy looks bright as pharmacists play vital roles in patient care using advanced technology and personalized medicine. Collaboration with other health care professionals is also key to improving outcomes. Therefore, pharmacy education must be changed by focusing on clinical skills, combined professional training, and career development. Challenges such as regulations, differences in practices, and lack of recognition must be addressed through collaboration between health stakeholders, educators, and policy makers. This review article aims to explore the evolving role of clinical pharmacists in the health care system, highlighting their key competencies, the impact of competency-based education, and future prospects for the clinical pharmacy profession in the context of advancing technology and personalized medicine.

## Keywords

- ▶ clinical pharmacy
- ▶ pharmacy education
- ▶ pharmacy practice
- ▶ clinical pharmacy competencies
- ▶ health care professional

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## ملخص المقال باللغة العربية

## انتقال الصيدلة السريرية من النظرية إلى التطبيق

المؤلف: عبدالمولي رجب عبدالكريم، كلية الصيدلة، جامعة الشارقة، الشارقة، الإمارات العربية المتحدة. البريد الإلكتروني: [abdelkarim@sharjah.ac.ae](mailto:abdelkarim@sharjah.ac.ae)

لقد شهد العالم منذ الستينيات تطوراً كبيراً لدور الصيدلة السريرية، حيث تحولت مهنة الصيدلة ناحية تحسين العلاج الدوائي، وتعزيز الصحة، والوقاية من الأمراض. وازداد الطلب على الصيدلة السريرية في جميع أنحاء العالم حيث يُعترف بهم الآن كأعضاء لا غنى عنهم في فرق الرعاية الصحية. تشمل الكفاءات الرئيسية المطلوبة في الصيدلي السريري رعاية المرضى، والمعرفة الطبية، والتعاون مع فرق الرعاية الصحية، والكفاءة المهنية، وتقديم الرعاية الاستثنائية، والتأكد من الاستخدام الآمن للأدوية. يركز التعليم الصيدلي الحديث المبني على الكفاءة على مخرجات محددة يتوقع من الخريجين تحقيقها، وذلك بما يتماشى مع المعايير المهنية، حيث يعد هذا المنهج الطلاب للتفوق في تقديم الرعاية الصحية المتغير والمتطور، مما يؤدي في النهاية إلى تحسين نتائج المرضى وتقديم رعاية صحية أكثر كفاءة. ولذلك يبدو مستقبل الصيدلة السريرية مشرقاً حيث يلعب الصيدلة أدواراً حيوية في رعاية المرضى باستخدام التكنولوجيا المتقدمة والطب الشخصي. كما يعد التعاون مع متخصصي الرعاية الصحية الآخرين أمراً أساسياً لتحسين النتائج. ولذلك يجب تغيير التعليم الصيدلي بالتركيز على المهارات السريرية والتدريب المهني المشترك والتطوير الوظيفي. يجب معالجة التحديات مثل اللوائح والاختلافات في الممارسات وعدم الاعتراف من خلال التعاون بين أصحاب المصلحة في الصحة والمعلمين ووضعي السياسات. تهدف هذه المقالة المرجعية إلى استكشاف الدور المتطور للصيدلة السريرية في نظام الرعاية الصحية، وتبسيط الضوء على كفاءاتهم الرئيسية، وتأثير التعليم القائم على الكفاءة، والآفاق المستقبلية لمهنة الصيدلة السريرية في سياق تقدم التكنولوجيا والطب الشخصي.

الكلمات المفتاحية: الصيدلة السريرية، التعليم الصيدلي، ممارسة الصيدلة، كفاءات الصيدلة السريرية؛ خبير في الرعاية الصحية

## Introduction

Clinical pharmacy serves as a vital link between the theoretical understanding of pharmaceuticals and their practical application in patient care. Its primary focus is on enhancing medication therapy, promoting overall health, wellness, and disease prevention.

The evolution of the clinical pharmacy profession on a global scale since the 1960s has been a response to the growing complexity of patient treatment, particularly in cases involving multiple medications, comorbidities, and diverse medical practices. This evolution has stressed the importance of pharmacists in patient care, emphasizing their role beyond simply dispensing medications.

This transformation has been motivated by the imperative for safer and more effective medication usage, recognizing the significant impact that pharmacists can have on patient therapeutic outcomes.<sup>1,2</sup> The complexities of medication management present a significant challenge for modern health care systems. These challenges can result in issues related to the quality of care and system efficiency, stemming from harmful interactions between prescribed medications, improper drug selection and dosing, and misuse of medications.<sup>3</sup> As the complexity of health care continues to increase, the role of clinical pharmacists within health care teams is becoming increasingly valued. In many developed countries, clinical pharmacists are now considered a standard and essential part of clinical teams, providing independent health care services. Even in countries where clinical pharmacy was once underexplored or underdeveloped such as in developing nations, the profession is now highly sought considering the universal challenges in health care. Moreover, the demand for clinical pharmacists is on the rise, making it one of the most desired health care professions worldwide. Clinical pharmacy is a crucial health science discipline that involves pharmacists directly in patient care to optimize medication therapy, promote

health, and prevent disease.<sup>4</sup> Unlike traditional pharmacy practice, clinical pharmacy requires pharmacists to play an active role in the therapeutic process. This mini-review provides a comprehensive overview of clinical pharmacy core competencies, highlighting its key principles, the pharmacist's role in health care, the significance of specialized pharmacotherapy knowledge and skills, and the importance of education and professional development for specialist clinical pharmacists who can assess patient's disease history, clinical signs, and laboratory results.<sup>5,6</sup> In a broader context, clinical pharmacists are often involved in developing and implementing personalized care plans.

Clinical pharmacy core competencies, including patient care, medical knowledge, interprofessional collaboration, systems-based practice, practice-based learning and improvement, professionalism, communication skills, leadership, and management, are crucial skills, knowledge, and attitudes necessary for successful practice in the field. These competencies are essential in preparing clinical pharmacists to deliver exceptional patient care, collaborate effectively within health care teams, and advocate for safe and effective medication use.

Competency-based education places a strong emphasis on the outcomes of the learning process, focusing on what students should know, do, and embody upon completing their training. Competency-based curricula are centered around clearly defined competencies that align with professional standards and practice requirements. In contrast, Intended Learning Outcomes-based curricula typically outline what students are expected to learn in terms of content and skills by the end of a course or program, often without explicitly defining the proficiency levels required. By integrating competency-based curricula into pharmacy education, graduates are more prepared to navigate the ever-changing health care environment, ultimately resulting in enhanced patient outcomes and more efficient health care delivery.<sup>7-10</sup>

## Implementation of Clinical Pharmacy Services

The role of clinical pharmacists within the health care system is essential and can only be fully appreciated when viewed within the context of larger health care teams. Clinical pharmacists play a crucial role in patient care, particularly during admission and discharge, where they assist in discharge planning and ensure continuity of care. They also act as coordinators for patients as they indulge into different care settings.<sup>11</sup> Clinical pharmacy services are integrated into various health care settings, such as hospitals, community pharmacies, and clinics. Key practices within clinical pharmacy include medication therapy management which involves a comprehensive review to ensure optimal drug use, collaborative practice agreements which formalize agreements allowing pharmacists to manage drug therapy, and patient counseling which educates patients about their medications to improve adherence and outcomes.<sup>12–14</sup>

As such, clinical pharmacists play a vital role in the health care system by ensuring safe and effective medication use, collaborating with other health care professionals, and educating patients to improve their health outcomes.

## The Future of Clinical Pharmacy Practice

Clinical pharmacists are no longer just dispensing medications; they are now essential members of direct patient care teams. This shift in roles and responsibilities is driven by a recognition of their specialized knowledge in pharmacotherapy and their ability to improve patient outcomes. The future holds even greater potential for clinical pharmacists, as they are expected to play key roles in chronic disease management, personalized and precision medicine, and collaborative interdisciplinary health care teams.<sup>15</sup> The landscape of clinical pharmacy practice is on the brink of transformation due to technological advancements. Innovations such as electronic health records, telepharmacy, and artificial intelligence (AI) are leading the way. AI, for example, has the power to revolutionize patient care by predicting medication responses, identifying potential adverse reactions, and ultimately enhancing the accuracy of pharmacotherapy.<sup>16</sup> Telepharmacy, especially in rural and underserved areas, addresses the lack of traditional pharmaceutical services by providing essential care.<sup>17</sup> These advancements are paving the way for a more efficient and effective approach to pharmacy practices, benefiting patients, health care providers, and health care systems. Personalized medicine, a groundbreaking approach that tailors treatment based on individual genetic profiles, is quickly becoming a reality. Pharmacogenomics, the study of how genes impact a person's response to drugs, enables clinical pharmacists to identify the most effective medications while minimizing potential side effects.<sup>18</sup> This innovative approach not only improves patient outcomes but also helps reduce health care costs by eliminating trial-and-error prescribing.

In conclusion, the future of clinical pharmacy is bright, with clinical pharmacists playing increasingly vital roles in patient care. The integration of advanced technologies and

personalized medicine can revolutionize the field and can lead to improved outcomes and a more efficient health care system through interprofessional collaboration. The future of clinical pharmacy will be highly recognized on a significant level of collaboration once clinical pharmacists collaborate closely with physicians, nurses, and other health care professionals to deliver comprehensive care. This team-based approach ensures that all aspects of a patient's health are taken into consideration, ultimately leading to improved overall therapeutic outcomes.<sup>19</sup> To adequately prepare for these expanding roles within the field of pharmacy, it is imperative that pharmacy education undergoes a transformation. Current curricula are placing greater emphasis on developing clinical skills, promoting interprofessional education, and providing hands-on experience. Additionally, continuous professional development will be crucial in ensuring that pharmacists stay current with the latest therapeutic advancements and technologies.<sup>20</sup>

## Conclusion

The future of clinical pharmacy is promising, with collaboration being at its core. By working in conjunction with other health care professionals and continuously enhancing their knowledge and skills, pharmacists will be well-equipped to deliver high-quality care and contribute to improved patient outcomes. However, despite the great potential that lies ahead for clinical pharmacists, there are several obstacles that must be addressed.<sup>21</sup> These challenges include regulatory hurdles, varying scopes of practice across regions, and a lack of recognition for the essential role that clinical pharmacists fulfill. To tackle these issues, it will be crucial for professional organizations, educational institutions, and policy makers to collaborate in a coordinated effort.<sup>22</sup>

### Conflict of Interest

None declared.

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