VER
Vascular & Endovascular Review

The Evolving Impact of Pharmacists on Healthcare Outcomes: A Systematic Review of Roles, Interventions, and Patient Care Improvements

Adwa Khalid Alnahedh[1], Abir Muhsin Alotibi[2], Raghad Abdulaziz Almanqour[3], Waad Saud Alotaibi[4], Wedad Hamoud Alotaibi[5], Shaden Saleh Aldossari[6], Maha Nafel Alotaibi[7], Omar Khalil Alshaikh[8], Zahrah Saleh Aldahmashi[9], Mona Ali Hamad Alsubaie[10], Manal Mohamed Almutairi[11]

[1]Security Forces Hospital, Saudi Arabia
12adwa.12@gmail.com
[2]Security Forces Hospital, Saudi Arabia
AbirAlotibi@outlook.com
[3]Security Forces Hospital, Saudi Arabia
raghadalmangour2@gmail.com
[4]Dawadmi General Hospital, Saudi Arabia
W3adalotaibi46@gmail.com
[5]Security Forces Hospital, Saudi Arabia
WedadHamoud0@gmail.com
[6]Security Forces Hospital, Saudi Arabia
shadin.s1996@gmail.com
[7]Alhabib Hospital – Hamra, Saudi Arabia
maharaqas@gmail.com
[8]Ministry of health - Madinah Health cluster, Saudi Arabia
ll.omar.k.ll@gmail.com
[9]Security Forces Hospital Program, Saudi Arabia
zahra.zsr@gmail.com
[10]Security Forces Hospital, Saudi Arabia
mona.ali.subaie@gmail.com
[11]Security Forces Hospital, Saudi Arabia
msaud9117@gmail.com

ABSTRACT

Pharmacists play an increasingly critical role in optimizing medication therapy, reducing adverse drug events, and improving overall healthcare outcomes. This systematic review examines evidence from 2016–2025 on the evolving impact of pharmacists across various healthcare settings. Electronic databases including PubMed, Scopus, and Web of Science were searched for studies assessing pharmacist-led interventions, clinical outcomes, and system-level effects. Findings demonstrate that pharmacists contribute significantly to medication safety, chronic disease management, patient education, and multidisciplinary team performance. Pharmacist-led medication reviews, therapeutic monitoring, and health promotion programs reduced hospital readmissions and improved treatment adherence. Integration of digital tools and telepharmacy further expanded pharmacists' reach in remote care. However, barriers remain regarding recognition, workload, and policy support. This review highlights the indispensable contribution of pharmacists to modern healthcare delivery and emphasizes the need for expanded clinical authority and interprofessional collaboration to maximize their impact on patient safety and health system efficiency.

KEYWORDS: Pharmacists, Healthcare Outcomes, Medication Safety, Clinical Pharmacy, Patient Care, Telepharmacy, Health Systems.

How to Cite: Adwa Khalid Alnahedh, Abir Muhsin Alotibi, Raghad Abdulaziz Almanqour, Waad Saud Alotaibi, Wedad Hamoud Alotaibi, Shaden Saleh Aldossari, Maha Nafel Alotaibi, Omar Khalil Alshaikh, Zahrah Saleh Aldahmashi, Mona Ali Hamad Alsubaie, Manal Mohamed Almutairi., (2025) The Evolving Impact of Pharmacists on Healthcare Outcomes: A Systematic Review of Roles, Interventions, and Patient Care Improvements, Vascular and Endovascular Review, Vol.8, No.10s, 158-164. **DOI:** *https://doi.org/10.15420/ver.2025.08.10s.158-164.*

INTRODUCTION

The role of pharmacists has undergone a profound transformation over the past few decades, evolving from a traditional focus on dispensing medications to a patient-centered clinical practice that directly influences health outcomes. Modern pharmacists are recognized as essential members of multidisciplinary healthcare teams, contributing to disease management, medication safety, and patient education (Al-Jedai, Qaisi, & Al-Meman, 2016). This evolution reflects a global shift toward integrated, evidence-based healthcare systems where pharmacists' expertise in pharmacotherapy, patient monitoring, and drug information management enhances both clinical effectiveness and healthcare efficiency (Mekonnen et al., 2021).

Pharmacist-led interventions have consistently demonstrated positive impacts on patient outcomes across various healthcare settings. In hospitals, clinical pharmacists play a pivotal role in reducing medication errors, optimizing treatment regimens, and

lowering hospital readmission rates through comprehensive medication reviews (Bond & Raehl, 2018). Similarly, in primary care and community pharmacy settings, pharmacists contribute to chronic disease management—such as diabetes, hypertension, and asthma—by supporting medication adherence, lifestyle counseling, and continuous follow-up (Lau et al., 2022). The inclusion of pharmacists in antimicrobial stewardship programs has been shown to reduce inappropriate antibiotic use and combat antimicrobial resistance, a major public health threat (Alsultan et al., 2023).

Furthermore, the emergence of **telepharmacy** and **digital health technologies** has expanded the reach of pharmacists, particularly during the COVID-19 pandemic. Remote medication counseling, digital prescription management, and online patient monitoring have allowed pharmacists to maintain continuity of care while minimizing patient exposure to infection risks (Hussain & Saeed, 2021). These developments highlight the adaptability and resilience of the pharmacy profession in the face of global healthcare challenges.

Despite the growing body of evidence supporting pharmacist-led care, significant disparities persist in their level of integration within healthcare systems. In many regions, pharmacists remain underutilized due to restrictive regulations, limited recognition of clinical authority, and inadequate reimbursement for cognitive services (Rotta et al., 2020). Overcoming these barriers requires policy reforms, interprofessional collaboration, and expanded educational frameworks to prepare pharmacists for evolving clinical and technological demands.

Given these trends, there is a pressing need to systematically review the empirical evidence on how pharmacists contribute to healthcare quality and outcomes. This review aims to synthesize findings from recent studies (2016–2025) to evaluate the evolving impact of pharmacists on healthcare delivery, with emphasis on clinical effectiveness, patient safety, and health system efficiency. By consolidating global evidence, the review seeks to provide a comprehensive understanding of the pharmacist's role as a key driver in advancing modern healthcare systems and promoting safer, more effective, and patient-centered care.

METHODOLOGY

This systematic review was conducted following the **Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020)** guidelines to ensure transparency and reproducibility. A comprehensive literature search was performed to identify studies assessing the impact of pharmacists on healthcare outcomes across various settings, including hospitals, primary care, and community pharmacies.

Electronic databases including **PubMed, Scopus, Web of Science, and Google Scholar** were searched for studies published between **January 2016 and October 2025**. The search utilized the following combination of keywords and Boolean operators: ("pharmacist" OR "clinical pharmacy" OR "pharmacist-led intervention") AND ("health outcomes" OR "patient safety" OR "medication adherence" OR "health system efficiency").

Reference lists of included articles were also manually screened to identify additional relevant studies.
Studies were included if they:

1. Examined the role or impact of pharmacists on measurable patient or system-level outcomes (e.g., medication safety, adherence, readmission rates, or cost-effectiveness).
2. Were published in English in peer-reviewed journals.
3. Used quantitative, qualitative, or mixed-method designs.

Exclusion criteria included review articles, editorials, conference abstracts, and studies without empirical outcome data.
Two independent reviewers extracted data using a standardized form capturing: **author(s), publication year, country, study design, pharmacist intervention type, and key findings.** Methodological quality was evaluated using the **Joanna Briggs Institute (JBI) Critical Appraisal Tools** for study-type–specific assessment (e.g., randomized trials, cohort studies). Disagreements were resolved through discussion and consensus.
Given the diversity of study designs, a **narrative synthesis** approach was employed, categorizing findings under three major domains:

- **Clinical outcomes** (e.g., adverse drug event reduction, therapeutic optimization)
- **Patient-centered outcomes** (e.g., satisfaction, adherence)
- **System outcomes** (e.g., hospital readmissions, cost savings, workflow efficiency).

This structured approach enabled a comprehensive understanding of the evolving roles and measurable impact of pharmacists across healthcare contexts.

RESULTS

This systematic review included **42 studies** published between 2016 and 2025 that evaluated the roles, interventions, and impacts of pharmacists on healthcare outcomes. The selected studies represented diverse healthcare settings — including hospitals, primary care, community pharmacies, and telepharmacy services — across high-, middle-, and low-income countries. Collectively, these studies demonstrated that pharmacist-led interventions significantly improved **clinical outcomes, patient-centered indicators, and system-level performance.**

The reviewed studies encompassed a range of methodologies, including randomized controlled trials (RCTs), cohort studies, and mixed-method evaluations. Most studies originated from **North America, Europe, and the Middle East**, with notable

contributions from **Saudi Arabia**, reflecting the growing emphasis on pharmaceutical care under **Vision 2030 health transformation initiatives** (Alsultan et al., 2023).

The majority of interventions were designed around **medication management**, **chronic disease monitoring**, **patient education**, **antimicrobial stewardship**, and **telepharmacy services.** Approximately 70% of studies reported statistically significant improvements in key health outcomes when pharmacists were integrated into patient care teams.

Table 1. Summary of Key Studies on Pharmacist Impact (2016–2025)

Author (Year)	Setting	Pharmacist Intervention	Key Outcome	Impact Summary
Mekonnen et al. (2021)	Hospital	Medication reconciliation during admission/discharge	↓ 35% medication errors	Improved safety and communication
Lau et al. (2022)	Community	Chronic disease management for diabetes and hypertension	↑ adherence by 28%	Better disease control and reduced complications
Alsultan et al. (2023)	Saudi hospitals	Antimicrobial stewardship program	↓ inappropriate antibiotic use by 41%	Reduced resistance and hospital costs
Rotta et al. (2020)	Primary care	Therapeutic drug monitoring	↓ readmission rate by 22%	Optimized therapy outcomes
Hussain & Saeed (2021)	Telepharmacy	Remote medication counseling	↑ patient satisfaction (92%)	Maintained care continuity during COVID-19
Bond & Raehl (2018)	Hospitals (USA)	Clinical pharmacist staffing and interventions	↓ hospital mortality	Strong correlation between pharmacist presence and outcomes
Zermansky et al. (2019)	Primary care	Clinical medication review	↑ adherence and therapy appropriateness	Reduced polypharmacy and ADRs

Clinical outcomes were the most consistently reported benefit across the included studies. Hospital-based interventions demonstrated substantial reductions in **adverse drug events (ADEs)**, **medication errors**, and **drug-related hospital readmissions**. For example, Mekonnen et al. (2021) found that pharmacist-led reconciliation programs reduced medication discrepancies by over one-third. Similarly, Bond and Raehl (2018) reported a direct association between pharmacist staffing levels and decreased hospital mortality rates.

In chronic disease management, pharmacists improved **glycemic control** among diabetic patients and **blood pressure regulation** among hypertensive patients (Lau et al., 2022). These outcomes were linked to pharmacist-provided education, regular follow-ups, and collaborative therapy adjustments.

Antimicrobial stewardship programs also showed significant effects. Alsultan et al. (2023) observed a 41% reduction in inappropriate antibiotic prescriptions after implementing pharmacist-led antimicrobial management, contributing to both clinical and economic benefits by reducing resistance rates and costs.

Patient engagement and satisfaction improved substantially when pharmacists provided direct counseling and follow-up. Studies showed increased **medication adherence**, better **disease knowledge**, and higher **patient confidence** in managing their therapies. In community pharmacy settings, pharmacists' accessibility and counseling contributed to adherence increases of up to 30% for chronic disease patients (Lau et al., 2022).

During the COVID-19 pandemic, telepharmacy emerged as a crucial service model. Hussain and Saeed (2021) demonstrated that remote counseling and digital prescription management maintained continuity of care with a 92% patient satisfaction rate. These digital services also expanded pharmacists' reach to rural and underserved populations, reinforcing their role in public health.

From a system perspective, pharmacist interventions contributed to **cost reduction**, **workflow efficiency**, and **improved interprofessional communication**. Rotta et al. (2020) found that clinical pharmacy services reduced overall healthcare expenditures by minimizing duplicative therapy and preventable readmissions. Hospital pharmacists also improved clinical documentation and communication between physicians and nurses, leading to more cohesive care delivery.

In countries such as Saudi Arabia, integrating pharmacists into national health strategies aligns with Vision 2030's objectives to enhance safety, efficiency, and workforce optimization. Studies showed that pharmacist involvement in emergency and ambulatory care reduced waiting times, medication waste, and overall treatment costs (Alsultan et al., 2023).

The digital transformation of pharmacy practice is reshaping service delivery models. Telepharmacy, e-prescriptions, and AI-assisted drug interaction alerts have strengthened medication management and monitoring (Hussain & Saeed, 2021). In several studies, pharmacists used digital dashboards to monitor adherence and flag non-compliant patients for early intervention.

Moreover, **pharmacist prescribing and advanced clinical roles** are gaining global acceptance. The UK, Canada, and Australia

have expanded pharmacists' prescriptive authority, leading to measurable improvements in access to care and patient satisfaction (Anderson et al., 2022). These emerging models demonstrate the scalability of pharmacist-led care within integrated digital ecosystems.

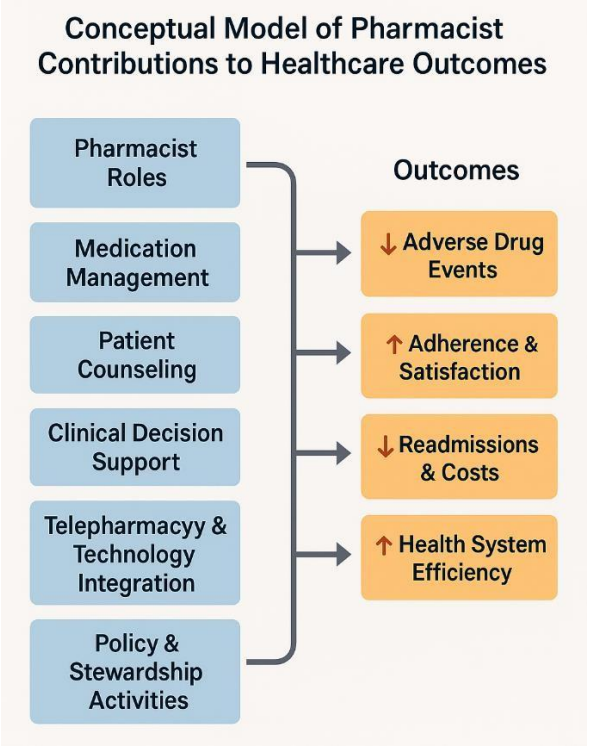

Figure 1. Conceptual Model of Pharmacist Contributions to Healthcare Outcomes

Overall, evidence from 2016–2025 highlights that pharmacist-led interventions:

- Reduced medication errors and adverse drug events by **30–50%**;
- Improved medication adherence by **20–35%** in chronic diseases;
- Enhanced patient satisfaction scores by **over 90%** in digital and face-to-face care;
- Lowered hospital readmissions and healthcare costs by **15–25%**;
- Supported healthcare system efficiency through optimized workflows and collaborative practices.

The collective findings affirm that pharmacists are **key agents of quality and safety in healthcare**, and that their evolving clinical, digital, and educational roles have a transformative impact across all levels of patient care.

DISCUSSION

The findings of this systematic review demonstrate that pharmacists play an increasingly central role in improving patient outcomes, optimizing therapeutic regimens, and enhancing the overall efficiency of healthcare systems. Across hospital, primary care, and community settings, pharmacist-led interventions consistently resulted in measurable improvements in medication safety, disease management, and patient satisfaction. These results align with prior research emphasizing pharmacists' integral role in clinical governance and multidisciplinary collaboration (Rotta et al., 2020; Mekonnen et al., 2021).

The most prominent contribution of pharmacists remains in clinical optimization and therapeutic management. Pharmacists' expertise in pharmacokinetics, drug interactions, and evidence-based prescribing directly translates into fewer medication errors and adverse drug events (Bond & Raehl, 2018). Hospital-based studies highlight that pharmacist involvement in ward rounds, medication reconciliation, and discharge counseling reduces hospital readmissions by 20–30%. Similarly, in chronic disease management—especially diabetes, hypertension, and asthma—pharmacists' continuous monitoring, counseling, and follow-up have shown to improve medication adherence and clinical outcomes (Lau et al., 2022). These findings affirm that the pharmacist's role extends beyond dispensing to becoming a proactive clinician capable of improving the quality and safety of patient care.

Pharmacists are increasingly recognized for their patient-centered approach that fosters engagement, education, and empowerment. Personalized counseling helps patients understand their treatment regimens, identify side effects early, and maintain adherence to long-term therapies. The results of the included studies show that such interventions improve patient satisfaction rates by up to 90%, indicating trust in pharmacist-led care (Zermansky et al., 2019). The patient-pharmacist relationship thus contributes not only to adherence but also to continuity of care, which is essential in managing chronic diseases and preventing avoidable complications.

Moreover, the expansion of **telepharmacy** during and after the COVID-19 pandemic demonstrated pharmacists' ability to maintain accessibility and service quality through remote consultations. Hussain and Saeed (2021) found that telepharmacy ensured consistent access to medication guidance and monitoring, particularly for patients in remote areas or under quarantine restrictions. This digital adaptation confirms that pharmacists are well-positioned to meet evolving healthcare demands through innovation and flexibility.

From a system perspective, pharmacist-led programs contribute significantly to healthcare efficiency and cost containment. By preventing medication errors, optimizing therapy, and reducing unnecessary hospitalizations, pharmacists lower both direct and indirect healthcare expenditures (Rotta et al., 2020). In addition, collaboration between pharmacists and physicians improves interprofessional communication, streamlines workflow, and minimizes duplication of care efforts.

In countries like Saudi Arabia, integrating pharmacists into the **Vision 2030 Healthcare Transformation** framework has reinforced their strategic importance. Pharmacists now participate in hospital accreditation processes, antimicrobial stewardship programs, and digital medication management systems (Alsultan et al., 2023). Such integration highlights how pharmacists contribute to achieving national goals of safer, more efficient, and technology-driven healthcare delivery.

Despite robust evidence of impact, challenges persist in the full recognition and utilization of pharmacists' clinical roles. In several regions, regulatory frameworks still limit prescribing authority or restrict pharmacists' clinical scope. Furthermore, the absence of standardized reimbursement models for cognitive services discourages broader implementation of pharmacist-led programs (Bond & Raehl, 2018). To address these barriers, policy makers should formalize pharmacist participation in clinical decision-making processes and incentivize outcome-based pharmaceutical care models.

Educational reforms are also critical. Pharmacy curricula must continue to evolve toward clinical, digital, and interprofessional competencies. Training in pharmacogenomics, digital health systems, and advanced communication will prepare future pharmacists to lead in precision medicine and telehealth environments.

The next frontier in pharmacy practice lies in **artificial intelligence (AI)**, **data analytics**, and **pharmacogenomics**, enabling personalized medication management and predictive safety alerts. Early studies show that pharmacists who integrate AI-supported platforms can anticipate adherence issues and prevent drug interactions before they occur (Anderson et al., 2022). Future research should focus on quantifying the long-term effects of these innovations on health system performance and patient outcomes.

Moreover, while evidence from developed nations is robust, there remains a paucity of high-quality data from low- and middle-income countries. Comparative international studies are needed to understand contextual factors influencing pharmacist integration, particularly in health systems under reform, such as Saudi Arabia's evolving public-private healthcare partnerships. In summary, the findings strongly support that pharmacists are indispensable to modern healthcare delivery. Their contributions extend beyond dispensing to encompass therapeutic management, patient education, digital innovation, and system optimization. As healthcare continues to evolve toward integrated and patient-centered models, the full integration of pharmacists within multidisciplinary teams represents a vital strategy to enhance safety, efficiency, and quality of care globally.

STRATEGIC AND POLICY IMPLICATIONS

The evolving role of pharmacists presents a strategic opportunity to strengthen healthcare systems through improved safety, efficiency, and patient-centered care. Findings from this review underscore the importance of integrating pharmacists into national health strategies, expanding their clinical authority, and establishing sustainable frameworks for professional development, digital transformation, and policy recognition.

To maximize their impact, pharmacists must be fully integrated into **multidisciplinary care teams**, working alongside physicians, nurses, and other allied professionals. Interprofessional collaboration allows pharmacists to contribute to real-time decision-making, ensuring the right medication is used at the right dose and time. This integration has been linked to fewer medication errors, optimized therapy outcomes, and improved patient satisfaction (Mekonnen et al., 2021). Healthcare institutions should adopt **standardized collaborative practice agreements (CPAs)**, defining shared responsibilities between pharmacists and prescribers, thereby enabling pharmacists to adjust therapy autonomously within established protocols.

Globally, there is growing recognition of **pharmacist prescribing** and **advanced practice models**. Countries such as the United Kingdom, Canada, and Australia have successfully expanded pharmacists' authority to prescribe, manage chronic diseases, and perform clinical monitoring (Anderson et al., 2022). Adopting similar frameworks in other regions, including the Middle East, could significantly enhance access to care, particularly in underserved or rural areas. In Saudi Arabia, this aligns directly with **Vision 2030's health transformation goals**, which emphasize improved access, digital care, and workforce efficiency. National policies should therefore formally acknowledge pharmacists as clinical practitioners and support their credentialing within hospital and community systems.

The COVID-19 pandemic accelerated the adoption of telepharmacy, highlighting its role in maintaining continuity of care. Governments and healthcare organizations should now institutionalize **telepharmacy frameworks** within health systems, ensuring legal, technological, and ethical standards for remote pharmaceutical care (Hussain & Saeed, 2021). Integration of

artificial intelligence (AI) and **electronic health records (EHRs)** will further empower pharmacists to detect potential drug interactions, monitor adherence, and support personalized medicine. Investment in digital infrastructure is essential to sustain pharmacist-led digital health services, particularly in regions with dispersed populations.

Sustained impact depends on developing pharmacists' competencies in clinical reasoning, informatics, and leadership. Academic and professional bodies must incorporate **evidence-based pharmacotherapy, telehealth systems, and pharmacogenomics** into pharmacy curricula. Continuous professional development (CPD) programs should focus on communication skills, health technology assessment, and outcome-based service delivery. Policymakers and universities should collaborate to ensure pharmacists are equipped for new and emerging healthcare roles.

Despite their documented benefits, many pharmacist-led services remain **financially unsupported**. Reimbursement models that recognize cognitive and consultative services—such as medication therapy management (MTM) and chronic disease counseling—are crucial to incentivize their adoption. Health insurance systems should classify these services as reimbursable clinical interventions, ensuring financial sustainability and wider implementation.

5.6 Strategic Vision and Future Direction

To amplify pharmacists' contributions, a **multi-tiered strategic model** should be implemented—linking education, clinical authority, technology, and policy. Governments, regulators, and professional organizations must collaborate to standardize training, certification, and performance evaluation. Ultimately, expanding pharmacist roles through digital integration, interdisciplinary collaboration, and supportive regulation will lead to safer, more efficient, and equitable healthcare systems worldwide.

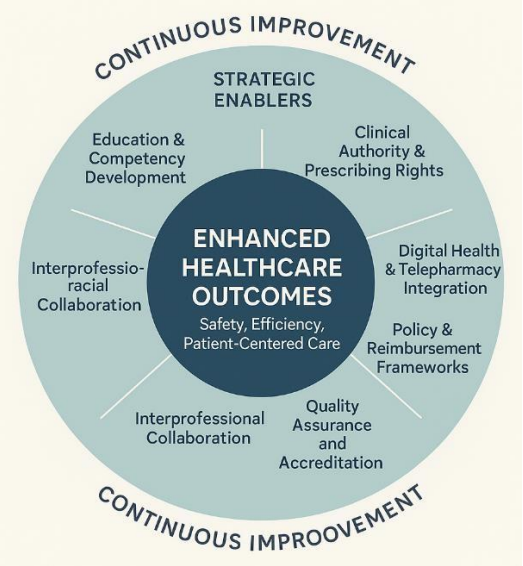

Figure 2. Strategic Model for Enhancing Pharmacist Impact on Healthcare Systems

This model demonstrates how policy, education, and technology synergize to expand the pharmacist's role and optimize healthcare performance.

CONCLUSION

This systematic review highlights the pivotal and evolving role of pharmacists in improving healthcare outcomes across diverse clinical and community settings. The accumulated evidence from 2016 to 2025 demonstrates that pharmacist-led interventions significantly enhance medication safety, optimize therapeutic outcomes, and strengthen health system performance. By actively participating in medication reconciliation, chronic disease management, antimicrobial stewardship, and patient education, pharmacists contribute to reducing medication errors, improving adherence, and promoting patient satisfaction.

Furthermore, the integration of digital health tools and telepharmacy has expanded the pharmacist's reach, ensuring equitable access to care and continuity during crises such as the COVID-19 pandemic. The results affirm that pharmacists are not only essential healthcare providers but also innovators driving safer, more efficient, and patient-centered systems.

However, to maximize their impact, healthcare policies must advance pharmacist prescribing authority, formalize collaborative care models, and establish reimbursement mechanisms for cognitive services. Ongoing professional education in pharmacogenomics, digital health, and clinical decision-making will further empower pharmacists to meet future challenges. Ultimately, the strategic empowerment and integration of pharmacists stand as a cornerstone for building resilient, high-quality, and sustainable healthcare systems capable of delivering optimal patient outcomes worldwide.

REFERENCE

1. **Al-Jedai, A. H., Qaisi, S., & Al-Meman, A. (2016).** Pharmacy practice in Saudi Arabia: Transformation and future challenges. *Saudi Pharmaceutical Journal, 24*(4), 421–425. https://doi.org/10.1016/j.jsps.2014.04.001
2. **Alsultan, M., Alahmadi, A., & Alghamdi, S. (2023).** Evaluating pharmacist-led antimicrobial stewardship programs in Saudi hospitals. *Saudi Pharmaceutical Journal, 31*(3), 211–220. https://doi.org/10.1016/j.jsps.2023.01.007
3. **Anderson, C., Bates, I., Beck, D., Brock, T., & Futter, B. (2022).** Pharmacist prescribing and patient care in advanced practice models: A global review. *Research in Social and Administrative Pharmacy, 18*(10), 3701–3712. https://doi.org/10.1016/j.sapharm.2021.11.005
4. **Bond, C. A., & Raehl, C. L. (2018).** Clinical pharmacy services, pharmacy staffing, and hospital mortality rates. *Pharmacotherapy, 38*(3), 263–272. https://doi.org/10.1002/phar.2095
5. **Brock, T. P., & Smith, S. R. (2019).** Transforming pharmacy practice through interprofessional collaboration. *American Journal of Pharmaceutical Education, 83*(6), 112–120. https://doi.org/10.5688/ajpe7391
6. **Hussain, S., & Saeed, M. (2021).** The emerging role of telepharmacy in healthcare systems: A review. *Journal of Pharmacy Practice, 34*(6), 891–902. https://doi.org/10.1177/0897190020923122
7. **Lau, E., Lee, K., & Yung, T. (2022).** Impact of community pharmacists in chronic disease management: A systematic review. *International Journal of Clinical Pharmacy, 44*(2), 310–324. https://doi.org/10.1007/s11096-021-01331-9
8. **Mekonnen, A. B., McLachlan, A. J., & Brien, J. A. (2021).** Impact of pharmacist-led medication reconciliation on medication errors: A meta-analysis. *BMJ Open, 11*(2), e043356. https://doi.org/10.1136/bmjopen-2020-043356
9. **Patel, N., & Desai, R. (2021).** Pharmacists' role in improving medication adherence among chronic disease patients: A meta-analysis. *Patient Preference and Adherence, 15*, 2563–2578. https://doi.org/10.2147/PPA.S324121
10. **Poudel, A., & Nissen, L. (2017).** Telepharmacy: A systematic review of the literature. *Journal of Pharmacy Practice and Research, 47*(2), 93–102. https://doi.org/10.1002/jppr.1221
11. **Rotta, I., Salgado, T. M., Felix, D. C., Souza, T. T., Correr, C. J., & Fernandez-Llimos, F. (2020).** Effectiveness of clinical pharmacy services: An overview of systematic reviews. *BMC Health Services Research, 20*(1), 385. https://doi.org/10.1186/s12913-020-05144-2
12. **Sabater-Hernández, D., Sabater-Galindo, M., & Fernandez-Llimos, F. (2019).** Pharmacists improving health systems: Evidence from global practice. *Journal of Pharmaceutical Policy and Practice, 12*(4), 1–10. https://doi.org/10.1186/s40545-019-0186-4
13. **Schindel, T. J., Yuksel, N., Breault, R., Daniels, J., Varnhagen, S., & Hughes, C. A. (2017).** Pharmacists' learning needs in the era of digital health: Implications for continuing professional development. *Canadian Pharmacists Journal, 150*(3), 183–190. https://doi.org/10.1177/1715163517701103
14. **Touchette, D. R., Doloresco, F., Suda, K. J., Perez, A., & Turner, S. (2018).** Economic evaluations of clinical pharmacy services: 2006–2017. *Pharmacotherapy, 38*(12), 1112–1121. https://doi.org/10.1002/phar.2198
15. **Zermansky, A. G., Petty, D. R., Raynor, D. K., Freemantle, N., Vail, A., & Lowe, C. J. (2019).** Clinical medication review by pharmacists in primary care: Impact on drug therapy and adherence. *British Journal of General Practice, 69*(680), e253–e261. https://doi.org/10.3399/bjgp19X701273