

The Role of Clinical Pharmacists in Optimizing the Rational Use of Multi-Indication Medications: A Narrative Review

Abedulla Khan Kayamkani 

Department of Clinical Pharmacy and Pharmacology, Ibn Sina National College for Medical Studies, Jeddah, Saudi Arabia

Abstract

Introduction: The function of clinical pharmacists has moved beyond being product-based to providing clinical services that focus on patients. There are several drugs that have been discovered to have wide-ranging uses and are commonly utilized across various specialties in medicine. It is because of their multi-purpose nature that several issues arise concerning these drugs, ranging from improper prescription, dosage variation, misuse of the drug, complicated monitoring techniques, and occurrence of adverse reactions to the drug. **Objectives:** The objective of the study is to discuss and critically appraise the role played by clinical pharmacists in the rational selection, monitoring, and optimal use of multi-indications in various contexts. **Materials and Methods:** This study involved performing a structured narrative review using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses principles for reporting. An extensive literature search through PubMed, Scopus, and Google Scholar databases covering literature between 2000 and 2025 was performed. Studies that involved clinical pharmacists' intervention concerning management of medication therapy, therapeutic drug monitoring, pharmacovigilance, improvement of adherence, and reconciliation of medication were selected. Two-level screening based on titles/abstracts and full texts was employed, and data synthesis was carried out narratively. **Results:** In the current study, 312 references were found, and out of those references, 68 studies fulfilled the selection criteria for inclusion in the study. This depicts that there is an indispensable role of clinical pharmacists in frameworks such as the pharmacists' patient care process. They must cooperate with other professionals in an interdisciplinary way. Studies indicate that interventions by pharmacists may help to decrease polypharmacy, increase compliance among patients, detect errors at the earliest, manage chronic diseases, antimicrobial stewardship, conduct medication reviews, and cause massive savings. **Conclusion:** The integration of Clinical Pharmacists plays a key role in the achievement of the optimal use of multi-indication medicines because this practice will always lead to higher effectiveness and safety of pharmacotherapy and, consequently, cost-effective management decisions. The inclusion of Clinical Pharmacists should always be considered as one of the basic tools of achieving rational use of flexible drugs. Further research should pay attention to the results of implementation.

Key words: Clinical pharmacists, medication reconciliation, multi-indication drugs, pharmacovigilance, polypharmacy, rational drug use

INTRODUCTION

A great deal of evolution has taken place within the scope of pharmacy in recent years. Nowadays, the role of pharmacists is no longer limited to the process of compounding the prescribed medications but includes caring for the patients and ensuring the effectiveness of medication usage. In addition, clinical pharmacists have become crucial members of the healthcare teams. They can provide patients with comprehensive information about medications, assist with the selection and administration of medications,

and contribute to the overall improvement of the quality of care delivery.^[1-3]

Address for correspondence:

Abedulla Khan Kayamkani,
Department of Clinical Pharmacy and Pharmacology, Ibn
Sina National College for Medical Studies, Jeddah, Saudi
Arabia.
E-mail: abidulla.k@gmail.com

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It goes without saying that the changes described above acquire greater significance, especially from the perspective of “Multi-Indication medications.” They may involve various chronic diseases, complicated regimen involving numerous types of medications, and the attempt to utilize outdated drugs for the treatment of certain disorders. For instance, polypharmacy refers to the phenomenon when a person takes two or more medicines simultaneously. This situation is quite typical of elderly patients or individuals with multiple disorders.^[4,5]

Multi-Indications Medicines refers to the multi-functional medicines in the expanding realm of therapeutics, which include broad spectrum antibiotics, blood thinning medicines, immune suppressants, anti-epileptic medicines, biologicals (such as monoclonal antibodies; example, rituximab used in treating cancers and autoimmune disorders), along with medicines such as metformin, statins, and chloroquine, which are being employed for purposes that were never envisaged at the time of their development. Although there is much therapeutic benefit derived from their use, the use of such medicines is fraught with many clinical challenges, including dose variation, a narrow therapeutic window, off-label medication administration, drug-to-drug interaction, duplicate therapy, and an increased possibility of adverse medication reactions.^[2,6] It has become the most important area of concern in the current context of medicine^[7] (World Health Organization, 2020).

The rational use of Multi-Indication drugs requires a systematic and scientific approach to achieve the greatest benefit with the least adverse effect. According to the World Health Organization, the concept of rational drug usage is explained as patients getting medicines that match their therapeutic needs. These medications should be given in doses that fit individual requirements, for the right amount of time, and at the lowest cost to both the patients and their community, while also being sustainable for the patient.^[8,9] To achieve such a task remains difficult, particularly if the targeted population includes complex patients who traditionally have neither been enrolled in randomized controlled trials (RCTs)^[2] nor benefited from the important advantages of the rational use of Multi-Indication medications. The clinical pharmacists, through their knowledge of pharmacotherapy, pharmacokinetics, and patient care, play a vital role in ensuring that rational use of medications becomes a common practice. This review will attempt to collect data on the multifaceted role played by the role of the clinical pharmacist in the rational use of Multi-Indication medications.

The present review aims to offer a brief account of the role played by clinical pharmacists in the rational use of drugs for the treatment of ailments based on their wide range of indications in modern-day health care institutions.

MATERIALS AND METHODS

This review was carried out using a structured narrative approach based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for methodological transparency in evaluation and compiling information regarding the role of clinical pharmacists in rational use and multi-indication medications. A systematic literature analysis was performed in databases such as Scopus, Google Scholar, EMBASE, and PubMed. Literature was collected during the period between January 2000 and June 2025 was considered in the analysis. In addition, literature available in the English language only was selected for this review.

Terms searched individually and combined together in different ways include: “Clinical pharmacist, Clinical pharmacy services, Multi-Indication medications, Rational drug use, medication therapy management (MTM), therapeutic drug monitoring (TDM), drug repurposing, Antimicrobial stewardship, Medication reconciliation, pharmacovigilance, and polypharmacy”.

“Boolean search terms used were” (“clinical pharmacist” OR “clinical pharmacy services” OR “multi-indication medications”) AND (“rational drug use” OR “medication optimization”) (“Clinical pharmacist interventions”) AND (“therapeutic drug monitoring” OR “TDM”) (“Clinical pharmacist”) AND (“medication reconciliation”) (“Pharmacist-led”) AND (“Antimicrobial stewardship”).

The selection of articles was not a simple task but rather a sophisticated process. Screening for the title and abstract of articles collected through electronic searches was done separately for those papers that talked about any activity or intervention involving patients with regard to medicines by pharmacists. Original research articles, randomized controlled trials, observational cohort studies, systematic reviews, meta-analysis, and practice guidelines formed part of this literature search.

Articles that were excluded include editorials, commentaries, non-English articles, conference abstracts when there was a lack of complete information, and observations that did not include quantifiable matters.

First, a total number of 312 articles were identified. Following the elimination of duplicate articles and screening of articles, ninety-four full-length articles were identified for scrutiny. Ultimately, sixty-eight articles were selected for this review to help understand the clinical, humanistic, or economic impact of pharmacists’ interventions.

Qualitative synthesis of findings obtained through the evidence generated by the studies was performed. Specific attention is accorded to the nature of the interventions, locations of the

interventions, drug classes, and measures used in evaluating the interventions. The results were analyzed qualitatively, and important findings have been presented through tables that highlight the effect of having clinical pharmacists on the rational use of multi-indication medications.

RESULTS AND DISCUSSION

Approaches to the rational use of drugs and clinical pharmacy practice

The realm of clinical pharmacy includes the paradigmatic structures that facilitate quality and effective implementation of the medication process. The described structures represent paradigmatic models for effective utilization and constitute an efficient base for rational thinking and rational incorporation of the work of a clinical pharmacist into the health care system.

Rules of rational prescribing and drug utilization

When prescribing medications, doctors use a certain procedure. First, it includes a number of steps that involve the identification of the problem and evaluation of its treatment. In other words, the doctor should diagnose the patient's problem; however, such diagnosis cannot be perfect all the time. It also presupposes consideration of future outcomes of the treatment and weighing its positive and negative effects.

The act of determining goals for treatment is an exercise done by the doctor and the person being treated. The practice of rational medicine entails such action. Prescribing goals may vary from one patient to another. In some instances, curing the disease becomes the goal of prescribing medicine. In other cases, the prescription of the drug may be done with the goal of improving the comfort of the patient by relieving symptoms. The objective of rational medicine may also involve the avoidance of recurrence of the disease in the future. The selection of the type of medication and the dose to be used should be aimed at maximizing benefits while minimizing harm in relation to the drug properties, patient's attributes, and costs.^[10] The World Health Organization has gone further to define rational medicine consumption using core prescribing indicators such as polypharmacy, antibiotics, injections, and adherence to EML and generic medicines prescription.^[7]

Pharmacists' patient care process (PPCP)

In an effort to promote the standardization of the patient care process, the Joint Commission of Pharmacy Practitioners (JCPP), USA, has developed the PPCP. The first version of this process was introduced in 2014 and was subsequently updated to its present form, which consists of five stages, reflecting the development of the ethic of care as follows:

1. **Collect:** The pharmacists will collect subjective and objective information about the patient, which may

include medical history, current medication regimen, lifestyle, and other aspects pertaining to social health.^[11]

2. **Assess:** During this stage, pharmacists will analyze the collected information and seek medication therapy problems, examining each drug for appropriateness, effectiveness, and safety.^[11]
3. **Plan:** In conjunction with other health professionals and the patient, the pharmacist develops a plan for managing the problems in a cost-efficient way for which medication was used for the patient.^[11]
4. **Implementing:** The pharmacists implement a plan that includes initiating, modifying, or discontinuing therapy, patient education, and working with other clinicians.^[11]
5. **Evaluation and monitoring:** The pharmacist will monitor and evaluate the results of the treatment and modify if necessary.^[11]

In this process, teamwork, record keeping, and continuous interaction between the patient and optimization of pharmacotherapy are the key factors.^[1,11]

Professional practice standards (PPS)

Internationally, the practice of pharmacy involves professional standards that represent minimum standards of conduct and performance. For example, there are PPS that have been established by PSA, and these standards are based on the cycle of management of medications involving wide domains such as person-centered care, accountability, and collaboration, among others, and narrow domains such as patient assessment, prescription, dispensation, and medication review.^[12,13] The standards can be used along with competence standards, legislation, and clinical guidelines for the delivery of services that are of high quality and safe.

Clinical pharmacy interventions

Clinical pharmacists use various evidence-based interventions to help patients optimize their medication therapy. This process is supposed to be comprehensive and involve all possible aspects of patients' medication-related issues.

MTM and medication reviews

MTM refers to a process or a number of services to help patients achieve maximum benefit from therapy.^[14,15] It became a part of the American healthcare system after being introduced with the Medicare Modernization Act in 2003.^[15,16] MTM is aimed at improving the quality of medications used, minimizing incidents, and providing education to patients and promoting their adherence.^[15,16] The components of the MTM process are the medication therapy review (MTR), personal medication record, medication action plan, interventions or referrals, and documentation and follow-up.^[15] The MTR is an evidence-based process of collecting information and conducting a review of medications to identify drug therapy problems (DTPs) and develop the appropriate solutions.^[15,17]

Another crucial component of MTM is medication review, as it is an integral part of clinical pharmacy practice too. An advanced medication review, referred to as a Type 3 medication review by Pharmaceutical Care Network Europe, includes the examination based on patient interview, medication history, and medical records.^[2] Evidently, this kind of service proved to be effective in reducing PIMs, DDI, and number of drugs taken at once.

For instance, a retrospective study performed in a psychiatric hospital in Slovenia showed that a pharmacotherapy review led to a decrease of the total number of prescribed drugs by 6.6%, usage of potentially inappropriate drugs by 29.5%, and minimized the potential drug–drug interactions significantly.^[2] Nevertheless, some systematic reviews and meta-analyses demonstrated that MTM services also helped to reduce the risks of DTPs, medication costs, and healthcare utilization, such as ED visits or hospitalization.^[8,18] The criteria for assessing the presence of PIMs and major prescribing errors are represented by such standards as screening instrument of elder individual's prescriptions and screening tools to vigilantly correct therapeutic management.^[19]

Chronic disease management (CDM)

Clinical pharmacists are key stakeholders in the management of chronic diseases since these account for significant morbidity, mortality, and costs globally.^[21,22] There is no doubt that the involvement of clinical pharmacists in CDM has tremendously improved the outcome in most cases. During the management of diabetes mellitus, pharmacists have made huge strides in lowering the HbA1c through intervention measures.^[3,15,23] This can be observed during the management of hypertension when pharmacist interventions in the form of CDM programs increased the proportion of individuals with their BP at target from 16% to 48%.^[16,17] The management of heart failure has also been revolutionized with the increase in adherence to guideline-directed medical therapy like the use of β -blockers and ACE inhibitors up to their highest tolerated doses.^[2,3] The improvement in adherence to heart failure therapy was observed in a psychiatric hospital where the figure rose from 9.9% to 71.8% upon pharmacist recommendations.^[2]

Enhancing medication adherence

Non-adherence to medical advice is a significant challenge to global health. Of course, about 50% of patients diagnosed with chronic diseases are not adherent to their treatment regimen. Worse health conditions arise due to poor adherence, causing increased progression of diseases and increased healthcare expenditures. Non-adherence to medications is expected to cause up to 125,000 preventable deaths each year in the US alone. Being very accessible, pharmacists can help patients cope with the challenges associated with medication adherence.

According to a systematic review of 26 RCTs, 69.2% of pharmacist-led interventions have shown statistical

significance in enhancing patient adherence to medical advice.^[21,24] In most cases, successful interventions are multimodal and tailored to individual patient needs. The most common techniques include:

- Counseling and education: Giving patients knowledge about the condition and its treatment. As a rule, interventions combining education and behavior change are the most effective interventions.
- Personalized interventions: Recognizing barriers that might be associated with capability, opportunity, or motivation of each patient. This could involve using the COM-B model, for instance.^[21,25] This is actually a very effective way of promoting better health behaviors within less time and resources spent on the process.
- Influence technology-based solutions: Technology such as mobile applications that remind patients of their medications, automated medication dispensers, and tele-monitoring tools that help patients keep up with their medication schedules.^[26,27]

Through understanding the underlying factors behind non-adherence, pharmacists are capable of making a huge difference within the participation and response rates of the patients.^[21,22]

The pharmacist's role in drug repositioning and combination therapy

Not only does the rapidly evolving domain of pharmacotherapy entail a number of challenges in terms of the novel application of existing drugs for treating other diseases, but the utilization of combinations of multiple pharmaceutical agents to generate synergic effect is an increasingly prevalent approach within clinical practice. Clinical pharmacists are highly essential in interpreting and implementing complex pharmacotherapy strategies.

Drug repositioning: A novel approach to pharmacotherapy

Drug repurposing, which may be defined as using existing drug products for novel therapeutic applications, is regarded as significantly more effective and economical than drug development, due to the presence of pre-existing knowledge about the drug's toxic and pharmacokinetic characteristics. In addition, the drug development timeline is significantly shortened. Among the disease categories in which drug repositioning becomes widely popular, there are cancers, infectious, and autoimmune disorders. Prominent examples of this phenomenon include.

- Metformin: Metformin is one of the most common drugs in the treatment of diabetes. The application of metformin as an anti-cancer drug is currently under investigation. Several studies show that it interferes with the proliferation, survival, and metastasis of cancer cells.^[28-30]
- Statins: The most frequent dyslipidemias are statins. A study by Zhang *et al.* showed that simvastatin can be

used against cancer because of its ability to restore the functions of *p53* gene and cholesterol pathway products that are important in the development of cancer cells.^[28]

- Chloroquine/hydroxychloroquine (HCQ): Chloroquine is used for the treatment of malaria, while HCQ is used to treat autoimmune diseases such as rheumatoid arthritis and lupus. It has been investigated as an autophagy inhibitor and lysosome pH control drug in the antiviral and anticancer fields. However, the use of HCQ against coronavirus remains controversial.^[20,31]
- Ivermectin: Ivermectin is an anthelmintic drug that is currently being studied for its antiviral, anti-inflammatory, and anti-cancer effects. The hypotheses about its mode of action involve the inhibition of proliferation of cancerous cells and the induction of apoptosis.
- Examples of broad-spectrum agents are beta-lactam antibiotics such as piperacillin-tazobactam.
- Multidrug indication examples: Aspirin, which has applications for pain relief, anti-inflammation, and cardioprotection.
- Examples of biologic/targeted therapy: Tumor necrosis factor-alpha inhibitors such as adalimumab for RA, psoriasis, and inflammatory bowel disease.

It is essential for the clinical pharmacist to be involved in this process. First, it is important that they always remain up-to-date concerning any new developments in its use. Second, it is essential that they help raise awareness among physicians and patients of what benefits can be derived from such medications and their potential risks. The knowledge about pharmacokinetics and pharmacodynamics is also essential when administering a drug in question since these medicines are often prescribed for patients who have not been tested yet or have a different dosage schedule.^[1,28]

Combination drug therapies

Combining medications with a variety of mechanisms of action can make each of them more efficient/toxic. It is already widely used in pain management and oncology.

- Multimodal analgesia: Multimodal analgesia refers to the use of drugs to enhance pain management using a smaller amount of opioids. The process entails administration of scheduled doses of non-opioid analgesics, including acetaminophen and non-steroidal anti-inflammatory drugs combined with regional anesthesia or other types, such as gabapentinoids and alpha-2 adrenergic agonists.^[32,33] Clinical pharmacists contribute immensely in this regard by developing strategies for multimodal therapy while considering aspects such as drug combinations and timing among others to prevent any possible adverse drug interactions.^[32]
- Combination immunotherapy: Combination immunotherapy can refer to a combination of different immunotherapeutic agents or immunotherapeutic agent in combination with other therapeutic approaches such

as chemotherapy, radiotherapy, or targeted therapies, all which have a synergistic relationship with each other, but possess a lot of complex toxicities associated with them, including irAEs.^[16] Combination treatments of immunotherapy and other approaches are quite popular in oncology nowadays.^[16] Clinical pharmacists are highly involved in managing combination therapies and related adverse effects in oncology.^[1]

Effects on healthcare and economic costs

The introduction of clinical pharmacists to healthcare teams proves to be a successful solution in all respects, such as clinical, humanistic, and economical. Clinical services rendered by pharmacists are gaining more proof due to the growing body of evidence based on systematic reviews and meta-analyses.

Clinical and safety effects

This activity carried out by pharmacists contributes to better outcomes. Thus, the study conducted with 81 articles examining the influence of the provision of MTM services showed that it contributed to the significant reduction in the number of hospital readmissions (odds ratio [OR]: 0.77), ED visits (OR: 0.88), and adverse drug events (OR: 0.68).^[20] Besides, in cases concerning certain diseases, the effects are even more impressive. Pharmacists' management of patients diagnosed with DM and HTN improves patients' glucose control and reduces their BP, accordingly. Furthermore, in terms of congestive heart failure, there is an improvement in compliance with treatment guidelines.^[2,3,17]

However, during research conducted among inpatients at a psychiatric hospital, the contribution by the pharmacist in terms of drug management was able to resolve some critical problems, for example, minimizing the use of PIMs like prolonged administration of benzodiazepines and proton pump inhibitors. Besides that, the pharmacist managed "gullible and potentially dangerous" DDIs.^[2]

Humanistic outcomes

Humanistic outcomes including QoL and patient satisfaction are also positively impacted by clinical pharmacy services. Patient-centered approach toward health provision, health education, and empowerment by the pharmacists has helped patients to gain better understanding, thus showing significant positive correlations with medication adherence.^[26,32] The systematic review of clinical pharmacy services offered to patients in Sudan shows that positive impact was observed for humanistic outcomes where 85.7% of the studies showed positive values in terms of medication adherence, treatment satisfaction, and patient knowledge.^[3] Patient satisfaction research, carried out through PACIC, indicates significantly positive values regarding patient satisfaction regarding the pharmacist-led management of chronic illnesses, which

shows positive views of interprofessional and patient-centered care.^[29] Although measuring the impact of clinical pharmacy on QoL may be somewhat tricky at some points, the improvements observed for medication satisfaction and adherence certainly show humanistic values of pharmacist involvement.^[3,18,32]

Economic impact

At present, pharmacy-based approaches are believed to be cost-effective.^[34] As revealed by a systematic review of 75 intervention studies, there is a powerful economic rationale for the provision of extra services by pharmacists, primarily medication reviews and management of chronic diseases, most of which can be classified as dominant (more effective and cheaper) or cost-effective.^[35] Moreover, it was shown that MTM services have a great potential for reducing the medication costs significantly (highly statistically significant), thereby generating positive economic returns by preventing the use of costly health care resources, such as hospitalization and emergency visits.^[15,36] For instance, one study estimated that by providing a prescription service by a pharmacist, it was possible to reduce total costs by \$10,162 per person over a period of 30 years.^[37] Another study examining the use of pharmacist-based services in relation to the use of antiulcer drugs reported highly statistically significant reductions in the use costs and medication use duration.^[38]

Challenges and Future Directions

There have been numerous pieces of evidence proving that clinical pharmacists can make an impact on patients, yet there are some challenges encountered which hinder their proper integration in clinical settings. The primary challenge is limited funding and inadequate time for engaging in intellectually demanding tasks such as CMR and MTM.^[39] Another issue that might arise when integrating pharmacists and other health practitioners, for instance, medical practitioners and specialists, would require efficient communication channels among them.^[29,39] Furthermore, even though several guidelines are established in practice, there is a possibility of inequality requiring international guidelines to ensure appropriate quality treatment, especially in Developing Countries.^[40]

Polypharmacy: The elderly patient is often on several medications, which may cause several problems regarding drug interactions. This is an issue for the pharmacist to deal with, but due to a lack of time.

- **Regulatory and availability concerns:** Lack of availability of drugs like multi-indication injectables (e.g., heparin) leads to rationalization. Use of drugs without prescription is not scientifically validated, and ethics comes into question.
- **Resistance to change:** Physician freedom becomes a barrier to the capability of the clinical pharmacist to recommend drugs, but this barrier can be decreased within interdisciplinary care.

- **Disparities around the globe:** It is essential that in poorer nations, where clinical pharmacists have little training and the availability of TDM technology is costly.

The Future of Clinical Pharmacy Practice consists of utilizing technological developments and widening the scope of practice. Information and Communication technologies, comprising artificial intelligence (AI), electronic health record and AI-enabled decision support system, mHealth apps, and Telehealth, are reshaping the practice area in this profession as they facilitate the automation of Repetitive Tasks, Remote Patient Monitoring, and Real-time Clinical Decision Support.^[27,28] academic and Policy Change, Precision Medicine is the ability of pharmacogenomics in facilitating personalized treatment options with Multi-Indication drugs (for example, Warfarin based on CYP2C9/VKORC1 genotype) to make it more rational. AI-based models can be used in detecting cases of Medication Non-Adherence, identifying ADE risks among Patients, and drug re-purposing tools.^[16,27] To understand these possibilities, pharmacists should develop the digital health literacy skill through education.^[20]

It will certainly be the need of the day to introduce policy changes to ensure that this transformation takes place. It will entail the mainstreaming of pharmacists into healthcare policies in such a manner that they can prescribe drugs when there is a need, as well as the design of efficient payment models for their services.^[3,40] The future research efforts should therefore target RCTs to address the existing knowledge gap with regard to the clinical and cost-effectiveness issue.^[3,21]

DISCUSSION

The findings discussed above indicate the crucial role played by clinical pharmacists in ensuring proper use of multiple-indication medications. As is seen from the findings, the work of pharmacists proves to be effective for ensuring better appropriateness of use and safety of medications.^[1,20,34]

As far as the findings reported in this paper are concerned, what should be pointed out is that such an effect can be obtained through various kinds of interventions. Regardless of the intervention that took place, there was progress in obtaining the required clinical effect.^[41,42] This means that the importance of using the services provided by pharmacists cannot be associated with their ability to treat patients with only one kind of disease.

The findings were highly important to patients exposed to the risk of polypharmacy and patients on high-risk medications. This is because patients falling under such risk factors would be more vulnerable to adverse drug events, prescribing cascade, persistence therapy, and duplicate therapy.^[6,43] The pharmacists possess specialized knowledge in the areas of pharmacotherapy, pharmacokinetics, drug interactions, and dosing adjustments.^[44]

Healthcare systems in the Middle East are experiencing a very rapid expansion with modernization initiatives in addition to rising chronic illnesses such as diabetes mellitus, hypertension, cardiovascular disease, and infectious diseases. This shift in disease prevalence has contributed to a high consumption rate for flexible drugs requiring continued safety evaluation. In a majority of healthcare settings in the Middle East, there is a prevailing physician-centric approach to drug prescribing, with a fully implemented drug management program not yet in place in these countries. As a result, the concerns arising from high instances of drug combinations, the misuse of highly useful antibiotics, and drug-related issues continue to constitute a source of prominent healthcare concerns with high economic costs. Clinical pharmacists can offer appropriate solutions to these rising concerns using systematic approaches such as drug management therapy, drug monitoring, and drug reconciliation initiatives. A number of research initiatives based in Saudi Arabia, the Kingdom of Jordan, and the UAE have established the beneficial effects of pharmacist interventions in improved patient observance with standardized medical drug therapy protocol requirements, with minimal total treatment costs resulting from these interventions in healthcare settings.

The Kingdom's Vision 2030 and Health Sector Transformation Program stress the improvement in quality of care and patient safety, as well as efficient use of resources. Antimicrobial Stewardship Programs are common practice in tertiary hospitals nationwide, where clinical pharmacists, as an integral part, perform a number of important functions, such as reviewing broad-spectrum antimicrobial, compliance with guidelines, and resistance trends monitoring. Likewise, TDM of multi-indication drugs such as vancomycin, aminoglycosides, phenytoin, and valproic acid becomes an emerging practice performed by clinical pharmacists within MOH healthcare facilities. In addition, pharmacist-managed medication reconciliation on hospital admission and discharge becomes one of the primary strategies to ensure patients' safety by preventing medication errors and duplication of therapy. Saudi CBAHI guidelines recommend performing medication management and pharmacovigilance procedures in a structured way, which are often facilitated by pharmacists. This proves that integration of clinical pharmacists into multidisciplinary teams not only corresponds to the national health policies but also represents a sustainable solution to achieving rational use of complex drugs.

Despite its strengths, certain limitations of the evidence should be acknowledged. First, there was high variability in the design, outcome, follow-up, and setting of various studies presented. The variation narrows down the comparability of the research. Second, while numerous studies proved short-term advantages, only a few of them provided long-term effects. Third, many of the interventions were introduced in a clinical environment where the pharmacy practice was well-developed.^[20,44]

The issue of implementation barriers should not be ignored either. Such limitations as limited time for consultations, shortage of personnel, limited prescribing privileges, difficulties with payment, and differences in interdisciplinary acceptance still hinder broader implementation of the pharmacist-delivered service within various health care organizations. The importance of such interactions is especially pronounced in developing countries.^[44,45]

CONCLUSION

The clinical pharmacist plays an important part in optimizing the utilization of multi-indication medications. Through structured intervention, through MTM, medication assessment, or disease state management, clinical pharmacists will be able to assist complicated cases in polypharmacy, improve compliance, and ensure appropriate usage, either for intended uses or multi-indication applications. The incremental value entails a conglomeration of various benefits, namely minimized medication issues, reduced health costs, and better quality of life among patients. With growth in the healthcare industry, advances in healthcare technology will be inevitable or at the very least extremely significant to ensure that the effort made by clinical pharmacists is fully optimized.

CONTRIBUTION OF AUTHORS

All authors have made a substantial equal contribution to the work and approved it for publication.

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