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REVIEW ARTICLE
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ROLE OF PHARMACISTS IN CLINICAL DECISION-MAKING: A REVIEW OF CLINICAL REASONING, MEDICATION MANAGEMENT, AND PATIENT-CENTERED CARE

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ABSTRACT
Pharmacists are increasingly recognized as essential members of multidisciplinary healthcare teams, with responsibilities extending beyond medication dispensing to clinical assessment, medication optimization, monitoring, patient education, and participation in therapeutic decision-making. Clinical decision-making in pharmacy involves the systematic integration of patient-specific information, pharmacological knowledge, clinical evidence, treatment guidelines, and patient preferences to identify medication-related problems and select safe, effective, and individualized therapeutic strategies. Recent literature indicates that clinical reasoning is a core competency of pharmacists and represents an important stage in the clinical decision-making process. Pharmacists contribute to clinical decision-making through medication reconciliation, medication review, identification and prevention of drug-related problems, dose optimization, adverse drug reaction monitoring, drug interaction assessment, antimicrobial stewardship, adherence support, and collaborative management of chronic diseases. Evidence from systematic reviews suggests that pharmacist-led interventions can improve medication adherence, disease control, medication safety, and selected clinical outcomes. Furthermore, clinical decision-support systems are increasingly being integrated into pharmacy practice to assist pharmacists in identifying drug-related problems and improving the efficiency and quality of medication reviews. However, effective pharmacist participation in clinical decision-making requires adequate clinical knowledge, access to patient information, interprofessional collaboration, communication skills, appropriate authority, and continuing professional development. This review discusses the evolving role of pharmacists in clinical decision-making, with particular emphasis on clinical reasoning, medication management, patient-centered care, clinical decision-support systems, and future directions.

Keywords: *Pharmacist; clinical decision-making; clinical reasoning; medication management; medication review; patient-centered care; clinical pharmacy; clinical decision support; drug-related problems.*

1. INTRODUCTION

The role of the pharmacist has undergone substantial transformation from a primarily product-oriented profession to a patient-centered clinical healthcare profession. Modern pharmacy practice emphasizes the safe, effective, and rational use of medicines and recognizes pharmacists as healthcare professionals who contribute directly to patient outcomes. Pharmacists possess specialized knowledge of pharmacotherapy, pharmacokinetics, pharmacodynamics, drug interactions, adverse drug reactions, dosage optimization, and medication-use processes. These competencies position pharmacists to make important contributions to clinical decision-making within healthcare teams.

Clinical decision-making refers to the process through which healthcare professionals collect and interpret clinical information, identify patient problems, consider therapeutic alternatives, evaluate risks and benefits, and select an appropriate course of action. For pharmacists, clinical decision-making is particularly important because medication therapy is frequently complex and must be individualized according to disease characteristics, comorbidities, organ function, concurrent medicines, adherence, lifestyle, and patient preferences [1,2].

Clinical reasoning is a fundamental component of this process. A scoping review by Mertens et al. demonstrated that pharmacists use both analytical and intuitive approaches when addressing clinical scenarios, particularly when evaluating medication appropriateness and forming clinical assessments [1]. Clinical reasoning therefore provides the cognitive foundation through which pharmacists translate pharmacological knowledge and patient information into clinically relevant recommendations.

The increasing prevalence of polypharmacy, multimorbidity, chronic diseases, medication-related harm, and antimicrobial resistance has further increased the need for pharmacist involvement in clinical decision-making. Pharmacist-led medication reviews and medication therapy management can identify drug-related problems, optimize treatment, and support patients in achieving therapeutic goals [3-7]. Consequently, the pharmacist is increasingly functioning as a clinical decision-making partner rather than solely as a dispenser of medicines.

2. CONCEPT OF CLINICAL DECISION-MAKING IN PHARMACY PRACTICE

Clinical decision-making in pharmacy involves a structured process of collecting patient information, identifying medication-related needs, evaluating evidence, developing therapeutic recommendations, implementing interventions, and monitoring outcomes. The process is closely associated with clinical reasoning because pharmacists must interpret clinical information and determine its relevance to pharmacotherapy.

Mertens et al. reported that pharmacists' clinical reasoning is a context-dependent cognitive process in which knowledge and clinical experience are integrated with available clinical information [1]. Their review identified clinical reasoning in situations involving diagnosis formation and medication appropriateness. Importantly, the authors suggested that clinical reasoning should be explicitly taught and recognized as a distinct component of clinical decision-making.

Clinical decision-making is influenced by several factors, including pharmacist capability, professional experience, availability of patient information, clinical environment, collaboration with other healthcare professionals, organizational support, and patient-related factors [2]. Pharmacists therefore require not only pharmacotherapeutic knowledge but also critical thinking, communication, problem-solving, and decision-making skills.

3. ROLE OF PHARMACISTS IN CLINICAL ASSESSMENT

An important contribution of pharmacists to clinical decision-making is the assessment of medication-related aspects of a patient's clinical condition. Pharmacists review patient histories, medication lists, laboratory parameters, allergies, previous adverse drug reactions, adherence, and therapeutic response.

Clinical assessment enables pharmacists to identify potential or actual drug-related problems such as:

- inappropriate drug selection;
- incorrect dose or dosage regimen;
- untreated indications;
- therapeutic duplication;
- drug-drug interactions;
- drug-disease interactions;
- adverse drug reactions;
- medication errors;
- contraindications;
- unnecessary medication use;
- inadequate monitoring; and
- medication non-adherence.

Through systematic evaluation, pharmacists can communicate clinically relevant recommendations to prescribers and other members of the healthcare team.

4. PHARMACIST-LED MEDICATION REVIEW

Medication review is one of the most important clinical activities through which pharmacists participate in decision-making. It involves systematic assessment of a patient's complete medication regimen with the objective of optimizing therapy and minimizing medication-related problems.

A systematic review by Graabaek and Kjeldsen found that pharmacist-led medication reviews in hospitals were associated with improvements in patient outcomes, although the magnitude and nature of benefits varied between studies [3]. Medication review can be particularly valuable in patients with polypharmacy, multiple chronic diseases, elderly patients, and patients experiencing transitions between healthcare settings.

A more recent systematic review and narrative synthesis by Craske et al. examined the components of pharmacist-led medication reviews and their relationship with outcomes [4]. The findings indicated that collaborative working, patient

involvement in goal-setting and action planning, and follow-up may contribute to improved medication-related and clinical outcomes. These findings emphasize that medication review should not be regarded as a simple prescription-checking exercise; rather, it is a patient-centered clinical intervention.

5. MEDICATION THERAPY MANAGEMENT AND CLINICAL DECISION-MAKING

Medication Therapy Management (MTM) provides pharmacists with a structured framework for optimizing medication therapy. MTM generally involves comprehensive medication review, identification of medication-related problems, development of recommendations, patient education, and follow-up.

Marupuru et al. conducted a systematic review evaluating pharmacist-provided MTM among patients with diabetes, hypertension, and dyslipidemia [5]. The review found improvements in clinical outcomes in many of the included studies, supporting the contribution of pharmacist-led MTM to chronic disease management.

Through MTM, pharmacists may assess whether:

1. each medication has an appropriate indication;
2. the medication is effective for the intended therapeutic goal;
3. the dosage is appropriate;
4. the patient is able and willing to use the medication correctly;
5. adverse effects are occurring;
6. clinically important interactions are present; and
7. laboratory or clinical monitoring is required.

These activities demonstrate how pharmacists actively participate in therapeutic decision-making.

6. PHARMACISTS AND MEDICATION SAFETY

Medication errors and adverse drug events represent important causes of preventable patient harm. Pharmacists contribute to medication safety at multiple stages of the medication-use process, including prescribing, dispensing, administration, monitoring, and transitions of care.

A systematic review by Kaboli et al. evaluated clinical pharmacist involvement in inpatient medical care and identified improvements in medication safety and several other outcomes [6]. Pharmacist participation in patient rounds, medication reconciliation, drug-specific services, discharge counseling, and follow-up were among the interventions evaluated.

Medication reconciliation is particularly important during admission, transfer, and discharge because discrepancies between medication lists can result in omissions, duplications, incorrect doses, and unintended medication changes. Pharmacists can identify discrepancies and communicate appropriate recommendations to the healthcare team.

7. PHARMACISTS IN CHRONIC DISEASE MANAGEMENT

The increasing burden of chronic diseases has expanded opportunities for pharmacists to participate in long-term clinical decision-making. Community and clinical pharmacists may contribute to management of hypertension, diabetes, dyslipidemia, asthma, chronic obstructive pulmonary disease, cardiovascular disease, and other chronic conditions.

Milosavljevic et al. reviewed community pharmacist-led interventions and reported improvements in medication adherence and selected health outcomes, including blood pressure and cholesterol management [7]. Similarly, Yuan et al. found that community pharmacy services were associated with positive clinical outcomes across a range of disease-management programs [8].

Pharmacists can support chronic disease management by monitoring treatment response, reinforcing adherence, identifying adverse effects, recommending medication adjustments within their professional scope, providing lifestyle counseling, and referring patients when clinical assessment indicates the need for medical evaluation.

8. PHARMACISTS AND PATIENT-CENTERED CARE

Patient-centered care requires consideration of the patient's clinical condition, preferences, values, concerns, health literacy, socioeconomic circumstances, and ability to follow the proposed treatment plan. Pharmacists are well positioned to provide patient-centered medication care because medication use is a major point of interaction between patients and healthcare professionals.

Patient counseling allows pharmacists to explain the purpose of medicines, correct administration techniques, expected benefits, possible adverse effects, precautions, and the importance of adherence. Pharmacists can also identify barriers that prevent patients from achieving therapeutic goals.

A systematic review of community pharmacist-led interventions demonstrated that pharmacist involvement can improve medication adherence and contribute to improved disease control [7]. Patient participation is particularly important because therapeutic decisions are more likely to be successful when patients understand and accept the treatment plan.

9. PHARMACISTS AS MEMBERS OF MULTIDISCIPLINARY HEALTHCARE TEAMS

Modern clinical decision-making is increasingly collaborative. Physicians, pharmacists, nurses, and other healthcare professionals contribute complementary knowledge to patient care. Pharmacists provide specialized expertise in pharmacotherapy and medication-use processes, while physicians and other professionals contribute diagnostic, procedural, nursing, and broader clinical expertise.

Pharmacist participation in multidisciplinary teams may include attending clinical rounds, reviewing medication orders, discussing therapeutic alternatives, recommending dose modifications, monitoring treatment response, and educating patients and healthcare professionals.

Evidence from hospital-based systematic reviews indicates that integration of clinical pharmacists into patient care can improve medication appropriateness and reduce some medication-related problems [6]. Effective collaboration requires clear communication, mutual respect, defined responsibilities, and access to relevant clinical information.

10. PHARMACISTS AND CLINICAL DECISION-SUPPORT SYSTEMS

Digital technologies are increasingly influencing clinical pharmacy practice. Clinical decision-support systems (CDSSs) can provide alerts and recommendations related to drug interactions, contraindications, dosing, adverse effects, laboratory monitoring, and other medication-related problems.

The clinical pharmacist has an important role in ensuring that decision-support information is clinically relevant. Excessive or inappropriate alerts can produce alert fatigue and reduce the effectiveness of CDSSs. Pharmacists can contribute to the development, evaluation, and clinical interpretation of decision-support systems and can help determine whether an alert requires intervention [10].

Recent evidence also demonstrates the potential value of CDSSs during medication review. In a randomized controlled study, pharmacists using a CDSS completed medication reviews more efficiently and identified more relevant drug-related problems than when working without the system [11]. Similarly, research involving an intelligent medication-review system demonstrated improved identification of relevant drug-related problems and better proposed interventions when pharmacists were supported by the system [12].

These findings suggest that technology should complement rather than replace pharmacist clinical reasoning. The pharmacist remains responsible for interpreting patient-specific information and determining whether a computerized recommendation is clinically appropriate.

11. FACTORS AFFECTING PHARMACISTS' CLINICAL DECISION-MAKING

Clinical decision-making does not occur in isolation. Several factors can influence the quality and consistency of pharmacists' decisions. These include:

11.1 Clinical knowledge and experience

Strong pharmacotherapeutic knowledge and clinical experience improve the ability of pharmacists to recognize medication-related problems and develop appropriate interventions [1,2].

11.2 Availability of patient information

Incomplete information regarding diagnosis, laboratory values, medication history, allergies, and treatment goals can limit the pharmacist's ability to make an appropriate recommendation.

11.3 Interprofessional collaboration

Communication with physicians, nurses, and other healthcare professionals is essential for integrating pharmacist recommendations into patient care.

11.4 Work environment

Time constraints, workload, staffing, access to clinical records, and organizational support can influence pharmacists' ability to undertake comprehensive clinical assessments.

11.5 Patient preferences

Clinical decisions should consider patient preferences, health literacy, adherence barriers, lifestyle, and treatment priorities.

11.6 Access to clinical decision-support tools

Reliable drug-information databases, electronic health records, interaction-checking systems, and CDSSs can support decision-making but should be used as aids to professional judgment rather than substitutes for clinical reasoning.

12. EVIDENCE FOR PHARMACIST-LED INTERVENTIONS

The overall evidence indicates that pharmacist-led services can improve several aspects of medication use and patient care. A systematic review of pharmacist-led interventions in ambulatory care found that clinical medication review was particularly useful for managing drug-related problems and adverse events, while adherence-focused interventions improved medication adherence [9].

Similarly, systematic reviews have reported benefits from pharmacist-led medication therapy management, community pharmacy services, and medication review [4,5,7-9]. However, the evidence is not uniformly consistent across all clinical outcomes. Differences in intervention design, pharmacist responsibilities, healthcare systems, patient populations, duration of follow-up, and outcome measures contribute to heterogeneity between studies.

Therefore, the effectiveness of pharmacist involvement depends not simply on the presence of a pharmacist but on the nature, intensity, integration, and quality of the clinical service provided.

13. CHALLENGES IN PHARMACIST PARTICIPATION IN CLINICAL DECISION-MAKING

Despite increasing evidence supporting pharmacist involvement, several barriers remain.

First, the scope of pharmacist clinical practice varies considerably between countries and healthcare systems. Second, some healthcare environments may not provide pharmacists with adequate access to patient records or laboratory information. Third, workload and staffing limitations may reduce the time available for clinical activities. Fourth, variation in clinical training and continuing professional development can influence pharmacists' confidence in complex decision-making.

Another important challenge is the need to establish clear professional roles within multidisciplinary teams. Pharmacists should have clearly defined responsibilities and appropriate mechanisms for communicating and documenting clinical recommendations.

14. FUTURE PERSPECTIVES

The future role of pharmacists in clinical decision-making is likely to expand as healthcare systems increasingly emphasize medication safety, chronic disease management, patient-centered care, precision medicine, and digital health.

Artificial intelligence and advanced clinical decision-support systems may increasingly assist pharmacists in detecting drug-related problems, evaluating large amounts of clinical information, and prioritizing patients requiring medication review. However, such technologies should be viewed as supportive tools. Human clinical reasoning remains necessary because therapeutic decisions require consideration of patient preferences, clinical context, uncertainty, and ethical considerations.

Future pharmacy education should therefore place greater emphasis on clinical reasoning, evidence-based decision-making, communication, interprofessional practice, informatics, and interpretation of clinical data. Pharmacists should also receive continuing professional development to maintain competence as therapeutic options and healthcare technologies evolve.

15. CONCLUSION

Pharmacists have evolved from medication suppliers to active participants in clinical decision-making and patient-centered healthcare. Their expertise in pharmacotherapy enables them to assess medication appropriateness, identify drug-related problems, optimize treatment, monitor outcomes, improve adherence, prevent medication errors, and provide evidence-based recommendations to patients and healthcare professionals.

Clinical reasoning is a fundamental component of this role, allowing pharmacists to integrate patient-specific information with pharmacological knowledge and clinical evidence [1,2]. Medication reviews and medication therapy management provide structured opportunities for pharmacists to identify and resolve medication-related problems [3-5]. Evidence from systematic reviews indicates that pharmacist-led interventions can improve medication adherence, medication safety, disease management, and selected clinical outcomes [6-9].

The integration of clinical decision-support systems offers additional opportunities to enhance pharmacist decision-making, provided that technology complements rather than replaces professional judgment [10-12]. The future of pharmacy practice therefore lies in combining pharmacotherapeutic expertise, clinical reasoning, patient-centered communication, multidisciplinary collaboration, and appropriate digital technologies.

Overall, pharmacists should be recognized as essential clinical decision-making partners within modern healthcare systems. Strengthening pharmacist education, professional autonomy, clinical integration, access to patient information, and evidence-based practice can further enhance their contribution to safe, effective, and individualized medication therapy.

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