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ROLE OF ARTIFICIAL INTELLIGENCE (AI) AND MACHINE LEARNING IN CLINICAL PHARMACY PRACTICE

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ABSTRACT:

Artificial Intelligence (AI) and Machine Learning (ML) are rapidly transforming clinical pharmacy practice by enabling data-driven decision-making, personalized therapy, and improved patient outcomes. Traditionally, pharmacists relied on standard guidelines and manual evaluation, which may not fully capture the complexities of individual patient needs. AI and ML provide innovative approaches for analyzing large-scale healthcare data, predicting disease progression, optimizing drug therapy, and minimizing adverse drug reactions. These technologies support clinical pharmacists in medication management, drug–drug interaction detection, pharmacovigilance, and adherence monitoring, thereby enhancing safety and effectiveness of treatments. AI-based clinical decision support systems can identify the most suitable therapeutic options for patients by integrating genetic, clinical, and lifestyle data. Machine learning algorithms are also applied in dose optimization, early detection of medication errors, and automation of routine tasks, allowing pharmacists to focus on patient-centered care. With continuous advancements, AI and ML are expected to play a crucial role in achieving precision pharmacy, reducing healthcare costs, and improving overall quality of clinical services. The AI role in pharmacy practice is revolutionary. From improved patient safety and treatment outcomes to workflow optimization and personalized delivery of care, AI is changing the way pharmacists deliver their services. But it is necessary to confront the challenges, introduce appropriate training, and cooperate in order to unleash the potential of AI towards improved pharmacy practice and patient care. AI is revolutionizing the pharmacy career through paradigm shifts in how pharmacists provide their services, ranging from optimizing patient safety and therapeutic results to enhancing operations and providing tailored care. But it is essential to meet the challenges, get necessary training, and cooperate in order to realize the potential of AI in enhancing pharmacy practice and patient care.

Keywords: Clinica practice, Machine learning, Pharmacovigilance, Optimizing drug threapy, Personalized drug delivery.