MEDICO & ENGINEERING FUTURE

Bridging Medical Science and Engineering for a Healthier Tomorrow

Volume: 1
ISSUE: 1

ISSN: Pending

SUMMER 2024

Editor-in-Chief

Dr. A. Mirani

MEDICO & ENGINEERING FUTURE

Review Article

Receive: 16/08/2024
Acceptance: 10/09/2024
Publish: 18/09/2024

Using Artificial Intelligence to Improve Clinical Decision-Making and Nursing Care

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Abstract

This article examines the role of artificial intelligence (AI) in clinical decision-making and patient care. With advancements in AI technologies such as machine learning and artificial neural networks from the 1960s to the present, significant improvements have been made in the field of nursing and healthcare. However, challenges such as data quality, result interpretation capabilities, and ethical issues still persist. Training nurses and adhering to accuracy and caution when using AI are of paramount importance.

This article is a review conducted using the PRISMA approach. Twelve articles were selected and reviewed after searching publications from databases like MEDLINE, EMBASE, PubMed, CINAHL, Scopus, Web of Science, and Cochrane from 2016 to 2024. The results indicate that predictive analysis technologies using AI have significantly advanced nursing care, but challenges like data quality, result interpretation, and ethical issues remain.

The discussions emphasize the importance of teamwork among nurses and the development of ethical and quality infrastructures for AI use in nursing care. These issues necessitate further research and an enhanced understanding in these domains.

VOLUME (1), ISSUE (SPRING)
DOI:10.

Keywords: ***artificial intelligence, clinical decision-making, nursing care, machine learning***

1 Introduction

Artificial intelligence (AI) is one of the most advanced technologies of the 21st century and plays a crucial role in the evolution of clinical decisions and patient care. In the last decade, nurses and healthcare professionals have faced increasing challenges such as a lack of human and financial resources, increased healthcare demand, and the complexity of diseases. AI can help reduce the burden and challenges of healthcare systems.

Historical and Current Context

AI has a long history in medicine and healthcare. Since the 1960s, rule-based expert systems have been used to diagnose and treat diseases. With recent advances in machine learning and neuroscience, AI can now perform more complex tasks, such as clinical decision-making and predicting outcomes. Studies show that AI can assist in the diagnosis and treatment process, analyze disease risk factors, manage patient information, and improve clinical decisions, alongside nurses.

The Role of Artificial Intelligence

AI enables the collection, review, and analysis of vast amounts of data. It can participate in the diagnosis and treatment process, analyze disease risk factors, manage patient information, and improve clinical decisions. Machine learning and artificial neural networks provide the capacity to analyze big data and build predictive models that help nurses identify risks and implement effective changes in patient care plans.

Literature Review

Several studies have investigated the impact of AI as a support tool to empower nurses in clinical decisions and to provide effective and safe patient care. AI can assist nurses in the simultaneous monitoring of patients, providing access to patient information, performing administrative tasks, and managing daily heavy workloads, thus allowing more time for direct patient care.

Gaps in Research

Despite the progress in AI applications in nursing, there is a significant gap in the training of nurses regarding the qualifications required to use AI-based tools. Nurses need the ability to evaluate and interpret the results obtained from AI tools in patient care. Effective AI use requires an understanding of its benefits, limitations, and risks.

Research Objectives and Questions

The purpose of this study is to identify the primary roles of nurses in AI usage and the necessary skills to exploit AI capabilities to improve healthcare. The following questions are addressed:

1. What qualifications and capabilities are necessary for the successful use of AI in nursing?

2. To what extent are nurses prepared to use AI tools?

3. How can nurses' training be enhanced to empower them in using AI?

The Importance of Research

The training of nurses in the qualifications and capabilities required for effective AI use is crucial. Properly empowering nurses to use AI tools can help strengthen their pivotal role in patient care and ensure patient safety.

Introduction of Main Variables

The main variables in the reviewed studies on artificial intelligence to improve clinical decision-making and nursing care are:

- Clinical decision-making: Using AI to improve clinical decision-making in patient care, including diagnosing patients, predicting complications, and formulating better treatment strategies.

- Patient care: Using AI to monitor and manage patient care, including providing guidance and empowering microclimate managers to mitigate risks associated with immobility pressures.

- Training and improving knowledge: Providing training related to AI for nurses and creating suitable educational environments for improving knowledge and skills related to AI.

- Technology development: Conducting research and development in AI to enhance care processes, increase diagnostic accuracy, improve nurses' resource and time management, and improve healthcare and treatment quality.

These variables demonstrate the broad importance of using AI in nursing care and enhancing the performance and quality of healthcare services.

Confirmation and Contradiction:

The use of AI in nursing care can directly improve clinical decisions and patient care. This technology can aid in the accurate and rapid diagnosis of diseases, predict complications, and offer suitable treatment solutions, thus helping nurses provide better care and improve the efficiency and quality of nursing services. Conversely, the use of AI may be accompanied by challenges and risks, such as incorrect or insufficient information, the need for clinical interpretation of AI-generated results, privacy and trust concerns, and a lack of expertise in AI. These issues can lead to difficulties in successfully implementing AI in nursing care.

Due to these confirmations and contradictions, it is necessary to use AI in nursing care carefully and cautiously. To resolve these contradictions and optimize AI usage, more education and awareness for nurses are needed, along with the establishment of appropriate policies and solutions to manage risks and challenges associated with AI in nursing care

2 Material and Methode

This review article is based on the PRISMA approach. A search was performed in MEDLINE, EMBASE, PubMed, CINAHL, Scopus, Web of Science, and Cochrane databases from 2016 to 2024 using keywords related to "Artificial Intelligence," "Clinical Decision-Making," and "Nursing Care" alone or in combination.

Initially, 2570 articles were identified between 2016 and 2024. Studies outside the target topic were excluded.

Findings: After completing the search and removing duplicates, the titles and abstracts of 45 articles were examined, and ultimately 12 articles were selected for in-depth study.

The inclusion criteria for articles were research articles, systematic review articles, and practical reports about the use of AI in nursing or the examination of skills required by nurses to use AI-based tools. Exclusion criteria were articles not available, duplicate articles, and articles that reviewed AI in general.

First, abstracts of relevant articles were extracted. Articles that seemed relevant were selected for full-text review. Information from each article, including authors' details, publication year, country of publication, purpose, method, and research findings, was recorded. Informative articles related to the role of AI in nursing, the qualifications nurses need to use AI-based tools, and the upcoming challenges in this field were presented.

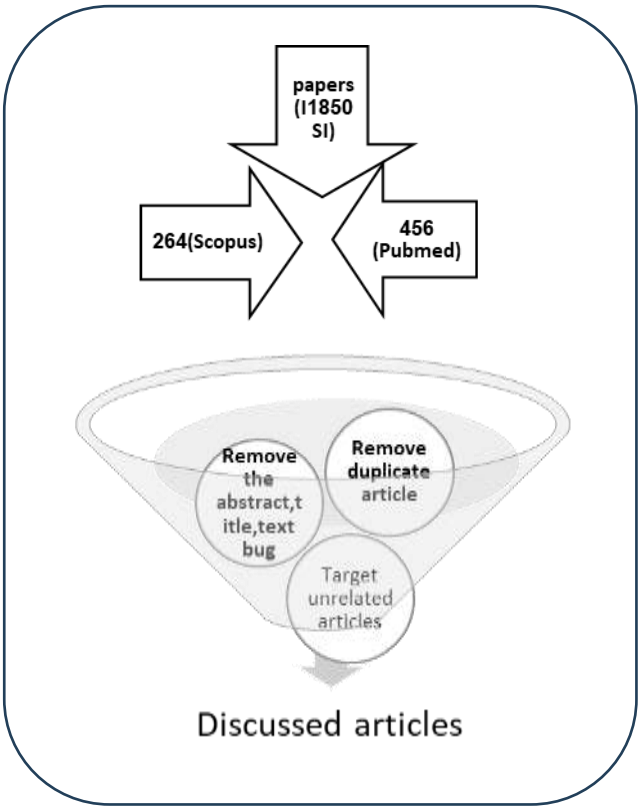

Figure-1:PRISMA flow chart

3 Discussion

The review provides a comprehensive view of AI-based technologies in nursing over the past decade, focusing on the development stage of these technologies. The main technology used in the studies was predictive analysis using various AI methods. While most technologies were evaluated as roadmaps for intended uses, there were concerns about their validation and effectiveness in real clinical settings.

A key finding from the literature review was the lack of evaluation of outcomes related to the quality of care, patient satisfaction, organization of nursing care, and other important aspects of nursing practice. The primary goal of using AI technologies was to reduce the nursing workload, but this goal was not evaluated in any of the articles. This indicates a need for comprehensive frameworks to evaluate and examine the impact of AI technologies on various aspects of clinical decision-making and nursing care more closely.

Another critical issue highlighted in the review is the limited involvement of clinical staff in the use and analysis of AI technologies. To develop user-centered technologies, it is essential to include nursing expertise at all stages of technology development. Additionally, the absence of discussions about the ethical issues of AI use in nursing in the articles is a serious concern, showing that the ethical dimensions of AI technologies in improving clinical decisions need consideration.

The studies also pointed out challenges related to data quality and documentation in electronic health records, which can affect the deployment of AI technologies in nursing. Reliance on incomplete or inaccurate data sources can result in a skewed and inadequate distribution of AI technologies, affecting the expectations of underrepresented social groups. Therefore, ensuring the quality and completeness of data in electronic health records is crucial for the successful implementation of AI technologies in improving clinical decision-making and nursing care.

4 Conclusion

Overall, the review of various aspects of AI in improving clinical decision-making and nursing care focuses on the development of AI tools, and most studies view the use of AI positively. However, concerns about the actual implementation and effectiveness of AI in clinical settings have been raised. Another issue is the lack of participation and collaboration of the clinical staff, which is a challenge in advancing the use of AI.

Training on the use of AI for users is essential and should be incorporated at all staff levels so that in the near future, we can enhance clinical decision-making and nursing care through AI.

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