

NURSES' USE OF ARTIFICIAL INTELLIGENCE AND ITS ASSOCIATION WITH CLINICAL DECISION-MAKING AND PERCEIVED PATIENT SAFETY

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Abstract

Artificial intelligence (AI) is transforming modern nursing practice by assisting clinical decision-making, boosting patient safety, and improving care quality. Although AI-based technologies, especially clinical decision support systems, have the potential to minimize medical errors, maximize resource utilization, and enable prompt clinical interventions, their application in nursing practice is still uneven because of issues like high infrastructure costs, limited algorithmic transparency, worries about data interoperability, and ambiguity surrounding professional accountability. The impact of AI on clinical decision-making and patient safety outcomes was investigated by nursing students using a descriptive qualitative research approach. Fifteen Bachelor of Science in Nursing students were chosen based on their clinical learning experiences and academic exposure, and semi-structured interviews were used to gather data. To find recurrent themes, meanings, and opinions about the application of AI in nursing education and clinical practice, the interview data were transcribed and subjected to thematic analysis. Participants saw AI as a possible accelerator for healthcare modernization, better clinical judgment, and improved nursing education through augmented learning, according to the findings, which highlighted a central theme of cautious innovation. However, this confidence was tempered by worries referred to as a dependability paradox, which reflects the conflict between AI systems' practical performance in real-world clinical situations and their theoretical correctness. Additionally, participants stressed the necessity for institutional preparedness through formal curriculum reform and structured training, as well as ethical duty, ambiguity in accountability, and data integrity. The study comes to the conclusion that advancement in three crucial areas—technical proficiency, clinical validation, and professional governance—is necessary for the effective integration of AI into nursing practice. In

addition to continuing to practice clinical reasoning, ethical judgment, and patient-centered care, future nurses must be equipped to critically assess AI tools. It is advised that more research be done to create human-AI partnership models that present AI as a helpful supplement to nursing practice rather than as a substitute for human-centered, compassionate clinical care.

INTRODUCTION:

Modern nursing practice has been profoundly altered by the incorporation of Artificial Intelligence (AI) into healthcare systems, especially in the areas of clinical decision-making and patient safety. Healthcare practitioners may evaluate vast amounts of patient data, produce evidence-based recommendations, and improve the precision of clinical judgments thanks to AI technologies like Clinical Decision Support Systems (CDSS) (Ouanes & Farhah, 2024). These developments help to optimize healthcare resources, lower medical errors, and improve patient outcomes (Epelde, 2024). Despite these advantages, there are a number of obstacles to overcome before AI is widely used in nursing practice. Accessibility is restricted in many healthcare settings due to problems including high implementation costs and infrastructural constraints (Epelde, 2024). Furthermore, the "black box" phenomenon lack of transparency in algorithmic processes—raises questions regarding the accuracy of AI suggestions (Gong et al., 2024). The complete application of AI technologies in healthcare settings is further limited by issues with data interoperability and system architecture (Elhaddad & Hamam, 2024). Additionally, there are issues with trust, workload, and clinical autonomy when nurses deal with AI technologies. According to research, although AI has the potential to improve clinical practice, its efficacy depends on appropriate integration, user-friendly design, and robust human-AI collaboration (Shamszare & Choudhury, 2023; Ratwani et al., 2024). Therefore, maximizing AI's usage in healthcare settings requires an understanding of how it affects clinical decision-making and patient safety outcomes in nursing practice.

With a rising impact on clinical decision-making, patient safety, nurse education, and professional

accountability, artificial intelligence (AI) is emerging as a key component of modern healthcare (Lashari, Morio & Jalbani, 2026). AI in healthcare refers to computer-based systems that can carry out activities like data analysis, pattern recognition, prediction, risk stratification, and decision support that have historically required human intelligence (Imran & Lashari, 2023). These technologies are most evident in nursing practice through clinical decision support systems, predictive analytics, early warning systems, automated documentation, virtual assistants, remote monitoring systems, and educational platforms that support simulation-based and customized learning. According to recent research, AI may enhance evidence-based nursing care by assisting nurses in interpreting complicated patient data, identifying hazards, predicting decline, customizing care plans, lowering medication-related errors, and increasing workflow efficiency (Brydges, 2025; Imran & Lashari, 2023). AI-powered clinical decision support systems, for instance, can combine information from patient histories, laboratory results, electronic health records, and physiological monitoring to deliver timely alarms and practical suggestions at the point of care. In order to improve patient safety and facilitate prompt clinical action, such systems may help nurses identify early indicators of sepsis, falls, pressure injuries, adverse medication events, or other avoidable consequences (Lashari, Morio & Jalbani, 2026). Discussions about health-system policy are also reflecting the growing significance of AI. In addition to highlighting the significance of national strategies, ethical frameworks, workforce readiness, data governance, and people-centered approaches to AI integration, the World Health Organization Regional Office for Europe reported in 2025 that AI is changing how

healthcare is planned, delivered, and governed. In a similar vein, recent governance literature contends that while the use of AI in healthcare is expanding, it must be accompanied by structured oversight, workflow integration, performance monitoring, equity assessment, and risk management to guarantee that these technologies enhance patient outcomes rather than merely complicate technology (Hussein et al., 2026). This issue is particularly significant in the nursing profession since nurses are front-line workers who constantly monitor patient status, convey changes in condition, coordinate multidisciplinary treatment, educate patients and their families, and react quickly to safety issues. As a result, the usefulness of AI in nursing depends not only on algorithmic correctness but also on whether AI outputs are intelligible, timely, clinically relevant, morally acceptable, and consistent with nurses' professional judgment. Nursing care is still based on human assessment, contextual reasoning, empathy, communication, and ethical responsibility, even though AI can provide computational support. This leads to a dual reality: AI may improve patient safety and nursing decision-making, but only if nurses are sufficiently trained to comprehend, assess, and apply these technologies critically. This perspective is supported by recent nursing literature, which highlights how AI can lessen workload, increase care efficiency, and support clinical reasoning. However, it may also raise issues with dehumanization, professional redundancy, data security, bias, surveillance, accountability, and the erosion of human-centered care (Bodur et al., 2025). Because of this, the application of AI in nursing needs to be considered not just as a technological advancement but also as a professional, ethical, educational, and organizational change that impacts how nurses think, learn, act, and continue to be responsible for patient outcomes.

Despite AI's potential, its application in clinical decision-making and patient safety is still uneven, especially in nursing settings where there may be significant differences in digital infrastructure,

institutional readiness, curriculum change, and expert advice. According to recent studies, nurses and nursing students frequently acknowledge the advantages of AI but are wary of its dependability, transparency, and potential effects on clinical duty. In a qualitative study of nurses' viewpoints, Bodur et al. (2025) discovered that while nurses acknowledged AI's potential to lessen workload, improve patient care, and increase efficiency, they also voiced concerns about systemic bias, emotional disconnection, de-skilling, professional redundancy, threats to patient safety, ambiguity in accountability, and data security. Because nurses are required to respond on patient information in ambiguous, rapidly evolving, and ethically difficult settings, these issues are especially pertinent to clinical decision-making. Nurses may be unsure recommendations are erroneous, poorly articulated, biased, or contradictory with the patient's clinical presentation. This leads to what could be called a reliability paradox: although AI systems are frequently marketed as being extremely accurate and evidence-based, their actual performance may be impacted by missing data, poor interoperability, shifting patient conditions, variations in local workflow, algorithmic bias, or a lack of validation in various clinical settings. AI tools require continuous oversight rather than one-time approval or passive adoption, according to the U.S. Food and Drug Administration's 2025 draft guidance on AI-enabled device software functions, which emphasizes the need for documentation, safety and effectiveness evaluation, and risk management throughout the entire product life cycle (Food and Drug Administration, 2025). Similar to this, research on healthcare AI governance emphasizes that safe implementation necessitates organizational structures for choosing, assessing, deploying, monitoring, and maintaining AI systems because poorly managed AI may have unforeseen effects on clinical decision-making, patient welfare, and health equity (Hussein et al., 2026). Discussions about patient safety also reflect these worries. One of the top patient safety issues for 2025, according to ECRI, is inadequate

governance of AI in healthcare. This highlights the need for healthcare executives to look for vulnerabilities in people, organizations, tasks, processes, technology, and the care environment (ECRI, 2025). Because nurses frequently act as the last checkpoint between a system recommendation and direct patient care, these issues become even more important in the nursing setting. AI should therefore be viewed as a decision-support tool that must be interpreted using nursing expertise, clinical reasoning, ethical judgment, and patient-centered communication rather than as an autonomous clinical authority. For nursing students, who are still forming their professional identities, clinical confidence, and decision-making abilities, this is especially crucial. Students may become unduly reliant on automated outputs if they see AI as a replacement for reasoning. On the other hand, they might oppose technologies that could enable safer and more effective care if they perceive AI as untrustworthy or dangerous. In nursing education, where students must learn not just how to use AI tools but also how to question, validate, explain, and responsibly integrate them into clinical practice, an understanding of this balance is crucial.

In order to prepare future nurses to interact with AI in a safe, moral, and productive manner, nursing education is essential. According to recent studies on nursing students' use and perceptions of generative AI, students acknowledge the benefits of AI for clinical reasoning, care-plan development, academic support, and personalized learning. However, they also raise concerns about accuracy, privacy, academic integrity, ethical use, and the need for formal guidance (Han et al., 2025; Khlaif et al., 2025; Shen et al., 2025). Nursing students' acceptance of AI is impacted by perceived usefulness, ease of use, trust, readiness, competence, institutional support, and alignment with professional values, according to systematic reviews published in 2025 and 2026 (Alrazeeni et al., 2026; Nursing students' perceptions of artificial intelligence, 2025). These results imply that informal exposure alone is insufficient to

prepare nurses for AI. Rather, systematic instruction on AI literacy, clinical validation, algorithmic bias, data protection, documentation ethics, accountability, patient permission, and human-AI collaboration must be incorporated into nursing courses. AI cannot be safely used without accountability frameworks, continuous monitoring, and physician involvement, according to recent regulatory and governance discussions (Mello & Cohen, 2025; Hussein et al., 2026). This means that AI should be included into nursing in a way that supports rather than obscures professional accountability, strengthens rather than weakens clinical reasoning, and improves rather than replaces compassionate care. As a result, investigating nursing students' perspectives is crucial for patient safety, curriculum improvement, and future workforce development in addition to being educationally relevant. The results of this kind of research can help nursing educators, clinical facilities, legislators, and healthcare executives create AI training that will enable future nurses to interact with intelligent technologies in a critical, ethical, and self-assured manner while upholding the human-centered principles at the core of nursing practice.

Statement of the Problem

Artificial intelligence (AI) has demonstrated significant potential to improve patient safety and clinical decision-making, but its integration into nursing practice is still uneven, complicated, and undeveloped. Inadequate training, high implementation costs, a lack of well-established system integration techniques, and a lack of technological infrastructure all impede the successful deployment of AI-based solutions in many healthcare organizations. These obstacles limit nurses' and healthcare organizations' capacity to fully employ AI as a helpful tool in clinical practice (Epelde, 2024; Elhaddad & Hamam, 2024).

The application of AI in nursing presents significant issues with algorithmic bias, system dependability, data accuracy, and patient safety threats in addition to organizational and technical

obstacles. Nurses are among the main users of AI-supported clinical decision-making systems since they are directly involved in patient assessment, monitoring, and care coordination. However, nurses' confidence, clinical judgment, and decision-making processes may be impacted by doubts about the reliability and correctness of AI-generated recommendations (Ferrara et al., 2024; Shamszare & Choudhury, 2023). This is a significant challenge for nurses, who must strike a balance between using technology support and their professional expertise, ethical obligations, and patient-centered judgment.

Furthermore, patient safety outcomes may be adversely affected by both excessive and insufficient use of AI systems. Automation bias, in which nurses accept AI-generated advice without doing enough critical analysis, might result from an over-reliance on AI. On the other hand, a lack of confidence in AI could lead to the rejection or restricted application of potentially useful decision-support systems. The safety and quality of patient care may be jeopardized in both circumstances (Festor et al., 2025). As a result, it is necessary to assess how AI affects clinical judgment and patient safety in nursing practice and to pinpoint the obstacles to its successful application. Developing suitable tactics, educational initiatives, and professional standards that promote the ethical, successful, and safe application of AI in nursing care requires an understanding of these concerns.

Research Objective:

- To explore the impact of artificial intelligence on clinical decision making and patient safety outcomes in contemporary nursing practice.

Research Question

- What is the impact of Artificial Intelligence on clinical decision-making and patient safety outcomes in contemporary nursing practice?

Literature Review

Theoretical Framework

The study's theoretical framework is predicated on the notion that technology, users, the clinical setting, and organizational support can interact to understand how artificial intelligence (AI) affects clinical decision-making and patient safety outcomes in nursing practice. The Socio-Technical Systems Theory and the Technology Acceptance Model (TAM) serve as the foundation for this research since they both provide light on how nurses and nursing students view, accept, and utilize AI-based technology in healthcare environments. According to Davis's (1989) Technology Acceptance Model, perceived usefulness and perceived ease of use are the two fundamental criteria that determine whether or not a technology is accepted and used. The degree to which nursing students think AI can enhance clinical decision-making, lessen workload, support patient monitoring, boost accuracy, and improve patient safety outcomes is referred to as perceived usefulness in this study. The degree to which students think AI systems are straightforward, intelligible, user-friendly, and simple to incorporate into nursing practice is known as perceived ease of use. Nursing students are more likely to adopt a favorable view of AI's usage in clinical practice if they believe it to be practical and simple to utilize. However, students can be reluctant to trust or use AI systems successfully if they believe they are complicated, untrustworthy, hard to comprehend, or opaque.

The Socio-Technical Systems Theory, which highlights that effective technology implementation depends not only on the technical system itself but also on the social and organizational environment in which it is used, supports this study in addition to the Technology Acceptance Model. This idea holds that AI and other healthcare technologies cannot work well on their own. People, technology, work procedures, institutional policies, training, communication, and professional responsibilities all play a part in their effectiveness. AI may offer clinical alarms, risk forecasts, documentation help, and decision-

making assistance in nursing practice, but nurses are still in charge of evaluating these suggestions in light of the patient's clinical situation. Therefore, how well AI is incorporated into nursing processes, how well nurses are taught to utilize it, how trustworthy the data are, and how precisely accountability is specified all affect how effective AI is. Because participants recognized both the advantages and difficulties of AI, such as increased productivity, educational transformation, patient safety support, system reliability issues, ethical responsibility, and professional accountability, this framework is especially pertinent to the current study.

When taken as a whole, these theories offer a solid basis for comprehending how nursing students view AI in clinical decision-making and patient safety. While the Socio-Technical Systems Theory describes the larger institutional and professional elements that drive AI implementation, the Technology Acceptance Model discusses students' propensity to accept and apply AI based on its perceived value and simplicity of use. According to this approach, the study makes the assumption that when students view AI as helpful, trustworthy, intelligible, and supportive of clinical judgment, it can have a positive impact on nursing practice. However, obstacles including inadequate infrastructure, algorithmic bias, data inaccuracy, unclear accountability, and a lack of ethical rules may restrict its beneficial effect. Thus, the theoretical framework implies that a balance between technology efficiency and human clinical judgment is necessary for the successful integration of AI into nursing practice. AI could serve as a helpful tool that improves nurses' ability to make decisions, but healthcare experts should still have the last say in clinical matters.

The four primary components of this study's framework are AI integration, nursing students' perceptions, clinical decision-making, and patient

safety outcomes. The term "AI integration" describes the application of AI-based systems in risk assessment, communication, patient monitoring, documentation, and decision support. The usefulness, dependability, usability, ethical issues, and constraints of AI are among the opinions held by nursing students. Their understanding and acceptance of AI in nursing practice are influenced by these perceptions. The process by which nurses evaluate patient data, pinpoint issues, set priorities for treatment, and perform the necessary clinical steps is known as clinical decision-making. Error prevention, prompt intervention, precise monitoring, and the provision of safe and efficient nursing care are all considered patient safety outcomes. This approach suggests that when AI is appropriately developed, accurately validated, ethically managed, and successfully incorporated into nursing education and clinical practice, it may enhance clinical decision-making and patient safety.

The theoretical approach in this study facilitates the investigation of nursing students' perceptions of AI's impact on nursing care and their understanding of its position in contemporary healthcare. Additionally, it clarifies why students could be both hopeful and wary of AI. On the one side, AI is seen as a technology that can help with patient safety, learning, accuracy, and efficiency. However, its adoption and use may be impacted by worries about dependability, accountability, ethical responsibility, and overdependence. As a result, this framework offers a foundation for examining the main idea of cautious innovation, which views AI as a potential but strictly restricted development in nursing practice. The notion that AI should help nurses make safer, better-informed, and patient-centered clinical decisions rather than replace them is further supported by the framework.

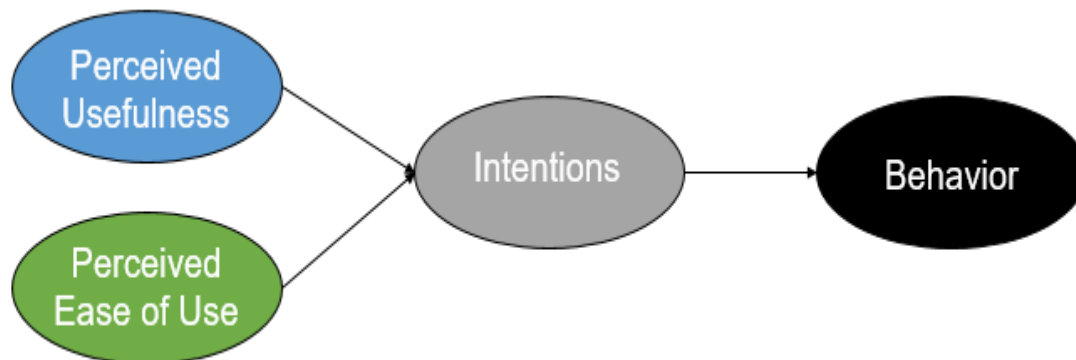


Fig 1: Technology Acceptance Model by Davis (1989)

The introduction of AI into hospital settings is frequently framed as a revolution in patient safety with substantial economic benefits. Epelde (2024) notes that the clinical impact of AI is evidenced through its ability to process vast datasets more efficiently than traditional methods. This efficiency translates into cost savings by reducing hospital stays and preventing adverse events; however, the initial investment in such infrastructure remains a hurdle for many institutions (Epelde, 2024). Furthermore, AI-driven interventions allow for a more streamlined allocation of resources, which is critical in overburdened nursing environments. Epelde (2024) emphasizes that the long-term economic sustainability of hospitals may rely heavily on these technological optimizations to maintain high standards of care.

Artificial Intelligence in Clinical Decision Support Systems (CDSS)

One of the most direct applications of AI in nursing is its incorporation into Clinical Decision Support Systems. Ouanes and Farhah (2024) argue that the effectiveness of AI-driven CDSS is measured by its ability to provide real-time, evidence-based recommendations at the point of care. These systems assist nurses in navigating complex clinical scenarios, thereby narrowing the gap between theoretical knowledge and practical application (Ouanes & Farhah, 2024). Despite

these benefits, the transition to AI-integrated systems is fraught with technical and operational challenges. Gong et al. (2024) highlight that while CDSS offers a pathway toward sustainable healthcare, the complexity of these algorithms can lead to "black box" scenarios where the logic behind a recommendation is opaque to the user. Consequently, the challenge lies in ensuring that AI acts as a transparent collaborator rather than a disruptive force in the clinical workflow (Gong et al., 2024).

The pursuit of optimizing these systems is an ongoing endeavor within the medical community. Elhaddad and Hamam (2024) suggest that the potential of AI-driven CDSS remains partially untapped due to limitations in data interoperability and system design. To achieve full clinical utility, these systems must be tailored to the specific nuances of nursing care, moving beyond generic diagnostic tools (Elhaddad & Hamam, 2024).

Strategies for Reducing Medical Errors

Patient safety is fundamentally linked to the reduction of medical errors, an area where AI demonstrates significant promise. Baurasien et al. (2023) identify that AI-based strategies, such as automated medication reconciliation and predictive monitoring for falls, are instrumental in minimizing human error. These tools act as a secondary safety net, catching discrepancies that

may be overlooked by fatigued or distracted clinicians (Baurasien et al., 2023). Moreover, the systematic application of AI helps in identifying patterns of error that are often invisible during manual audits. Baurasien et al. (2023) advocate for a proactive approach where AI is used to predict and prevent errors before they reach the patient, rather than merely documenting them after the fact.

Risk Management and Safety in the AI Era

The transition to AI-enhanced care necessitates a robust framework for risk management. Ferrara et al. (2024) conducted a systematic review highlighting that while AI reduces certain types of errors, it may introduce new, unanticipated risks related to algorithmic bias or system failure. Therefore, nursing leadership must develop comprehensive protocols to monitor AI performance and ensure patient safety is never compromised by technical glitches (Ferrara et al., 2024). Mendoza et al. (2025) provide a perspective on critical patient safety, noting that in high-stakes environments like the ICU, the reliance on AI must be balanced with rigorous human oversight. The ethical implications of delegating life-critical decisions to an algorithm remain a central point of debate among safety experts (Mendoza et al., 2025).

Human-AI Collaboration and Physical Simulation

The dynamic between human clinicians and AI systems is best understood through the lens of cooperative decision-making. Festor et al. (2025) utilized physical simulations to study how humans interact with AI in intensive care settings, finding that the "safety" of the decision is highly dependent on the level of trust the clinician places in the system. If a nurse over-relies on AI, they may suffer from automation bias; conversely, a lack of trust leads to the rejection of beneficial AI guidance (Festor et al., 2025). Ratwani, Bates, and Classen (2024) further argue that the design of the user interface plays a critical role in how safely AI is integrated into clinical care. Poorly designed AI

tools can increase cognitive load, paradoxically creating new safety risks instead of mitigating existing ones (Ratwani et al., 2024).

The successful implementation of AI is ultimately determined by the clinicians who use it daily. Shamszare and Choudhury (2023) explored clinician perceptions and found that while there is optimism regarding AI's potential, there are significant concerns regarding its impact on workload and the erosion of clinical intuition. Many nurses feel that if AI is not seamlessly integrated, it becomes "just another task" rather than a supportive tool (Shamszare & Choudhury, 2023). Trust is the cornerstone of this integration. Shamszare and Choudhury (2023) conclude that for AI to be accepted, it must demonstrate consistent reliability and provide clear, actionable insights that align with the clinician's professional experience.

The integration of Artificial Intelligence into nursing practice represents a significant advancement in the pursuit of clinical excellence and patient safety. The literature suggests that while AI-driven CDSS and predictive algorithms offer powerful tools for reducing medical errors and optimizing hospital resources, their success is predicated on transparent design, robust risk management, and the cultivation of trust among clinicians. Future research should prioritize the refinement of human-AI collaboration models to ensure that technology serves as an empowering adjunct to the compassionate, human-centered care that defines the nursing profession.

Research Methodology:

Research Design

This study adopted a qualitative research design to explore the impact of Artificial Intelligence on clinical decision-making and patient safety outcomes in nursing practice. Qualitative research is appropriate for this study as it allows for an in-depth understanding of participants' experiences, perceptions, and interpretations regarding the integration of AI in clinical settings. A descriptive qualitative approach was utilized in this study. This design focuses on describing phenomena as

experienced by participants without manipulation of variables. It enables the researcher to obtain detailed insights into nursing students' perspectives on AI and its role in clinical decision-making and patient safety.

Sampling Technique:

The study was carried out with students who access to fundamental theoretical knowledge and pertinent clinical exposure in an appropriate academic context. Bachelor of Science in Nursing (BSN) students enrolled in the nursing program at the chosen university made up the target group since they were deemed suitable participants because of their growing clinical competencies and academic learning. Participants were chosen based on particular inclusion and exclusion standards. Students who were enrolled in the second and third years of BSN programs, eager to engage in the study, and capable of successfully communicating their experiences and perspectives were among the inclusion criteria. Due to their insufficient clinical exposure, first-year BSN students were excluded, as were students who expressed no interest in participation and those who were not pertinent to the study population. Participants were chosen using a purposive sampling methodology, which enables the researcher to deliberately select people with pertinent experience and knowledge regarding the research issue. This strategy made it possible to guarantee that the information gathered was comprehensive, significant, and in line with the study's goals. 15 participants made up the final sample size, which was established using the data saturation method. In order to ensure that the qualitative data had sufficient depth, completeness, and relevance, data collecting proceeded until no

new themes or noteworthy material surfaced from the participants' responses.

Data Collection Method

Data was collected using semi-structured interviews. This method allows flexibility in exploring participants' views while maintaining a consistent framework of questions. An interview guide was developed based on the research objectives, covering key areas such as awareness and understanding of AI of AI in patient safety-perceptions of AI in clinical decision-making-role Challenges and concerns related to AI integration-each interview was conducted individually in a quiet and comfortable environment to ensure confidentiality and minimize distractions.

Ethical Considerations:

Ethical principles were strictly adhered to throughout the study. Informed consent was obtained from all participants prior to data collection, ensuring that they were fully aware of the purpose and procedures of the research. Participation was entirely voluntary, and participants were given the right to withdraw from the study at any point without any consequences. The confidentiality and anonymity of all participants were carefully maintained to protect their privacy. Additionally, the data collected was used solely for academic and research purposes. Prior to conducting the study, formal permission was also obtained from the relevant institutional authority.

Data Analysis

The collected data was analyzed using thematic analysis. This method involves identifying, analyzing, and reporting patterns (themes) within the data.



Fig 2: Graphical Representation of Impact of AI on Clinical Decision Making and Patient Safety Outcomes.

Theme 1: Functional Integration and Utility

Functional integration and utility refers to the degree of artificial intelligence integration into routine nursing workflows to support documentation, patient monitoring, communication, and clinical decision-making. In this study, participants viewed AI as a useful support system that could enhance efficiency, reduce workload, and enhance the accuracy of nursing care. Clinicians found AI-based tools such as clinical decision support systems, predictive analytics, automated alerts, and electronic documentation platforms useful for complex clinical tasks and workflow organization. Literature also indicates that AI is playing an increasing role in transforming nursing practice through the optimization of clinical workflows, support for patient care, and advancement of nursing education (El Arab et al., 2025; Frontiers in Digital Health, 2025).

The results of the interviews suggested that, overall, participants' attitudes towards the practical utility of AI in clinical settings were positive. They thought AI can help with clinical decision making by giving quick access to patient data, support with

documentation, early signs of patient deterioration and better communication within the healthcare team. But participants also emphasized the need for proper training and adaptation to effectively harness AI in clinical practice.

P 2: :AI enhances efficiency in documentation and patient monitoring. According to them, automated systems reduce time spent on manual charting and improve accuracy, which ultimately contributes to better patient management and safety.

P3: AI plays an important role in early detection of patient deterioration. They emphasized that predictive analytic s tools alert healthcare providers in advance, enabling timely interventions and improving clinical outcomes

These findings support recent studies that AI could improve nursing workflow, clinical efficiency, patient monitoring and decision-making support. AI is quickly changing healthcare and helping to make patient care, clinical workflows, and nursing education better (El Arab et al., 2025). Similarly, an integrative review in Frontiers in Digital Health (2025) found that AI

technologies in nursing can improve clinical outcomes, operational efficiency, workload management and staff well-being. However, the literature also highlights that successful AI integration relies on sufficient training, system usability, ethical implementation, and acceptance by healthcare professionals (El Arab et al., 2025; Frontiers in Digital Health, 2025).

P4 : AI is beneficial, its integration into clinical workflow requires proper training and adaptation. They pointed out that without adequate knowledge, healthcare professionals may under-utilize these technologies or face challenges in relying on them effectively.

P5 :AI improves coordination within the healthcare team by facilitating communication and data sharing across departments. They believed that this integration leads to a more organized workflow and enhances overall quality of care.

In general, participants regarded AI as a useful tool to enhance clinical efficiency, documentation, patient monitoring, and decision making. However, successful functional integration depends on the technical competence of nurses, proper training, user-friendly systems and institutional support. Therefore, AI should be used as an adjunct to nursing practice that enhances nursing practice but preserves professional judgment.

Theme 2: The Safety-Reliability Nexus

The safety-reliability nexus is the relationship between the deployment of AI, patient safety and the reliability of clinical outcomes. Patient safety is a key priority in healthcare and AI has the potential to reduce clinical errors, enhance monitoring and support timely interventions. AI systems can analyze large amounts of data from patients, identify trends and send alerts to help nurses and other healthcare workers avoid adverse events. At the same time, reliability of AI depends on accurate data, validated systems, regular updates and continuous human oversight (World Health Organization (WHO, 2024; Frontiers in Digital Health, 2025).

The interview results revealed that participants were aware of both the advantages and disadvantages of AI regarding patient safety. They believed that AI could help to reduce human error, improve safety around medication, support monitoring in critical care settings and give real-time alerts. However, participants also voiced concerns that AI reliability is dependent on accurate data input, system validation and regular updates, and continuous human oversight.

P1 :AI enhances patient safety by minimizing human errors, particularly in medication administration and clinical calculations. They believed that automated alerts and verification systems improve reliability and reduce the chances of adverse events.

P2: the reliability of AI depends heavily on the quality of data entered into the system. They emphasized that inaccurate or incomplete data can lead to misleading outputs, which may compromise patient safety if not carefully reviewed by healthcare professionals.

P3: AI systems are generally reliable in monitoring patient conditions, especially in critical care settings. They highlighted that continuous surveillance and real-time alerts help in early identification of complications, thereby supporting safer clinical decisions.

These findings are in line with existing literature that AI can enhance patient safety through clinical monitoring, risk prediction, and diagnostic accuracy, as well as early detection of deterioration. In an integrative review published in Frontiers in Digital Health (2025), the authors noted that AI in nursing has the capacity to enhance clinical outcomes and operational efficiency, but also poses ethical and safety concerns that must be managed with care. WHO (2024) emphasized that AI systems in healthcare have to be used in line with the principles of safety, transparency, accountability, privacy protection and human oversight. This supports participants' concerns that AI should not replace clinical judgment, but be a decision-support tool in safe and accountable systems (WHO, 2024; Frontiers in Digital Health, 2025).

P4: over-reliance on AI could pose risks to patient safety. They explained that healthcare providers must use their clinical judgment alongside AI recommendations, as technical errors or system failures can occur.

P5 : proper system validation, regular updates, and staff training are essential to ensure the safety and reliability of AI tools. They believed that when these factors are addressed, AI can be a trustworthy component of clinical workflow.

In general, participants saw AI as a potential tool for enhancing patient safety and reliability, especially by providing alerts, monitoring and reducing errors. But they stressed that AI needs to be supported by accurate data, validated systems, staff training and human oversight. The findings suggest that the safest model is a collaborative one, where AI supports nurses but the ultimate clinical decisions are made by healthcare professionals.

The interview findings reveal that participants acknowledge the role of AI in enhancing patient safety and reducing clinical errors. Many respondents expressed confidence in AI-supported systems for improving reliability in decision-making. However, concerns were also noted regarding system malfunctions and the possibility of incorrect outputs. Participants emphasized the importance of combining AI assistance with professional judgment to ensure safe and effective patient care.

Theme 3: Educational Transformation

Educational transformation refers to the impact of AI on learning processes, skill development, and professional training in nursing education. With the advancement of digital technologies, AI is increasingly being incorporated into educational settings to enhance learning experiences. Tools such as virtual simulations, intelligent tutoring systems, and adaptive learning platforms are helping nursing students develop clinical competencies in a more interactive and efficient manner. This transformation is reshaping traditional teaching methods and preparing future nurses for technology-driven healthcare environments.

P1:AI has transformed learning by providing easy access to a vast range of educational resources. They mentioned that AI-powered platforms help students understand complex clinical concepts more clearly through interactive and personalized learning methods.

P2:AI supports skill development by offering simulation-based learning and virtual clinical scenarios. According to them, this allows students to practice decision-making in a safe environment, enhancing their confidence before real-life clinical exposure.

P3: AI enables self-directed learning among students. They explained that learners can study at their own pace, revisit difficult topics, and receive instant feedback, which improves knowledge retention and academic performance.

Overall, participants viewed AI as a transformative force in education, enhancing learning experiences, skill development, and accessibility, while also stressing the importance of balanced use and educator support.

The literature shows that AI has greatly improved nursing education with its personalized learning opportunities and realistic clinical simulations. AI-supported simulation-based learning enables nursing students to practice clinical skills, clinical reasoning and decision-making in a safe and controlled environment, before exposure to real patients (Sitterding et al., 2025). AI tools can also enable personalized learning by identifying students' learning gaps and providing customized feedback, which can improve understanding, confidence, and academic performance (Cucci et al., 2025). However, contemporary research also points to challenges such as restricted access to advanced technologies, insufficient training for educators, ethical concerns, and resistance to new pedagogical methods. The successful incorporation of AI requires institutional support, faculty development, and responsible usage (El Arab et al., 2025; Alrazeeni et al., 2026).

P4 :despite its advantages, the integration of AI in education requires proper guidance from educators. They emphasized that without supervision, students may rely too heavily on AI

tools, which could limit critical thinking and independent learning skills.

P5: AI has improved accessibility in education, especially for students who may face challenges in traditional learning environments. They believed that digital tools and intelligent tutoring systems make education more inclusive and adaptable to individual needs.

According to the interview data, participants recognized the positive impact of AI on their learning experiences, particularly in improving clinical knowledge and decision-making skills. Many reported that simulation tools and AI-based learning platforms enhanced their confidence and preparedness for real clinical situations. Nevertheless, some participants mentioned the need for better access to resources and proper guidance in using these technologies. Overall, AI is seen as a valuable tool in transforming nursing education, though its effectiveness depends on accessibility and proper implementation.

Theme 4: Governance and Accountability

Governance and accountability refer to the ethical, legal, and regulatory aspects associated with the use of AI in healthcare. As AI becomes more integrated into clinical practice, questions arise regarding responsibility, data privacy, and ethical decision-making. Ensuring that AI systems are used appropriately and transparently is essential to maintain trust and protect patient rights. Healthcare institutions must establish clear guidelines and policies to regulate the use of AI technologies.

P1: proper governance frameworks are essential to ensure that AI is used ethically and safely in healthcare. They highlighted that clear guidelines help define how AI should be integrated into clinical decision-making processes.

P2: accountability must remain with healthcare professionals, even when AI systems are involved. They emphasized that nurses and clinicians are ultimately responsible for patient outcomes and should critically evaluate AI-generated recommendations.

P3: there is a need for institutional policies to regulate the use of AI in clinical practice. They explained that standardized protocols can help prevent misuse and ensure consistency in how AI tools are applied.

P4 pointed out concerns regarding data privacy and security. They stressed that patient information must be protected, and strict measures should be in place to prevent unauthorized access or data breaches when using AI systems.

P5: continuous monitoring and evaluation of AI systems are necessary to maintain accountability. They believed that regular audits and updates can ensure that AI tools remain accurate, safe, and aligned with clinical standards.

Overall, participants emphasized that strong governance and clear accountability are crucial for the safe and ethical integration of AI in healthcare, ensuring both patient safety and professional responsibility.

Academic studies emphasize the importance of ethical guidelines and policy regulations for the application of AI in health care. Common issues discussed include data security, patient confidentiality, algorithmic transparency, and human oversight as AI systems can impact clinical decisions and patient outcomes (World Health Organization [WHO], 2024; Nouis et al., 2025). Recent studies also highlight issues of accountability when AI contributes to clinical errors, particularly because responsibility may become unclear among healthcare professionals, institutions and technology developers (Nouis et al., 2025; Beaulieu-Jones et al., 2026). Researchers recommend that healthcare professionals should remain ultimately responsible for final clinical decisions even when AI tools provide recommendations as clinical judgment and ethical responsibility cannot be fully delegated to automated systems (WHO, 2024; Kim et al., 2026). Therefore, establishing governance structures, transparent algorithms, data protection policies and institutional accountability mechanisms is critical to ensure the safe, ethical and trustworthy

use of AI in healthcare (Mittermaier et al., 2025; Beaulieu-Jones et al., 2026).

P4 pointed out concerns regarding data privacy and security. They stressed that patient information must be protected, and strict measures should be in place to prevent unauthorized access or data breaches when using AI systems.

P5: continuous monitoring and evaluation of AI systems are necessary to maintain accountability. They believed that regular audits and updates can ensure that AI tools remain accurate, safe, and aligned with clinical standards.

The interview findings indicate that participants are aware of ethical and legal concerns related to AI use in clinical settings. Many emphasized the importance of maintaining patient confidentiality and ensuring responsible use of technology. Some participants also expressed uncertainty about accountability in situations involving AI errors. These findings highlight the need for clear policies, proper training, and institutional guidelines to support ethical and accountable AI integration in healthcare.

This study concludes by highlighting the important and expanding role artificial intelligence is playing in changing nursing practice, especially with regard to clinical decision-making and patient safety outcomes. The results show that nursing students view AI as a useful supportive tool that can improve the effectiveness, precision, and caliber of nursing care by helping with patient monitoring, documentation, communication, risk assessment, and prompt clinical decision-making. AI has the ability to lessen effort, limit errors, promote evidence-based practice, and improve patient care safety overall, according to the participants. However, the study also showed that integrating AI into nursing practice is linked to a number of difficulties, such as worries about algorithmic bias, data accuracy, system reliability, lack of transparency, inadequate training, limited infrastructure, and uncertainty about professional accountability. These worries imply that although AI can help nurses make well-informed clinical decisions, it cannot take the role of human

judgment, moral reasoning, critical thinking, and patient-centered care that is compassionate. The study also highlights the need for a balanced approach to successful AI integration in nursing, wherein nurses have sufficient education, professional preparation, and institutional support to employ AI technology in a safe and efficient manner. As a result, healthcare organizations should offer ongoing training, nursing curriculum should incorporate organized AI instruction, and ethical and governance frameworks should be established to direct responsible AI use in clinical settings. Overall, the study comes to the conclusion that rather than replacing nurses, AI should be seen as a supplement to nursing practice. Technical proficiency, clinical validation, ethical accountability, and professional governance are necessary for its successful deployment. AI can significantly improve safer, more effective, and higher-quality nursing care while upholding the humanistic principles that are still fundamental to the nursing profession by encouraging human-AI collaboration, bolstering nursing education, and guaranteeing accountability in clinical decision-making.

Recommendations:

- To assist nurses in using AI technology safely and successfully in clinical settings, healthcare organizations should offer ongoing professional development programs.
- AI solutions should be built to provide seamless integration into nursing operations, emphasizing reduced complexity, accuracy, and usability.
- To address issues with accountability, data privacy, transparency, and patient safety, clear ethical norms and governance procedures should be created.
- To investigate the wider effects of AI on nursing practice, clinical decision-making, and patient safety outcomes, further study should be carried out with bigger and more diverse populations.

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