Artificial intelligence: potential and challenges for perioperative nursing

Inteligência artificial: potencialidades e desafios para a enfermagem perioperatória

Inteligencia artificial: potencialidades y desafíos para la enfermería perioperatoria

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Artificial intelligence (AI) has been an integral part of daily life for several decades. Its presence has become so seamlessly integrated that this coexistence often occurs instinctively and goes unnoticed.

Building on this trend, AI has become essential in various activities, including email usage, social networks, streaming platforms, traffic applications, and search engines, among others. However, how can its full potential be understood and effectively utilized? Moreover, how can the challenges AI present in professional life be addressed?

In the healthcare field, particularly within the surgical unit, technological advancements have been rapidly accelerating. From the adoption of electronic medical records to the use of robotic systems[1], these innovations have driven a digital transformation in clinical practice, primarily enhancing process optimization and the safety of anesthetic-surgical procedures.

In perioperative nursing, staying updated is essential to ensuring the highest quality of care for surgical patients while also contributing positively to the healthcare team and the institution.

AI has been increasingly applied and refined in the surgical context, particularly in the areas of patient care, education, and research. In patient care, for example, it can enhance operating room management and optimize surgical scheduling. Additionally, AI contributes to patient-centered care by managing analytical and predictive data, supporting clinical decision-making, and implementing safeguards in medication administration to reduce the risk of errors. Traceability techniques already enable the monitoring of patient movement in and out of operating rooms, helping prevent incidents such as incorrect room admissions[1].

AI plays a crucial role in nursing management by supporting the efficient allocation of human resources, automating tasks, auditing processes, and developing standard operating procedures tailored to institutional needs and care demands[2]. Managers can utilize AI-driven tools to forecast and allocate materials and equipment based on the specific requirements of each anesthetic-surgical procedure; assign operating rooms according to team expertise and needs; and monitor real-time quality indicators, such as cancellation rates, infection rates, adverse event occurrences, and room turnover, among others.

In research, AI facilitates study development and the validation of scientific evidence by analyzing large volumes of data and identifying patterns. This capability enhances the robustness and impact of research findings[2].

In the perioperative context, technology has become a focal point of research for those aiming to reduce the risk of injury and enhance surgical safety. Studies on AI's potential are being conducted worldwide, exploring its applications in pain management, prevention of postoperative complications, surgical scheduling, monitoring and reducing anesthesia-related mortality, and supporting technical skill development[3]. When appropriately utilized as a research tool, AI can drive significant advancements in the field, contributing to the development of evidence-based nursing[2].

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In education, AI-driven tools are already being used for textual analysis and correction, assistance in formulating assessment questions, and training in virtual centers that simulate real-life scenarios. These technologies allow students and educators to engage with realistic cases while supporting the implementation of active teaching-learning methodologies.

Continuing education is a fundamental pillar of professional development. AI facilitates personalized and accessible learning through interactive and adaptive platforms, enabling nurses to continuously enhance their knowledge, skills, and competencies. The integration of AI-based educational resources broadens opportunities for professional training, strengthening nursing practice[2]. The potential for innovation is vast, ranging from AI-assisted decision-making through analytical precision algorithms to training in virtual reality simulations[4].

While AI offers significant potential for application in perioperative nursing, it also presents substantial challenges, necessitating continuous training and the development of new skills. Effectively leveraging AI requires the ability to use its resources for the greatest benefit, ensuring accuracy and precision in information delivery, clear communication, and adherence to best practices.

The use of AI technology relies on human input, particularly the entry of data into digital platforms, which can present an initial challenge. Increasing emphasis is placed on formulating precise and well-structured questions to enable AI to generate accurate and robust responses.

The processing models enabled by AI have the potential to become valuable resources across various fields of knowledge. However, professional responsibility, balance, and security must be prioritized, as real risks are associated with ethical and legal concerns, misinformation and biases, privacy breaches, and data security. Users must remain continually vigilant to these challenges[2,4].

The Federal Nursing Council (*Conselho Federal de Enfermagem* – COFEn) acknowledges that while AI is essential to nursing, it cannot replace the human aspects of care, such as touch and presence, which are fundamental to nursing practice. Although technological innovations offer significant benefits, they must be implemented in a manner that safeguards employment and upholds the quality of education and professional practice[5].

By integrating innovation with a commitment to ethical principles, perioperative nursing must continue to progress in the mindful use of AI tools to provide optimal care for surgical patients both now and in the future.

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