ESP-JETA
ESP Journal of Engineering & Technology Advancements
ISSN: 2583-2646 / Volume 5 Issue 4 October 2025 / Page No: 23-28
Paper Id: JETA-V5I4P105/ Doi: 10.56472/25832646/JETA-V5I4P105

Original Article

The Impact of Artificial Intelligence on the Changing Roles of Nurses in Patient Care: A Quantitative Study

Archiles Briones Tolentino
Department of Health Sciences, Oman College, Muscat.

Received Date: 26 August 2025 Revised Date: 13 September 2025 Accepted Date: 09 October 2025

Abstract: *This study examines the impact of artificial intelligence (AI) on the changing roles of nurses in patient care, emphasizing its growing significance in modern healthcare systems. The research highlights how AI integration reshapes nursing practices by automating clinical documentation, supporting real-time monitoring, and enhancing clinical decision-making. A quantitative research design was utilized, involving twenty (20) nurses—ten from private hospitals and ten from public hospitals—to assess their perceptions and experiences regarding AI-assisted care. Findings reveal that AI has contributed to improved accuracy, reduced workload, and more efficient patient management. However, disparities remain between public and private hospital nurses in terms of exposure, training, and technological readiness. The study underscores that while AI serves as a powerful tool to strengthen nursing performance, it does not replace the nurse's human touch and clinical judgment. Instead, it complements their expertise, enabling more focused and patient-centered care. The implications of this study highlight the necessity for continuous professional development, institutional support, and policy adaptation to ensure that nurses are adequately prepared for an increasingly AI-driven healthcare environment.*

Keywords: *Artificial Intelligence, Clinical Decision-Making, Nursing Practice, Patient Care, Technological Readiness.*

I. INTRODUCTION

Artificial Intelligence (AI) is increasingly transforming healthcare delivery, reshaping traditional nursing roles and redefining how patient care is provided. The integration of AI technologies such as predictive analytics, virtual assistants, and clinical decision support systems has led to improved accuracy, efficiency, and patient outcomes [1]. Nurses are now expected to adapt to these technological advancements by developing new competencies that allow them to collaborate effectively with AI-driven tools while maintaining the humanistic aspects of care.

In recent years, researchers have emphasized the growing importance of AI literacy in nursing education and practice. Montejo et al. [2] highlighted that nursing curricula must evolve to include AI-related competencies, preparing future nurses for a technology-augmented clinical environment. Similarly, Tam et al. [3] noted that AI-powered chatbots and virtual learning assistants are reshaping how nursing students acquire and apply knowledge, signaling a shift in both educational methods and professional expectations. This evolution requires not only technical skills but also critical thinking and ethical awareness to ensure patient-centered care remains at the core of nursing practice.

Moreover, studies have shown that nurses' readiness to adopt AI technologies is influenced by factors such as accessibility, perceived usefulness, and confidence in using digital tools [4]. Understanding these factors is crucial for successful AI integration in healthcare systems. AI has also demonstrated potential in addressing issues like nurse burnout, as interventions powered by AI can help manage workload, improve job satisfaction, and enhance overall well-being [5]. In mental health nursing, AI applications are supporting more personalized and efficient care delivery, allowing nurses to focus more on therapeutic relationships and less on administrative tasks [6].

Despite its promising benefits, the incorporation of AI into nursing practice poses challenges related to data privacy, ethical use, and role redefinition. As technology continues to evolve, it is essential to examine how AI influences the responsibilities, autonomy, and professional identity of nurses. This study aims to assess the impact of artificial intelligence on the changing roles of nurses in patient care, providing empirical insights that can guide policy development, education, and clinical practice in the era of digital health.

II. REVIEW OF RELATED LITERATURE

A. Artificial Intelligence in Nursing Practice

Artificial intelligence has become increasingly important in modern nursing practice, influencing how nurses deliver patient care and manage clinical operations. The integration of AI technologies enhances the accuracy of patient assessment and allows for data-driven decision-making that supports evidence-based nursing interventions [7]. By automating repetitive tasks and providing real-time data analysis, AI enables nurses to devote more time to direct patient interaction and

holistic care, which are fundamental to the nursing profession. AI applications have also proven effective in supporting nurses in clinical decision-making and workload management. Through predictive algorithms and automated systems, AI assists in identifying patient deterioration early, ensuring prompt and appropriate interventions [8]. The systematic integration of these technologies has demonstrated improvements in patient outcomes, reduced error rates, and enhanced the efficiency of nursing workflows. Despite these benefits, there remain challenges regarding data privacy, system reliability, and the readiness of healthcare institutions to adopt AI-driven tools.

Comprehensive reviews of AI in nursing indicate that while technological advancements hold great potential, their success depends heavily on the preparedness and adaptability of nurses. Many healthcare institutions are still in the process of developing policies and training programs to ensure effective utilization of AI systems [9]. Continuous education and digital literacy are essential components for nurses to confidently use AI applications in their clinical duties. Moreover, AI adoption in nursing practice is influenced by attitudes, perceived usefulness, and individual readiness. Studies have shown that positive perceptions toward AI can enhance its successful integration, while apprehension or lack of understanding may hinder its acceptance [10]. Training programs and institutional support play critical roles in increasing nurses' confidence and motivation to engage with AI technologies.

AI has not only improved the operational side of healthcare but also contributed significantly to clinical decision-making and patient management. Integrative reviews reveal that AI enhances clinical precision, aids in diagnosis, and helps predict patient conditions before complications arise [11]. These contributions streamline nursing tasks and foster better collaboration between human expertise and technological systems. As AI continues to evolve, the nursing profession must ensure ethical and responsible use of these tools. The advancement of AI requires clear guidelines on accountability, data security, and professional boundaries to safeguard patient welfare [12]. Understanding the clinical and operational impacts of AI helps prepare nurses for emerging challenges and supports a smoother transition toward technology-supported care models.

Finally, the growing role of nursing informatics has become central to managing and integrating AI technologies within healthcare systems. Informatics bridges the gap between human care and machine intelligence, allowing for efficient data management and system interoperability [13]. As AI becomes more embedded in nursing practice, the collaboration between technology and nursing expertise will continue to shape the future of patient care, emphasizing a balance between innovation and compassion

B. Impact of AI on Clinical Decision-Making

Artificial intelligence has shown significant potential in transforming clinical decision-making by providing data-driven insights that enhance diagnostic accuracy and treatment planning. Through advanced algorithms and decision support systems, AI assists healthcare professionals in interpreting clinical data and recommending evidence-based interventions [14]. The integration of these systems reduces the risk of human error, ensures consistency in clinical judgment, and improves the quality of care delivery. AI-based clinical decision support has proven especially useful in handling large volumes of patient data that would be difficult for human practitioners to process efficiently. In recent years, the use of generative AI models in healthcare has expanded the scope of decision-making support by enabling the automatic generation of patient-specific recommendations and predictive analytics [15]. Such systems facilitate personalized medicine, improve workflow efficiency, and strengthen the decision-making capacity of clinicians. However, the integration of generative AI also raises issues concerning governance, accountability, and data security, which must be addressed to ensure responsible implementation in clinical environments.

Despite these advantages, several studies have highlighted the limitations of AI in clinical decision-making, particularly when relying on large language models. These models, although powerful, can sometimes produce inaccurate or biased outputs due to the quality and diversity of the data used to train them [16]. Therefore, human oversight remains essential to validate AI-generated recommendations and prevent misinterpretations that could compromise patient safety. Empirical evidence suggests that the inclusion of explainable AI systems can enhance clinicians' trust and understanding of AI-assisted decisions. When healthcare providers comprehend how AI arrives at specific recommendations, they are more likely to integrate the technology effectively into clinical workflows [17]. Explainable AI, therefore, plays a crucial role in bridging the gap between computational reasoning and clinical intuition, especially among less experienced practitioners.

AI-driven platforms such as large language models have also demonstrated potential to revolutionize information retrieval and decision support across various healthcare settings [18]. By synthesizing existing literature, patient records, and clinical guidelines, these systems assist in producing accurate, context-aware decisions that improve both patient outcomes and operational efficiency. Nonetheless, their clinical reliability depends on continuous updates, strong regulatory frameworks, and transparent evaluation of algorithmic performance. The integration of AI in diagnostic interpretation has

further been shown to enhance accuracy in specialized areas of medicine. Studies in radiographic analysis revealed that AI-assisted decision-making improved clinicians' ability to identify and interpret complex cases with greater confidence and precision [19]. The use of AI decision support not only accelerates diagnostic processes but also reduces inter-observer variability, leading to more standardized and reliable clinical assessments.

III. MATERIALS AND METHODS (SIZE 10 &BOLD)

A. Research Design

This study utilized a descriptive quantitative research design. This approach was used to determine the impact of artificial intelligence on the changing roles of nurses in patient care. The design allowed for the collection of numerical data to describe and analyze trends and relationships concerning AI integration in nursing practice.

B. Research Respondents

The respondents of this study consisted of twenty (20) registered nurses currently employed in both private and public healthcare institutions. Ten (10) nurses were selected from private hospitals, and another ten (10) were selected from public hospitals. The respondents were chosen based on their exposure to clinical environments where artificial intelligence and digital health systems are applied.

C. Research Instrument

A researcher-made questionnaire served as the main data-gathering instrument. It was divided into two parts: the first gathered demographic information such as age, gender, years of experience, and type of institution; the second measured perceptions regarding the effects of artificial intelligence on nurses' roles, workflow, and patient care. The items were structured using a Likert scale format to ensure objective quantification of responses.

D. Data Gathering Procedure

Before the distribution of questionnaires, validation was conducted by field experts to ensure clarity and reliability. A pilot test was also done with a small group of nurses who were not included in the main study. After validation, revisions were made as needed. Data collection took place after obtaining permission from hospital administrators, and informed consent was secured from all participants. Confidentiality and anonymity were strictly maintained throughout the study.

E. Statistical Treatment of Data

The data collected were tabulated, summarized, and analyzed using descriptive statistical tools such as frequency, percentage, and weighted mean. These statistical methods were used to interpret the responses and determine the degree of impact of artificial intelligence on nurses' changing roles in patient care.

III. RESULTS AND DISCUSSION (SIZE 10 & BOLD, CAPS)

Table 1 : Profile of the Respondents

Category	Indicators	Frequency (f)	Percentage (%)
Type of Hospital	Public	10	50
Private	10	50	
Years of Experience	1–3 years	6	30
4–6 years	8	40	
7 years and above	6	30	
Exposure to AI Tools	Yes	14	70
No	6	30	

Table 1 shows that half of the respondents came from public hospitals and the other half from private hospitals, ensuring balanced representation. Most of the nurses (40%) had four to six years of experience, and 70% reported exposure to AI tools or systems in their workplace. This suggests that the majority of nurses included in the study have adequate experience and familiarity with emerging healthcare technologies, supporting the validity of their responses.

Table 2 : Perceived Impact of AI on Nursing Roles

Indicators	Weighted Mean	Verbal Interpretation
AI helps reduce workload and repetitive tasks.	4.50	Strongly Agree
AI supports nurses in clinical decision-making.	4.35	Strongly Agree
AI enhances the accuracy of patient monitoring and documentation.	4.40	Strongly Agree
AI allows nurses to focus more on direct patient care.	4.25	Agree
AI requires nurses to develop new technical skills.	4.60	Strongly Agree
Overall Weighted Mean	4.42	Strongly Agree

As shown in Table 2, the overall weighted mean of 4.42 indicates that respondents strongly agree that AI has a positive impact on nursing roles. Nurses acknowledged that AI reduces their workload and improves the accuracy of documentation and patient monitoring. This finding is consistent with previous studies which state that AI assists in routine clinical tasks, allowing nurses to focus on compassionate and personalized care [7][8].

Table 3 : Perceived Impact of AI on Workflow Efficiency

Indicators	Weighted Mean	Verbal Interpretation
AI speeds up patient data processing and record retrieval.	4.30	Strongly Agree
AI improves coordination between departments.	4.15	Agree
AI reduces errors in clinical documentation.	4.25	Agree
AI enhances overall workflow and time management.	4.40	Strongly Agree
Overall Weighted Mean	4.28	Strongly Agree

Table 3 reveals that nurses perceive AI as improving workflow efficiency, with an overall weighted mean of 4.28, interpreted as Strongly Agree. The data show that AI systems help speed up information retrieval and reduce errors in documentation, thereby enhancing time management. Similar findings in literature affirm that AI-driven processes increase accuracy and allow healthcare teams to operate more efficiently [14][15].

Table 4 : Perceived Impact of AI on Patient Care

Indicators	Weighted Mean	Verbal Interpretation
AI contributes to faster patient assessment and response.	4.45	Strongly Agree
AI enhances the quality and safety of patient care.	4.50	Strongly Agree
AI helps detect early warning signs through predictive analytics.	4.35	Strongly Agree
AI strengthens evidence-based decision-making.	4.40	Strongly Agree
Overall Weighted Mean	4.43	Strongly Agree

Table 4 shows that nurses strongly agree on the positive impact of AI on patient care, with an overall weighted mean of 4.43. Respondents believed that AI enhances care quality, facilitates early detection of complications, and promotes evidence-based practice. These findings align with recent studies emphasizing that AI technologies support accurate assessment and patient-centered interventions [16][17][18].

Table 5 : Comparison between Public and Private Hospital Nurses

Category	Mean Rating	Interpretation
Public Hospitals	4.30	Strongly Agree
Private Hospitals	4.50	Strongly Agree

As shown in Table 5, both public and private hospital nurses strongly agreed that AI has a positive effect on their professional roles. However, nurses in private hospitals (mean = 4.50) showed slightly higher ratings compared to those in public hospitals (mean = 4.30). This indicates that AI adoption and familiarity may be more advanced in private healthcare institutions, possibly due to better technological infrastructure and training opportunities.

IV. CONCLUSION

The study revealed that artificial intelligence (AI) has a significant positive impact on nursing practice across both public and private hospitals. The integration of AI technologies in clinical settings enhances the accuracy of patient monitoring, supports evidence-based decision-making, and improves workflow efficiency. Nurses reported that AI reduces manual workload, allowing more time for patient care and critical thinking tasks. Despite these benefits, the study also found that nurses in private hospitals exhibit slightly higher familiarity and confidence in using AI tools compared to those in public hospitals, mainly due to greater access to modern systems and institutional support. This suggests that public health institutions may require additional training and infrastructure improvements to fully adopt AI-driven practices.

Overall, the findings emphasize the importance of preparing the nursing workforce for technological transformation. Continuous education, proper training, and organizational support are essential to maximize AI's potential in improving healthcare delivery while maintaining the humanistic aspect of nursing care.

A. Interest Conflicts

- The author(s) declare(s) that there is no conflict of interest concerning the publication of this paper.

B. Funding Statement

- This research received no external funding. All expenses related to the study were personally supported by the researcher.

C. Acknowledgments

The researcher sincerely extends deepest appreciation to all individuals and institutions that contributed to the successful completion of this study, "The Impact of Artificial Intelligence on the Changing Roles of Nurses in Patient Care."

Heartfelt gratitude is given to the clinical instructors and research advisers for their continuous guidance, constructive feedback, and unwavering support throughout the research process. Their professional insights and academic expertise provided direction and inspiration that strengthened the quality of this work.

The researcher also extends appreciation to the management and staff of the participating hospitals—both public and private—for allowing access to their facilities and providing the opportunity to conduct this study. Special thanks are offered to the twenty (20) nurse respondents who generously shared their time, experiences, and perspectives regarding the use of artificial intelligence in their professional practice. Their participation was invaluable in shaping the findings and interpretations of this research.

The researcher's heartfelt thanks also go to family and friends for their patience, moral support, and encouragement during moments of challenge and exhaustion. Their faith and motivation served as a constant reminder to persevere and complete this endeavor.

Finally, the researcher gives gratitude to God Almighty for the gift of wisdom, guidance, and strength throughout every stage of this study. Without His divine providence, this work would not have been possible.

V. REFERENCES

[1] Al Khatib, I., & Ndiaye, M. (2025). Examining the Role of AI in Changing the Role of Nurses in Patient Care: Systematic Review. JMIR Nursing, 8, e63335. https://doi.org/10.2196/63335

[2] Montejo, L., Fenton, A., & Davis, G. (2024). Artificial intelligence (AI) applications in healthcare and considerations for nursing education. Nurse Education in Practice, 80, 104158. https://doi.org/10.1016/j.nepr.2024.104158

[3] Tam, W., Huynh, T., Tang, A., Luong, S., Khatri, Y., & Zhou, W. (2023). Nursing education in the age of artificial intelligence powered chatbots (AI-chatbots): Are we ready yet? Nurse Education Today, 129, 105917. https://doi.org/10.1016/j.nedt.2023.105917

[4] Labrague, L. J., Aguilar-Rosales, R., Yboa, B. C., & Sabio, J. B. (2023). Factors influencing student nurses' readiness to adopt artificial intelligence (AI) in their studies and their perceived barriers to accessing AI technology: A cross-sectional study. Nurse Education Today, 130, 105945. https://doi.org/10.1016/j.nedt.2023.105945

[5] Baek, G., & Cha, C. (2025). AI-assisted tailored intervention for nurse burnout: A three-group randomized controlled trial. Worldviews on Evidence-Based Nursing, 22(1), e70003. https://doi.org/10.1111/wvn.70003

[6] Nashwan, A. J., Gharib, S., Alhadidi, M., El-Ashry, A. M., Alamgir, A., Al-Hassan, M., Khedr, M. A., Dawood, S., & Abufarsakh, B. (2023). Harnessing artificial intelligence: Strategies for mental health nurses in optimizing psychiatric patient care. Issues in Mental Health Nursing, 44(10), 1020–1034. https://doi.org/10.1080/01612840.2023.2263579

[7] Vasquez, B., Moreno-Lacalle, R., Soriano, G. P., Juntasoopeepun, P., Locsin, R. C., & Evangelista, L. S. (2023). Technological machines and artificial intelligence in nursing practice. Nursing & Health Sciences, 25(3), 474–481. https://doi.org/10.1111/nhs.13029

[8] O'Connor, S., Yan, Y., Thilo, F. J. S., Felzmann, H., Dowding, D., & Lee, J. J. (2023). Artificial intelligence in nursing and midwifery: A systematic review. Journal of Clinical Nursing, 32(13–14), 2951–2968. https://doi.org/10.1111/jocn.16478

[9] von Gerich, H., Moen, H., Block, L. J., Chu, C. H., DeForest, H., Hobensack, M., Michalowski, M., Mitchell, J., Nibber, R., Olalia, M. A., Pruinelli, L., Ronquillo, C. E., Topaz, M., & Peltonen, L. M. (2022). Artificial intelligence-based technologies in nursing: A scoping literature review of the evidence. International Journal of Nursing Studies, 127, 104153. https://doi.org/10.1016/j.ijnurstu.2021.104153

[10] Labrague, L. J., Aguilar-Rosales, R., Yboa, B. C., Sabio, J. B., & de Los Santos, J. A. (2023). Student nurses' attitudes, perceived utilization, and intention to adopt artificial intelligence (AI) technology in nursing practice: A cross-sectional study. Nurse Education in Practice, 73, 103815. https://doi.org/10.1016/j.nepr.2023.103815

[11] Hassanein, S., El Arab, R. A., Abdrbo, A., Abu-Mahfouz, M. S., Gaballah, M. K. F., Seweid, M. M., Almari, M., & Alzghoul, H. (2025). Artificial intelligence in nursing: An integrative review of clinical and operational impacts. Frontiers in Digital Health, 7, 1552372. https://doi.org/10.3389/fdgth.2025.1552372

[12] Rony, M. K. K., Parvin, M. R., & Ferdousi, S. (2024). Advancing nursing practice with artificial intelligence: Enhancing preparedness for the future. Nursing Open, 11(1), 10.1002/nop2.2070. https://doi.org/10.1002/nop2.2070

[13] Nashwan, A. J., Cabrega, J. A., Othman, M. I., Khedr, M. A., Osman, Y. M., El-Ashry, A. M., Naif, R., & Mousa, A. A. (2025). The evolving role of nursing informatics in the era of artificial intelligence. International Nursing Review, 72(1), e13084. https://doi.org/10.1111/inr.13084

[14] Ouanes, K., & Farhah, N. (2024). Effectiveness of artificial intelligence (AI) in clinical decision support systems and care delivery. Journal of Medical Systems, 48(1), 74. https://doi.org/10.1007/s10916-024-02098-4

[15] Reddy, S. (2024). Generative AI in healthcare: An implementation science informed translational path on application, integration and governance. Implementation Science, 19(1), 27. https://doi.org/10.1186/s13012-024-01357-9

[16] Hager, P., Jungmann, F., Holland, R., Bhagat, K., Hubrecht, I., Knauer, M., Vielhauer, J., Makowski, M., Braren, R., Kaissis, G., & Rueckert, D. (2024). Evaluation and mitigation of the limitations of large language models in clinical decision-making. Nature Medicine, 30(9), 2613–2622. https://doi.org/10.1038/s41591-024-03097-1

[17] Glick, A., Clayton, M., Angelov, N., & Chang, J. (2022). Impact of explainable artificial intelligence assistance on clinical decision-making of novice dental clinicians. JAMIA Open, 5(2), ooac031. https://doi.org/10.1093/jamiaopen/ooac031

[18] Iqbal, U., Tanweer, A., Rahmanti, A. R., Greenfield, D., Lee, L. T., & Li, Y. J. (2025). Impact of large language model (ChatGPT) in healthcare: An umbrella review and evidence synthesis. Journal of Biomedical Science, 32(1), 45. https://doi.org/10.1186/s12929-025-01131-z

[19] Prince, E. W., Mirsky, D. M., Hankinson, T. C., & Görg, C. (2025). Impact of AI decision support on clinical experts' radiographic interpretation of adamantinomatous craniopharyngioma. AMIA Annual Symposium Proceedings, 2024, 930–939.

[20] Vasquez, B., Moreno-Lacalle, R., Soriano, G. P., Juntasoopeepun, P., Locsin, R. C., & Evangelista, L. S. (2023). Technological machines and artificial intelligence in nursing practice. Nursing & Health Sciences, 25(3), 474–481. https://doi.org/10.1111/nhs.13029