

*Correspondence***Machine learning to improve the quality of nursing care in open heart intensive care unit: Challenges & opportunities**Azadeh Soltani ^a  | Yasaman Soltani ^{b*} 

a. Department of Information Technology Engineering, Mehrastan University, Astaneh Ashrafieh, Iran

b. Student Research Committee, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran

***Corresponding author(s):** Yasaman Soltani (PhD student), Student Research Committee, School of Nursing and Midwifery, Guilan University of Medical Sciences, Rasht, Iran.Email: Yas_slt@yahoo.com<https://doi.org/10.32598/JNRCP.2404.1068>

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To the Editor

Open heart intensive care unit (ICU) encounter distinctive challenges due to the critical condition of patients and the intricate nature of required care [1]. Meanwhile, machine learning has emerged as a potent tool to augment decision-making and patient management in this high-stakes setting [2]. This examination delves into how machine learning applications can transform nursing practices, bolster real-time clinical decision-making, and elevate patient outcomes. In this context, research has showcased the effectiveness of machine learning in various facets of ICU management, including real-time monitoring and predictive analytics. For example, machine learning algorithms have effectively anticipated complications like cardiac arrest and acute kidney injury, enabling proactive interventions [3]. Within the realm of open heart ICUs, machine learning models analyze data from continuous monitoring devices to forecast hemodynamic instability [4]. Additionally, machine learning has facilitated personalized care plans by adapting treatments based on individual patient data trends, thereby refining the accuracy of nursing care [5]. These technologies not only facilitate the optimization of resource allocation but also enable timely interventions, potentially shortening hospital stays and enhancing overall outcomes [6]. Furthermore, the integration of machine learning in diagnostic imaging within open heart ICUs represents a significant advancement [7]. Algorithms can scrutinize echocardiograms and other imaging data to detect subtle changes that might elude human observation, thus enabling earlier identification of postoperative

complications such as fluid accumulation or impaired heart function [8]. This capability is paramount in a setting where swift response to evolving patient conditions can be the decisive factor between recovery and deterioration [9]. Despite promising outcomes, the implementation of machine learning in clinical settings encounters several barriers. Challenges include data privacy concerns, the complexity of integrating machine learning systems with existing hospital information technology infrastructures, and the imperative for ongoing data validation [10]. Moreover, there is a pressing need for training ICU nurses to adeptly utilize machine learning tools, addressing a skills gap crucial for ensuring successful adoption and utilization of advanced technologies in clinical practice [11]. Additionally, resistance to change within the clinical workforce may impede the adoption of machine learning technologies [12]. Convincing healthcare professionals to depart from traditional practices and place trust in machine-driven data insights for critical decision-making may require significant effort. Furthermore, the cost associated with implementing and maintaining advanced machine learning systems poses a substantial challenge. Many healthcare facilities, particularly in developing regions, may find the initial investment and ongoing operational expenses prohibitive, thereby limiting the accessibility of advanced machine learning technologies and exacerbating disparities in healthcare quality across different regions and economic strata [13].

Additionally, future endeavors should concentrate on developing user-friendly machine learning systems that necessitate

minimal input from nursing staff to operate effectively. Research aimed at comprehending the enduring impacts of machine learning on patient outcomes in open heart ICUs holds significance. Furthermore, ethical considerations regarding patient data usage require thorough examination to formulate guidelines that safeguard patient privacy while harnessing the benefits of machine learning [14]. Additionally, more robust real-world trials and multi-center studies are imperative to validate the efficacy of machine learning applications across diverse settings and patient demographics. This could facilitate the establishment of standardized protocols and benchmarks for the utilization of machine learning in ICUs, fostering broader acceptance and implementation.

In sum, machine learning harbors transformative potential for nursing care in open heart ICUs, offering enhanced predictive capabilities and operational efficiencies. As the field progresses, a collaborative approach involving technologists, clinicians, and policymakers will be indispensable to tackle challenges and leverage the full potential of machine learning in this critical care environment.

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Authors' contributions

Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work: AS, YS; Drafting the work or revising it critically for important intellectual content: AS, YS; Final approval of the version to be published: AS, YS; Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved: AS, YS.

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Availability of data and materials

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Using artificial intelligent chatbots

None.

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