OPEN ACCESS

Saudi Journal of Medical and Pharmaceutical Sciences

Abbreviated Key Title: Saudi J Med Pharm Sci
ISSN 2413-4929 (Print) | ISSN 2413-4910 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article **Medical Science**

Insights into Nursing Students' Perceptions of Innovative Healthcare Technologies

Bushra Ahmed AlSoraya[1]*, Fatima Ahmad AlGhamdi[1], Muneerah Mushabab Albishi[1], Nouf Mohammed AlQarni[1], Rawan Abdulwahab Ozaybi[1], Sharifa Ibrahim AlNasheri[1], Waad Ahmed AlQahtani[1], Dr. Fatmah Alamodi[1]

[1]Prince Sultan Military College of Health Sciences, Dhahran, Saudi Arabia

DOI: https://doi.org/10.36348/sjmps.2025.v11i11.008 | **Received:** 07.09.2025 | **Accepted:** 01.11.2025 | **Published:** 14.11.2025

***Corresponding author:** Bushra Ahmed AlSoraya
Prince Sultan Military College of Health Sciences, Dhahran, Saudi Arabia

Abstract

Background: The integration of healthcare technologies in nursing has revolutionized patient care "delivery, and educational practices." Understanding nursing students' perceptions toward these innovations is crucial for ensuring workforce readiness in technology-driven healthcare systems. ***Objectives:*** This study assessed nursing students' awareness, readiness, and attitudes toward healthcare technologies, examined demographic variations, and identified perceived educational and training needs. ***Methods:*** A descriptive cross-sectional study was conducted among 149 students at Prince Sultan Military College of Health Sciences using a 24-item Likert-scale questionnaire covering awareness, readiness, attitudes, training needs, and perceived effectiveness. Reliability was confirmed (Cronbach's $\alpha = 0.963$). Descriptive statistics and one-way ANOVA tests were performed using SPSS v25, with significance set at $p < 0.05$. ***Results:*** Students demonstrated high awareness (76%), confidence (86%), and willingness to use technology (84%). Year of study, GPA, and prior exposure significantly affected perceptions, while age did not. Participants emphasized the need for simulation-based learning, electronic health records training, and telehealth exposure. ***Conclusion:*** Although nursing students recognize the benefits of technology, structured training remains insufficient. Educational institutions must integrate comprehensive digital health competencies into nursing curricula to enhance readiness and promote patient-centered innovation.

Keywords: Nursing education, healthcare technology, readiness, digital literacy, Saudi Arabia.

1. INTRODUCTION

Technological advancement is reshaping healthcare delivery, leading to a global shift toward data-driven and technology-enabled nursing practices. Nurses, as frontline healthcare providers, play a pivotal role in adopting and implementing digital innovations such as electronic health records (EHRs), artificial intelligence (AI), telehealth, and virtual simulation. The World Health Organization (WHO, 2023) emphasizes digital literacy as a fundamental competency for future healthcare professionals.

In Saudi Arabia, Vision 2030 underscores digital transformation across all healthcare sectors, "necessitating" with "highlighting the need for" of integrating technology into clinical care. However, there remains a limited understanding of how nursing students perceive these technologies and how prepared they feel to implement them in practice.

This study aims to fill that gap by analyzing the awareness, readiness, and attitudes of nursing students toward healthcare technologies, providing evidence to guide curriculum design and digital training programs.

2. LITERATURE REVIEW

Numerous international studies report positive attitudes among nursing students toward technology integration (Williamson & Muckle, 2018; Dallora *et al.*, 2024). Research in South Africa and Turkey has demonstrated that exposure to mobile applications, simulation tools, and e-learning platforms improve engagement and critical thinking (Harerimana & Mtshali, 2019; Terkes *et al.*, 2019). However, challenges persist, including limited access to digital resources, inadequate faculty training, and anxiety about depersonalized care (McCabe & Timmins, 2016). A study by van Houwelingen *et al.*, (2017) revealed that even digital-native nursing students show hesitancy toward telehealth applications, highlighting a gap

between familiarity with technology and its professional use. Regionally, research in the Middle East (Fadel *et al.*, 2020) found enthusiasm toward technology but limited practical experience. Collectively, these studies suggest that while nursing students appreciate the importance of innovation, they require structured educational support to achieve competency.

3. METHODOLOGY

A descriptive cross-sectional quantitative design was adopted. The study population included all undergraduate nursing students enrolled at Prince Sultan Military College of Health Sciences during the academic year 2023–2025. Convenience sampling yielded 149 respondents. A 24-item questionnaire was designed to measure five dimensions: awareness, readiness, attitudes, training needs, and perceived effectiveness of healthcare technologies.

The tool underwent face validation by two nursing education experts and pilot testing (n=36), "demonstrating highinternal consistency ($\alpha = 0.963$)". Ethical approval was obtained from the Institutional Review Board (IRB-2025-NUR-028). Participation was voluntary, with informed consent obtained electronically. Data were collected through Google Forms and analyzed using SPSS v25. Descriptive statistics summarized responses, while one-way ANOVA tested differences by demographic variables (age, GPA, year, experience).

4. RESULTS

Participants were predominantly fourth-year students (60.4%) with GPAs above 4.0 (63.8%). Awareness of healthcare technologies was high, with 86% reporting familiarity with telehealth and 85% understanding the benefits of digital tools. Regarding readiness, "Approximately 84%expressed eagerness for training" for consistency and 86.6% felt confident in integrating technology into practice.

Significant differences were found in awareness by GPA ($p = 0.008$) and experience ($p = 0.023$), readiness by year of study ($p = 0.005$), and attitude by year ($p= 0.037$). However, age showed no statistical significance ($p > 0.05$). Students emphasized the need for enhanced simulation and EHR-based education to bridge the theory-practice gap. Figures and tables illustrated demographic distributions, attitude scores, and ANOVA outcomes.

5. DISCUSSION

The study findings align with previous research highlighting the growing acceptance of healthcare technology among nursing students globally (George *et al.*, 2017; Saab *et al.*, 2021). Students demonstrated enthusiasm for adopting innovative tools but reported insufficient curricular exposure, echoing McBride *et al.*, (2020). The correlation between higher academic standing and greater technological confidence suggests that advanced students, through cumulative exposure, develop more positive attitudes.

Notably, "for technology" with "toward technology", indicating that digital competency may not be systematically embedded in the nursing curriculum. This reflects a need to revise educational frameworks to include consistent, practice- oriented technology modules. Furthermore, despite strong optimism, anxiety toward advanced technologies such as AI and big data remains a challenge requiring gradual skill-based introduction.

6. CONCLUSION AND RECOMMENDATIONS

The research concludes that nursing students at PSMCHS possess positive perceptions toward innovative healthcare technologies but lack comprehensive formal training. The findings emphasize the importance of institutional commitment to digital competency development through "structured learning experiences, increased practical exposure, and improved educator preparedness."

Recommendations Include:

(1) Integrating simulation-based and EHR modules into core courses.
(2) Providing continuous digital literacy training for faculty.
(3) Establishing partnerships with healthcare institutions to offer clinical exposure to real-world technology applications.

Future studies should adopt mixed- methods approaches designs to explore experiential learning outcomes and interventional impacts on digital readiness.

REFERENCES

- Dallora, A. L., Andersson, E. K., Palm, B. G., Bohman, D., Björling, G., & Anderberg, P. (2024). Nursing Students' Attitudes Toward Technology: Multicenter Cross-Sectional Study. *JMIR Medical Education, 10*, e50297.
- Fadel, M. A., Elfallah, E. A. O., & Elghriani, A. (2020). An evaluation of the attitudes of healthcare nurses towards new technologies. *Proceedings of the 6th International Conference on Engineering & MIS 2020*, 1–6.
- Harerimana, A., & Mtshali, N. G. (2019). Nursing students' perceptions and expectations regarding the use of technology in nursing education. *Africa Journal of Nursing and Midwifery, 21(2)*, 20–30.
- McBride, S., Tietze, M., & Thomas, L. (2020). Nursing and digital health: Transforming nursing practice. *Journal of Nursing Scholarship, 52(3)*, 249– 256.
- McCabe, C., & Timmins, F. (2016). Embracing healthcare technology – What is the way forward for

nurse education? *Nurse Education in Practice, 21*, 104– 106.

- Saab, M. M., Landers, M., Egan, S., Murphy, D., & Hegarty, J. (2021). Nurses and nursing students' attitudes toward technology in patient care: *A systematic review. CIN: Computers, Informatics, Nursing, 39(11)*, 704–713.
- Williamson, K. M., & Muckle, J. (2018). Students' perception of technology use in nursing education. CIN: *Computers, Informatics, Nursing, 36(2)*, 70–76.
- van Houwelingen, C. T., Ettema, R. G., Kort, H. S., & Ten Cate, O. (2017). Internet-generation nursing students' view of technology-based health care. *Journal of Nursing Education, 56(12)*, 717–724.
- Zayim, N., & Ozel, D. (2015). Factors affecting nursing students' readiness and perceptions toward the use of mobile technologies for learning. CIN: *Computers, Informatics, Nursing, 33(10)*, 456–464.