

A New Leap Based on Artificial Intelligence in Patient Care: Wearable Health Technology for Monitoring Vital Signs

Reza Abdollahi¹, PhD
candidate

Dear Editor

Monitoring patients' vital signs is one of the most critical actions for assessing their health status. The use of modern methods for measuring vital signs can significantly impact the accuracy, speed, and continuity of these measurements.¹ The integration of wearable health technology into the monitoring of patients' vital signs has revolutionized healthcare delivery, enabling continuous, real-time data collection. Wearable devices such as smartwatches, fitness trackers, and specialized medical wearables have emerged as essential tools for monitoring vital signs, including heart rate, blood pressure, and oxygen saturation.²

One of the main advantages of wearable health technology is its ability to provide continuous monitoring of vital signs, which was previously limited to periodic clinical assessments. Continuous monitoring enables the early identification of health crises and emergencies, which is crucial for managing chronic diseases such as diabetes and heart conditions.³ For example, wearable devices can alert healthcare teams and patients about unstable vital signs that may indicate impending critical health conditions, such as a stroke or adverse drug reactions. By collecting and analyzing timely data, these devices enable physicians to take preventive action to avert deterioration in patient health.⁴ Furthermore, research has shown that the use of wearable pulse oximeters during the COVID-19 pandemic facilitated continuous monitoring of patients' oxygen levels, significantly reducing the workload for healthcare teams.⁵

Wearable devices also enhance patient engagement in care programs by providing direct access to health-related data. This increased awareness encourages patients to continuously monitor their health status, adhere to prescribed treatment regimens, and adjust their lifestyles based on the information obtained.⁶ With ongoing advancements in these technologies, patients are finding it increasingly easy to interact with these devices, further supporting their health management efforts. Given the workforce shortages in Iran, particularly in nursing, the application of wearable technology can significantly reduce nurses' workloads, allowing them to dedicate more time to nursing-related care. Recently, Iranian researchers have developed various forms of smart wearables specifically designed for different patient populations. For instance, a textile-based system has been developed to monitor the vital signs of cardiac patients, using conductive fabrics to measure heartbeats and breathing rates⁷ accurately.

Despite numerous advantages, integrating wearable health technology into healthcare delivery faces several challenges. One significant barrier concerns patient data privacy and confidentiality. Wearable devices collect vast amounts of information about patients' health status, raising concerns about how this data is stored, transmitted, and protected against potential misuse.⁸ Ensuring patient trust is paramount and requires adherence to regulations such as the Health Insurance Portability and Accountability Act (HIPAA) to protect against unauthorized access.

¹Patient Safety Research Center, Clinical Research Institute, Nursing & Midwifery School, Urmia University of Medical Sciences, Urmia, Iran

Correspondence:

Reza Abdollahi, PhD candidate;
Patient Safety Research Center,
Clinical Research Institute, Nursing &
Midwifery School, Urmia University of
Medical Sciences, Urmia, Iran

Tel: +98 9019753320

Email: Rezaabdollahi97@yahoo.com

Received: 23 January 2026

Revised: 12 February 2026

Accepted: 06 March 2026

Additionally, the accuracy and reliability of data collected by wearable devices must be considered.⁹ Factors such as improper device placement and environmental conditions can lead to variations in actual data, resulting in misinterpretations and potentially incorrect treatment actions for patients.¹⁰ Furthermore, significant economic challenges, including sanctions and fluctuations in healthcare funding, may affect the affordability and accessibility of advanced wearable technologies in Iran.⁷

The future of wearable health technology in monitoring patients' vital signs is promising, especially with ongoing advancements in artificial intelligence (AI) and data analytics. The integration of AI algorithms enables analysis of large datasets collected by wearable devices, identifying patterns and predicting health issues before conditions worsen. This predictive capability can lead to early interventions and personalized treatment plans, ultimately improving patient care outcomes.¹¹ Additionally, with the expansion of telemedicine, the use of wearable devices will increase, particularly in underserved areas with limited access to healthcare facilities.¹²

The use of wearable health technologies to monitor patients' vital signs represents a significant advancement in patient care and treatment management. These devices offer a proactive approach to healthcare management that was previously unimaginable.

Comprehensive Framework for Integration: To effectively integrate wearable technology, healthcare providers and organizations should adopt a structured framework for evaluation and implementation. Creating such frameworks ensures that the devices selected for integration meet the specific needs of healthcare providers and patients. Additionally, solutions such as robust data encryption and accessible user agreements can ensure that patients are not only protected but also informed about the implications of sharing their data. The implementation of wearables should also focus on strengthening patient engagement and encouraging active participation in their health management. Healthcare providers should promote the use of wearables by educating patients about their benefits and demonstrating how the technology can improve health outcomes. With advancements in modern technologies and the integration of AI-based analytics, wearable devices have the potential to revolutionize patient care, enhance health outcomes, and contribute to a more efficient healthcare system.

Authors' Contribution

R.A. developed conceptualization, performed document

search, wrote the drafted of the manuscript, revised it, and approved the final version for publication.

Acknowledgements

Not applicable.

Funding

Self-funded.

Conflict of Interest

We do not have potential conflicts of interest with respect to the research, authorship, and publication of this article.

Keywords: Artificial intelligence, monitoring, vital signs, Wearable Electronic Devices

Please cite this article as: Abdollahi R. A New Leap Based on Artificial Intelligence in Patient Care: Wearable Health Technology for Monitoring Vital Signs. *J Health Sci Surveillance Sys*. 2026;14(2):185-187. doi: 10.30476/jhsss.2025.105329.2015.

References

- 1 Patel V, Orchanian-Cheff A, Wu R. Evaluating the validity and utility of wearable technology for continuously monitoring patients in a hospital setting: systematic review. *JMIR mHealth and uHealth*. 2021;9(8):e17411.
- 2 Wu M. Wearable technology applications in healthcare: a literature review. *On-Line Journal of Nursing Informatics*. 2019;23(3).
- 3 Adeghe EP, Okolo CA, Ojeyinka OT. A review of wearable technology in healthcare: Monitoring patient health and enhancing outcomes. *OARJ of Multidisciplinary Studies*. 2024;7(01):142-8.
- 4 Greiwe J, Nyenhuis SM. Wearable technology and how this can be implemented into clinical practice. *Current allergy and asthma reports*. 2020;20:1-10.
- 5 Babar ETR, Rahman MU. A smart, low cost, wearable technology for remote patient monitoring. *IEEE Sensors Journal*. 2021;21(19):21947-55.
- 6 Friend SH, Ginsburg GS, Picard RW. Wearable digital health technology. *Mass Medical Soc*; 2023. p. 2100-1.
- 7 Jafari N, Ghalati SY, Raberi VS, Moalemi S, Amin A. Impact of Wearable Technology on Heart Failure Management. *Galen Medical Journal*. 2024 Sep 11;13:1.
- 8 Ginsburg GS, Picard RW, Friend SH. Key issues as wearable digital health technologies enter clinical care. *New England Journal of Medicine*. 2024;390(12):1118-27.
- 9 Shajari S, Kuruvinashetti K, Komeili A, Sundararaj U. The emergence of AI-based wearable sensors for digital

- health technology: a review. *Sensors*. 2023;23(23):9498.
- 10 Prieto-Avalos G, Cruz-Ramos NA, Alor-Hernandez G, Sánchez-Cervantes JL, Rodríguez-Mazahua L, Guarneros-Nolasco LR. Wearable devices for physical monitoring of heart: a review. *Biosensors*. 2022;12(5):292.
- 11 Sprogis SK, Currey J, Considine J. Patient acceptability of wearable vital sign monitoring technologies in the acute care setting: A systematic review. *Journal of clinical nursing*. 2019;28(15-16):2732-44.
- 12 Islam MM, Mahmud S, Muhammad L, Islam MR, Nooruddin S, Ayon SI. Wearable technology to assist the patients infected with novel coronavirus (COVID-19). *SN computer science*. 2020;1:1-9.