



Course Title: Research Methodology in Computer Science

Course Code:AI800

Lecturer: Dr. Mohammed Anbar

Student Name: Ali N. Alzuanydi

Academic No: 261002560

(Assignment 2)



Enhancing the quality of healthcare and medical decision-making through the use of artificial intelligence

Problem Statement:

While healthcare systems face increasing pressure due to rising operating costs, an aging population shortage of healthcare workers and an increase in chronic diseases along with rising expectations for safe and high-quality healthcare the six studies show that artificial intelligence has the ability to improve diagnosis, prediction, service quality and operational efficiency making it one of the key tools for developing healthcare, However the integration of artificial intelligence (AI) into actual healthcare practice remains incomplete and unbalanced, While many systems demonstrate promising technologies their clinical trials are still limited due to poor compatibility with current work environments Insufficient training infrastructure constraints, and a lack of trust create a gap between what AI can theoretically offer and its actual potential the problem is not only technical but also extends to ethical and regulatory aspects, Research papers have highlighted challenges related to a lack of transparency as well as the impact of (AI) on the doctor-patient relationship Therefore the main research problem is that while artificial intelligence (AI) has great potential to improve healthcare quality accountability and predictive decision-making it still faces ethical regulatory and implementation obstacles that limit its effective adoption Hence there is a need for an integrated understanding that clarifies how AI can be designed governed and implemented in a way that achieves clinical efficacy ethical accountability and acceptance among healthcare stakeholders



Research Objectives:

Main objective:

To study how artificial intelligence can contribute to improving the quality of healthcare and predictive decision-making while addressing the ethical regulatory and practical challenges that limit its effective adoption in healthcare systems.

Sub-objectives:

- 1. To analyze the current role of artificial intelligence (AI) in improving healthcare delivery diagnosis operational efficiency and decision-making**
- 2. To identify the most prominent ethical challenges and issues associated with the use of AI in healthcare, including bias, ambiguity, privacy, consent, and medical and legal liability**
- 3. To examine the organizational impact of AI on healthcare professionals, staff performance, training needs, and the quality of healthcare services**
- 4. To explore healthcare providers' perceptions of the benefits and risks of AI and the practical challenges associated with its application in real-world healthcare settings**
- 5. To investigate how emerging concepts such as AI for medical science and predictive medicine can reshape healthcare practice in the future**



Literature Review:

Review studies show that artificial intelligence (AI) is having an increasing impact on the healthcare sector. One landmark study demonstrated that AI can improve diagnosis and clinical decision-making, and help healthcare systems cope with rising demand and staffing shortages in certain specialties. It also emphasizes that AI should enhance human intelligence, not replace it.

The paper, which addressed healthcare ethics from an Islamic perspective, also adds an important dimension related to governance, as it showed that the use of artificial intelligence in healthcare raises questions about transparency and privacy, since when artificial intelligence participates in the main decision, responsibility may extend to several parties such as doctors, developers, and regulatory bodies

At the institutional level, the Hafr Al-Batin study showed a positive relationship between the use of artificial intelligence technologies and employee performance and the quality of health services. However, the same study indicated the need to enhance training and professional development, which means that technological adoption alone is not enough without organizational preparation and continuous support for the workforce.

The Japanese focus group study also highlighted the importance of stakeholder acceptance. Healthcare providers acknowledged AI's ability to improve efficiency and support diagnosis, but they also expressed concerns about over-reliance, bias, inequality, shifting workloads, and ambiguity of responsibility. These findings suggest that successful implementation requires engaging healthcare workers and patients from the early stages to ensure clinical and social acceptance

Overall, the six papers reveal that artificial intelligence offers clear opportunities to improve the quality of healthcare, predictive capability, and efficiency of health systems. However, these opportunities remain constrained by unresolved challenges related to ethics and governance, training, accountability, stakeholder acceptance, and implementation mechanisms. Therefore, there is a strong case for conducting research that integrates these dimensions rather than treating AI in healthcare as a purely technological innovation.

References:

Bajwa, J., Munir, U., Nori, A., & Williams, B. (2021). Artificial intelligence in healthcare: Transforming the practice of medicine. *Future Healthcare Journal*, 8(2), e188–e194.

<https://doi.org/10.7861/fhj.2021-0095>

Ghali, M., Alakoum, M., Suleiman, B., Qaraqe, M., Stotland, M., & Chawla, S. (2024). Artificial intelligence and healthcare ethics: Medical accountability from an Islamic perspective. Doha: Hamad Bin Khalifa University

Dong, B., Lu, Z., Yang, T., Wang, J., Zhang, Y., Tuo, X., Wang, J., Lin, S., Cai, H., Cheng, H., Cao, X., Huang, X., Zheng, Z., Miao, C., Wang, Y., Xue, H., Xu, S., Liu, X., Zou, H., & Sun, P. (2025). Development, validation, and clinical application of a machine learning model for risk stratification and management of cervical cancer screening based on full-genotyping hrHPV test (SMART-HPV): A modelling study. *The Lancet Regional Health – Western Pacific*, 55, 101480.

<https://doi.org/10.1016/j.lanwpc.2025.101480>

Kogetsu, A., Kato, K., & Yamamoto, B. A. (2026). Perspectives on the use of artificial intelligence in Japan: A focus group interview study of healthcare providers. *Frontiers in Digital Health*, 8, 1716687. <https://doi.org/10.3389/fdgth.2026.1716687>

Sakurada, K., Ishikawa, T., Oba, J., Kuno, M., Okano, Y., Sakamaki, T., & Tamura, T. (2025). Medical AI and AI for medical sciences. *JMA Journal*, 8(1), 26–37.

<https://doi.org/10.31662/jmaj.2024-0185>

Al-Dhafeeri, J. H., Al-Dhafeeri, A. H., Al-Dhafeeri, S. B., Al-Dhafeeri, K. B., Al-Dhafeeri, A. H., AlDhafeeri, G. T., & Al-Mutairi, A. S. (2024). The role of artificial intelligence technologies and their impact on the quality of healthcare services in Hafr Al-Batin

