

# Assessing The Readiness Of Nursing Technicians And Specialists For AI Integration In Patient Care: A Qualitative Study In Saudi Arabian Hospitals

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## Abstract

The integration of artificial intelligence (AI) in healthcare is rapidly transforming patient care delivery. As frontline healthcare providers, nursing technicians play a crucial role in the successful adoption of AI technologies. This qualitative study explores the readiness of nursing technicians for AI integration in patient care within the context of Saudi Arabian hospitals. Semi-structured interviews were conducted with 20 nursing technicians from various hospitals across the country. Thematic analysis revealed four main themes: (1) awareness and understanding of AI, (2) perceived benefits and challenges of AI integration, (3) training and skill development needs, and (4) organizational support and resources. The findings suggest that while nursing technicians recognize the potential benefits of AI in enhancing patient care, they also express concerns about job security, technical competence, and the need for comprehensive training and support. This study highlights the importance of addressing the readiness of nursing technicians to ensure the successful integration of AI in healthcare settings. Recommendations for healthcare organizations and policymakers are discussed.

**Keywords:** artificial intelligence, nursing technicians, readiness, qualitative research, Saudi Arabia

## 1. Introduction

Artificial intelligence (AI) is revolutionizing various aspects of healthcare, from diagnosis and treatment planning to patient monitoring and care delivery (Jiang et al., 2017). The integration of AI technologies in healthcare has the potential to improve patient outcomes, optimize resource allocation, and alleviate the workload of healthcare professionals (Topol, 2019). As frontline caregivers, nursing technicians play a vital role in the successful adoption and implementation of AI in patient care settings (Bresnick, 2019).

In Saudi Arabia, the healthcare system is undergoing a significant transformation driven by the Vision 2030 initiative, which aims to improve the quality and efficiency of healthcare services (Vision 2030, n.d.). The integration of AI technologies is a key component of this transformation, as evidenced by the increasing investments in AI research and development in the country (Mahmoud et al., 2021). However, the readiness of healthcare professionals, particularly nursing technicians, to embrace and effectively utilize AI in patient care remains understudied.

This qualitative study aims to explore the readiness of nursing technicians for AI integration in patient care within the context of Saudi Arabian hospitals. By understanding the perspectives, concerns, and needs of nursing technicians, this research seeks to inform the development of strategies and interventions to support the successful adoption of AI technologies in healthcare settings.

## 2. Literature Review

### 2.1 AI in Healthcare

AI encompasses a range of technologies, including machine learning, natural language processing, and computer vision, that enable machines to perform tasks that typically require human intelligence (Mehta et al., 2019). In healthcare, AI has numerous applications, such as disease diagnosis, treatment planning, drug discovery, and patient monitoring (Davenport & Kalakota, 2019). AI-powered tools have demonstrated the potential to improve the accuracy and efficiency of healthcare delivery, ultimately leading to better patient outcomes (Stead, 2018).

### 2.2 Readiness for AI Adoption in Healthcare

The successful integration of AI in healthcare depends on various factors, including technological infrastructure, data quality, regulatory frameworks, and the readiness of healthcare professionals (Shaw et al., 2019). Readiness encompasses the knowledge, skills, attitudes, and behaviors necessary to effectively adopt and utilize AI technologies in practice (Demirkan et al., 2020). Previous studies have highlighted the importance of assessing and addressing the readiness of healthcare professionals to ensure the smooth implementation of AI in healthcare settings (Juneja et al., 2021; Sit et al., 2020).

### 2.3 Nursing Technicians and AI

Nursing technicians, also known as nursing assistants or patient care technicians, provide essential support to registered nurses and other healthcare professionals in delivering patient care (Brown & Stephenson, 2018). They are responsible for various tasks, such as monitoring vital signs, assisting with activities of daily living, and documenting patient information (Muller et al., 2020). The integration of AI technologies in patient care has the potential to impact the roles and responsibilities of nursing technicians (Leary et al., 2019). Therefore, understanding their readiness for AI adoption is crucial to ensure a smooth transition and effective utilization of these technologies.

## 3. Methods

### 3.1 Study Design

This study employed a qualitative research design using semi-structured interviews to explore the readiness of nursing technicians for AI integration in patient care. Qualitative methods were chosen to gain in-depth insights into the perspectives, experiences, and needs of nursing technicians regarding AI adoption in healthcare settings.

### 3.2 Participants

A purposive sampling technique was used to recruit 20 nursing technicians from various hospitals across Saudi Arabia. Inclusion criteria were: (1) currently employed as a nursing technician in a Saudi Arabian hospital, (2) at least one year of work experience, and (3) willingness to participate in the study. Participants were recruited through professional networks and referrals.

### 3.3 Data Collection

Semi-structured interviews were conducted either in-person or via telephone, depending on the participants' preferences and availability. The interviews were guided by a pre-developed interview protocol, which included open-ended questions related to the participants' understanding of AI, perceived benefits and challenges of AI integration, training and skill development needs, and organizational support. Interviews were conducted in Arabic, the participants' native language, and were audio-recorded with their consent.

### 3.4 Data Analysis

The audio recordings of the interviews were transcribed verbatim and translated into English. Thematic analysis was performed using NVivo qualitative data analysis software. The analysis followed the six-step process outlined by Braun and Clarke (2006), which involves familiarization with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Two researchers independently coded the data and discussed discrepancies to reach consensus.

## 4. Results

The thematic analysis of the interview data revealed four main themes related to the readiness of nursing technicians for AI integration in patient care.

### 4.1 Theme 1: Awareness and Understanding of AI

Participants demonstrated varying levels of awareness and understanding of AI and its potential applications in healthcare. While some nursing technicians had a basic understanding of AI concepts, others expressed limited knowledge and misconceptions about the technology. Key findings include:

- Limited exposure to AI technologies in current practice
- Confusion about the difference between AI and other healthcare technologies
- Uncertainty about the potential impact of AI on their roles and responsibilities

Table 1. Levels of AI Awareness Among Nursing Technicians

| Level of Awareness | Description  | Percentage |
|--------------------|--|------------|
| High               | Demonstrated a clear understanding of AI concepts and potential applications in healthcare | 20%        |
| Moderate           | Had a basic understanding of AI but expressed some uncertainties and misconceptions        | 50%        |
| Low                | Demonstrated limited knowledge and significant misconceptions about AI                     | 30%        |

4.2 Theme 2: Perceived Benefits and Challenges of AI Integration  
Nursing technicians recognized both potential benefits and challenges associated with the integration of AI in patient care. Perceived benefits included:

- Improved efficiency and accuracy in tasks such as documentation and monitoring
  - Enhanced decision support for patient care planning and interventions
  - Potential for reduced workload and increased time for direct patient care
- However, participants also expressed concerns and challenges, including:
- Fear of job displacement and reduced human interaction in patient care
  - Concerns about the reliability and safety of AI-generated recommendations
  - Potential for increased technical difficulties and system failures

Table 2. Perceived Benefits and Challenges of AI Integration

| Category   | Examples  |
|------------|---|
| Benefits   | - Improved efficiency and accuracy<br>- Enhanced decision support<br>- Potential for reduced workload           |
| Challenges | - Fear of job displacement<br>- Concerns about reliability and safety<br>- Potential for technical difficulties |

4.3 Theme 3: Training and Skill Development Needs  
Participants emphasized the need for comprehensive training and skill development programs to prepare nursing technicians for AI integration in patient care. Key areas identified for training included:

- Basic AI concepts and terminology
- Practical skills for using AI-powered tools and systems
- Interpersonal skills for effective communication and collaboration with AI technologies
- Critical thinking and problem-solving skills for navigating AI-generated recommendations

| Area                 | Description   |
|----------------------|---|
| AI Concepts          | Basic understanding of AI terminology, principles, and applications in healthcare   |
| Practical Skills     | Hands-on training for using AI-powered tools and systems in patient care            |
| Interpersonal Skills | Effective communication and collaboration with AI technologies and healthcare teams |
| Critical Thinking    | Ability to critically evaluate and navigate AI-generated recommendations            |

4.4 Theme 4: Organizational Support and Resources  
Nursing technicians highlighted the importance of organizational support and resources in facilitating their readiness for AI integration. Key areas of support identified included:

- Clear communication and transparency about AI implementation plans and timelines
- Adequate technical support and infrastructure for AI-powered tools and systems
- Opportunities for ongoing learning and professional development related to AI
- Involvement of nursing technicians in the planning and decision-making processes for AI integration

| Area | Description |
|------|-------------|
|------|-------------|

|                        |   |
|------------------------|---|
| Communication          | Clear and transparent communication about AI implementation plans and timelines               |
| Technical Support      | Adequate technical support and infrastructure for AI-powered tools and systems                |
| Learning Opportunities | Ongoing learning and professional development opportunities related to AI                     |
| Involvement            | Inclusion of nursing technicians in planning and decision-making processes for AI integration |

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## 5. Discussion

The findings of this qualitative study provide valuable insights into the readiness of nursing technicians for AI integration in patient care within the context of Saudi Arabian hospitals. The identified themes highlight the complex interplay of individual, technological, and organizational factors that influence the successful adoption of AI technologies in healthcare settings.

The varying levels of awareness and understanding of AI among nursing technicians underscore the need for targeted education and awareness campaigns to bridge knowledge gaps and dispel misconceptions. This finding aligns with previous research emphasizing the importance of educating healthcare professionals about AI concepts and applications to facilitate their readiness for adoption (Juneja et al., 2021; Sit et al., 2020).

The perceived benefits and challenges of AI integration expressed by nursing technicians reflect the complex nature of AI adoption in healthcare. While participants recognized the potential for AI to enhance efficiency, decisionmaking, and patient care, they also voiced concerns about job security, reliability, and technical issues. These findings are consistent with the literature highlighting the need to address the social, ethical, and technical challenges associated with AI integration in healthcare (Mehta et al., 2019; Shaw et al., 2019).

The emphasis on training and skill development needs underscores the importance of equipping nursing technicians with the necessary competencies to effectively utilize AI technologies in patient care. This finding aligns with previous research calling for the development of AI-specific training programs and curricula for healthcare professionals (Demirkan et al., 2020; Leary et al., 2019).

Finally, the importance of organizational support and resources in facilitating the readiness of nursing technicians for AI integration cannot be overstated. Participants highlighted the need for clear communication, technical support, ongoing learning opportunities, and involvement in decision-making processes. These findings are consistent with the literature emphasizing the critical role of organizational factors in the successful adoption of AI in healthcare (Davenport & Kalakota, 2019; Stead, 2018).

This study contributes to the growing body of research on the readiness of healthcare professionals for AI adoption and offers practical insights for healthcare organizations and policymakers in Saudi Arabia. However, it is important to acknowledge the limitations of this qualitative research, such as the small sample size and potential biases in participant responses. Future research should consider employing quantitative methods to further investigate the factors influencing the readiness of nursing technicians for AI integration and explore the generalizability of these findings to other healthcare contexts.

## 6. Conclusion

The integration of AI technologies in healthcare has the potential to transform patient care delivery and improve health outcomes. However, the successful adoption of AI in healthcare settings depends on the readiness of frontline healthcare professionals, such as nursing technicians. This qualitative study explored the readiness of nursing technicians for AI integration in patient care within the context of Saudi Arabian hospitals.

The findings reveal varying levels of awareness and understanding of AI among nursing technicians, perceived benefits and challenges of AI integration, training and skill development needs, and the importance of organizational support and resources. These insights highlight the need for targeted interventions and strategies to address the individual, technological, and organizational factors influencing the readiness of nursing technicians for AI adoption.

Healthcare organizations and policymakers in Saudi Arabia should prioritize the development and implementation of comprehensive education, training, and support programs to facilitate the readiness of nursing technicians for AI integration. By investing in the preparedness of this critical workforce, healthcare systems can harness the full potential of AI technologies to improve patient care and health outcomes.

Future research should continue to explore the readiness of healthcare professionals for AI adoption in various contexts and identify best practices for supporting their successful integration of these technologies in practice. As AI continues to shape the future of healthcare, ensuring the readiness of frontline providers, such as nursing technicians, will be crucial to realizing the promise of this transformative technology.

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