Impact of health information technology (HIT) on nursing practices and performance

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Abstract

Growing demand, rising expenses, inconsistent and poor service, and ineffective, poor quality of care processes are all threats to healthcare systems. Governments are responding by coming up with several initiatives, one of which is to heavily invest in health-related ICT (information and communication technologies) or HIT (health information technology). HIT have been challenging to integrate, despite their seeming potential. The implementation challenges related to organizational management and their interactions were shown. The study made several significant recommendations for the field's future directions: (1) more research is required to demonstrate the cost-effectiveness of HIT, as well as to develop the best HIT applications; and (2) more knowledge is required to understand how organizational change, incentives, liability concerns, end users' HIT competencies and skills, structure, and work process issues relate to achieving the benefits of HIT. The five aspects that were found while addressing the impact of HIT in healthcare organizational systems should be taken into account in future policy interventions, as well as the relationships between the effects of interventions targeted at different dimensions.

Keywords: Health information technologies (HIT) – healthcare organizational systems – nursing practices – nursing performance

Introduction

The emergence of health information technology (HIT) has quickly changed the healthcare industry (De Leeuw et al., 2020; Grossman, J.H. and Hwang, J., 2009). The use of the electronic health record (EHR) and various eHealth devices has significantly transformed the everyday routine of healthcare workers and the delivery of healthcare services. Robots and artificial intelligence will increasingly be integrated into health care, leading to ongoing changes (Buch et al., 2018; Safdari et al., 2015). It is widely accepted that HIT enhances the safety and quality of healthcare while decreasing morbidity and death. This necessitates widespread acceptance, execution, and various modifications in healthcare procedures and frameworks, at individual, national, and organizational levels (Taylor et al., 2005).

Artificial intelligence (AI) is being used in healthcare to help healthcare workers provide high-quality care in a more efficient and equitable manner. AI can assist inexperienced healthcare workers with limited resources by learning from others' experiences, such as identifying unusual disease signs through extensive database searches (Schaefer et al., 2020). Numerous challenges have been recognized in the adoption of HIT and its effects on many organizational levels, including the organization's structure, tasks, incentives, and information processes (Boonstra et al., 2014; Taylor et al., 2005).

Nurses constitute the largest group of certified health professionals, and the government is actively promoting HIT throughout all healthcare settings. Nurses will increasingly face and participate in HIT advancements. Research indicates various variables that impact nurses in the general population, including the lack of focus on how HIT affects nurses' workflow during the initial phases of implementation, as well as insufficient digital training and organizational support (Assis-Hassid et al., 2019; Eley et al., 2008).

Examples of AI applications in nursing showcase the potential influence these technologies can have on nursing practice. Speech recognition technologies can expedite and improve nursing documentation (Monica, 2018; Fratzke et al., 2014). Machine learning has been utilized to create a tool that assists nurses in utilizing standardized technologies by automatically recommending the most appropriate terms based on the nurse's written text (Moen et al., 2020).

AI technologies are utilized in text mining applications to analyze large amounts of nursing notes for identifying patients with fall history (Topaz et al., 2019a) or drug and alcohol use disorders (Topaz et al., 2019b), aiding in care planning and patient risk detection. Machine learning, particularly deep learning, has been used to forecast pain perception and physical decline in acute critical situations (Pruinelli et al., 2019a; Pruinelli et al., 2019b; Pruinelli et al., 2018).

In the future, AI technology will assist nurses in delivering precise and personalized evidence-based treatment tailored to patients' goals and priorities. AI technology will assist nurses in incorporating various sorts of pertinent data, such as environmental, genetic, health data, and socio-demographics, enhancing nurses' ability to deliver comprehensive care. Recent research has shown that most studies on AI in

healthcare have concentrated on secondary and tertiary care, indicating a need to investigate nurses' utilization of AI in primary care (Abbasgholizadeh-Rahimi et al., 2020). Nurses are increasingly incorporating AI into healthcare systems, with the potential to revolutionize healthcare delivery and enhance health results (Clancy, 2020).

There is a lack of research on how HIT affects nurses' daily work, but it has been suggested to have the potential to lower healthcare expenses and enhance care quality. There have been no specific studies conducted on the subgroup of nurses who are falling behind digitally compared to the majority of working nurses in the field.

Research Problem

Health Information Technology (HIT) is now a crucial component of contemporary healthcare systems, with the goal of enhancing patient care, facilitating communication between healthcare providers, and optimizing clinical workflows. The influence of HIT on nursing practices and performance is an intricate and multi-dimensional matter that necessitates thorough examination.

Nurses are essential in-patient care, serving as frontline caregivers with responsibilities including medicine delivery, patient monitoring, paperwork, and care coordination. Integrating HIT systems like Electronic Health Records (EHRs), nursing informatics tools, and telehealth platforms can revolutionize how nurses provide care and communicate with patients and coworkers.

Healthcare organizations must comprehend how HIT impacts nursing practices in order to maximize the effectiveness of implementing and using these technologies. This involves analyzing the impact of HIT on the effectiveness and precision of nursing duties, the standard of patient care provision, the communication and teamwork within healthcare groups, and the general productivity of nursing personnel.

Examining the challenges and obstacles nurses encounter while using HIT systems might reveal areas needing enhancement, like user education, system ease of use, data protection, and interoperability problems. Healthcare organizations can better assist nurses in utilizing HIT to improve their practices and boost patient outcomes by tackling these problems.

The aim of this study focuses on studying the influence of HIT on nursing practices and performance to discover ways to improve the incorporation and utilization of technology in nursing care delivery. The project seeks to provide significant insights that can help enhance the quality and efficiency of patient care in nursing settings by tackling this challenge and leveraging HIT.

Research Questions:

1. How does the adoption of HIT affect nursing practices in terms of efficiency and quality of care delivery?
2. What are the challenges faced by nurses in utilizing HIT systems in their daily workflow?
3. How does HIT influence communication and collaboration among healthcare providers, specifically nurses?
4. What are the perceived benefits and drawbacks of HIT implementation from the perspective of nursing staff?
5. How does HIT impact the accuracy and timeliness of documentation in nursing practices?

Aim and Objectives

The main aim of this study is to investigate the impact of Health Information Technology on nursing practices and performance. Specifically, the study aims to understand how the integration of HIT systems influences the daily tasks, communication, and overall performance of nursing staff in healthcare settings.

Secondary Objectives:

● To identify the key areas of nursing practices that are influenced by the adoption of HIT.

● To explore the challenges and barriers faced by nurses when using HIT systems in their work environment.

● To assess the perceived benefits and disadvantages of HIT implementation on nursing practices.

● To examine the role of HIT in improving patient outcomes and safety through enhanced nursing practices.

● To provide recommendations for optimizing the use of HIT in nursing practices to enhance overall performance and quality of care delivery.

Research Significance

The research on the influence of Health Information Technology (HIT) on nursing practices and performance is crucial for several stakeholders in the healthcare industry. Comprehending the impact of HIT on nursing practices can assist nurses in adjusting to technological progress, enhancing their workflow efficiency, and improving the quality of care for patients. This study can enable nurses to utilize HIT efficiently in their daily responsibilities and enhance patient outcomes.

Healthcare organizations can get valuable knowledge about how HIT affects nursing practices to enhance technology deployment, simplify processes, and enhance overall performance. Organizations can establish a conducive atmosphere for nurses to efficiently use HIT technologies by tackling the obstacles outlined in the study.

The study's results have the potential to enhance patient care delivery, safety, and outcomes. Improving nursing practices with strategic implementation of HIT can result in more organized care, decreased errors, and enhanced communication among healthcare professionals, ultimately leading to better health results for patients.

Policymakers can utilize the research findings to shape healthcare policies on HIT implementation, workforce training, and technology standards. Regulators should comprehend how HIT affects nursing practices to uphold data privacy standards and encourage the ethical use of technology in healthcare environments.

The study adds to the current understanding of nursing informatics, healthcare technology, and performance enhancement. Researchers might expand on the findings to investigate further elements of HIT integration in nursing practices, thus deepening the comprehension of how technology can improve patient care delivery.

The research on the influence of HIT on nursing practices and performance has the potential to bring about beneficial improvements in healthcare delivery, worker satisfaction, and patient outcomes. This study can facilitate more efficient use of technology in contemporary healthcare environments by examining the advantages, difficulties, and prospects linked to integrating HIT in nursing.

Effect of HIT on nursing practices in terms of efficiency and quality of care delivery

Nursing worldwide is being more and more impacted by digital technologies. Examples consist of the rising prevalence of artificial intelligence (AI) and robotic systems, society's dependence on mobile, internet, and social media, and the growing reliance on telehealth and other virtual care models, especially due to the COVID-19 pandemic.

Although significant progress has been made, challenges in the integration of digital technologies in nursing continue. Nurses have not kept up with the fast changes in digital technology and how they affect society. This hinders the potential advantages they offer to nursing practice and patient care. Nursing needs to promptly evolve into a digitally enabled profession to address current difficulties and be ready for future complexities in health systems and society.

Diverse examples demonstrate the advantages that digital technologies already provide to nursing practice (Krick et al., 2019). Telehealth systems, where nurses offer daily monitoring, coaching, and triage to patients with multiple chronic conditions, have successfully decreased emergency department admissions (van Berkel et al., 2019). Nurses are using smartphones and health apps to provide remote pain management advice to adolescent cancer patients (Jibb et al., 2020; Jibb et al., 2017) and enhance nursing education through innovative teaching methods and remote learning opportunities (Chuang et al., 2018).

AI systems in nursing are still in the early stages of development and implementation. Preliminary evidence indicates that virtual chatbots may help streamline communication with patients, while robots could enhance the emotional and social support provided by nurses, while acknowledging inherent challenges such as data privacy, ethics, and cost effectiveness (Buchanan et al., 2020).

Challenges faced by nurses in utilizing HIT systems in their daily workflow

Digital technologies could be seen as diverting attention from the hands-on care and therapeutic interactions that nurses establish with patients and families (Robichaux et al., 2019). This seeming inconsistency with conventional nursing values, such empathy and care, might clarify why some nurses are hesitant to embrace digital healthcare methods (O'Keefe-McCarthy, S., 2009; Sandelowski, M., 1997). Nursing's past has been structurally subservient to other healthcare disciplines, and the profession is currently solidifying its relationship and leadership within health systems (Fairman, J. and D'Antonio, P., 2008).

Nursing informatics emphasizes incorporating technology to enhance the profession; however, it has a limited number of practitioners worldwide. Nursing informaticians are mainly located in the United States, where the field is believed to have started. However, other countries and regions are also increasing their digital nursing workforce and participation in informatics (Atique et al., 2020; Hussey et al., 2015).

Insufficient leadership and resources have hindered progress in certain places where nurses are needed to spearhead and guide digital health projects. There is global uncertainty about the future actions the nursing profession should take to enhance and maximize its utilization of digital technologies. This difficulty is worsened by the worldwide variety within the profession, which includes unequal access to resources like technology infrastructure maturity and experience. Significant disparities exist globally in the digitalization of healthcare systems, internet accessibility, and transparency of health information.

The nursing literature discusses various digital technologies that aid or enhance the profession, such as hospital information systems, electronic health records, monitoring systems, decision support, telehealth for practice; e-Learning, virtual reality, serious games for education; and assistive devices sensors, ambient assisted living for rehabilitative and personalized healthcare approaches (Krick et al., 2019).

Investigating the impact of AI on human decision-making and labor is crucial for advancing nursing practice in the coming decade and beyond. AI technologies have the potential to offer significant advantages in data analytics and sophisticated clinical decision assistance inside the field. While the benefits of AI in nursing research, such as enhanced patient outcomes and increased efficiency, have not been fully demonstrated, it is certain that AI technologies will increasingly be utilized to enhance nurses' cognitive abilities, decision-making processes, and potentially labor tasks (Robert, N., 2019).

These opportunities introduce novel and dynamic practice issues for nursing and transdisciplinary competence. One example involves the inadvertent reinforcement of systemic inequities in society by self-evolving algorithms in systems and decision support tools containing AI. The growing utilization of AI introduces new policy, regulatory, legal, and ethical considerations. The nursing profession has to assess its role, procedures, and expertise in light of new ethical frameworks that analyze the potential benefits and dangers of AI and related advancements, while promoting patient participation in AI development

and use (Floridi et al., 2018).

Floridi et al. (2018) propose principles for AI advancement and ethical considerations, emphasizing the importance of developing AI technology that fosters trust, serves the public good, and enhances shared social responsibility. They argue that AI should be utilized to empower individuals, boost societal capabilities, promote social unity, and facilitate personal growth, with a focus on promoting and strengthening human dignity.50 Additional research, money, and expertise in this field are necessary to assist in creating new policies, regulations, and ethical standards to direct nursing practice.

Influence of HIT on the communication and collaboration among nurses

The coming years will witness the largest deployment of information and communication technology (ICT), however these advancements do pose risks to patients; as a result, some have dubbed this the "dangerous decade" for health information technology (HIT) (Coiera et al., 2012) It is commonly recognized that inadequate communication between doctors and nurses is a major contributing factor to all sentinel events (Joint Commission, 2017) and one of the most frequent causes of adverse events for hospitalized patients (Leape and Berwick, 2005; Sutcliffe et al., 2004; Gawande et al., 2003).

The electronic medical record, automated provider order entry, email, and pagers are just a few of the media that nurses and physicians are quickly embracing as a means of communication. HIT is frequently marketed as providing potential answers to the issues found by root cause analyses. There's no denying that increased ICT use will alter the way doctors and nurses interact, but research suggests that communication technology may paradoxically make communication challenges worse (Ammenwerth et al., 2008; Chiasson et al., 2007; Sutcliffe et al., 2004), rather than better (Chiasson et al., 2007; Sutcliffe et al., 2004). Therefore, it is crucial to comprehend how and when communication technology is applied in the healthcare industry in order to fulfill the goals of safer and better communication (Chiasson et al., 2007).

The impact of health information and communication technology on communication is also influenced by the stability of a team and the work relationships that are impacted by hierarchies within it. In order to successfully resolve patient care issues that involve input from different disciplines, doctors and nurses must communicate with one another. In these circumstances, communication is essential to fostering consensus, which can be challenging for a variety of reasons, two of which we have highlighted in our theoretical model. First, the hierarchical nature of the connection between doctors and nurses may make it difficult to reach a consensus if nurses keep quiet about concerns regarding patient care out of fear of embarrassment or rebuke from doctors. Therefore, it is advised to establish collaborative rather than hierarchical relationships in order to ensure that all viewpoints are considered while solving a difficult problem and that an agreement is reached (Manojlovich et al., 2015).

Second, the relationship between communication technology and communication may be particularly impacted by team stability. When the same people get together to collaborate on joint projects, that group is said to be stable. Stability within a team is crucial because it fosters the relationships required to help people appreciate other points of view. More communication leads to a greater degree of similarity between people because it increases belief and information sharing. It is simpler for clinicians to establish a shared reality and identify common ground (shared information between two communicators) when there is a steady medical presence on the health care team (Manojlovich et al., 2015).

Conclusion & Recommendations

The impact of Health Information Technology (HIT) on nursing practices and performance is a crucial area of study that holds significant implications for healthcare delivery, patient outcomes, and workforce satisfaction. Through an in-depth investigation, this research has highlighted the multifaceted influence of HIT on nursing tasks, communication, collaboration, and overall performance.

The integration of HIT systems, such as Electronic Health Records (EHRs) and nursing informatics tools, has the potential to enhance the efficiency, accuracy, and quality of nursing practices. However, challenges such as system usability, training gaps, and interoperability issues can hinder the full realization of these benefits. Addressing these challenges is essential to optimize the use of HIT in nursing care delivery and improve patient care outcomes.

Recommendations:

Based on the findings of this study, the following recommendations are proposed to enhance the integration and utilization of HIT in nursing practices:

- Healthcare organizations should invest in comprehensive training programs to ensure that nursing staff are proficient in using HIT systems effectively. Continuous education and support can empower nurses to leverage technology to its full potential.

- HIT systems should be designed with a focus on user-centered principles to enhance usability and user experience. Involving nurses in the design and implementation process can lead to more intuitive and user-friendly technology solutions.

- Healthcare institutions should prioritize interoperability standards to enable seamless data exchange between different HIT systems. This can improve care coordination, communication, and the overall efficiency of nursing practices.

- Robust data security measures should be implemented to safeguard patient information and maintain confidentiality. Nurses should receive training on data privacy regulations and best practices for ensuring the security of electronic health records.

- Healthcare organizations should conduct regular evaluations of HIT systems' impact on nursing practices and performance. Feedback from nurses should be collected to identify areas for improvement and implement changes to optimize technology utilization.

By implementing these recommendations, healthcare organizations can maximize the benefits of HIT integration in nursing practices, enhance patient care delivery, and support nursing staff in delivering high-quality care in a technology-enabled healthcare environment.

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