



Examining the Leadership Role of Registered Nurses in Relation to Using Informatics and Health Technology to Enhance Patient Safety

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Abstract

As healthcare systems evolve to meet healthcare practitioner and client needs, the integration of computer health technology has redefined nursing roles and responsibilities. This, in return, influences patient safety outcomes as technologies are mediators in clinical processes and activities. The combination of nursing knowledge and computer science technology has led to many initiatives to improve healthcare quality. In this paper, we explore the significance of technology and informatics in improving patient safety through automated assistive processes, and their ability to generate information about safety challenges. Registered nurses have key roles as informatics leaders in both formal and informal settings and must be able to use transformational leadership strategies to engage, inspire, and motivate nurses to embrace health technologies and to engage in the development and implementation of such technologies to ensure they support safe practice. Despite some resistance to technological advancement, it is the future of healthcare, and developing robust informatics competencies in nursing education and practice is necessary to ensure the nursing workforce can use health technology to its greatest advantage.

Key words: Nursing informatics, technology, patient safety, transformational leadership

Technology is rapidly evolving to aid the advancement of humanity. This phenomenon is highly evident in the context of healthcare, where nursing informatics is paving the way for enhanced patient safety practices. Nursing informatics is "Nursing Informatics science and practice integrates nursing, its information and knowledge and their management with information and communication technologies to promote the health of people, families and communities worldwide." (The International Medical Informatics Association Special Interest

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Group for Nursing Informatics [IMIA-SIGNI], 2011; 1st para). Nurses have reported improved clinical decision-making skills and quality of practice with the introduction of technology in healthcare (Gürdaş & Kaya, 2015). However, technology can also present a daunting but necessary change to which practitioners must adapt to advance safe nursing practice. Change is not always easy, and planning, implementing, and managing change is a core leadership responsibility. One means of achieving change is through using transformational leadership, which is a relational and values-based approach in which the leader strives to inspire, motivate, and stimulate the engagement of all staff in change initiatives (Ghorbani et al., 2023). In this paper, we discuss the impact nurses have on patient safety, how healthcare technologies are currently employed to improve practice, and how registered nurses can use informatics to improve patient outcomes in both formal and informal leadership. Using transformational leadership, nursing leaders can become guides that influence perceptions on the importance of informatics and improve competencies in the use of healthcare technology in nursing staff, subsequently enhancing patient safety.

Background

Gathering and assessing data to provide effective and safe patient care has always been a part of a nurse's responsibilities since Florence Nightingale started to track patient outcomes (Bryant et al., 2016). Simultaneously, tackling the issue of improving patient safety and health outcomes is a continuous quality improvement concern for nursing leaders. In 2019, the World Health Organization (WHO) reported more than 2.6 million patients' deaths annually due to unsafe practices such as medication errors and preventable complications such as urinary tract infections and pressure ulcers. These practices resulted in a diminished quality of care, patient readmissions, and decreased patient satisfaction with the care provided, demonstrating a need to nurture a culture of patient safety in a blame-free environment where practitioners feel empowered to learn and grow from mistakes (Pazokian & Borhani, 2017, Recio et al., 2018). Today's technologies allow for the optimization of nursing roles. With the utilization of existing technology in everyday practice, nurses can make a direct impact on improving patient outcomes through good habits.

Improving Practice with Technology

The use of EHR (Electronic Health Records) establishes a platform for clinical support and nursing care processes (Jalilian & Khairat, 2022) that can serve to ameliorate unsafe health practices by capturing information about care-related activities (Nicoll et al., 2016). This provides healthcare leaders with data from which they can identify safety issues. The success in improving patient safety with health technology is evident in research. Lee et al.'s (2017) study in Taiwan aimed to measure the effectiveness of Nursing Informatics Systems (NIS), a system with a different user interface that functions to aid with nursing tasks in patient safety. They compared the rates of near-miss incidents, medication errors, and specimen collection errors between pre-implementation of health technology and post-implementation. The results showed a decrease in all domains, revealing the effectiveness of the NIS in improving patient safety.

Barcode medication administration (BCMA) technology is a notable tool aimed at reducing patient safety risks and was implemented by Alberta Health Services in 2019

(ConnectCare, 2019). Proper barcode scanning practices can reduce the number of medication administration errors as the system is able to identify the correct patient and detect the right medication and dose prior to administration (Hutton et al., 2021; Mulac et al., 2021). Additionally, standardizing medication administration practices can improve workflow and reduce medication administration time (Barakat et al., 2020). Research by Macias et al. (2018) investigating the impact of BCMA on medication administration errors (MAE) with patients undergoing chemotherapy found a significant 85% reduction in MAE incidents with the BCMA system in place. Similarly, Jiang (2022) found that using an electronic labeling system for specimen collection and patient identification led to decreased ABO blood type specimen rejection rates resulting in decreased delays in care, specimen recollection, costs needed for additional resources, and the need to remake handwritten labels because of errors and illegibility.

The Role of Nursing Leaders

The diversified field of nursing allows for both formal and informal leadership contributions to clinical informatics related to patient safety. The intricate combination of human and technology factors means that a relational approach to nurse leadership is vital as it allows for “champion[ing] and support[ing] initiatives that reduce harm, keep patients safe, improve quality outcomes, and decrease the amount of time patients spend in a hospital” (Webb, 2021; para. 6). Nursing informaticists in formal leadership roles are positioned to address patient safety concerns because their viewpoint spans individual and group levels of work. As leaders, they have insight into individual clinical practices, care-related workflows, organizational policies, and unit cultures (Williams, 2019). They have the capacity to enact change by influencing policy development in the government sector that in turn, affects healthcare (Fields, 2015). Although nursing informaticists do not always have the authority to make decisions, they ensure that the patient is the focus during policy development (Parker, 2014). Nurse informaticists are, by necessity, transformational leaders who must be able to engage, inspire, motivate, and coordinate efforts to improve practice (Schleyer, 2022). In an informal leadership role, registered nurses working in the frontline utilize healthcare technology in everyday practice and have the responsibility of voicing concerns regarding patient safety, and the efficacy of the technology in safeguarding safety and streamlining work and productivity (Darawad et al., 2019).

Transformational Leadership and Innovation

Transformational leadership, a type of relational leadership, initiates organizational reform by emphasizing justice, equality, and human rights to create values such as honesty, loyalty, and fairness (Ghorbani et al., 2023). Transformational leaders accomplish visions and goals of interest by exhibiting four behaviours: idealized influence, inspirational motivation, intellectual stimulation, and individualized attention (Moynihan et al., 2012; Trottier et al., 2008, as cited in Lim & Moon, 2021). Transformational leaders are effective because they seek to change their followers’ beliefs and behaviors by “appealing to the importance of collective or organizational outcomes” (Moynihan et al., 2012; p. 147) through raising awareness of the significance of the organizational values and outcomes, and by creating a sense of vision, mission, and purpose. Transformational leaders inspire staff by acting as role models and building staff confidence and pride in the organization. Finally, transformational leaders

stimulate staff to challenge old assumptions about traditional practices and to create new ways to solve problems (Brown-Deveaux et al., 2022; Moynihan et al., 2012). These are particularly ideal traits and skills to adopt when discussing informatics and patient safety in nursing (Lappalainen et al., 2020). Accordingly, healthcare technologies utilized within a culture of transformational leadership are rapidly changing the working environment of nurses and will continue to do so in future years to come.

Incorporating Health Care Technology into Practice and Education

Nursing informaticists are specialized nursing leaders who can interpret data and present complex information to organizations, practitioners, clients, and students in a way that they can understand, making them ideal candidates for nursing educators and managers (Parker, 2014). They can aid with building the necessary skill sets needed to utilize health informatics technology at an optimal level and hence improve compliance with safety policies. However, the introduction of technologies is not always smooth and welcomed. In this section, we highlight existing perceptions of nurses on using health technologies, how transformational leadership can reinforce positive perceptions of informatics, and how implementing nursing informatics competencies in undergraduate education with a focus on patient safety is critical to ensure the nursing workforce is able to integrate the technology in their work.

Understanding the perceived and demonstrated benefits and limitations of healthcare technology can help identify the constructive and negative attitudes that will impact engagement and use of the technology. Healthcare technology can also increase costs due to system glitches and lower care quality because of heavy reliance on technology (Darawad et al., 2019; Gaughan et al., 2022; Taft et al., 2022). Though health technologies are developed with the intention to promote safe practices, there is also evidence that consequential effects can happen because of technology integration in healthcare. If done improperly, barcode medication administration technology can harm the patient and the nurse, with disruptions in workflow, workload increase, and medication errors resulting in deviations from policy (Mulac et al., 2021). Therefore, optimization for best BCMA practices through policy changes, updated technology, and further education is essential on an ongoing basis.

Although technology improves practice in general, apprehension can arise when faced with challenges such as insufficient training and support to utilize new software or when the technology malfunctions. These issues can be resolved at an institutional level by providing newer systems with fewer glitches and training opportunities aimed at optimizing workflow with technology (Gaughan et al., 2022). Technology and nursing informatics play a significant role in enhancing a culture of patient safety based on the literature. However, technology should not be used as a substitute for competent nursing judgment and practice, only as a tool aimed at aiding the nursing process. Transformational nursing leaders can work with their teams to inspire a fresh perspective on improved practice supported by technology, rather than technological demands usurping nursing processes. This helps to strengthen positive attitudes toward embracing change.

Acceptance of informatics and technology in healthcare is required for the success of patient safety initiative implementation. Enabling the evolution of healthcare delivery by

attending to individual workers' needs and feedback is the essence of transformational leadership in nursing informatics (Sherwood, 2020). Using a transformational leadership approach, nursing informaticists can develop relations with nurses who utilize health technologies to foster trust and understand their learning and practice needs, which can lead to a willingness to learn. This can be done through ways such as hosting educational events emphasizing the benefits of using technology to influence patient safety outcomes or useful tips demonstrating optimized workflows using computerized systems. Through continued engagement with frontline nurses, nursing informaticists can inspire change in nurses' outlook on using technology to improve their practice, thus resulting in improved patient outcomes (Brown-Deveaux et al., 2022).

Competency in nursing informatics is not exclusive to specific roles, as it is now seen as a core competency of safe nursing practice (Kleib et al., 2021). The Reporting and Learning System which is in use by Alberta Health Services is intended as an accountability and feedback tool where practitioners can submit adverse events related to patient care and concerns regarding workflow implications that may pose a risk to patient safety (Alberta Health Services, n.d.). This is an important strategy, as nursing informatics support may then audit the responses and design solutions to the challenges identified by these practitioners.

As an emerging practice, the need to include foundational informatics skill competencies for nursing education programs has been recognized since 2013 (Perezmitre & Peltonen, 2022). However, it is unknown whether current nursing education adequately teaches the skill sets required for integrating technology into nursing practice (Foster et al., 2021). This is evident in a study by Kleib et al. (2021) who point out that to date, there is limited attention to defining informatics competencies in nursing education, and another by Chipps et al. (2022) who found that nursing students in their final year perceived their informatics literacy skills to be deficient. Therefore, incorporating nursing informatics knowledge and competencies across the nursing education curriculum is needed to prepare future nurses to learn the use of technology in clinical practice and be prepared to actively participate in the development and implementation of technologies (Kleib et al., 2021; Perezmitre & Peltonen, 2022). Nurses already in practice can gain health information technology skills through participation in informatics projects or invitations to attend webinars related to the field. As more recognition is drawn to the benefits of health information technology, the inspiration of new possibilities of careers in informatics will continue to support effective and safe nursing practice.

Informatics and the use of health technology are closely interrelated as both focus on the improvement of nursing practice and patient safety. Evidence derived from informatics informs nursing practice. The integration of health technologies has transformed many aspects of the healthcare system including how nurses go about providing and documenting their nursing activities. Both assist frontline nurses with performing evidence-based practice, being accountable, quality improvement, and reducing practice errors supported by a culture of transformational leadership. In preparing future nurses for success, strategies for implementing informatics competencies are an essential component of nursing skills education requiring ongoing attention and development.

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