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DIGITAL HEALTH TECHNOLOGIES AND THE NURSE–PATIENT RELATIONSHIP: INSIGHTS FROM SOUTH AFRICAN HOSPITALS

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Abstract

This study explores how technology shapes the nurse-patient relationship, enhancing efficiency, responsiveness, and monitoring while posing risks to personal interaction. Guided by Normalization Process Theory (NPT), a qualitative interpretive design was used to examine nurses' experiences with digital health technologies (DHTs) in two Western Cape hospitals. Using purposive sampling, 28 participants provided in-depth insights analysed thematically. Findings show that DHTs improved efficiency, accuracy, and patient monitoring but also reduced face-to-face interaction, increased administrative tasks, and required ongoing training. Administrators valued DHTs' strategic benefits yet stressed the need to address relational and practical challenges. Overall, the study reveals the dual impact of DHTs - enhancing efficiency while challenging relational care - and offers insights into balancing digital innovation with patient-centered practice in South African hospitals during crises, but offers novel insight into its importance. These findings highlight the strategic value of developing communication skills.

Keywords:

Digital Health Technologies, Nurse-Patient Relationship, Normalisation Process Theory, Healthcare Integration, Patient-Centered Care.

1. Introduction

Digital health technologies (DHTs) have rapidly expanded and are transforming healthcare delivery, including within South African hospitals. Tools such as electronic health records, telemedicine, mobile health applications, and wearable devices enhance monitoring, patient engagement, and communication (Hatch et al., 2018). In rural areas, where accessibility and resource shortages persist, digital tools provide critical support by enabling real-time data tracking and improving care coordination (Maita et al., 2024). These technologies streamline clinical workflows, improve documentation, and strengthen data efficiency, resulting in enhanced overall service delivery (Ajibulu et al., 2025; Maita et al., 2024; May et al., 2025).

Despite these advancements, the nurse-patient relationship, centred on empathy, trust, and understanding, remains fundamental to quality care (Gupta et al., 2016). While digital tools can enhance access to information and support communication, they may also risk depersonalising care or worsening disparities linked to digital literacy (Marra et al., 2020). Concerns have been raised that digital integration may reduce the emotional connection essential to therapeutic relationships (Livesay et al., 2023; Schmalz et al., 2020).

Current evidence indicates a limited understanding of how South African nurses incorporate DHTs into relational care, particularly as they are often excluded from system design and policy development (Livesay et al., 2023; Mueller, 2020; Feroz et al., 2022). Further research is therefore required to explore nurses' perceptions of how DHTs support or hinder patient relationships, to enable more human-centred digital care (Wong et al., 2023; Bhamjee et al., 2022).

2. Literature Review

2.1 Introduction

This literature review situates the study within existing research on the nurse-patient relationship and the integration of digital health technologies (DHTs) in nursing. It identifies gaps in understanding how digital interventions influence relational dynamics, particularly within South African hospitals, where technological adoption continues to reshape care environments. Current literature highlights the dual role of technology: enhancing clinical efficiency while simultaneously reshaping interpersonal connections - an area that remains insufficiently explored.

The review highlights the importance of the nurse-patient relationship, which is foundational to patient-centred care and positive health outcomes. It examines the influence of DHTs on nursing practice, focusing on the balance between technological efficiency and the

preservation of empathy in clinical encounters. The South African hospital context provides a meaningful setting for exploring both the opportunities and constraints associated with digital integration.

The review also introduces the study's conceptual framework, which considers how technological advances shape nurse-patient interactions and their implications for maintaining human-centred care.

2.2 Conceptualizing Digital Health Technologies

DHTs encompass digital information and communication tools designed to improve care delivery, including electronic health records (EHRs), digital triage systems, telemedicine, wearable devices, mobile health apps, and health information exchanges (Merino et al., 2024; Gauthier-Beaupré & Grosjean, 2023). These tools enhance efficiency, data accuracy, and clinical decision-making (Han et al., 2024). However, challenges arise when digital demands increase time pressures or shift nurses' attention from patients to devices, potentially weakening relational care (Philippe et al., 2022).

2.3 The Nurse-Patient Relationship in a Digital Context

Empathy, communication, and trust underpin effective nurse-patient relationships (Wu & Street, 2020). In digital settings, technologies may support communication and patient engagement, yet they can also diminish personal connection if patients perceive reduced attentiveness from nurses reliant on digital systems (Janssen et al., 2025).

2.4 The Intersection of Technology and the Nurse-Patient Relationship

Nurses' perceptions and digital literacy influence technology adoption, ranging from acceptance to resistance (Yue et al., 2025; Özaras & Abaan, 2016). Training and organisational support foster confidence (Bridges et al., 2013; Reilly et al., 2019). Positive attitudes help maintain relational care by balancing technological competence with empathy, which is core to effective nursing (Turpin et al., 2012; Strandås & Bondas, 2017).

Overall, integrating DHTs presents both challenges and opportunities, emphasising the need to preserve meaningful nurse-patient relationships amid digital transformation.

2.5 Theoretical Framework

The Normalisation Process Theory (NPT) explains how nurses adopt and integrate digital technologies while preserving relational care. Its four domains: coherence, cognitive participation, collective action, and reflexive monitoring outline how technologies become embedded in practice. Coherence concerns nurses' understanding of a technology's purpose; when they perceive digital tools as enhancing care, adoption is more effective (May et al., 2018; McEvoy et al., 2014). Cognitive participation reflects engagement and commitment, with involvement in decision-making strengthening both uptake and relational care (Badawy et al., 2022; Blickem et al., 2014). Collective action emphasises teamwork, where interdisciplinary collaboration supports successful implementation (Taft et al., 2015; Hooker et al., 2015). Reflexive monitoring involves ongoing evaluation, enabling nurses to adapt technology use to sustain patient-centred care (Bouamrane et al., 2011; Nordmark et al., 2016). When applied to South African hospitals, the NPT underscores the need for training and organisational support to balance technological adoption with empathetic nursing practice (Taft et al., 2012; Murray et al., 2010).

3. Methodology

Qualitative methods, including in-depth interviews and observations, provided rich insights into how DHTs shape nursing routines and relationships (Charlick et al., 2016; Frechette et al., 2020).

A purposive sample of 28 participants from a tertiary and district hospital in the Western Cape was selected for their direct engagement with DHTs, ensuring diversity and data saturation (Saunders et al., 2019). Data were collected through semi-structured interviews, supported by observations and literature review, to enhance validity through triangulation (Creswell et al., 2012; Bhattacharjee, 2012).

Analysis followed Creswell et al.'s (2012) six-step framework and was guided by the NPT, aligning themes with its four constructs—coherence, cognitive participation, collective action, and reflexive monitoring. Thematic analysis identified key patterns such as resistance to technology and perceived usefulness, providing a structured understanding of DHT integration in nursing practice (Tong et al., 2007; Hsieh & Shannon, 2005; Yin, 2014).

4. Findings and Discussion

The analysed data provided in-depth insights into how technology influences the nurse-patient relationship in South African hospital settings. The findings reveal several similarities across cases, consistent with existing literature on DHTs in nursing practice and relational care. These similarities show that while technology supports clinical workflows, it also introduces complexities that influence interpersonal connections.

4.1 Technology generally supports care delivery

Across both cases, participants emphasised technology's positive role in patient monitoring and timely intervention. Tools such as cardiac monitors allow continuous surveillance of vital signs, real-time data transmission, and remote monitoring, strengthening clinical decision-making. Literature confirms these benefits: wearable devices and integrated monitoring systems increase accuracy and support rapid interventions during emergencies (Han et al., 2023), while enhancing responsiveness in high-pressure environments (Kavaklı, 2016).

Participants consistently viewed technology as improving efficiency, saving time, and supporting patient monitoring:

Case 1: *“With the monitors we can stand in one place and see the observations of many patients... Technology has a positive impact on the nurse-patient relationship.”*

Case 2: *“It does not hinder me. If a patient needs me now, I can save what I am doing on the system and I can tend to that patient.”*

These statements reflect technology's role in optimising workflow and reducing administrative burden, aligning with research emphasising its contribution to interprofessional communication (Gilardi et al., 2013)

4.2 Technology does not necessarily replace personal care

Despite acknowledging the benefits of DHTs, nurses stressed that technology does not replace the foundational aspects of nursing, namely, compassion, presence, and personalised care. This aligns with literature cautioning that excessive reliance on digital systems, particularly when poorly implemented, can contribute to feelings of disconnection in healthcare interactions (Nagel et al., 2012). Participants emphasised that relational care remains central to nursing practice:

Case 1: *“It definitely has a positive impact... It does not take away from the personal care at all.”*

Case 2: *“It does not come between me and my patient. I focus on my patient when I do my observations.”*

These responses suggest that when effectively integrated, DHTs complement rather than diminish traditional caregiving roles, with nurses actively mediating their use to maintain relational quality.

4.3 Positive Trend: Time-saving and improved responsiveness

Technology’s ability to reduce the time spent on administrative tasks and documentation was a strong theme across both cases. Participants described improved responsiveness to emergencies and increased availability for direct patient interaction when digital systems function efficiently.

This aligns with literature noting that digital tools facilitate faster assessments, reduce duplication, and support swift team communication, factors that are critical in acute care (Kavaklı, 2016; Gilardi et al., 2013).

Statements from participants include:

Case 1: *“It saves time, also helps us to treat patients with a heart attack... it really helps.”*

Case 2: *“You actually have more time with the patient. Patients are happy and complimenting us because we don’t do so much writing and the process is quicker.”*

These findings demonstrate that when properly integrated, DHTs can improve workflow efficiency and strengthen the nurse-patient relationship by freeing time for meaningful interaction.

4.4 Negative Trend: Risk of reduced personal interaction

Despite these benefits, nurses also acknowledged the potential drawbacks associated with technology, especially regarding screen-mediated interactions. Consistent with research, participants noted that digital devices, particularly stationary computers or cumbersome systems, can reduce face-to-face communication, thereby limiting opportunities for building rapport (Kwame & Petrucka, 2021; Barnard & Sandelowski, 2001). Moreover, as Nagel et al. (2012) argue, poorly executed implementation can contribute to emotional and relational distancing in nursing care.

Participants expressed these concerns as follows:

Case 1: *“Patients sometimes hate the technology infringing on their movement... they resent the technology as much as they appreciate it.”*

Case 2: *“Sometimes the patients would complain because they feel you are not giving them enough attention... the screen comes between you and them.”*

These reflections highlight the delicate balance required to ensure that technology supports care without disrupting the interpersonal elements central to the nurse-patient relationship.

4.5 Mixed Experiences: Depends on context and system usability

A prominent theme was that nurses’ experiences with DHTs vary significantly depending on system usability, implementation, and organisational support. Literature shows that nurses perceive technology positively when systems are efficient and user-friendly (Kwame & Petrucka, 2021; Sari & Mustamu, 2023). Conversely, slow or complex systems reduce time available for patients and may create frustration.

Participants expressed this variability:

Case 1: *“Technology can be a barrier if you have to struggle... if it only takes five minutes, it’s okay, but if it takes half an hour, it takes time away from my patients.”*

Case 2: *“It does take time away from the patient... before, we triaged manually while talking to them, now we have to walk away to the PC.”*

These insights reinforce that successful digital integration requires not only functional technology but also adequate training, workflow alignment, and institutional readiness (Nagel et al., 2012).

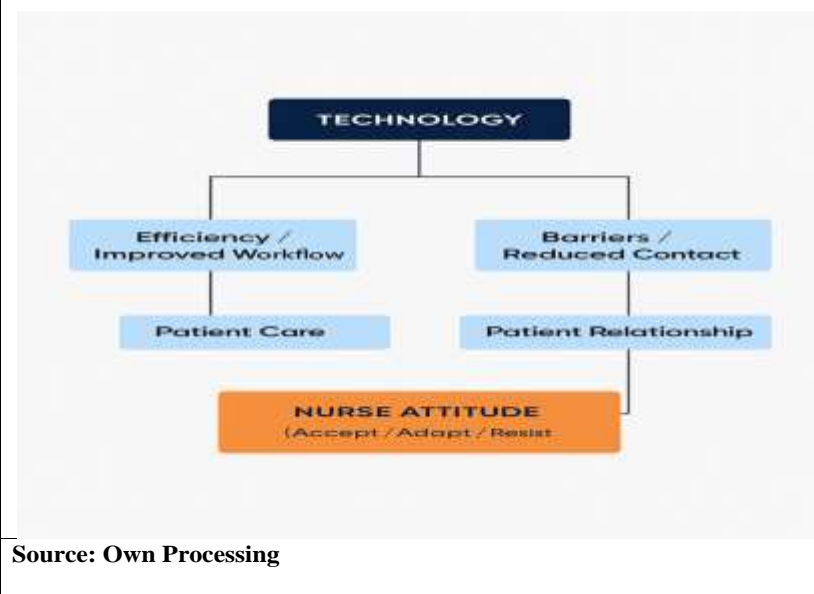
4.6 The Conceptual Diagram

The conceptual diagram (Figure 1) illustrates the interconnected relationship between technology, nurses, and patient care. Technology acts as a driver of operational efficiency by enhancing monitoring, reducing duplication, and improving data accuracy. However, its influence on care depends on the nurse’s ability to integrate it without compromising personal interaction.

The diagram further highlights several potential barriers, including limited infrastructure, inadequate digital literacy, resistance to change, and financial or technical constraints.

These are consistent with existing literature noting that successful digital transformation requires a combination of functional systems, organisational support, and ongoing professional development.

Figure 1: The relationship between technology, nurses, and patient care.



4.7 Integrating Technology While Preserving Humanistic Nursing

Overall, the findings demonstrate that while technology significantly enhances workflow efficiency and emergency responsiveness, its implementation must prioritise the preservation of relational care. Nurses consistently emphasised that personal connection remains central to their professional identity, and that technology should complement, and not replace the humanistic elements of practice.

This is consistent with recent literature calling for balanced integration of digital and relational competencies in nursing, supported by continuous education on new systems and their impact on care delivery (Pepito & Locsin, 2019).

5. Recommendations and Conclusions

This study explored the balance between technological efficiency and empathetic care. The findings show that negative impacts of DHTs stem not from the tools themselves, but from poor usability and implementation that pull nurses away from the bedside. The recommendations below aim to strengthen the positive effects of DHTs, namely, efficiency and

responsiveness, while minimising risks such as depersonalisation and relational barriers, aligning with the NPT constructs used in the methodology.

5.1 Mandate Nurse Co-Design and Cognitive Participation

Formalise protocols requiring nurses' involvement in all stages of DHT procurement, customisation, and implementation. Active participation fosters coherence and ensures that technologies support rather than disrupt bedside practice. Co-design can directly address the mixed experiences identified in the findings by prioritising user-centred interfaces, such as portable or bedside devices that reduce the need to turn away from patients.

5.2 Prioritise Usability and Infrastructure

Invest in reliable digital infrastructure and appropriate hardware (e.g., mobile devices, bedside tablets) to minimise delays caused by slow logins or outdated equipment. The findings indicate that when nurses must struggle with systems or walk away to a PC, technology becomes a barrier rather than a support. Reducing these friction points reinforces the positive trend of time-saving and improved responsiveness.

5.3 Expand Training to Include Digital Relational Competence

Training should extend beyond technical use to include nursing informatics and communication strategies that preserve empathy during digital interaction. This equips nurses to balance technological efficiency with relational care and strengthens their ability to mediate technology use, as highlighted in the conceptual framework.

In conclusion, digital transformation in South African hospitals offers opportunities to enhance workflow and responsiveness. However, when DHTs are poorly designed or supported, they create physical and psychological barriers between nurses and patients, leading to reduced attention and dissatisfaction. The central insight of this study is that the success of digital integration depends on the nurse's ability to mediate technology use. User-friendly, efficient systems empower nurses, while impractical systems hinder relational, compassionate care.

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