BRIDGING THE GAP: NURSES' PERSPECTIVES ON THE ADOPTION OF DIGITAL HEALTH TECHNOLOGIES IN HEALTHCARE

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Abstract - This study explores nurses' perceptions and experiences with Digital Health Technologies (DHTs) in healthcare. It examines the benefits, challenges, and factors influencing adoption, such as training and institutional support. The findings aim to inform strategies for effective DHT integration, enhancing nursing practice and patient care.This qualitative study used an interpretive approach and Normalisation Process Theory (NPT) to explore nurses' experiences with digital health technologies (DHTs) in hospitals. A purposeful sample of 28 participants from two Western Cape hospitals provided in-depth insights. The thematic analysis focused on nurses' perceptions of DHTs, identifying key themes to enhance understanding of their integration into practice.

The findings show that while Digital Health Technologies (DHTs) enhance nursing efficiency by streamlining tasks, challenges remain. Nurses faced a learning curve, especially older staff, and expressed frustrations with equipment reliability and slow repairs. Despite these issues, DHTs were viewed as beneficial to patient care, though nurses emphasised the need for training and the importance of balancing technology with manual skills. Overall, DHTs have improved efficiency, but better maintenance and training are needed for optimal use.

This study's application is to improve the integration of Digital Health Technologies (DHTs) into nursing practice. Its findings can guide healthcare organisations in optimising DHT implementation, inform training, and address barriers to adoption. The insights aim to enhance nursing workflows, improve patient care, and ensure the effective use of DHTs in healthcare settings.

This study's novelty lies in its focus on nurses' experiences with Digital Health Technologies (DHTs) using an interpretive approach and Normalisation Process Theory (NPT). It uniquely highlights the challenges and benefits of DHT integration from a frontline perspective, offering insights into how technology can be better incorporated into nursing workflows.

Keywords - Digital Health Technologies (DHTs), Nurses' perceptions, Nursing practice, Technology adoption, Normalisation Process Theory (NPT).

I. INTRODUCTION

Digital Health Technologies (DHTs) are integral to modern nursing practice, encompassing a range of tools such as Electronic Health Records (EHRs), triage systems, and clinical decision support systems. DHTs assist in providing health services via digital means, and the aim is improving patient care and outcomes. The World Health Organization (WHO) describes digital health as the field dedicated to the development and use of digital technologies and its purpose is to enhance health services delivery and outcomes (Zhao et al., 2024). The scope of DHTs surpasses mere record-keeping to include enabling remote monitoring, telehealth services, and enhancing communication between healthcare providers and patients (Troncoso & Breads, 2021; (Isidori et al., 2022).

In the global sphere, the adoption of DHTs has increased, more so in the wake of the COVID-19 pandemic, which forced healthcare systems to innovate rapidly in their digital transformation efforts. This shift has highlighted the crucial roles nurses play in integrating these technologies into practice, given that they are the largest segment of the healthcare workforce and act as fundamental communicators for both patients and healthcare teams (Nazeha et al., 2020; Livesay et al., 2023).

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The growing use of telemedicine and digital health tools has created a unique level of engagement, highlighting the importance of understanding how nurses perceive and adapt to these changes. (Isidori et al., 2022). Literature indicates a widespread adoption of digital solutions in various sectors; however, significant challenges remain regarding usability, accessibility, and the training of nursing professionals to handle these technologies effectively (Brown et al., 2020; Livesay et al., 2024; Tischendorf et al., 2024).

Because nurses are at the forefront of patient care, their unique experiences with and perceptions of digital health tools (DHTs) are essential for ensuring that these technologies are successfully implemented

and optimised to improve clinical outcomes. (Clarke-Darrington et al., 2023; Gause et al., 2022). Literature suggests that when nurses are actively involved in the development and deployment of DHTs, healthcare delivery becomes more effective, ultimately benefiting patient care outcomes (Livesay et al., 2023; Livesay et al., 2024). As digital health becomes more prevalent, the nursing profession must evolve by embracing technological integration without sacrificing the crucial human aspects of care. (Wong et al., 2023). Therefore, exploring nurses' experiences and perceptions of DHTs is vital, as it can provide insight into the barriers they face, the skills they require, and the support needed to maximise the benefits of digital innovations in healthcare (Kleib et al., 2024; Kleib et al., 2022).

Research supports the need for structured educational frameworks that integrate informatics and digital literacy into nursing training from the outset, thereby equipping nurses with essential competencies in digital health. (Lo et al., 2021; Mather et al., 2018).

Revising curricula to include digital health education not only prepares nursing students for the realities of modern healthcare but also fosters a culture of continuous learning among practicing nurses, thereby ensuring that they remain relevant and effective in their roles. (Pepito & Locsin, 2019; Nagle et al., 2020).

Therefore, digital health tools (DHTs) are transforming nursing practice, necessitating the nursing workforce to adapt through education and active involvement in digital health developments. The global adoption of these technologies highlights the critical need to evaluate nurses' perceptions, to ensure that their voices contribute to the evolution of healthcare technology. This study investigates nurses' perceptions and experiences with DHTs in healthcare, focusing on the benefits, challenges, and key factors shaping their adoption, including training and institutional support. The insights generated are intended to guide strategies for effective DHT integration, ultimately strengthening nursing practice and improving patient care.

II. LITERATURE REVIEW

Recent years have seen growing interest in the integration of Digital Health Technologies (DHTs) due to their potential to improve healthcare efficiency, patient care, and professional development for nurses. The following review of the literature synthesises research findings on the positive perceptions of DHTs. Furthermore, it synthesises research findings on the challenges and barriers to DHT adoption.

A. Positive Perceptions

Numerous studies highlight the transformative potential of DHTs, particularly telemedicine and Electronic Health Records (EHRs). During public health crises like the COVID-19 pandemic, telemedicine became a crucial solution, allowing for rapid access to care even when traditional services were strained. This adaptability is further enhanced by EHRs, which improve patient-provider communication and reduce healthcare costs through features like secure messaging (Hong et al., 2020). In addition, there's a growing acceptance of digital health solutions among older adults, reflecting a broader demographic shift toward embracing technology for health management (Ausserhofer et al., 2024; Alruwaili et al., 2023). These positive perceptions are often linked to improved engagement and satisfaction with managing chronic conditions (Kichloo et al., 2020). The following sections highlight a number of positive perceptions of nurses in the use of DHTs as part of their daily work activities.

Improved Time Management and Workflow Efficiency

The adoption of Digital Health Technologies (DHTs) has been shown to significantly reduce the time nurses spend on documentation. For example, research on the implementation of digital systems in intensive care units found that nurses saved between 48 to 65 minutes per shift by moving from paper to digital methods (Volkan et al., 2024). Over time, these time savings lead to a notable increase in patient care days, demonstrating the power of DHTs to streamline workflows (Volkan et al., 2024; Yilmaztürk et al., 2023). In addition to time saved on documentation, digital triage and reporting mechanisms have been found to improve the efficiency of patient registration (Wilson et al., 2020.) This allows nurses to spend more time engaging directly with patients rather than focusing on administrative tasks, a finding supported by the experiences reported by nurses themselves (Westbrook et al., 2011; Kleib et al., 2024).

Enhanced Patient Care and Clinical Outcomes

Digital Health Technologies (DHTs) are evolving into crucial tools for decision support systems, leading to faster and more accurate diagnoses. The use of these technologies in clinical settings has been shown to improve the accuracy of triage, which ultimately contributes to better clinical outcomes (Papachristou et al., 2024). For example, a systematic review found that DHTs significantly reduce adverse drug events (ADEs) and medication errors by using better tracking and alert systems (Insani et al., 2025). Moreover, it is widely acknowledged that a key benefit of DHTs is their potential to minimise human error, a persistent issue in medical practice that can compromise patient safety (Naqvi et al., 2023; Al-Thubaity & Shalby, 2023). The integration of these technologies offers a structured approach that promotes safer healthcare environments by addressing the need for solutions that mitigate human error rates in practice (Read et al., 2021; Beirouti et al., 2022).

Professional Growth and Digital Literacy

The increased use of DHTs in healthcare settings has brought the importance of digital literacy among professionals to the forefront. Literature indicates that providing nurses with exposure to digital tools during both their education and practice is essential for developing the necessary skills (Bimerew, 2024; Kleib et al., 2024).

Elevating digital proficiency through DHTs not only aids in immediate patient care but also promotes ongoing professional development (Livesay et al., 2023). Studies show that integrating DHTs into nursing curricula gives students the knowledge to succeed in a technology-driven healthcare environment (Bimerew, 2024; Brown et al., 2020). Furthermore, this continuous exposure to technology promotes lifelong learning and adaptability among healthcare professionals, which ultimately benefits both patient care quality and clinical efficacy (Cellina et al., 2023).

B. Challenges and Barriers to DHT Adoption

The transition to digital health is a complex process with several challenges that can hinder its effective implementation. Technical failures, such as system downtimes and inadequate infrastructure, are common barriers that can disrupt service delivery and undermine the credibility of these technologies (Owoyemi et al., 2022). At the same time, the absence of structured training programs can leave healthcare providers ill-equipped to navigate new technologies, which complicates their adoption (Ferreira et al., 2025). Another major obstacle is the psychological and cultural resistance to change, with many healthcare professionals preferring traditional methods over digital innovations (Olaye & Seixas, 2023). The ensuing sections will focus on the challenges encountered by nurses when using DHTs as part of daily work activities.

Technical Failures and Infrastructure Limitations

Technical failures are a significant disruptor to the operation of Digital Health Technologies (DHTs) in healthcare settings. Studies have highlighted that issues such as system downtimes, power failures, and even cable theft can severely limit the effectiveness of digital frameworks (Isidori et al., 2022; (Abdolkhani et al., 2022). For example, inconsistent access to electronic health records (EHRs) has been shown to increase errors and negatively impact a nurse's time management and workflow (Brown et al., 2020).

These issues highlight the urgent need for a robust IT support system and digital infrastructure to ensure seamless technological interactions. An insufficient digital backbone not only leads to operational disruptions but also makes healthcare providers vulnerable to outages and data loss (Wilson et al., 2020).

Training Gaps and Time Constraints

Access to adequate training on Digital Health Technologies (DHTs) remains a significant barrier, especially in areas with limited resources. Bimerew notes that without structured and accessible training programs, nurses may feel less competent in using these technologies effectively, which can make the adoption of digital health solutions more challenging (Bimerew, 2024).

Furthermore, the time constraints faced by nurses—a well-documented barrier to continuous learning—limit their ability to participate in training. This gap highlights the necessity for healthcare institutions to integrate comprehensive training strategies directly into their operational frameworks (Kim et al., 2024).

Resistance to Technological Change

Psychological and cultural resistance to technological change is a significant barrier in healthcare. Many healthcare providers are reluctant to adopt new technologies because of established practices or a fear of the unknown (Livesay et al., 2023). To address these issues, effective change management strategies are crucial. Research suggests that creating an environment that supports gradual adaptation—by appointing digital role models to guide their peers—can help alleviate the anxiety associated with new technology (Leeuw et al., 2020; Zhao et al., 2024). This approach not only improves digital literacy but also encourages a culture of innovation within healthcare teams (Nagle et al., 2020).

Organisational and Policy Implications

The successful integration of DHTs requires both strategic organisational changes and strong policy support. Studies recommend implementing robust backup systems and investing in training programs that emphasise the importance of digital competence for healthcare professionals (Livesay et al., 2024; Nazeha et al., 2020). Leadership support is thus paramount, as a commitment from management to endorse training, provide necessary resources, and foster an inclusive environment can significantly ease the transition to new technology (Sari et al., 2024). Moreover, it is essential to prioritise governance structures focused on data security and the ethical use of DHTs to protect patient information and build trust in these systems (Abdolkhani et al., 2022; Kleib et al., 2022).

In summary, the favourable perceptions of digital health technologies (DHTs) within healthcare highlight their transformative potential in enhancing time management, patient care, and professional development. As technological innovation becomes increasingly embedded in healthcare systems, strengthening the digital competencies of nurses is essential to fully realise these benefits. At the same

time, the successful adoption of DHTs requires careful attention to the technical, educational, and cultural barriers that persist. Collaborative efforts among policymakers, healthcare institutions, and practitioners are therefore crucial in creating an enabling environment that not only harnesses the benefits of DHTs but also mitigates the challenges they present, ensuring sustainable and equitable integration into nursing practice.

C. Theoretical and Conceptual Frameworks

This study adopted the Normalisation Process Theory (NPT) as its analytical framework because of its distinctive strength in explaining how complex healthcare interventions are implemented and embedded into routine practice. Unlike the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), which primarily emphasise individual attitudes and behavioural intentions, NPT offers a more comprehensive lens by highlighting the sociological processes that shape collective action, integration, and sustainability within healthcare settings (May & Finch, 2009). This makes the NPT particularly relevant for examining how nurses adopt and normalise digital health technologies (DHTs) within their everyday practice, where social, organisational, and contextual factors play a critical role in shaping successful implementation. The theory's focus on coherence, cognitive participation, collective actin and reflexive monitoring provided a nuanced understanding of the enablers and barriers of DHT adoption.

The theory's emphasis on coherence, cognitive participation, collective action, and reflexive monitoring offered a nuanced lens through which to examine the facilitators and barriers to DHT adoption. According to Normalisation Process Theory (NPT), four key constructs are essential for successfully integrating new practices or innovations into a work environment (May & Finch, 2009).The study used the NPT as a framework to analyse the process of adopting and embedding DHTs in public hospitals, and the four aforementioned constructs were explicitly used to structure the data analysis.

For example, coherence was evaluated by examining the participants' understanding of the DHTs purpose and how it fit in with their existing practices. Similarly, reflexive monitoring was used to understand how participants made ongoing adjustments to integrate new technologies into their daily workflows.

The study's use of the NPT thus ensured that the findings were grounded in a theoretical framework which assisted in explaining the real-world challenges and adaptations. This approach aligns with other studies that have applied the NPT to guide the design and evaluation of complex healthcare interventions (Mishuris et al. 2019; Huddlestone et al., 2020). By using the NPT the study offers valuable insights for healthcare managers, policymakers, and practitioners on how to successfully embed new technologies into routine practice.

III. METHODOLOGY

Research philosophy explores the nature of knowledgeSaunders et al., 2019). Ontology deals with the nature of reality, encompassing views like objectivism (reality exists independently) and subjectivism (reality is shaped by perception)(Creswell & Poth, 2016). Epistemology questions what constitutes valid knowledge, with two prominent philosophies:

Positivism: Relies on empirical measurement and deductive reasoning to test hypotheses and establish objective truths. Interpretivism: Seeks to understand social phenomena from the subjective perspectives of individuals. It uses inductive reasoning and qualitative methods to explore complex realities (Krauss, 2005; Walsham, 2006).

Given its focus on individual perspectives, interpretivism was a suitable philosophy for this study, particularly for understanding the lived experiences of nurses with Digital Health Technologies (DHTs) (Saunders & Tosey, 2013). To align with this philosophy, the study used a qualitative approach, employing in-depth interviews and observations to gather rich insights into nurses' experiences (Cresswell et al., 2012). This methodology is well-suited to exploring individual stories and understanding subjective meanings (Cresswell et al., 2012; Neubauer et al., 2019). By adopting an interpretive phenomenological approach, this study was able to "bridge the gap" between the intended and actual use of Digital Health Technologies (DHTs). The methodology allowed for a detailed understanding of how nurses make sense of their work practices and how they experience the alignment between the planned purpose of the technologies and the reality of their daily use in a healthcare setting. This approach is based on the idea that knowledge is subjective and can be understood through the inductive interpretation of lived experiences (Finlay, 2013; Frechette et al., 2020).

The study employed a purposive sampling technique to select participants who had in-depth knowledge of using DHTs in public hospitals. This approach ensured the collection of diverse perspectives from a range of healthcare professionals, including nurses, nurse managers, and other stakeholders directly involved with the technology.

To align with the recommendations for interpretive phenomenological studies, a total of 18 participants

from two public hospitals in the Western Cape, South Africa (Hospital A and Hospital B) were interviewed until data saturation was reached (Frechette et al., 2020). The sampling criteria ensured a representative cohort based on professional roles, years of experience, and exposure to DHTs.

Ethical principles guided the research process from inception to completion. Ethical clearance was obtained from both the CPUT Faculty of Health and Wellness Ethics Committee and the CPUT Faculty of Informatics and Design Ethics Committee. Permission to conduct the study in the selected tertiary and district hospitals was subsequently granted by the Western Cape Department of Health. A cover letter accompanied the research instrument, outlining the purpose of the study and the nature of the data to be collected. Participation was entirely voluntary, and respondents were informed that they could decline to answer any question, withdraw at any stage, or refuse participation without any negative consequences. Respect for participants' views was upheld throughout. Confidentiality and anonymity were strictly maintained: personal information and responses were anonymised during coding, securely stored, and accessible only to the researcher. In cases of withdrawal, any data already collected were destroyed to safeguard participants' rights and privacy.

Primary data were collected through in-depth, semi-structured interviews, while observational techniques provided additional context by capturing non-verbal cues and workflow interactions. This triangulation of data sources enhanced the study's rigor and provided a comprehensive understanding of the research phenomena (Bhattacherjee, 2012).The interview instrument was designed based on a comprehensive review of the literature, the research questions, and guided by the Normalisation Process Theory (NPT). To ensure reliability, semi-structured in-depth interviews were conducted iteratively with participants until data saturation was achieved, and interviews were repeated until it was evident that the collected data fully captured the phenomenon under study. The validity of the instrument was further strengthened through a pre-test conducted at Hospital A, which helped refine the questions and confirm their clarity and relevance.

Thematic analysis was used to interpret the qualitative data, following a structured, six-step framework (Cresswell et al., 2012). The themes were aligned with the NPT constructs: coherence, cognitive participation, collective action, and reflexive monitoring. This approach provided a robust analytical lens for categorising participant experiences and identifying key patterns and sub-themes, such as resistance to technology and perceptions of efficacy (Hsieh & Shannon, 2005; Tong et al., 2007).

IV. FINDINGS AND DISCUSSION

Based on the responses from the 18 participants, a comprehensive understanding has emerged with regard to the perspectives and lived experiences of nurses in relation to their use of DHTs in practice. Overall, the responses reveal a strongly positive perception of DHTs, with nursing expressing appreciation for the way in which technology has enhanced their efficiency, patient care and reduced administrative burden. However, despite the predominantly positive experiences, several challenges and limitations were raised – particularly in relation to system downtime and technical failures. Five themes emanated from the analysis as per the following diagram below and are discussed below.



Theme 1: Technology as a catalyst for time-saving and efficiency

All participants have emphasised that DHTs are essential for saving time. The transition from manual, paper-based tasks like documentation and reporting to digital systems has freed up significant amounts of time, which allows nurses to spend mor time to direct patient care. One nurse reported that electronic reporting, for example reduces a two-hour task to mere minutes. This streamlining of workflows is consistently cited as a key benefit, making their jobs easier and allowing them to handle emergencies more effectively.

"Electronic reporting is made easier because whatever you need to ask the patient is already captured electronically... For me that is a huge time saver, our critical time is 5 to 6 pm and there are always emergencies. It gives us more time to spend with our patients." (MP06). Existing research highlights DHTs' transformative potential in improving time management, enhancing patient care, and supporting professional growth through digital literacy (Volkan et al., 2024; Papachristou et al., 2024; Bimerew, 2024).

Theme 2: Enhanced patient care and monitoring
The nurses' perceptions highlight that technology directly improves patient outcomes. Data driven insights, provided by DHTs, such as predicting the

severity of a patient's condition or instructing nurses to perform specific tests such as ECGs or a urine test) is based on real-time data. This capability enhances the accuracy of the triage process and as a result enables quicker and more targeted interventions. Nurses feel that patient care is safer and more responsive due the immediate and confidential access to crucial information.

"It can accurately predict the severity of the patient's condition. Sometimes as nurses you can't always tell how sick the patient is. However, with this technology, if a patient is rated orange, it can tell you that the patient has chest pain and you can immediately do an ECG." (MP02)

TA3: "The nurses can be guided by the technology... it guides them on what to do when something happens with the patient... so it makes their lives much easier."

Theme 3: Resistance followed by adaptation
The journey was not without problems. One nurse noted that there was initial resistance from staff who were comfortable with manual processes. However, as they saw the ease and efficiency of the new system firsthand, their attitudes changed. This highlights a common pattern: initial reluctance is often overcome once the visible benefits become clear through practical experiences, thereby fostering a more positive attitude towards technological change.

"When it was introduced in this hospital, we were all very resistant, but now we can't do without it. Because of the training that was provided, we all adopted the system." (TA1)

"I was motivating the resistant staff to try out the new technology... Nurses were resistant to the new system, they thought they would write first and then add things on the computer. Once they saw how easy it is, they are happy." (MP07)

Theme 4: Ongoing training needs and skills development
The responses reveal a clear need for continuous training and skills development. Nurses have expressed that, although technology can be a powerful tool, some feel that they do not receive enough exposure and training to use it effectively. Whilst they acknowledge that being "computer literate" has become a core competency and are motivated to learn, they often face time constraints. Furthermore, the technology has brought about a greater awareness of computer literacy, with some nurses undertaking computer training courses to enhance their skills. Some are also trying to understand medical terms and abbreviations.

"I am so impressed with the technology. It makes the staff more aware of being computer literate. I have done three computer training courses. We get to learn about diagnosis, medical terms, we learn what the abbreviations mean." (MP05)

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Theme 5: Technical failures and infrastructure limitations
A major recurring challenge is technical failure. Nurses reported that when the system is down, often due to power outages or infrastructure challenges such as cable theft, they must revert to manual processes. This is described as being extremely challenging as it often results in chaos, delays and requires significant time to correct once the system is back online. These disruptions highlight the heavy reliance on technology and the need for a robust, reliable infrastructure to support it.

"When the system is down, we are forced to go back to the manual system. When we have to go back to the old system, it is difficult to find the old paper folders." TB3

"With this new technology, the only challenge that I have experienced, especially in the EC, is when there is a power failure and we are off-line. We don't have back up, so we have to switch to manual." (MP03). Literature highlight commonly reported barriers include technical failures, infrastructure limitations, inadequate training, resistance to change, and policy gaps (Owoyemi et al., 2022; Ferreira et al., 2025; Olaye & Seixas, 2023).

SUMMARY OF FINDINGS

The interview findings highlight a dual perspective on the adoption of DHTs in public hospitals: although recognised for their transformative potential, their implementation is frequently hindered by significant practical challenges.

On one hand, the findings consistently show that nurses perceive DHTs as a powerful tool for time-saving and efficiency. The findings from the interviews reveal a dual perspective on the adoption of Digital Health Technologies (DHTs) in public hospitals: while they are highly valued for their transformative potential, their implementation is often hindered by significant practical challenges.

Participants have described technology as essential, reducing the time spent on manual tasks, thereby making their jobs easier. This streamlining of workflows is thus consistently cited as a key benefit. On the other hand, the process of adopting these

technologies has not been without difficulty, as illuminated by the recurring theme of resistance, followed by adaptation. The reference to initial resistance from staff who were comfortable with manual procedures to their subsequent adoption of technology highlights the importance of user experience and the need for a seamless transition. In addition, reliance on these technologies highlights the critical issue of technical failures and infrastructure limitations.

Lastly, the findings signal a clear need for ongoing training and skills development, as nurses are cognisant of the fact that they need to continuously adapt and learnt to fully leverage these tools.

How Empirical Findings fill the research gap

The empirical findings fill the following research gaps: 1) whilst most of the global literature focuses on high-resource settings, this study adds empirical evidence from South African public hospitals, where resource constraints and infrastructural vulnerabilities (e.g., power failures, cable theft) uniquely shape the adoption of DHTs. 2) Where previous studies often describe resistance as a fixed barrier, this study indicates resistance evolving into acceptance once nurses experienced the practical benefits and received training. This insight refines existing theoretical models of adoption. 3) By applying the NPT, the study not only validates the constructs (coherence, cognitive participation, collective action, reflexive monitoring) in a new context but also shows how they manifest in practice. This strengthens the theoretical framework's applicability across diverse healthcare systems.

The summary of trends (Table 1 below) for both Hospital A and Hospital B reveals several consistent experiences with digital health technology, alongside some notable differences.

Shared Trends

Both hospitals reported a strong, positive relationship between technology adoption and core operational improvements. Participants from both hospitals consistently identified time-saving and improved patient care as key benefits. The data shows that the transition was not entirely smooth, as both hospitals experienced resistance to change from staff and highlighted a universal need for training to ensure effective use. A critical and shared challenge was the issue of system failures, which forced a return to less efficient manual systems.

Unique Trends

The analysis also highlighted a few differences in each hospital's experience. Participants at Hospital A specifically discussed emotional adaptation to the new technology, a theme not explicitly raised by those at Hospital B. On the other hand, Hospital B's responses highlighted concerns about administrative efficiency and security concerns, topics not mentioned by participants at Hospital A. These unique trends may reflect differences in the specific technology, organisational culture, or implementation priorities at each hospital.

Table 1: Summary of Trends across the two hospitals

Theme	Hospital A	Hospital B
Time-saving	✓	✓
Improved patient care	✓	✓
Resistance to change	✓	✓
Need for training	✓	✓
System failures	✓	✓
Emotional adaptation	✓	○
Administrative efficiency	○	✓
Security concerns	○	✓

[Own processing]

The findings illustrate that while DHTs are seen as an essential and beneficial advancement in healthcare, their successful integration requires addressing both the human and technical challenges of implementation.

The study offers actionable insights for key stakeholders. It highlights the importance of robust training and addressing technical failures for healthcare managers and policymakers. For healthcare professionals, the findings validate their experiences with resistance and adaptation, emphasizing their role in successful adoption. Finally, technology developers can use the feedback on real-world usability and infrastructure needs to improve their products.

LIMITATIONS OF THE STUDY

The study was conducted in two public hospitals in the Western Cape, South Africa. Findings may not be generalisable to other provinces, private healthcare settings, or international contexts where infrastructure, resources, and policies differ. As the findings are based primarily on self-reported experiences, they may be influenced by recall or social desirability bias, despite triangulation with observations. Furthermore, DHTs evolve quickly. The findings reflect perceptions at the time of data collection and may not capture future adaptations, upgrades, or changes in infrastructure. Lastly, the emphasis on context-specific challenges—such as power outages and cable theft in South African public hospitals—may limit the transferability of results to different healthcare contexts.

FUTURE RESEARCH

Further research could extend beyond nurses to include the perspectives of patients, doctors, policymakers, and IT staff, providing a more comprehensive understanding of DHT adoption. Comparative studies across different healthcare contexts—such as rural and urban settings, public and private facilities, and other regional or international systems—would help identify context-specific factors which influence adoption. Longitudinal and mixed-methods approaches are recommended to capture changes in perceptions over time and to quantify the impact of DHTs in terms of efficiency, patient safety, and clinical outcomes. In addition, more focused studies on training strategies, organisational support, and policy frameworks are needed to guide sustainable digital literacy and integration. Research into infrastructural resilience in resource-limited environments, as well as patient-centred perspectives, would further enrich insights.

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