



Role of telemedicine platforms in the northern zone regional hospitals' healthcare services delivery: A case of northern zone regional hospitals

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ABSTRACT

This study examines the role of telemedicine platforms in the Northern Zone regional hospitals' healthcare services delivery in Northern Zone regional hospitals in Tanzania. Guided by the Systems Theory, the study adopted a pragmatic research philosophy, employing a mixed research approach and a case study design covering Haydom Lutheran Hospital, Mawenzi Regional Referral Hospital, and Mount Meru Hospital. A total of 176 respondents were selected using purposive and stratified sampling techniques, and data were collected through questionnaires, interviews, and documentary reviews. Quantitative data were analysed using IBM SPSS, with descriptive statistics and regression analysis, while qualitative data were analysed using content analysis. The study revealed that telemedicine platforms improve access to healthcare services, enhance service quality, and increase efficiency in service delivery. The study concluded that digital platforms play a vital role in enhancing healthcare delivery in Northern Zone hospitals. This study recommended that hospitals strengthen telemedicine, invest in training and infrastructure, and adopt supportive policies. Further studies should examine long-term impacts, barriers to adoption, and comparative analyses across regions to optimize digital healthcare services.

Keywords: Digital Health, Healthcare Service Delivery, Hospitals, Northern Zone, Systems Theory, Tanzania, Telemedicine Platforms.

I. INTRODUCTION

The integration of digital platforms in healthcare has revolutionized medical services, improving patient outcomes, accessibility, and operational efficiency (Smuck et al., 2021; Ajegbile et al., 2024). Awad et al. (2021) reported a sharp rise in telemedicine adoption following COVID-19, enabling remote consultations and reducing hospital congestion. Digital health innovations, including wearable devices and remote monitoring technologies, have demonstrated significant potential to improve the continuous management of chronic conditions and facilitate more personalized healthcare delivery (Smuck et al., 2021). China has adopted electronic medical record (EMR) systems in over 90% of hospitals to enhance care and operations (Zhang et al., 2021), while Europe's health information exchange (HIE) platforms have improved diagnostic accuracy by 40% (Faggini, Bruno, & Parziale, 2021). Despite these gains, cybersecurity risks, high costs, and digital literacy gaps hinder full adoption globally (Feroz et al, 2021; Chandra et al., 2022).

In Africa, digital health has expanded post-COVID-19 through government and private investment (Manyazewal et al., 2021). In South Africa, 60% of providers use telemedicine, improving rural access (Mbunge et al., 2022). Kenya's Afya Moja platform enables seamless patient data exchange, enhancing diagnosis efficiency by 35% (Neumark & Prince, 2021). Ghana uses IoT to monitor patients remotely, reducing maternal mortality by 25% (Boakye & Olumide, 2021), while Ethiopia applies AI in medical imaging for better disease detection (Manyazewal et al., 2021). Challenges such as limited infrastructure, poor internet access (43% coverage), data security, and insufficient provider training constrain adoption (Ayo-Farai et al., 2023; Nwankpa & Datta, 2022; Ibeneme et al., 2022).

Tanzania has made progress with digital health technologies to improve accessibility and efficiency (Mustafa et al., 2023). Public hospitals using electronic health records (EHRs) have cut misdiagnoses and boosted treatment efficiency by 50% (Mwogosi, 2024). Platforms like Daktari Online serve over 1.2 million rural patients, and mHealth apps such as mJamii have increased postnatal care use by 40% (Masoi et al., 2023; Kullian & Ally, 2023). Yet, challenges persist, including inadequate infrastructure, internet gaps, high costs, low digital literacy, and data security concerns (Budde, 2021; Holst et al., 2021).



Mawenzi Regional Referral Hospital in Moshi has implemented electronic patient records and teleconsultation, improving data management and specialist access (Nsaghurwe et al., 2021; Unkels, 2023). Nevertheless, inconsistent internet, limited technical skills, and financial constraints impede full adoption (Mwogosi & Mambile, 2024). Similar challenges affect other regional hospitals, such as Haydom Lutheran and Mount Meru, resulting in long waits, lost records, poor interdepartmental communication, restricted telemedicine use, and inefficient EMR systems, which increase errors and delays (Masoi et al., 2023; Kullian & Ally, 2023; Holst et al., 2021, 2022). While previous studies in both developed and African contexts have extensively documented the benefits of telemedicine and electronic medical records (EMRs) in addressing issues such as long waiting times, loss of patient records, poor interdepartmental communication, and lack of integrated health information exchange (Faggini *et al.*, 2021; Smuck *et al.*, 2021; Mbunge *et al.*, 2022; Ibeneme *et al.*, 2022; Boakye & Olumide, 2021), there remains a limited understanding of how these digital solutions are specifically applied and functioning in Tanzania's regional hospitals. This study assessed the role of telemedicine platforms in the Northern Zone regional hospitals' healthcare services delivery at Haydom Lutheran, Mawenzi Regional Referral, and Mount Meru Hospitals.

1.1 Research Objective

The general objective of this study is to assess the role of telemedicine platforms in the delivery of healthcare services in Tanzania's regional hospitals: a case of the northern zone regional hospitals.

II. LITERATURE REVIEW

2.1 Theoretical Review

The Health Belief Model (HBM) was developed by Irwin Rosenstock in 1950. It is one of the most widely used psychological models for understanding and predicting health-related behaviours, particularly the adoption of preventive health practices (Neumark & Prince, 2021). The Health Belief Model posits that individuals are more likely to engage in health-promoting behaviours if they believe they are at risk for a health problem (perceived susceptibility), believe the problem has serious consequences (perceived severity), believe taking a specific action would reduce their risk (perceived benefits), and believe the benefits of acting outweigh the costs or barriers (perceived barriers) (Manyazewal *et al.*, 2021). The model assumes that people's health behaviours are influenced by their personal beliefs and perceptions about their health and the actions required to improve it. The key components of the model include perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. These components work together to determine an individual's likelihood of taking health-related actions, such as using digital healthcare platforms like telemedicine or electronic medical records (Holst *et al.*, 2022).

The Health Belief Model is widely applicable, flexible, and easy to use for designing interventions aimed at changing health behaviors. It is particularly strong in understanding preventive health behaviors and has been successfully applied in various health-related settings (Ibeneme *et al.*, 2022). Its focus on the individual's perceptions makes it useful in tailoring health interventions to specific populations, addressing personal beliefs and barriers to health-promoting actions. However, despite its broad applicability, the HBM has been criticized for its narrow focus on individual perceptions without considering broader socio-economic and cultural factors (Boakye & Olumide, 2021). The model assumes that people act rationally based on their health beliefs, which may not always hold. Additionally, it overlooks the role of social influences, emotional factors, and external barriers like economic constraints that may impact behaviors. Moreover, the model doesn't adequately address how individuals' habits and environmental factors affect their decision-making (Holst *et al.*, 2021).

This theory is relevant in this study as it was used to assess how healthcare professionals and patients in regional hospitals perceived the benefits of adopting telemedicine platforms. Specifically, it assisted the researcher in understanding how healthcare providers and patients perceived the usefulness of telemedicine and whether they felt at risk of delayed treatment without it. Additionally, the model assisted in examining the perceived benefits of integrated health information exchange platforms in improving patient care coordination and reducing delays, as well as identifying any barriers to implementation.

2.2 Empirical Review

A comprehensive global framework for bolstering health systems through the strategic application of digital technologies is provided by the World Health Organization's (WHO) Global Strategy on Digital Health (2020–2025). It places special emphasis on advancing Universal Health Coverage (UHC), enhancing service delivery efficiency through innovations like telemedicine, and improving equity in access to healthcare. The goal underlines the vital importance of enhancing digital health governance, guaranteeing health information systems' interoperability, advancing data security and standards, and encouraging people-centered digital health transformation (World Health Organization, 2021). Tanzania has implemented the National Digital Health Strategy (2023–2030) in accordance with this global agenda,



which places a high priority on expanding telemedicine services, integrating health information systems, bolstering digital infrastructure, and enhancing health data governance to address enduring issues such as shortages of healthcare professionals, geographical barriers, and inefficiencies in referral systems (Ministry of Health Tanzania, 2023).

Empirical evidence from East Africa further supports the growing relevance of telemedicine in resource-limited settings, with studies from Kenya indicating improved access to specialist consultations, reduced patient travel burden, and enhanced referral efficiency; research from Uganda demonstrating improved maternal and child health outcomes through remote clinical support and strengthened inter-facility collaboration; and findings from Rwanda showing that structured telemedicine integration improves healthcare accessibility, reduces waiting times, and strengthens continuity of care, particularly in rural and underserved areas.

Across the region, post-COVID-19 evidence also highlights accelerated adoption of telemedicine, contributing to improved healthcare access and system responsiveness. However, challenges such as inadequate digital infrastructure, limited internet connectivity, low digital literacy, and concerns over data privacy and security continue to constrain optimal implementation (Kichloo et al., 2020; Kruse et al., 2018; Wosik et al., 2020).

Adeghe (2024) examined emerging trends in telemedicine, focusing on innovations such as video consultations, virtual patient interactions, and artificial intelligence applications in diagnostic imaging. The study examined specialized telemedicine applications, including mental health interventions and chronic disease management, highlighting adoption and integration challenges. Telemedicine improves patient access, service quality, and clinical efficiency, but prior research did not explore its operation within Tanzania's healthcare system. This study addresses that gap by assessing telemedicine's role in service delivery at Mawenzi Regional Referral Hospital, considering both benefits and contextual challenges.

Ezeamii et al. (2024) found that telemedicine enhances patient outcomes, reduces costs, and improves efficiency, particularly for chronic diseases like diabetes. However, it did not investigate adoption in Tanzania, leaving gaps regarding local infrastructure and technology constraints, which this study addresses.

Atluri et al., (2022) highlighted telemedicine's impact on outcomes, accessibility, and integration, noting inconsistent patient engagement and uneven service quality in low-infrastructure areas. While strategies for adoption were suggested, the study did not assess Tanzania's context. This research examines how global approaches can be adapted locally at Mawenzi Hospital.

Haleem et al. (2021) emphasized telemedicine's role in workflow management, remote diagnosis, follow-up care, and digital recordkeeping, especially during crises, but did not study its integration in Tanzanian hospitals. In Tanzania, Budde (2021) showed mobile devices improve real-time data access, communication, and operational efficiency in low-resource settings, yet he did not examine telemedicine platforms as part of broader digital systems. This study fills these gaps by evaluating telemedicine use at Mawenzi Hospital, including challenges such as connectivity, digital literacy, and infrastructure limitations.

III. METHODOLOGY

This study adopted a pragmatic research philosophy, which allowed the integration of both qualitative and quantitative approaches to address real-world challenges in healthcare service delivery (Creswell & Creswell, 2018; Saunders, Lewis, & Thornhill, 2019). A mixed-methods approach was employed, combining statistical analysis of healthcare indicators such as patient satisfaction, service efficiency, and telemedicine usage with qualitative insights into the experiences of healthcare providers and patients (Sileyew, 2020; Bryman, 2016). A case study research design was used to examine three regional hospitals in Northern Tanzania, including Haydom Lutheran, Mawenzi, and Mount Meru, allowing for an in-depth and contextualized understanding of how digital platforms, including telemedicine, electronic medical records (EMR), and health information exchange (HIE) systems, impact patient care and service delivery (Yin, 2018; Merriam & Tisdell, 2016; Saunders et al., 2019).

3.1 Sampling

The study population included both hospital employees (doctors, nurses, and administrative staff) and patients, ensuring diverse perspectives on digital healthcare utilization. A total sample of 176 respondents, which includes staff and patients, was selected to provide comprehensive quantitative and qualitative data, enabling a robust evaluation of telemedicine's role in improving efficiency, accessibility, and patient satisfaction in the targeted hospitals. Data collection was conducted between August and October 2026. The sample size for hospital staff was determined using the Yamane (1967) formula, where n represented the number of samples, N was the total population, and e was the margin of error.

$$n = \frac{N}{1 + N \cdot e^2} = \frac{1270}{1 + 1270 \cdot (0.07)^2} = 176$$

Table 1



Sample Size

Hospital	Population	Sample Size
Haydom Lutheran Hospital	350	49
Mawenzi Regional Referral	420	58
Mount Meru Hospital	500	69
Total	1270	176

Source: (Haydom Lutheran Hospital, 2024; Mawenzi Regional Referral Hospital, 2024; Mount Meru Hospital, 2024).

In addition, purposive sampling was used to select 30 patients for semi-structured interviews based on their experience with hospital services, frequency of visits, and willingness to provide detailed insights (Etikan et al., 2016). This sample size is considered adequate for achieving thematic saturation in qualitative research, particularly given the distribution across three hospital settings, which ensured contextual variation while maintaining analytical depth. Approximately 10 interviews per site allowed for sufficient exploration of recurring patterns, with saturation reached when no new themes were emerging from additional data.

3.2 Data Collection Methods

Primary data were collected using structured questionnaires for staff and interviews for patients. Questionnaires employed a five-point Likert scale, where responses were interpreted using mean values (1.0–1.4 = no extent, 1.5–2.4 = small extent, 2.5–3.4 = moderate extent, 3.5–4.4 = large extent, 4.5–5.0 = very large extent) and standard deviation (SD) to measure response variability; a low SD (<1) indicated consistency among participants, whereas a high SD highlighted differing opinions (Bryman, 2016).

3.3 Data Analysis

Quantitative data were analysed using IBM SPSS version 26, employing descriptive statistics such as mean, SD, and frequency distributions, while inferential statistics, including Pearson correlation analysis, examined the strength and direction of relationships between variables. Content analysis was used to analyse qualitative data collected from interviews. This technique involved identifying patterns, themes, and key insights from the responses (Krippendorff, 2018). Thematic coding was applied to ensure that qualitative findings complemented the quantitative results, providing a well-rounded understanding of the research problem.

3.4 Quality Assurance

This study adhered to the ethical guidelines set by the Institute of Accountancy Arusha to ensure responsible research conduct. An official introduction letter was obtained for approval from the selected hospitals. Confidentiality and anonymity were maintained by protecting respondents' identities and using the data solely for research purposes. Informed consent was obtained, ensuring participants understood the study's purpose, their voluntary participation, and their right to withdraw at any stage.

To ensure reliability, the questionnaire was piloted with a small group of respondents before full data collection. The test–retest method assessed the stability of the instrument by administering the questionnaire twice and comparing the responses. Cronbach's alpha was also calculated for the Likert-scale items, with values above 0.7 indicating acceptable internal consistency (Emerson, 2024). In addition, structured interview protocols were used to maintain uniformity and consistency in qualitative data collection.

The results showed strong reliability across all scales. Telemedicine platforms had a Cronbach's alpha of 0.795, and Health Information Exchange (HIE) recorded 0.799, both indicating good reliability. Electronic Medical Records (EMRs) showed excellent reliability with an alpha of 0.874. Healthcare Service Delivery had an alpha of 0.772, reflecting acceptable reliability. Overall, the scales consistently measured their intended constructs, confirming the reliability of the study data.

Validity ensured the study measured what it was intended to measure. Content validity was achieved by developing the questionnaire from established literature and expert input, while construct validity was confirmed through factor analysis (Hair et al., 2019). For qualitative data, credibility was strengthened through member checks, allowing participants to verify the accuracy of interpretations. Dependability and confirmability were ensured by thoroughly documenting the research process, making the findings consistent and traceable to the original data.



IV. FINDINGS & DISCUSSION

4.1 Demographic of Respondents

These demographic characteristics of respondents are from Haydom Lutheran Hospital, Mawenzi Regional Referral Hospital, and Mount Meru Hospital. The analysis includes variables such as gender, age, education level, years of work experience, job position, and frequency of using digital platforms.

Table 1

Demographics of Respondents

Details		Frequency	Percent
Gender of the Respondents	Male	70	46.7
	Female	80	53.3
Age Distribution	20-30 years	48	32.0
	31-40 years	54	36.0
	41-50 years	40	26.7
	Over 50 years	8	5.3
Education Level	Certificate	7	4.7
	Diploma	50	33.3
	Bachelor's Degree	61	40.7
	Master's Degree	30	20.0
	Doctorate (PhD/MD)	2	1.3
Years of Work Experience in this Hospital	Less than 1 year	15	10.0
	1-5 years	45	30.0
	6-10 years	60	40.0
	11-15 years	18	12.0
	More than 15 years	12	8.0
Job Position	Medical Doctor	45	30.0
	Nurse	75	50.0
	Laboratory Technician	12	8.0
	Pharmacist	10	6.7
	Administrative Staff	8	5.3
Frequency of Using Digital Platforms	Daily	130	86.7
	Several times a week	11	7.3
	Occasionally	5	3.3
	Rarely	4	2.7

4.1.1 Gender of Respondents

Table 1 showed that out of 150 respondents, 70 (46.7%) were male while 80 (53.3%) were female. This indicates a fairly balanced gender representation among the hospital staff in the Northern Zone hospitals, with a slightly higher proportion of female employees. The presence of both genders in almost equal proportions may suggest inclusive staffing policies and could enhance collaborative healthcare service delivery, as diverse perspectives contribute to decision-making and patient care.

4.1.2 Age Distribution of Respondents

Table 1 indicates that the majority of respondents were aged between 31 and 40 years (54 respondents, 36%), followed by those aged 20 to 30 years (48 respondents, 32%), 41 to 50 years (40 respondents, 26.7%), and over 50 years (8 respondents, 5.3%). This implies that the workforce in the Northern Zone hospitals is relatively young and middle-aged, which is advantageous for adopting and integrating digital healthcare platforms, as younger staff are often more adaptable to new technologies.

4.1.3 Educational Level of Respondents

According to Table 1, most respondents held a bachelor's degree (61 respondents, 40.7%), followed by diploma holders (50 respondents, 33.3%), master's degree holders (30 respondents, 20%), certificate holders (7 respondents, 4.7%), and doctorate holders (2 respondents, 1.3%). This distribution implies that the hospitals have a well-educated



workforce capable of understanding and utilizing digital healthcare platforms such as electronic medical records and health information exchange systems, which are crucial for efficient service delivery.

4.1.4 Years of Work Experience

Table 1 showed that 60 respondents (40%) had 6–10 years of experience, 45 respondents (30%) had 1–5 years, 18 respondents (12%) had 11–15 years, 15 respondents (10%) had less than 1 year, and 12 respondents (8%) had more than 15 years of experience. This implies that the hospitals have a workforce with a moderate level of experience, which is beneficial for balancing practical knowledge with openness to digital innovations in healthcare services.

4.1.5 Job Position of Respondents

As indicated in Table 1, the majority of respondents were nurses (75 respondents, 50%), followed by medical doctors (45 respondents, 30%), laboratory technicians (12 respondents, 8%), pharmacists (10 respondents, 6.7%), and administrative staff (8 respondents, 5.3%). This distribution suggests that frontline healthcare providers, who interact directly with patients, form the largest group of staff. Their engagement in digital platforms is critical for improving service delivery, as their frequent use can enhance data entry, telemedicine consultations, and patient monitoring.

4.2 Frequency of Using Digital Platforms

Table 1 indicated that 130 respondents (86.7%) reported using digital platforms daily, 11 respondents (7.3%) used them several times a week, 5 respondents (3.3%) used them occasionally, and 4 respondents (2.7%) used them rarely. This implies a high adoption rate of digital healthcare platforms among staff in the Northern Zone hospitals, which is promising for implementing telemedicine, electronic medical records, and health information exchange systems. Frequent use of these platforms may lead to improved efficiency, faster patient care, and better health outcomes across the hospitals.

Table 2

Telemedicine Platforms

Statements	Mean	SD	Interpretation
Telemedicine improves access to healthcare services.	3.9	0.8	Large Extent
Telemedicine reduces patient waiting times.	2.6	0.5	Moderate Extent
Telemedicine improves service quality.	3.5	0.8	Large Extent
Telemedicine consultations are easy to access.	3.2	0.8	Moderate Extent
Telemedicine enhances communication between patients and doctors.	3.4	0.7	Moderate Extent
Telemedicine improves healthcare efficiency.	3.5	0.9	Large Extent
Telemedicine reduces the need for travel.	3.0	1.3	Moderate Extent
Telemedicine improves diagnosis timeliness.	3.1	1.5	Moderate Extent
Telemedicine increases patient satisfaction.	3.4	1.2	Moderate Extent
Telemedicine expands healthcare service options.	3.7	1.1	Moderate Extent
COMPOSITE MEAN	3.33		

The study revealed that telemedicine improves access to healthcare services to a large extent (mean = 3.9, SD = 0.8), and telemedicine reduces patient waiting times to a moderate extent (mean = 2.6, SD = 0.5). During the interview, three key informants asserted that

“For me, telemedicine has been very helpful because I can talk to the doctor without traveling long distances.” – Key Informant [September, 2025]

“Sometimes the system delays, and I still have to wait long before getting help, so it doesn’t really save time.” – Key Informant [September, 2025]

“I feel telemedicine makes it easier to get treatment quickly, but not all patients know how to use it.” – Key Informant [September, 2025]

These responses indicate that while many patients value the convenience and improved access provided by telemedicine, challenges still exist in terms of waiting times and usability. This suggests that telemedicine has great potential to improve the delivery of healthcare, but how well it works will determine how beneficial it is. The differing viewpoints show that different hospitals have different telemedicine experiences for their patients. This demonstrates that while the method is well embraced by some, it is nevertheless restricted for others because of different situations.

Furthermore, the study found that telemedicine improves service quality to a large extent (mean = 3.5, SD = 0.8), and telemedicine consultations are moderately easy to access (mean = 3.2, SD = 0.8). During the interview, four key informants asserted that

“The doctor explained my condition clearly through telemedicine, and I felt satisfied with the service.” – Key Informant [September, 2025]



“Sometimes the video or sound is not clear, so I don’t feel the quality is the same as a face-to-face visit.”

– Key Informant [September, 2025]

“It is easy for me to access the consultation because I can just use my phone, and I don’t need to travel.”

– Key Informant [September, 2025]

“I find it a bit difficult to connect to the system, and sometimes I need help before the consultation starts.”

– Key Informant [September, 2025]

These responses indicate that patients generally recognize improvements in service quality through telemedicine, especially in terms of communication and medical guidance. This suggests that while digital consultations can provide adequate treatment, the whole experience is impacted by technological problems such as system usability and connection. The conflicting opinions also imply that whereas some patients have little trouble accessing telemedicine, others find it difficult. This demonstrates that telemedicine access and service quality differ for each patient based on their unique circumstances and experiences.

The study unveiled that telemedicine enhances communication between patients and doctors to a moderate extent (mean = 3.4, SD = 0.7), telemedicine improves healthcare efficiency to a large extent (mean = 3.5, SD = 0.9), while telemedicine reduces the need for travel to a moderate extent (mean = 3.0, SD = 1.3). During the interview, five key informants asserted that

“It is easier to talk to my doctor now because I can call instead of always going to the hospital.” – Key Informant [September, 2025]

“Sometimes communication is not smooth, and I feel the doctor does not understand me well through the phone or video.” – Key Informant [September, 2025]

“Telemedicine makes the services faster because I don’t spend the whole day waiting at the hospital.” – Key Informant [September, 2025]

“Even though I don’t have to travel far, I still prefer to go physically because the network is not always reliable.” – Key Informant [September, 2025]

“I think telemedicine reduces unnecessary hospital visits, but sometimes I still need to go when it is something serious.” – Key Informant [September, 2025]

These responses indicate that patients recognize the contribution of telemedicine in improving communication and efficiency, though the experience is not uniform. This suggests that whereas some patients find digital consultations to be time-saving and convenient, others encounter difficulties with network dependability and communication clarity. According to these viewpoints, the decrease in travel is beneficial but not total because some medical conditions still call for in-person appointments. Findings depicted that telemedicine improves diagnosis timeliness to a moderate extent (mean = 3.1, SD = 1.5), telemedicine increases patient satisfaction to a moderate extent (mean = 3.4, SD = 1.2), and telemedicine expands healthcare service options to a moderate extent (mean = 3.7, SD = 1.1). During the interview, five key informants asserted that

“I was able to get my test results quickly through telemedicine, which helped me start treatment faster.” – Key Informant [September, 2025]

“Sometimes the doctor takes long to respond online, so the diagnosis is delayed compared to a face-to-face visit.” – Key Informant [September, 2025]

“I feel satisfied because I can consult a doctor from home without going to the hospital.” – Key Informant [September, 2025]

“I am not always satisfied, since sometimes the consultation feels rushed and not detailed.” – Key Informant [September, 2025]

“Telemedicine gives us more options, like talking to different specialists, which is very useful.” – Key Informant [September, 2025]

These responses indicate that while patients recognize the benefits of timely diagnoses and wider service options offered through telemedicine, these improvements are not experienced equally by all. This suggests that both the effectiveness of the system and the caliber of the consultation are factors that influence patient satisfaction. The conflicting opinions also demonstrate that whereas some patients value flexibility and quicker services, others continue to experience delays and discontent. This indicates that in Northern Zone hospitals, telemedicine offers modest but variable gains in diagnostic timeliness, satisfaction, and service choices.

The composite mean of 3.33 indicates that telemedicine plays a moderately positive role in enhancing healthcare delivery across the Northern Zone regional hospitals.

4.3 Correlation Analysis



The study examined the relationship between digital platforms and healthcare service delivery in Northern Zone regional hospitals. Findings are shown in Table 3.

Table 3
Correlations

Correlations			
		Telemedicine Platforms	Healthcare Service Delivery
Telemedicine Platforms	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	150	
Healthcare Service Delivery	Pearson Correlation	.815	1
	Sig. (2-tailed)	.000	
	N	150	150

Findings revealed a strong positive correlation between telemedicine platforms and healthcare service delivery (correlation = 0.815, $p = .000$), indicating that greater adoption of telemedicine is associated with improved access, quality, and efficiency of healthcare services. However, the strength of this association should be interpreted with caution due to the cross-sectional nature of the study and reliance on self-reported data collected from a single source. Since both constructs were measured using a structured Likert-scale questionnaire, the possibility of common method variance and conceptual overlap may have inflated the observed correlation. Nevertheless, all measurement scales demonstrated acceptable internal consistency, with Cronbach's alpha values exceeding 0.70. Although multicollinearity diagnostics showed VIF values within acceptable thresholds, confirmatory factor analysis was not conducted to further assess construct validity, which is acknowledged as a limitation of the study. Overall, the findings should be interpreted within these methodological constraints.

4.4 Discussion

Findings revealed that telemedicine improves access to healthcare services for a wide range of patients, enabling more timely and convenient consultations. In the same vein, systems theory emphasizes the interconnectedness of healthcare components, suggesting that integrating telemedicine strengthens the overall hospital system by linking patients, providers, and information flows more effectively. This is consistent with research by Adeghe et al. (2024), which has shown that telemedicine facilitates more effective clinical processes, improves service quality, and increases patient access. On the other hand, conflicting data from Atluri et al. (2022) emphasized issues including uneven patient involvement and variation in service quality, highlighting the necessity of meticulous digital platform development and administration. Telemedicine assists Haydom Lutheran, Mawenzi Regional Referral, and Mount Meru hospitals in streamlining appointment scheduling, lessening the stress of travel for patients from far-off places, and enhancing patient-provider contact. These hospitals can improve patient happiness, improve service delivery, and build a more robust and responsive healthcare system in the Northern Zone by fortifying these digital ties.

The study showed that telemedicine enhances the quality of care provided in hospitals and that telemedicine consultations are relatively easy to access, allowing patients to receive timely medical attention without the need for physical visits. In the words of Haleem et al. (2021), telemedicine is a useful adjunct to in-person consultations, especially in times of public health emergencies like pandemics when access to conventional medical services may be restricted. Telemedicine integration may assist hospitals like Haydom Lutheran, Mawenzi Regional Referral, and Mount Meru in preserving continuity of care, easing patient traffic, and boosting overall service effectiveness. Telemedicine enables healthcare professionals to access disadvantaged communities and better manage patient flow by offering an alternate platform for consultations. Additionally, this strategy encourages improved chronic condition monitoring and follow-up, guaranteeing that patients receive regular care in spite of logistical or geographic obstacles.

Findings depicted that telemedicine strengthens communication between patients and healthcare providers, allowing for more timely interactions and better sharing of medical information. In a similar vein, Budde (2021) observed that telemedicine improves communication, boosts operational efficiency in healthcare settings, and enables real-time access to patient data. This enhanced communication can help hospitals like Haydom Lutheran, Mawenzi Regional Referral, and Mount Meru make decisions more quickly, provide more coordinated care, and involve patients more fully. Without the limitations of in-person visits, telemedicine systems enable medical professionals to immediately address patient inquiries, modify treatment plans, and track progress. Additionally, this connectivity makes it possible for diverse teams to collaborate, which raises the standard and uniformity of treatment. Hospitals in the Northern Zone may improve patient-provider interactions and streamline the delivery of healthcare services by cultivating these digital communication channels.



The study found that telemedicine contributes to overall efficiency in healthcare service delivery by streamlining patient management and optimizing workflow processes. Similarly, Ezeamii et al. (2024) demonstrated that telemedicine improves patient health outcomes, reduces treatment costs, and enhances service efficiency. Telemedicine may assist hospitals like Haydom Lutheran, Mawenzi Regional Referral, and Mount Meru in better handling large patient loads while reducing needless hospital stays. These hospitals can save time for patients and healthcare professionals by facilitating remote monitoring, virtual consultations, and quicker access to medical advice. Furthermore, telemedicine facilitates more efficient resource allocation, freeing up staff members to concentrate on complicated situations that need face-to-face care.

V. CONCLUSION & RECOMMENDATIONS

5.1 Conclusion

The study concluded that telemedicine platforms play a significant role in improving healthcare access, enhancing service quality, and supporting overall efficiency in service delivery. These platforms are crucial in bridging the gap between patients and healthcare providers, particularly for those in remote areas, and contribute to timelier and coordinated care. Telemedicine also enables hospitals to manage patient flow more effectively, reducing pressure on physical facilities. Furthermore, it offers flexibility for both patients and healthcare staff, allowing consultations to occur without geographic or time constraints. Telemedicine supports the adoption of more innovative, patient-centered approaches in the delivery of healthcare services.

5.2 Recommendations

The study recommends that Northern Zone hospitals should expand and strengthen telemedicine platforms to improve access and quality of healthcare services. Hospitals should invest in training healthcare providers and patients to effectively use telemedicine systems, ensuring wider adoption and better utilization. Additionally, there is a need to improve the technological infrastructure, including reliable internet connectivity and user-friendly platforms, to support smooth telemedicine operations. Hospitals should also develop policies to integrate telemedicine with existing clinical workflows, ensuring consistency and efficiency in service delivery. Continuous monitoring and evaluation of telemedicine initiatives are recommended to identify challenges and implement improvements.

Future research should examine the long-term impact of telemedicine, electronic medical records, and health information exchange systems on patient outcomes and healthcare delivery in Tanzania. Studies could assess telemedicine effectiveness across specialties and demographics, explore adoption barriers, evaluate EMR's impact on efficiency and patient safety, and investigate HIE adoption factors such as interoperability, training, and data security. Comparative studies could identify best practices and guide policy for improving digital healthcare services.

Declaration of Interest

The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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