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Technological Infrastructure and Resource Availability: Telemedicine Adoption Drivers and Health Service Delivery in Murang'a County, Kenya

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ABSTRACT

Purpose: Health service delivery plays a vital role in determining the accessibility, efficiency, and quality of healthcare in Kenya. In Murang'a County, persistent challenges such as limited access to specialized care, long waiting times, and shortages of healthcare personnel, particularly in rural areas, continue to hinder effective service provision. To mitigate these challenges, the county government has initiated the adoption of telemedicine as a strategy to enhance access, efficiency, and quality of healthcare delivery. The study aimed to find out what motivates people to use telemedicine and how health services are provided in Murang'a County, Kenya. The specific adoption drivers considered in the study comprised of technological infrastructure and resource availability.

Methodology: To give a thorough theoretical framework, the study was based on the Resource-Based View Theory and Diffusion of Innovations Theory. A descriptive research design was employed, targeting a population of 40 health facilities across Murang'a county where telemedicine had been implemented. The units of observation comprised of one medical officer, one clinical officer, and one health records officer in each health facility. The study employed a purposive sampling approach to include 132 respondents. A standardized questionnaire containing 5-point Likert scale items was used in gathering primary data. A drop-and-pick method of data collecting was used in the study. The data was analyzed using a mix of descriptive (means and standard deviations) and inferential (correlation and regression analysis) statistics using SPSS v25 and Microsoft Excel. A multiple linear regression model was used to look at how different aspects of telemedicine adoption are linked to the way health services are delivered.

Findings: The results revealed that telemedicine adoption drivers comprising of technological infrastructure and resource availability positively and significantly influenced health service delivery in Murang'a County. This was shown through beta values of 0.337 and 0.251 with corresponding significant values of 0.000 and 0.000. According to the study's findings, increasing each telemedicine adoption driver by one unit increases the degree of health service provision with the corresponding units of the beta value.

Unique Contribution to Theory, Practice and Policy: In order to ensure effective and accessible service delivery, the study recommends investing in a strong technology infrastructure, and allocating more resources in order to increase the efficacy of telemedicine in Murang'a County.

Key Words: *Technological Infrastructure, Resource Availability, Telemedicine Adoption Drivers, and Health Service Delivery*

BACKGROUND OF THE STUDY

Telemedicine has been a ground-breaking technology in healthcare, changing the face of health care delivery. With the advancement of ICT, physicians can diagnose, treat, and monitor remotely their patients from telemedicine. According to Alqahtany et al. (2022), this is helpful to break down geographical barriers and optimize the efficiency of health care delivery Immutable. Telemedicine has grown from a medical innovation into an instrumental tool for enhancing healthcare systems and the delivery of health services in a time where there is an ever growing demand from patients, who have high expectations for quality and access to health care with escalating costs.

In Kenya, the use of telemedicine in the health sector has been on the rise as part of the digital transformation drive in healthcare. The Ministry of Health (MoH) eHealth Strategy (2016–2030) is arte and part policy akin the adoption of ICT-enabled health care delivery system for better access to service towards universal health coverage (MoH, 2017). Rising Smartphone Adoption, Increased Connectivity of Internet and Wider Mobile Coverage The wide use of smartphones enhanced internet connectivity and widespread mobile coverage have provided an enabling atmosphere for the adoption pace of telemedicine nationwide (Omondi, 2023). Large health facilities including The Nairobi Hospital, Kenyatta National Hospital, and AAR Healthcare have effectively adopted telemedicine platforms for improving patient consultations, chronic diseases management and sustaining the continuity of care (Kariuki & Wanjohi, 2022).

The use of telemedicine in counties offers a novel opportunity for improving service delivery, which is faced with challenges of shortages of health human resources, long travel distance to health facilities and limited specialty care. As telemedicine is increasingly being appreciated for its gains, there remains unequal dissemination across the counties and not only due to previous determinants but also to the level of technological infrastructure, provider readiness regulator system and patient awareness (Mugo & Kimani, 2024). Identifying the drivers of telemedicine adoption are therefore essential for increasing healthcare access, efficiency, and equitable service delivery effects.

Although previous research has focused on the implementation of telemedicine in urban private hospitals, there is little econometric evidence about how adoption drivers affect health service provision in Murang'a County. The study therefore aimed at determining influence of telemedicine drivers on health service delivery outcomes including Accessibility, service efficiency, and service responsiveness in Murang'a County, Kenya.

Health Service Delivery

Health service delivery describes how healthcare resources get changed into health services which lead to better health results for entire populations (World Health Organization, 2010). The process

of delivery operates through organizational systems which handle all aspects of preventive and curative and rehabilitative services while maintaining patient access and service efficiency and service delivery responsiveness to patient needs. The delivery systems of health services provide equitable access to care which enables continuous patient treatment through timely services that focus on their specific medical needs according to Kruk and Freedman (2008). The delivery of health services in Murang'a County plays a vital role in providing communities with urgent access to reliable medical services. The research study defines health service delivery through three main indicators which assess healthcare service accessibility and service delivery effectiveness and service delivery responsiveness.

Telemedicine functions as an essential system which enhances healthcare access by overcoming geographical barriers and eliminating travel expenses and enabling remote access to specialized medical services. The study defines healthcare services accessibility through telemedicine systems which allow Murang'a County patients to access qualified medical professionals and receive urgent treatment without needing to travel their distance to their location. Service efficiency exists when healthcare resources get used in their most effective way to produce maximum health results (WHO, 2010). The efficiency of a system requires complete elimination of all waste materials from the system while the system produces maximum results for every patient who receives care through the system. Health systems need to provide timely diagnosis and treatment and effective patient management with minimal resource requirements and time intervals.

Telemedicine demonstrates its operational benefits through its ability to digitize patient records and simplify the consultation procedure while it improves the collaboration between different healthcare specialists according to the research findings of Alami et al (2020) and Kiberu et al (2019). Healthcare systems demonstrate their responsiveness to meet patient requirements when they provide their services both quickly and skillfully (Murray & Frenk 2000). The healthcare system shows its responsiveness through non-medical functions which include how staff members communicate with patients, how quickly they provide assistance, and how well they treat patients with dignity and deliver dependable services. The level of responsiveness which exists in a healthcare system functions as a primary factor that influences how patients perceive their experience and how much they believe in the system.

The field of telemedicine measures responsiveness through three main aspects which include the speed of digital platform interactions between providers of healthcare and patients and the speed of conducting consultations and the procedure for managing follow-ups and referrals. The studies carried out by Donelan et al. (2019) and Alami et al. (2020) demonstrated that telemedicine systems which provide timely responses and continuous communication build patient trust while they perceive better quality care which leads to increased system usage. People in Murang'a County use telemedicine platforms to deliver their healthcare services which they assess through

three factors that include service delivery times and system dependability and proper treatment of patients. The system measures its responsiveness through its ability to meet patient requirements while delivering immediate assistance which doctors need for effective digital health service delivery to maintain patient satisfaction and continuous treatment.

Statement of the Problem

Health, Service Delivery remains a central pillar that controls healthcare systems in Kenya, as it forms accessibility, effectiveness, and quality of services against which citizens are offered. For instance, in Murang'a County, healthcare facilities have continued to experience challenges such as lack of adequate access to specialized care, long waiting times, and scarcity of healthcare personnel. To mitigate such challenges, the County Government of Murang'a has made some steps towards integrating digital health solutions, including the introduction of telemedicine services in selected hospitals. This was supposed to facilitate health services, low the number of patient referrals, and increase the efficiency of services given via remote consultation and online diagnostic services. However, all these efforts and initiatives have resulted in limited realization of the benefits of telemedicine.

However, many healthcare facilities in the county still experience difficulties in effectively implementing telemedicine systems due to infrastructural, technological, and human resource constraints. Other issues including poor internet connectivity, and funding have further reduced the pace of adoption and utilization. As such, patients in rural and underserved areas are still delayed in accessing quality health services and specialized medical consultation, thus defeating the purpose of health services delivery improvement (Wambui & Mugo, 2023). It is against this background that the study was carried out to determine how telemedicine adoption drivers comprising of technological infrastructure and resource availability influences health service delivery in the county.

The study is also motivated by research gaps that are identified in previous studies. For instance, Singh and Dev (2021) investigated the factors affecting telemedicine adoption and healthcare performance in India. However, the study was done in India creating a contextual knowledge gap as healthcare systems, technology infrastructure, and policy environments vary significantly from those in Kenya. In a similar study, Ukaoha and Egbokhare (2022) examined telemedicine and its role in facilitating healthcare delivery in rural communities in Nigeria. Since socio-economic and political variation exist between Nigeria and Kenya, their findings cannot be generalized to Kenyan context thus another contextual gap.

Ratemo and Juma (2025) focused on operational efficiency on the private hospitals in Kenya focusing on disruptive technologies like telemedicine, and artificial intelligence. However, the study emphasized operational efficiency in the private sector rather than focusing on the public

health sector's service delivery, thus creating a conceptual gap. Similarly, Amboyi et al., (2024) assessed technological capability and short-term competitive advantage with no specific focus on the influence of telemedicine on health service delivery outcomes, particularly among hospitals in Kenya.

Objectives of the Study

i. To determine the influence of technological infrastructure on health service delivery in Murang'a County, Kenya
ii. To determine the influence of resource availability on health service delivery in Murang'a. County, Kenya

LITERATURE REVIEW

Theoretical Review

Diffusion of Innovations Theory

Everett-Rogers, introduced the Theory, in 1962.The theory, which includes basic principles, provides essential guidance for understanding how people, organizations, and societies adopt new concepts and technological advancements (Dearing & Cox, 2018). The theory establishes essential stages that people and organizations must navigate when they assess and adopt new technologies for their activities. The phases of the process include knowledge, persuasion, decision-making, execution, and confirmation. The diffusion process depends on four factors which include perceived innovation attributes, communication channels, time factors, and social system organization (Riemer-Reiss, 1999).

The DOI Theory explains how technological infrastructure impacts health service delivery through its applications in telemedicine. The technological infrastructure of telemedicine includes its telemedicine platforms, communication networks, digital devices, and technical support systems. According to DOI Theory, innovations that exhibit clear relative advantage, that is those that are perceived to offer better outcomes than existing methods, are more readily adopted. A strong telemedicine system enables better healthcare services because it allows patients to access medical care without traveling and waiting in line while doctors and patients can talk instantly. The healthcare system of Murang'a County accepts telemedicine because its residents see more benefits from the technology (Cox, 2018).

The theory establishes compatibility as a measurement of how closely an innovation matches the values and needs of its users and their current working methods. Telemedicine systems require operational technologies that function together with current healthcare procedures and requirements of patients. The integration of telemedicine systems with hospital management software enables hospitals to maintain patient care while protecting data integrity. The

combination of dependable hardware and strong internet connection enables patients to communicate with medical professionals which leads to better service delivery and operational performance.

DOI Theory identifies two essential characteristics which require evaluation through their two major dimensions for evaluation. The telemedicine system becomes more attractive for healthcare providers and patients when its operation becomes simpler and more straightforward. The combination of technical support with training programs helps users to handle system difficulties because they can access maintenance help and problem resolution which creates system confidence. Healthcare workers need to test the system before using it because they require the ability to evaluate and enhance the system through trialability.

The DOI Theory establishes a requirement that organizations need to establish a strong technological system before they can successfully implement telemedicine in Murang'a County and enhance health services. The organization achieves better service delivery through its financial commitment to digital resources and communication systems which allows for customer support services. The theoretical framework of DOI theory establishes a foundation for researchers to study how technological systems enable telemedicine adoption which results in better health outcomes for residents in Murang'a County.

Resource Based View

The theory functions as a strategic management framework which demonstrates how internal company assets drive organizations to achieve better performance results. The theory which Birger Wernerfelt developed in 1984 and Jay Barney refined in 1991 demonstrates that organizations achieve sustainable success through their possession and use of unique and valuable assets which remain difficult to duplicate by competitors. RBV demonstrates how internal company resources allow organizations to provide their services through better and faster service delivery. The theory explains telemedicine implementation by showing how healthcare institutions use their internal resources to deliver patient care which meets accessibility and efficiency and responsiveness standards.

Murang'a County health service delivery depends on healthcare facilities which successfully allocate their essential resources for telemedicine system implementation. Telemedicine operations depend on tangible resources which include technological infrastructure and reliable internet connectivity and diagnostic equipment. The success of telemedicine systems depends on both human capital expertise and technological knowledge and institutional know-how. The RBV framework states that financial resources function as essential elements which enable organizations to obtain and sustain and enhance their telemedicine systems which include digital consultation platforms and secure data management systems and remote diagnostic tools. Financial

strength functions as a valuable resource which exists in rare supply because it enables healthcare organizations to extend their service delivery capacity while they achieve higher operational productivity according to Sabourin (2020).

The availability of resources depends on human resources which include healthcare workers and information technology experts who have received training in digital health systems. The RBV shows that human resources base their operations on permanent human capital which exists as a unique resource because it combines specialized skills with secret knowledge and work experience which competitors cannot easily copy according to Almarri and Gardiner 2014. The operating proficiency of telemedicine depends on how well these skills get handled and their respective applications which direct control healthcare services to achieve their expected outputs. Existing medical systems and telemedicine technologies need to have compatible operations because this aspect determines their entire operational efficiency.

The process of service delivery achieves better operational efficiency because seamless integration creates fewer interruptions and allows doctors to maintain continuous patient assessment throughout their medical activities. According to Nemati et al (2010) research shows that compatibility functions as an essential resource which healthcare organizations need to improve their service delivery performance while maintaining their ability to meet patient needs. The RBV shows that the necessary resources for Murang a County to implement telemedicine succeed because they meet all VRIN requirements. The resources of the organization create value by enabling healthcare delivery through cost-effective and timely access to medical services which patients can easily reach while the organization maintains a competitive advantage.

This is through its specialized infrastructure and expertise which exists as a rare asset and the organization costs business rivals too much to duplicate its resources and telemedicine resources of the organization which business rivals cannot substitute. These resources' alignment with the VRIN qualities demonstrates their critical role in promoting efficient, responsive, and inclusive health service delivery. The theory provides a solid theoretical foundation for comprehending how Murang'a County's health service delivery effectiveness is impacted by the availability of monetary, technological, and personnel resources. Healthcare businesses may improve accessibility by contacting patients remotely, boost efficiencies through automated workflows and real-time consultations, and raise responsiveness by ensuring timely medical interventions by proactively mobilizing and exploiting these unique resources. The hypothesis states that resource availability is not just a factor of operational capability but also a strategic enabler of improved health service delivery outcomes in the evolving telemedicine landscape.

Conceptual Framework

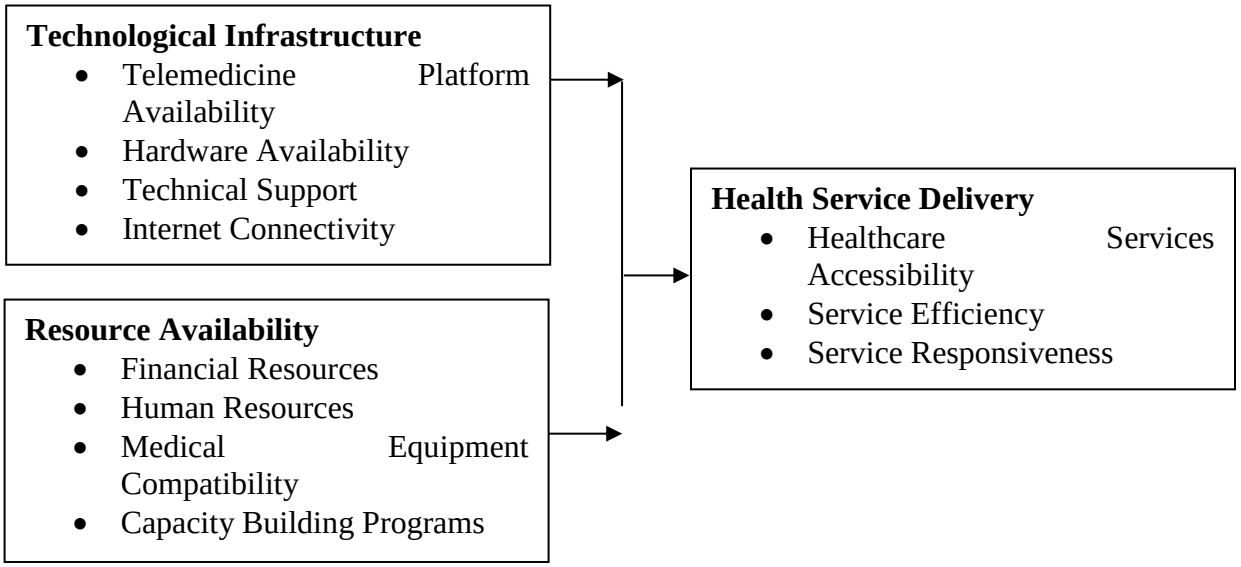

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

Research Design

A research design, a stated by Gorard (2013), is the framework, technique, or approach used to find answers to research questions. This research adopted a descriptive design. The design involves a systematic procedure of examining and portraying the behavior or characteristics of a subject without manipulating or altering them in any way. It is primarily concerned with explaining the "what" of a phenomenon, and it seeks to provide an accurate representation of variables, their distribution, and relationships as they naturally occur (Nassaji, 2015). The descriptive style is suitable since it makes it easier in gathering quantitative information about the current level of telemedicine adoption drivers and its relationship to health service delivery.

Target Population

According to Willie (2022), a target population is any group of individuals, objects, or events that have traits that the investigator has an interest in. A population is composed of a particular set of individuals, objects, activities, services, or homes that are the focus of the study, claim Casteel and Bridier (2021). There are 44 health facilities across the county where telemedicine has been implemented (Murang'a County Government, 2024). 40 of the health facilities were involved in the study. The observational units were one medical officer, one clinical officer and one health records officer in each health facility. The selected professionals are in the implementation,

utilization, and documentation of telemedicine services within the health facilities, thereby providing comprehensive insights into health service delivery.

Table 1: Target Population

Target Population	Population
Medical Officer	44
Clinical Officer	44
Health Records Officer	44
Total	**132**

Sample Size and Sampling Technique

Taherdoost (2016) perceives a sample as a portion of the population under study that accurately represents the population. Purposive sampling was used in the study. Purposive sampling, as explained by Etikan and Bala (2017), means carefully choosing participants based on their role, experience, or knowledge in a particular area. This enables the researcher to obtain rich and relevant information that directly addresses the research questions. The technique is justified by the fact the research targets individuals who are directly involved in telemedicine implementation and healthcare service delivery and possess firsthand knowledge and experience with telemedicine systems and their influence on service delivery outcomes.

Data Collection Instrument

Taherdoost (2016) perceives a data collecting instrument as a tool used by researchers to obtain precise and organized data that is pertinent to the study concerns. The primary information that was gathered for the study served as its foundation. The information was gathered using a 5-point Likert scale questionnaire. Five different anchors are used to respond to questions on the Likert scale, which is a type of interval scale. 6 sections made up the questionnaire. The first segment aims to collect background data on respondents, while the remaining five sections gathered data on the study's variables. The research tool is chosen for the study because of its affordability, increased anonymity, decreased biasing error and its accessibility to a broad geographical contact at a low cost.

Data Analysis and Presentation

Inferential as well as descriptive statistics were use in the study's analysis of the data gathered. The standard deviation and mean are examples of descriptive statistics. Regression and correlation analysis are types of inferential statistics that were used to check if there is a meaningful connection between the variables being studied. The statistics were generated using SPSS version 24 to determine whether the data indicated positive or negative relationships. A multivariate linear regression approach was used to evaluate the interaction among both independent and dependent variables. As noted by Mugenda and Mugenda (2013), this analytical approach helps assess the

extent to which a set of predictors can effectively forecast the outcome variable, thereby enhancing the precision of the predictions. The study's model is as illustrated below:

$$\boldsymbol{Y = a + \beta_1 X_1 + \beta_2 X_2 + \varepsilon}$$

Where:

Y=Health Service Delivery

X_1 = Technological Infrastructure

X_2 = Resource Availability

α=regression coefficient (constant)

β_1 and β_2= independent variables' coefficients

ε=error term

RESULTS

Response Rate

132 questionnaires were issued to the people involved in the study, which included Medical Officers, Clinical Officers, and Health Records Officers. Figure 2 shows how many people responded to the study.

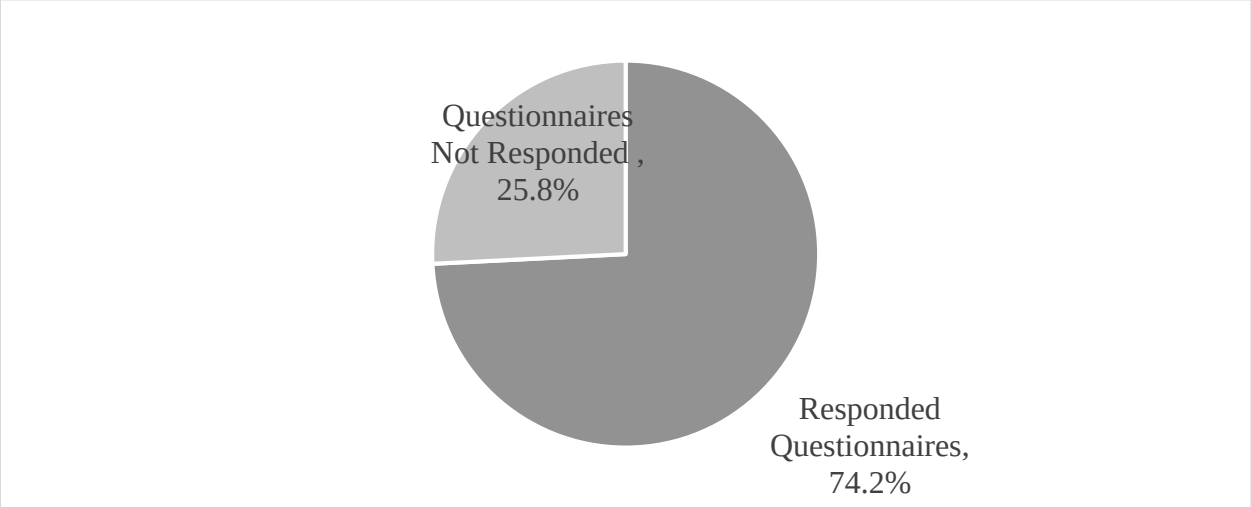

Figure 2: Response Rate

There were 98 completed questionnaires, with a 74.2% response rate. According to claims made by Mashall and Rosman (2021), who stated that a rate of response of more than 70% is appropriate for analyzing and drawing conclusions, the rate of response was deemed adequate for the study.

Descriptive Statistics

The distribution of responses to various questionnaire items across various factors was displayed in the study using descriptive statistics. Both means and standard deviations were used in the presentation of the descriptive statistics. The researcher evaluated the mean responses and associated standard deviations for each response. Conclusions were made using standard deviations and mean responses. If the mean was nearer 5, participants indicated more inclined to concur with the statement.

Respondents' neutral or moderate level of agreement was captured by a score mean of between 2.6 and 3.4; respondents' lower level of agreement with the statement was indicated by a mean closer to 1. Standard deviation measured the degree to which responses differed from the mean. A lower standard deviation showed that responses were closely clustered around the mean, whereas a higher standard deviation indicated greater response variability.

Technological Infrastructure

Table 2 outlines the descriptive statistics on technological infrastructure.

Table 2: Descriptive Statistics on Technological Infrastructure

Statements	Mean	Std.Dev
Our health facility has a reliable telemedicine platform for delivering remote healthcare services	3.276	1.498
The telemedicine platform integrates well with other hospital information systems	3.337	1.586
Our facility has adequate hardware such as computers, tablets, and cameras to support telemedicine operations	3.296	1.581
The facility has adequate backup power systems to support telemedicine sessions	3.306	1.516
There is adequate technical support available for troubleshooting telemedicine system issues	3.122	1.535
The technical team promptly responds to system failures or malfunctions	3.112	1.655
The health facility has a stable and high-speed internet connection for telemedicine operations	3.051	1.652
The internet connection is adequately secured to protect patient data during telemedicine sessions	3.051	1.621
Overall Response	**3.194**	**1.581**

The overall response as per the results on technological infrastructure and its influence on health service delivery was 3.194. This had the implications that respondents were generally neutral on

the various aspects of technological infrastructure. The standard deviation of 1.581 showed moderate variabilities on the responses. The results additionally revealed that respondents portrayed a neutrality with the notion that the health facility had a reliable telemedicine platform for delivering remote healthcare services (mean=3.276, std.dev=1.498), that the telemedicine platform integrated well with other hospital information systems (mean=3.337, std.dev=1.586) and that the facility has adequate hardware such as computers, tablets, and cameras to support telemedicine operations (mean=3.296, std.dev=1.581).

Respondents further showed neutral responses with the suggestions that the facility had adequate backup power systems to support telemedicine sessions (mean=3.306, std.dev=1.516), that there was adequate technical support available for troubleshooting telemedicine system issues (mean=3.122, std.dev=1.535) and that the technical team promptly responds to system failures or malfunctions (mean=3.112, std.dev=1.655). Respondents consequently showed neutrality stance with the statements that the health facility had a stable and high-speed internet connection for telemedicine operations (mean=3.051, std.dev=1.652) and that the internet connection was adequately secured to protect patient data during telemedicine sessions (mean=3.051, std.dev=1.621). In accordance with Parajuli and Doneys (2017), technological infrastructure such as mobile phones and video conferencing, significantly enhances health service delivery by reducing travel costs and enabling timely consultations.

Resource Availability

Table 3: presents the results.

Table 3: Descriptive Statistics on Resource Availability

Statements	Mean	Std.Dev
The facility has adequate budgetary allocation to support telemedicine initiatives	2.704	1.555
The facility experiences delays in funding that hinder telemedicine implementation	2.663	1.499
The facility has sufficient trained personnel to manage telemedicine operations	2.663	1.506
Staff are competent in using telemedicine systems effectively	2.724	1.591
The available medical equipment is compatible with telemedicine technologies	2.796	1.428
The facility provides regular training on telemedicine systems for healthcare staff	2.52	1.613
The facility collaborates with external organizations for capacity-building in telemedicine	2.714	1.526
Overall Response	**2.683**	**1.531**

According to the results presented in table 3, the statements on resource availability attained an overall response of 2.683 suggesting that respondents' opinions on the claims were impartial. The respondents' responses varied moderately, as demonstrated by the overall average standard deviation of 1.531.The results additionally revealed that respondents had a neutral stance on the

assertions that the facility had adequate budgetary allocation to support telemedicine initiatives (mean=2.704, std.dev=1.555) and that the facility experienced delays in funding that hinder telemedicine implementation (mean=2.663, std.dev=1.499). Similarly, the statements on whether the facility had sufficient trained personnel to manage telemedicine operations and whether staff were competent in using telemedicine systems effectively attained a neutral stance. This was depicted by a response mean of 2.663 and std.dev of 1.506 and mean of 2.724 and std.dev of 1.591 respectively.

Respondents further had a neutral stand with the statements that the available medical equipment were compatible with telemedicine technologies (mean=2.796, std.dev=1.428), that the facility provided regular training on telemedicine systems for healthcare staff (mean=2.52, std.dev=1.613) and that the facility collaborated with external organizations for capacity-building in telemedicine (mean=2.714, std.dev=1.526). The outcomes are consistent with research by Kyei et al. (2024), who found that resource availability such as infrastructure development and training facilitated telemedicine adoption. However, barriers such as high setup costs, and inadequate resources lead to resistance and limited utilization.

Health Service Delivery

Table 4 displays the results

Table 4: Descriptive Statistics on Health Service Delivery

Statements	Mean	Std.Dev
Telemedicine has improved patients' ability to access healthcare services regardless of their location	4.01	1.288
Patients are able to consult with healthcare professionals more conveniently through telemedicine platforms	4.02	1.362
The availability of telemedicine has minimized delays in receiving medical consultations	3.837	1.352
Telemedicine has improved the speed at which healthcare services are delivered in this facility	3.918	1.274
The adoption of telemedicine has reduced administrative workload in service delivery	3.673	1.383
Telemedicine has improved the overall productivity of healthcare staff	3.724	1.449
Telemedicine enables healthcare providers to respond promptly to patients' needs	3.827	1.34
Patients receive timely feedback and follow-up care through telemedicine services	3.929	1.294
Overall Response	**3.867**	**1.342**

The results displayed in table 4 shows that the aggregate score for the health care delivery statements was 3.867, indicating that every respondent agreed with the statements. Consequently,

the overall standard deviation of 1.342 depicted small variability amongst the responses on the statements on health service delivery from the respondents. The results further revealed that respondents agreed with the assertions that telemedicine had improved patients' ability to access healthcare services regardless of their location (mean=4.01, std.dev=1.288) and that patients were able to consult with healthcare professionals more conveniently through telemedicine platforms (mean=4.02, std.dev=1.362).

Additionally, respondents concurred with the claims that the availability of telemedicine had minimized delays in receiving medical consultations (mean=3.837, std.dev=1.352) and that it had also improved the speed at which healthcare services are delivered in this facility (mean=3.918, std.dev=1.274). The statements on whether the adoption of telemedicine had reduced administrative workload in service delivery and whether it had improved the overall productivity of healthcare staff attained an agreed stance (mean=3.673, std.dev=1.383 and mean 3.724, std.dev=1.449 respectively). There was further an agree stance with the statements that telemedicine enabled healthcare providers to respond promptly to patients' needs (mean=3.827, std.dev=1.34) and that patients received timely feedback and follow-up care through telemedicine services (mean=3.929, std.dev=1.294). The results were consistent with Levesque et al. (2013) who posited that the fundamental principle of equitable healthcare systems requires accessibility which depends on available services and their costs and the ability to reach services and the existing medical staff and healthcare facilities.

Inferential Statistics

The study incorporated the inferential statistics aiming at establishing presence of relationships amongst the independent and the dependent variables of the study. The inferential statistics comprised of the correlation analysis as well as the regression analysis.

Correlation Analysis

The nature of correlations between the independent and the dependent variables was assessed through the correlation analysis. Table 5 presents the results.

Table 5: Correlation Analysis

		Technological Infrastructure	Resource Availability	Health Service Delivery
Technological Infrastructure	Pearson Correlation	1		
	Sig.(2-tailed)			
	Sig. (2-tailed)	.086		
Resource Availability	Pearson Correlation	-.061	1	
	Sig. (2-tailed)	.275		
Health Service Delivery	Pearson Correlation	.512	.346	1
	Sig. (2-tailed)	.000	.000	
	N	98	98	98

Technology infrastructure and health services provision in Murang'a County, Kenya, are positively and significantly correlated, according to the findings shown in table 5. A correlation coefficient of 0.512, accompanied by a significance level of 0.000, demonstrates this relationship. The findings suggest that improving the technical infrastructure in Murang'a County, Kenya, leads to higher levels of health service delivery. Parajuli and Doneys (2017) revealed that technological infrastructure such as mobile phones and video conferencing, significantly enhances health service delivery by reducing travel costs and enabling timely consultations.

A correlation coefficient of 0.346 and a p-value of 0.000 showed that resource availability and health service delivery in Murang'a County, Kenya, had a positive and statistically significant association. According to these results, improving the availability of resources leads to higher levels of health service delivery in Kenya's Murang'a County. According to Venkataraman et al. (2024), resource availability, including reliable internet connectivity and comprehensive ICT training, significantly enhances telemedicine adoption. Conversely, resource deficiencies like unreliable connectivity and training gaps hinder adoption.

Multiple Regression Analysis

To determine what sort of association between the independent factors and the dependent variable, the study performed a multiple regression analysis at a 95% confidence level. Three outputs were produced by the analysis: the model summary, the ANOVA, and the model coefficient.

Model Summary

The model summary was used in the study to evaluate the extent to which health care delivery and telemedicine adoption drivers (technological infrastructure and resource availability) are related.

The model was also used to determine the percentage of the dependent variable that the independent factors accounted for. The results are shown in Table 6.

Table 6: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.705[a]	.497	.475	.638

Predictors: (Constant),Technological Infrastructure and Resource Availability

According to the results presented in table 6, there exists a moderately high relationship between telemedicine adoption drivers (technological infrastructure and resource availability) and health service delivery in Murang'a County. This was depicted by the R-value of 0.705. The coefficient of determination presented by the value of R-square was 0.497 implying that the independent variables comprising of technological infrastructure and resource availability accounts for 49.7% of health service delivery in Murang'a County.

ANOVA

To establish whether the model linking the dependent variable to the independent variables was statistically significant, the study conducted an analysis of variance (ANOVA).The results are shown in Table 7.

Table 7: ANOVA (Model Significance)

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	49.792	2	24.896	29.585	0.000[b]
Residual	79.943	95	0.842		
Total	51.735	97			

Dependent Variable: Health Service Delivery
Predictors:(Constant), Technological Infrastructure and Resource Availability

The model that linked the dependent variable with the independent variables was deemed appropriate for the investigation since, according to the data shown in table 7, the significant value was 0.000<0.05.

Model Coefficient

The model coefficient was incorporated in the study to indicate the direction of change in the dependent variable in response to variations in the independent variable. Table 8 presents the results.

Table 8: Model Coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**T**	**Sig.**
(Constant)	1.037	0.331		3.132	0.002
Technological Infrastructure	0.337	0.048	0.529	7.004	0.000
Resource Availability	0.251	0.054	0.346	4.632	0.000

Dependent Variable: Health Service Delivery

From the model coefficients, the optimal model of the study becomes:

Health Service Delivery = 1.037 + 0.337 (Technological Infrastructure) + 0.251(Resource Availability)

According to the results resented in table 8, technological infrastructure has a positive and statistically significant effect on health service delivery in Murang'a County, as evidenced by a p-value of 0.000 and a beta coefficient of 0.337.The findings suggest that a one-unit improvement in technological infrastructure leads to a 0.337-unit increase in the county's service delivery levels. According to Antonacci et al. (2023), a robust digital system equipped with reliable tools and easy-to-use functions greatly helps in serving more patients and delivering better healthcare services at remote locations.

The results further revealed that resource availability bear a positive and significant influence on health service delivery in Murang'a County. A significant value of 0.000 and a beta value of 0.251 illustrate this. The findings suggest that a one-unit increase in resource availability leads to a 0.251-unit rise in the county's service delivery levels. According to Almeman (2024), availability of adequate resources determines the reliability, efficiency, and reach of telemedicine systems.

CONCLUSION AND RECOMMENDATION

Conclusion

The study comes to the conclusion that while Murang'a County has technology infrastructure for telemedicine, it is not yet completely functional or optimized to greatly improve healthcare delivery. Nonetheless, the correlation and regression studies' positive and significant association demonstrates that infrastructure upgrades, including improved connectivity, system integration, and technical assistance, can significantly improve the provision of health services. Therefore, in order to fully reap the benefits of telemedicine, technological infrastructure must be strengthened and optimized.

The study comes to the conclusion that Murang'a County currently lacks adequate telemedicine resources, including financing, qualified staff, training, and technology support. Improving these resources, however, can greatly improve healthcare results, as seen by the strong positive and

substantial association between resource availability and health service delivery. For telemedicine to be implemented successfully and to improve service delivery, more funding and better resource allocation are therefore essential.

Recommendations

The study recommends that Murang'a County health authorities invest in strengthening and optimizing technological infrastructure for telemedicine by improving internet connectivity, upgrading telemedicine platforms, ensuring adequate hardware provision, enhancing system integration, and providing reliable technical support, since these improvements have been shown to significantly enhance health service delivery outcomes.

The study also recommends that the county government and relevant stakeholders allocate adequate financial, human, and technical resources toward telemedicine. This can be realized by investing in staff training, funding, and support systems, as improved resource availability significantly contributes to better healthcare service delivery outcomes.

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