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The Influence of ICT Infrastructure Support for Management of Essential Medicine Supply Chain in Health Facilities in Kenya

Robert Mugubi N. Nalebe [a*], Prof. George W. Odhiambo-Otieno [b], PhD, Dr. Caroline Kawila Kyalo, PhD [c]

[a] *Department of Health Systems Management, Kenya Methodist University, Kenya, bobnalebeson@yahoo.com**

[b] *Department of information Science , Health Records and Systems, Rongo University, Kenya*

[c] *Department of Health Systems Management, Kenya*

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A B S T R A C T

While application of ICT to support management of essential medicine supply chain in public facilities in Counties is increasing, full utilization of digitalization is slowed down by poor or inadequate ICT infrastructure, frequent system breaks down, lack of internet bundles and inadequate digital skills to support management of essential medicine supply chain at all levels of the health system. The aim of this study was to investigate the influence of ICT infrastructure support for essential medicine supply chain management in public healthcare facilities in Kenya. The study employed both quantitative and qualitative research design. The study sites were Kajiado, Makueni and Mombasa Counties. Simple random sampling and purposive sampling were used to identify respondents to the study. The research focused on medical professionals including medical officers, clinical officers, pharmacists, health records personnel, pharmaceutical technologists, and procurement officers, along with key informants selected from 11 level 4 and 3 level 5 public healthcare facilities across three counties. A total of 150 participants were selected using the formula devised by Nasiurma D.K (2000) at a confidence level of 95%. Quantitative and qualitative data were collected through a combination of 12 key informant interviews and 143 semi-structured questionnaires. The collected data underwent cleaning, transformation, and analysis using NVivo, Qualitative Data Analysis (QDA) Miner, and SPSS software. The study revealed that most public hospitals in Kenya do not have sufficient functional computers to support processing of digital information for managing essential medicine supply chain. The findings also reveal that while most public hospitals in the counties of Kajiado, Makueni and Mombasa have electricity connectivity, most of them do not have reliable internet to support inter computer connectivity and timely digital essential medicine information communication between units and departments for timely management of essential medicine supply chain process. The study is significant to all stakeholders because it provides evidence for strengthening ICT infrastructure and digitalization information processing and sharing to support efficiency in management of essential medicine supply chain.

Keywords: ICT infrastructure, management, essential medicine, supply chain, digital skills, digital health information.

1. Introduction

Significant global resources have been allocated to the development of digital health information systems to bolster evidence-based service delivery in the healthcare sector (Tulu et al., 2021). Several countries, including Slovenia, Estonia, the Netherlands, Denmark, Sweden, Norway, Finland, the United Kingdom, Scotland, and Wales, have successfully implemented digital health information systems with the capacity to collect, process, and disseminate information across various information systems (CIC, 2021). In 2017, European stakeholders in the medicine supply chain emphasized the importance of early detection of shortages of essential medicines through improved data infrastructure, access to essential medicines information, consistent reporting, and collaboration (European Association of Hospital Pharmacists, 2022).Governments in developing countries have also put efforts in developing digital health information systems (HISs) to facilitate real-time information dissemination however poor planning, fragmentation, and lack of integration have hampered successful implementation of the majority of HISs more specifically for managing essential medicines at the facility (Bagayoko et al, 2020). Consequently, two billion people globally suffer from preventable diseases and death due to lack of timely access to essential medicines (United Nations Human Rights Commission, 2015 and WHO, 2017). In Africa nearly 800,000 children under four years die of malaria yet early treatment with efficacious essential medicines could save lives (Management Science for Health, 2012). Diseases that can be treated or alleviated using cost effective essential medicines still are the main causes of disabilities and death in developing countries (Management Science for Health, 2012). While millions of people do not have regular access to essential medicines and those who manage to receive, receive either wrong or little treatment (ibid). Many patients in Africa, especially those from poor household face difficulties accessing essential medicines (Adebisi et al ,2022). African governments would therefore think about investment in effective digital information system, policies on digitalization and health workforce that can promote essential medicine availability at the hospital (Ogollah, et al, 2022). However, due to poor leadership, inadequate technical infrastructure, low levels of digital skill, lack of trained personnel, poor data quality and weak information analysis at facility level, information systems in Africa are incapable to produce information that can

effectively support the management of essential medicine supply chain (Ogollah et al, 2022, Khubone et al, 2020, Ohia et al, 2021, Jason,2021, WHO 2008, Nandikove, 2020 and Ibeneme et al, 2022). Within East African Region digital health information systems are characterized by fragmentation, information errors, duplications, and inadequate information to support essential medicine supply chain management (Ibeneme et al, 2022 and Neumark and Prince, 2021). However, despite these challenges in East Africa the use of mTrac, a mobile device, for medical data collection, analysis, and communication among health personnel has proven to be successful in Uganda.

Governments in developing countries have made efforts to develop digital health information systems (HISs) to facilitate real-time information dissemination. However, poor planning, fragmentation, and lack of integration have hindered the successful implementation of the majority of HISs, especially concerning the management of essential medicines at healthcare facilities (Bagayoko et al., 2020). As a result, an estimated two billion people globally suffer from preventable diseases and death due to the lack of timely access to essential medicines (United Nations Human Rights Commission, 2015; WHO, 2017). In Africa, nearly 800,000 children under four years old die from malaria, despite the fact that early treatment with effective essential medicines could save lives (Management Science for Health, 2012). Diseases that could be treated or alleviated with cost-effective essential medicines continue to be the primary causes of disabilities and death in developing countries (Management Science for Health, 2012). Unfortunately, millions of people lack regular access to essential medicines, and those who do receive treatment often receive incorrect or insufficient care (ibid). Many patients in Africa, particularly those from impoverished households, face challenges accessing essential medicines (Adebisi et al., 2022).

African governments should consider investing in effective digital information systems, as well as developing policies on digitalization and strengthening the health workforce to promote the availability of essential medicines in hospitals (Ogollah et al., 2022). However, due to poor leadership, inadequate technical infrastructure, low levels of digital literacy, a lack of trained personnel, poor data quality, and weak information analysis at the facility level, information systems in Africa are incapable of producing information that effectively supports the management of the essential medicine supply chain (Ogollah et al., 2022; Khubone et al., 2020; Ohia et al., 2021; Jason, 2021; WHO, 2008; Nandikove, 2020; Ibeneme et al., 2022). In the East African region, digital health information systems are characterized by fragmentation, information errors, duplications, and inadequate information to support essential medicine supply chain management (Ibeneme et al., 2022; Neumark and Prince, 2021). Despite these challenges, the use of mTrac, a mobile device, for medical data collection, analysis, and communication among health personnel has proven successful in Uganda.

2. Literature Review

According to GSMA Intelligence (2017), insufficient or underutilized Information and Communication Technology (ICT) systems for processing essential medicine information contribute to medicine stockouts in the healthcare sector. They also note that pharmaceutical companies and governments are increasingly investing in digital ICT to enhance the quantification, visibility, and availability of essential medicines, aiming to reduce stockouts. The benefits of digitalization in healthcare, as highlighted by GSMA Intelligence (2017), include real-time visibility of essential medicines, continuous monitoring of stock levels, and facilitating timely requisition and resupply of medicines. Ayad (2011) emphasizes the importance of computerized information technology systems in healthcare facilities, particularly in improving pharmacy inventory visibility and management. Abdulla et al. (2017) further assert that the use of electronic health information systems and ICT is essential for automating hospital operations, including drug management. Agarwal et al. (2018) suggest that the rapid global growth of information technology offers solutions to challenges related to essential medicine supply and stockouts. Bwana et al. (2014) highlights the role of ICT in facilitating communication between departments regarding medicine consumption demands and stockouts, thus improving coordination. Nkanata et al. (2018) add that ICT implementation in health facilities facilitates the capture and dissemination of quality information for planning purposes.

Furthermore, Tortorella et al. (2022) argue that ICT adopted by healthcare sector actors promotes digitization and connectivity of processes, medical supplies, and products. They emphasize that an ICT-driven approach enables reliable real-time management of digital information systems for medical supplies, supply chain management, patient diagnosis, and treatment. Michalski et al. (2015) stress the importance of computerization in the healthcare sector, noting its potential to bring improvements to the overall healthcare system of a country. Similarly, Panth and Charya (2015) highlight the critical role of computers in data collection and processing, making information accessible for education, healthcare professionals, and decision-makers. Michalski et al. (2015) reiterate that computerization is crucial in the healthcare sector for enhancing information management processes.

Muinga et al. (2020) and Selcuk (2023) assert that challenges such as theft of computers, inadequate supply of computer equipment, electrical power outages, and network equipment damage significantly impede the utilization of digital information systems in healthcare facilities in Kenya. Akhlaq et al. (2016) also observe that deficiencies in infrastructure, including computers, printers, and alternative power sources, as well as lack of electricity, hinder the successful implementation of digital health solutions in low- and middle-income countries (LMICs). Kerina (2018) points out technical barriers such as lack of metadata and standards, restrictive data formats, and absence of ICT technical solutions that hinder information dissemination and use in health facilities. However, the World Health Organization (2008) notes recent advances in ICT that have facilitated the presentation of complex information.

The competence of an organization in information technology (IT) measures its proficiency in adopting usable and efficient digital systems, technologies, and services (Duncan et al., 2022). Poor or inadequate capacity in ICT infrastructure, lack of internet access, and frequent breakdowns of the system impede the full utilization of ICT systems to support essential medicine supply chain management at the county government and facility levels (MoH Kenya Supply Chain Strategy 2020-2025). The strategy also acknowledges the inadequacy of ICT support infrastructure for essential medicine supply chain management at all levels.

Chen et al. (2019) and Moner et al. (2021) highlight the importance of reliable electricity for the operation of essential ICT-systems, medical equipment, and devices in healthcare. Moner et al. (2021) further notes that challenges with electricity supply commonly experienced in rural Sub-Saharan African healthcare facilities affect the operation of ICT infrastructure, medical equipment, and devices. Cahill et al. (2021) echo this sentiment by stating that only 28 percent of facilities in eight Sub-Saharan African countries had reliable access to electricity. Signe (2021) emphasizes that power outages in hospitals and clinics in rural Sub-Saharan Africa adversely affect the operation of digital information systems, ICT infrastructure, and medical equipment, with implications for essential medicine supply chain management and service delivery. Suhlrie et al. (2018) cite examples from Malawi where public health facilities are often connected to off-grid electricity systems compared to facilities managed by other entities. Aila and Kithuka (2021) and Muinga et al. (2020) note that inconsistent electricity supply challenges hinder the effective use of computers, data analysis, and health information critical for planning and service delivery.

Furthermore, Aila and Kithuka (2021) suggest that unreliable internet connections hamper the production, transmission, and efficient use of health information for planning and service delivery. Kuyo et al. (2020) report challenges at Uasin Gishu County hospitals related to the use of information from DHIS2, including unreliable internet connectivity, inadequate user skills, non-connected computers, and insufficient management support. Similarly, Kuyo et al. (2018) identify factors such as lack of computers, erratic internet connections, poor system knowledge, and insufficient human resource capacity that influence the utilization of information in DHIS 2 for planning and service delivery at facilities. Despite Kenya's regional leadership in ICT, internet connectivity, and mobile phone adoption, TFHC and AHB (2021) suggest that factors such as low levels of digital literacy and expensive internet data hinder the use of digital health information in planning for informed service delivery.

3. Methodology

A nested mixed-method research approach, integrating qualitative and quantitative methods, was employed to complement each other, ensuring comprehensiveness and providing an in-depth understanding of multifaceted phenomena. This approach aimed to address a shared research problem and draw common conclusions by gaining deeper insights into both contextual factors and numerical data. A correlation quantitative research design was utilized to gather and analyze numerical data, aiming to determine the extent of influence of digital health information on the essential medicine supply chain in public healthcare facilities in Kenya.

Data collection involved interviews with a representative sample population using semi-structured standardized questionnaires. The study population comprised clinical officers, medical officers, pharmacists, and health records and information officers from level 4 and 5 public healthcare facilities in Kajiado, Makueni, and Mombasa counties. The selection of these participants was guided by their roles within the health facility, particularly in relation to health information and essential medicines supply chain management.

A sample frame of 23 (20 level 4 and 3 level 5) public health facilities was established. A multistage sampling approach was utilized, with health facilities grouped into clusters based on county and tier/level of operation. Simple random sampling was then applied to select a sample from 12 level 4 public health facilities in Makueni County, 4 in Mombasa County, and 4 in Kajiado County as units of the study.

The sampling process involved subdividing the health facilities per county (cluster), followed by simple random sampling of level 4 public healthcare facilities per county. Subsequently, the number of human resources for health (clinical officers, medical officers, pharmacists, and health records and information officers) from the sampled public healthcare facilities in the three counties was determined. Finally, a random selection of key informants, including health records and information officers, medical officers, pharmacists, and clinical officers, was made for interviews. Key informants were purposively selected based on their roles in health information management and essential medicine supply chain management at the facility level.

Sample size calculation was performed using the formula by Nasiurma, D. K. (2000), where N represents the population, C is the coefficient of variation (0.5), e denotes the level of precision (0.05), and n represents the sample size.

$$n = \frac{NC^2}{1 + (N-1)\,e^2}$$

164 respondents (150 semi structured questionnaire and 14 key informants) from 14 sampled public healthcare facilities were sampled and participated in this study facilities. To ensure that information collected fitted into the aim of the study, purposive sampling was used to enroll an adequate number of respondents in relation to the roles in health information and essential medicine supply chain management at the facility level. The 150 participants were distributed as follows; 20 medical officers (Makueni 8, Kajiado 4 and Mombasa 8), 34 pharmacists (Makueni 06, Kajiado 8 and Mombasa 20), 30 clinical Officers (Makueni 12, Kajiado 6 and Mombasa 12), 16 health records and information officers (Makueni 6, Kajiado 3 and Mombasa 7), 20 procurement officers (Makueni 8, Kajiado 4 and Mombasa 8), 10 nurses (Makueni 4, Kajiado 2 and Mombasa 4), 8 pharmaceutical technologists (Makueni 3, Kajiado 2 and Mombasa 3), and 5 medical stores officers (Makueni 2, Kajiado 1 and Mombasa 2) responded to the semi structured questionnaire. Therefore, 143 respondents from the 14 participating public healthcare facilities completed the semi-structured questionnaires while 12 key informants were interviewed. In total, 155 participants out of the 164 targeted respondents took part in the study.

4. FINDINGS AND DISCUSSION

4.1 Descriptive Statistics

The respondents were requested to indicate their level of agreement on the statements on the influence of ICT infrastructure support on essential medicine supply chain management in public healthcare facility in Kenya. Results are presented in Table 1.

Table 1: Influence of ICT Infrastructure Support

Statements	strongly disagree	disagree	Neutral	Agree	strongly agree	Mean	Std. Dev
Your facility has enough functional computers to support digital information for managing essential medicine supply chain	11.80%	52.90%	10.60%	18.80%	5.90%	2.39	1.082
Your health facility has electricity connectivity to support ICT application of digital health information for management of essential medicine supply chain	1.20%	15.30%	1.20%	49.40%	32.90%	2.21	0.497
Your health facility has reliable internet to support digital health information for management of essential medicine supply chain	10.60%	45.90%	14.10%	17.60%	11.60%	2.52	0.762
Better management of essential medicine supply chain in this facility relies on ICT infrastructure for management of digital health information system	2.40%	1.20%	8.20%	64.70%	23.50%	2.18	0.796
Average						**2.325**	**0.784**

According to the results presented in table 4.19, a significant majority of the participants (64.70%) expressed disagreement regarding the adequacy of functional computers in their facilities to handle digital information for the management of essential medicine supply chains. Conversely, only 24.70% of the respondents agreed that their facilities possessed sufficient functional computers for this purpose. These findings underscore the prevalent inadequacy of functional computers in most public hospitals across Kenya, hindering their ability to manage essential medicine supply chains effectively using digital information. This observation aligns with the Ministry of Health's Kenya Supply Chain Strategy (2020-2025), which acknowledges an increasing but constrained adoption of ICT for managing essential medicine supply chains due to issues such as insufficient ICT infrastructure, frequent system failures, limited internet access, and inadequate digital skills at various levels of the healthcare system. Moreover, GSMA Intelligence (2017) highlights the detrimental impact of insufficient or underutilized ICT on essential medicine supply chains, often resulting in stockouts within the healthcare sector. While Abdulla et al. (2017) suggest that ICT infrastructure is pivotal for effective essential medicine supply chain management in Kenyan public healthcare facilities, the findings also indicate a prevalent absence of comprehensive digital health information systems in these facilities. Form the interviews, one respondent averred that *"ICT infrastructure for digitizing health information system in essential medicine supply chain has not been installed in the facility. Essential medicine supply chain processing is still paper based due to among other reasons the limited ICT infrastructure in public healthcare facilities .For the integrated end to end digital health system to be installed in public health facility and run efficiently, there is need to have ICT infrastructure including as computers, internet access and intranet at all departments to enable end-to-end communication"* . Another respondent postulated, "*In the current technological world, ICT infrastructure is essential in every sector. In our facility, ICT plays a key role in the management of medicine supplies. Yes, it's not a complete system yet but at least the supply chain department has ICT infrastructure."*

The investigation also discovered that a significant majority of participants (82.30%) confirmed the presence of electricity connectivity in their healthcare facilities to support the application of ICT for managing digital health information related to essential medicine supply chains. Conversely, only 16.50% of respondents disagreed with this assertion. These findings indicate that most public hospitals in Kenya are equipped with electricity connectivity. In contrast, Moner et al. (2021) found that only 28% of facilities across eight countries in sub-Saharan Africa had consistent access to electricity. Signe (2021) highlights that hospitals and clinics in rural Sub-Saharan Africa often experience power outages, negatively impacting the operation of digital information systems, ICT infrastructure, medical equipment, and ultimately affecting the management of essential medicine supply chains and service delivery.

Furthermore, the study investigated the availability of reliable internet connectivity in health facilities to support the management of digital health information related to essential medicine supply chains. According to the findings, a majority of respondents (56.50%) disagreed with the presence of reliable internet in their health facilities for this purpose, while only 29.20% agreed. These results indicate that most public health facilities in Kenya lack dependable internet connectivity to support digital health information management for essential medicine supply chains. This corroborates the observations of Aila and Kithuka (2021), who suggest that unreliable internet connections hinder the production, transmission, and efficient utilization

of health information for planning and service delivery. Kuyo et al. (2020) also identified challenges in Uasin Gishu County hospitals related to the use of information from DHIS2, citing factors such as unreliable internet connectivity (47.1%), inadequate user skills (48.6%), non-connected computers (36.7%), and insufficient management support (34.3%). Key informants interviewed in the study raised concerns about the consistency of internet access. As one of them stated, *"Internet interruptions are very common, for example, we lost internet for 2 months as we are transitioning from one provider to another."*

ICT infrastructure plays a crucial role in facilitating the effectiveness of digitized health information strategies aimed at supporting the management of essential medicine supply chains. A well-equipped hospital facility with computers, ICT devices, and a digital system ensures streamlined communication throughout the chain. However, the absence of key components like reliable internet connectivity undermines efforts to establish comprehensive digital systems for supporting essential medicine supply chain management.

According to the research findings, a significant majority of respondents (88.20%) recognized the dependency of improved essential medicine supply chain management on ICT infrastructure for digital health information system management. Only a small fraction (3.60%) disagreed with this assertion. These results underscore the widespread acknowledgment among public healthcare facilities in Kenya regarding the importance of ICT infrastructure for managing digital health information systems in the context of essential medicine supply chain management.

While many hospitals lack fully integrated end-to-end digital health information systems capable of supporting essential medicine supply chain management, healthcare facility management acknowledges the pivotal role such systems could play in enhancing supply chain management. ICT infrastructure enables the digitization of information, which in turn facilitates the management of essential medicine supply chains. A fully autonomous digital health information system can operate efficiently only when hospitals have sufficient ICT infrastructure in place.

Table 2: Health facility electricity and internet connectivity

Statements	**Yes**	**No**	**Mean**	**Std. Dev**	
Is your health facility connected to electricity supply from the Kenya Power grid supply to support digital health information system for management of supply chain?	97.60%	2.40%	1.98	0.152	
In your opinion does the connection to electricity in your facility support the use of digital health information system for management of essential medicine supply chain	90.60%	9.40%	2.88	0.391	
Does your health facility have a Generator for supplying electricity during black out from Kenya power supply to support digital health information system for management of supply chain?	96.50%	3.50%	1.96	0.186	
Does the absence of electricity in your health facility affect availability of digital health information for management of supply chain?	3.50%	96.50%	1.05	0.263	
Does your health facility have adequate internet connectivity to support use of digital health information system transmission of information for management of supply chain?	22.40%	77.60%	1.22	0.419	
Does lack of internet connectivity in your health facility affect the transmission of digital health information for effective management of supply chain?	88.20%	11.80%	1.88	0.324	
Average			**2.41**	**0.0995**	

The research also aimed to determine whether health facilities are connected to the national electricity grid, provided by Kenya Power, to support digital health information systems for supply chain management. From the results, an overwhelming majority of respondents (97.60%) confirmed that their health facilities are indeed connected to the national electricity grid, facilitating the use of digital health information systems for supply chain management. Only a small fraction (2.40%) disagreed with this. This indicates that public health facilities in Kenya are generally connected to the national electricity grid for this purpose, despite many lacking complete digital health information systems. Nevertheless, having this electricity connection in place suggests a smooth transition for implementing integrated end-to-end digital health information systems to support essential medicine supply chain management.

Additionally, the study revealed that the availability of electricity in health facilities supports the utilization of digital health information systems for essential medicine supply chain management, with a majority of respondents (90.60%) acknowledging this. A minority (9.40%) disagreed. This indicates that the electricity connection in most public health facilities in Kenya facilitates the use of digital health information systems for supply chain management, even though complete systems are not yet widely implemented.

Regarding preparedness for power outages, the study found that a large majority of respondents (96.50%) reported that their health facilities have generators to supply electricity during blackouts, ensuring continuous operation of digital health information systems for supply chain management. Only a small percentage (3.50%) disagreed with this. This suggests that most public health facilities in Kenya are adequately prepared for power outages, which is crucial for ensuring the effectiveness of digital health information systems in managing essential medicine supply chains.

When asked whether the absence of electricity in their health facilities affects the availability of digital health information for supply chain management, the majority of respondents (96.50%) answered negatively. This is primarily because most public health facilities in Kenya are connected to electricity and have backup generators to support their operations during power outages. However, a few respondents who answered affirmatively cited either a lack of electricity connectivity or absence of backup generators.

Furthermore, the study investigated the adequacy of internet connectivity in health facilities to support the transmission of digital health information for supply chain management. The findings revealed that a significant majority of respondents (77.60%) stated that their health facilities did not have sufficient internet connectivity for this purpose, while only 22.40% reported having adequate connectivity. This indicates that most public health facilities in Kenya lack sufficient internet connectivity to support the transmission of digital health information for supply chain management. Interviews conducted during the study revealed that although some hospitals had internet connectivity, it was often limited to specific departments rather than being available across all essential departments supporting essential medicine supply chains. This inadequacy in internet connectivity could potentially hinder the installation of digital health systems for supporting essential medicine supply chain management across public health facilities.

Finally, the study explored whether the lack of internet connectivity in health facilities affects the transmission of digital health information for effective supply chain management. The majority of respondents (88.20%) answered affirmatively, recognizing the importance of internet connectivity in facilitating the transmission of digital health information for effective management of essential medicine supply chains in most public hospitals in Kenya.

4.2 Correlation Analysis

Correlation analysis was carried out between ICT infrastructure support (independent variable) and essential medicine supply chain management in public healthcare facility in Kenya (dependent variable). Results are presented in Table 3.

Table 3: Correlation Matrix

		Essential medicine supply chain management in public healthcare facility in Kenya	**ICT infrastructure support**
Essential medicine supply chain management in public healthcare facility in Kenya	**Pearson Correlation**	**1.000**	**0.354****
	Sig. (2-tailed)		**0.000**
ICT infrastructure support	**Pearson Correlation**	**0.354****	**1.000**
	Sig. (2-tailed)	**0.000**	
**** Correlation is significant at the 0.01 level (2-tailed).**			

Results in Table 3 show that there was a positive and a significant association between ICT infrastructure support and essential medicine supply chain management in public healthcare facilities in Kenya (r=0.354, p=0.000). These findings agree with that of Gemma (2019), who found a positive relation between ICT and supply chain of medicine in Hospitals in Zambia.

4.3 Regression Analysis

The findings displayed in table 4.22 assess the suitability of the regression model in elucidating the phenomenon under study. It was determined that ICT infrastructure support serves as a significant variable in elucidating essential medicine supply chain management in public healthcare facilities in Kenya. This assertion is substantiated by a coefficient of determination, also referred to as R-squared, of 12.6%. This indicates that ICT infrastructure support

accounts for 12.6% of the variability observed in the dependent variable, which is essential medicine supply chain management in public healthcare facilities in Kenya.

Table 4: Model Fitness

Variables	Values
R	**0.354**
R Square	**0.126**
Adjusted R Square	**0.119**
Std. Error of the Estimate	**0.50537**

Table 4 displays the results of the analysis of variance (ANOVA). The findings indicate that the overall model achieved statistical significance. Moreover, the results suggest that ICT infrastructure support, serving as the independent variable, effectively predicts essential medicine supply chain management in public healthcare facilities in Kenya. This conclusion is corroborated by an F statistic of 20.405 and a reported p-value (0.000), which is less than the conventional significance level of 0.05.

Table 5: Analysis of Variance

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	**5.211**	**1**	**5.211**	**20.405**	**0.000**
Residual	**36.266**	**143**	**0.255**		
Total	**41.478**	**144**			

Regression of coefficient results is presented in Table 6

Table 6: Regression of Coefficients

	B	Std. Error	T	Sig
(Constant)	**2.035**	**0.306**	**6.648**	**0.000**
ICT infrastructure support	**0.379**	**0.084**	**4.517**	**0.000**

The regression coefficients analysis indicated a significant relationship between ICT infrastructure support and essential medicine supply chain management in public healthcare facilities in Kenya, with a correlation coefficient (r) of 0.379 and a p-value of 0.000. This suggests a positive association between ICT infrastructure support and the management of essential medicine supply chains. Similarly, Gemma (2019) observed a positive relationship between ICT utilization and medicine supply chain management in hospitals in Zambia.

$Y = 2.035 + 0.379X3$

According to the regression equation, a 0.379% change in ICT infrastructure support corresponds to a 1% change in essential medicine supply chain management in public healthcare facilities in Kenya, indicating a positive relationship between these variables. These findings align with those of Tshibanda (2022), who also observed a positive correlation between information technology and the supply chain of pharmaceutical departments within public hospitals in Johannesburg.

5. CONCLUSION

The findings indicate that a significant number of public hospitals in the counties of Kajiado, Makueni, and Mombasa lack sufficient functional computers to effectively process digital information for managing essential medicine supply chains. Additionally, while most of these hospitals have electricity connectivity, the majority lack reliable internet access, which hampers inter-computer connectivity and timely communication of digital essential medicine information between units and departments. Health facility management acknowledges the critical importance of adequate and reliable ICT infrastructure for the timely processing and management of essential medicine information and supply chains.

The study concludes that ICT infrastructure support for health information significantly influences essential medicine supply chain management in public healthcare facilities in Kenya. This conclusion is drawn from the significant relationship observed between ICT infrastructure support for health information and essential medicine supply chain management in these facilities.

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