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IMPROVING SERVICE DELIVERY THROUGH ELECTRONIC COMMUNICATION IN PUBLIC HOSPITALS IN KENYA

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Abstract

Quality healthcare service delivery has a significant influence on customer satisfaction, the burden of meeting health service costs, and the recovery of patients. Therefore, health facilities should make use of electronic health management systems to improve the quality of their service delivery in administration and patient care. The purpose of carrying out this study was to establish how Service Delivery can be improved through Electronic Communication in Public Hospitals in Kenya. A pragmatic research paradigm was employed coupled with Descriptive and correlational research design. The target population was all the 1207 professional staff working in Moi Teaching and Referral Hospital Eldoret and Kenyatta National Hospital Nairobi as well as 1841 outpatients treated in both hospitals between January and May 2020. To select the 341 respondents of the research, a stratified random sampling technique was used. The researcher used secondary and primary data. Semi-structured questionnaires were distributed to the respondents to allow for the collection of primary data. Qualitative data was analyzed with the help of thematic analysis. Inferential and descriptive statistics were used in the analysis of quantitative data. Descriptive statistics that were used include mean, percentages, frequencies, and standard deviation. Inferential statistics that were used are multiple regression analysis, correlation analysis, and univariate regression analysis. From the findings, the utilization of electronic communication had a positive influence on service delivery in public hospitals in Kenya as indicated by the regression coefficient of 0.715 (p-value=0.000). This implies that a unit improvement in the utilization of electronic records management would lead to a 0.715 improvement in service delivery in public hospitals in Kenya. Since the p-value (0.000) is less than the significance level (0.05), the null hypothesis was rejected and hence utilization of electronic records management has a significant influence on service delivery in public hospitals in Kenya. It can be recommended that health facilities in Kenya should improve the utilization of personal digital assistants, social media platforms, and local area networks to improve service delivery through reduced queuing and turnaround time.

Key Words*: Electronic communication, Service Delivery, Public Hospitals.*

Introduction

Despite the use of information technology (IT) by many sectors around the world, the health sector has been left behind in taking advantage of IT to improve its communications, services, knowledge, efficiency, quality, and outcomes (Murtuza and Bakshi, 2012) Today health sector is characterized by innovations and it is obvious that IT plays an essential role in the provision of the best care to those who need it. Information technology has been used in multiple instances to improve the quality and access to healthcare, streaming operational efficiencies, and lowering the overall cost of service delivery in healthcare facilities. Business process management and clinical automation are trends in the globe that affect both developing and mature healthcare markets (Duplaga, 2012). The reasons why IT should be used in the health sector include its potential to achieve the provision of quality care, manage the patients in hospital and their data, reduce the use of paper-based systems and the legacy and complexity in such systems, increase compliance with health regulations, enhance security around patient confidentiality and availability of information to allow for improved care (McCullough et al., 2010; Cline and Luiz, 2013).

Communication in the healthcare setting has continued to change especially due to many electronic means of communication that have emerged (Schabetsbergera et al., 2006). Today patients can learn more about health as they access easily information via such means as the Internet. Additionally, those who give healthcare services are also able to get educative information from clinical practice guidelines and reference materials that are found online (Hernandez-Jayo et al., 2015). As indicated by Ross (2004) clinicians can easily access lab test results and patient records electronically in addition to placing orders using systems that have integrated medical records. The health care professionals can also communicate electronically with patients and provide them with personal care via means such as emails or by using electronic devices such as tablets, mobile phones, computers, bar coding scanners, monitoring devices, and smartphones to communicate with the patients and other employees of the health care facility (Broussard & Broussard, 2013).

The healthcare system in Kenya is characterized by poor provision of services although the Ministry of Health advocates for the provision of quality health services in Kenya (Achia and Mageto, 2015). Currently, long queues of patients awaiting services and overcrowding are common phenomena in public hospitals. The average life expectancy in Kenya is 61.08 years, which is lower than the global life expectancy (68 years) (World Health Organization, 2015). In addition, maternal mortality in the year 2015 was 510 per 100,000 live births. Although this was a decrease from 605 per 100,000 live births, this is still high compared to developed countries' average maternal mortality ratio of (239 per 100,000 live births). In the United States, Celik, Sahin, and Aydin (2014) found that the utilization of e-communication leads to an increase in the quality of healthcare service delivery in terms of efficiency and reduction of medical errors. In Ghana, Achampong (2012) found that the utilization of electronic communication led to a reduction in the cost of service delivery. However, despite the slow utilization of e-communication in Kenya and poor healthcare service delivery, there is little empirical evidence showing the influence of utilization of electronic communication on service delivery in public hospitals. It is against this background that this study sought to establish how Service Delivery can be improved

through Electronic Communication in Public Hospitals in Kenya.

The researcher sought to test the following alternate hypotheses:

$H_1 1$: Utilization of electronic communication has no significant influence on service delivery in public hospitals in Kenya.

Literature Review

Utilization of Electronic Communication and Service Delivery in Public Hospitals

Delivering quality healthcare services has a significant influence on customer satisfaction costs and the recovery of patients. Medical healthcare services include services that are provided by physicians, hospitals, dentists, pharmacies, durable medical equipment, and vision. Medical healthcare services that are delivered in hospitals include emergency service, inpatient care, work-related medical services, medical rescue service, rehabilitative care, dispensary care, preventive care, and provision of medicines and medical devices (World Health Organization, 2015). Quality of health care services may take the form of interpersonal and technical quality, and amenities. Technical quality is how effective the care is in coming up with achievable quality services. Interpersonal quality is the accommodation available for the patients and whether the facility can meet their preferences. Amenities are the features that the organizations that provide the needed services have such as comfort, physical surroundings, and the way the health facility provides its services (World Health Organization, 2015).

The measures of health service delivery include maternal life expectancy, child mortality rate, mortality rate, and cost of health care (Aksan, Ergin, and, Ocek, 2010). The quality health measures of service delivery can assess care across the world and fall into categories such as structure, process, outcome, and patient experience. Health expectancy is highest in Japan (82 years), Australia (82 years), and Canada (80 years). In Africa, the life expectancy in Tanzania, Uganda, and Ghana is 63 years, 59 years, and 63 years respectively. The average global life expectancy is 68 years, which is higher than the life expectancy in Kenya (61.08) (World Health Organization, 2015).

Communication in healthcare is no longer the same because of the changes that have been brought about by electronic systems (Aqil-Burney, Mahmood and, Abbas, 2010). Through electronic communication, patients are easily able to get health information on the internet although it can be hard for them to judge the most reliable sources of the information. Health caregivers are also able to access online information in terms of reference, materials, and guidelines on the best clinical practices (Kripalani et al., 2017). Through electronic communications, clinicians can look at their patients' records and the results of lab tests in addition to placing orders in the electronic systems that can integrate the patients' medical records. Additionally, electronic communications ensure that care providers can directly communicate with their patients and give individualized treatment by use of email consultation.

Communication using electronic gadgets is changing the face of health care. There are numerous providers using email for better coordination of the care they give to their patients. Margalit *et al.* (2016) found out that healthcare providers in the same facility can better communicate using electronic mail. Electronic communication is beyond communication between different care providers caring for the same patient. Radiologists located in India can now look at MRIs and X-rays that are transmitted from

sites in the United States (Baumgart, 2015). Electronic transfer of images using new wireless fidelity systems has evolved to the point that it now takes less than 4 seconds, while it previously took nearly one hour to transmit a mammogram.

In some states, networks in telemedicine are being put in place to give consultation in different health specialties including surgery, behavioral health, Radiology, oncology, psychiatry, pharmacy, and pathology among others (Aqil-Burney, Mahmood and Abbas, 2010). Computer systems that are integrated allow care providers to get patient-specific information from different sites and sources (Baptist et al., 2011). Pharmacy services can now be provided in rural remote areas or inner cities with no pharmacist around but when the medicine is dispensed remotely by an offsite pharmacist who keeps on checking and authorizing the provision of the medicine. If there are any questions from the patients they can be answered using audiovisual contact with the pharmacists (Baumgart, 2015).

The use of electronic communication between nurses and their patients can be said to still be in the infancy stage but the benefits of using technology in this area are many patients also are positive that they can make use of this form of communication (Kripalani *et al.,* 2017). There has been increased interest in the use of emails by patients when communicating with physicians. For instance, 80% of the patients found in family clinics agreed that they would prefer to use this method adding that their email address was most unlikely to change compared to their telephone numbers or home address (Free et al., 2013). According to study findings, the use of email communication is an effective method for patient-to-physician communication. Email communication benefits include informed decision-making, increased efficiency, and better patient-provided communication. All these benefits affect the behavior of the patient and in the end the provision of care (Weiner, 2012).

The use of social networks such as Twitter and Facebook is not common in health provision however this is a communication strategy that can be utilized (Niiland *et al.,* 2011). Due to the newness of using social networks as a form of e-communication among healthcare professionals, it is hard to choose if the message passed across is productive and appropriate. Some healthcare facilities have set up clear policies on the use of social networks for communication to protect their facilities, patients, and employees (Allen *et al.,* 2018).

In a study on factors influencing the provision of health care service delivery in Kenya, Akacho (2014) made use of a census research design to do the surveys that targeted the total employees who worked at Uasin Gishu District Hospital. According to the findings, poor communication channels significantly affected the delivery of quality healthcare services in Uasin Gishu District Hospital. The study also found that the challenges faced by staff in terms of communication negatively affected the access to treatment, the patient's ability to participate in preventive care, the provision of consent by patients' loved ones, the ability of the care providers to meet ethical obligations, healthcare quality including medical errors, hospital admission, patient safety, follow up quality, diagnostic testing and care for mental health patients.

Theoretical Framework

General System Theory (GST) was originally founded by Hungarian biologist Ludwig von Bertalanffy in 1972 (Von Bertalanffy, 1972). From a biological perspective, the theory considers an organism as an integrated system of interdependent structures and functions. A biological organism consists of

cells and cells are made of molecules that are expected to work in harmony for the successful functioning of the organism (Peery, 1972).

From a sociological perspective, system theory is the trans-disciplinary approach of an organization. A sociological system comprises four things, namely; objects, attributes, internal relationships among objects, and environment (Kast and Rosenzweig, 2011). According to Zenko et al. (2013), objects are considered to be parts, variables, or elements, in a system. Attributes are the properties, characteristics, or qualities of a system and its objects. Every system has internal relationships that exist among its objects. In addition, a system exists in an environment (Zenko *et al.*, 2013). A system, therefore, can be defined as a set of objects of things that influence each other in the environment and end up forming a bigger pattern that is unique from each of the other parts.

An important concept of general systems theory is how much focus it puts on interactions and relationships between objects. Another key concept is the difference between isolated, closed, and open systems (Chuang and Inder, 2012). Open systems are characterized by exchanges of information and matter in the external environment. On the contrary, in a closed system, there is no exchange of matter and information with the external environment. Further, in an isolated system, there is no exchange of elements (Rivard, Lapointe, and Kappos, 2011).

A healthcare facility is an open system that comprises various departments and personnel and is highly influenced by the external environment (Rivard, Lapointe and, Kappos, 2011). Departments in a healthcare facility may include the laboratory, outpatient department, wards, administration, billing department, pharmacy, and cleaning department. In addition, a healthcare facility has various personnel that are characterized by different specialties. For a healthcare facility to achieve efficiency and effectiveness in service delivery effective communication between various departments and healthcare personnel is of paramount importance (Kirkpatrick et al., 2013). Effectiveness and efficiency in service delivery is not an outcome of one department but a result of interaction between various departments. Information technology improves communication between various departments. Therefore, the utilization of electronic communication is likely to improve efficiency and effectiveness in service delivery.

Conceptual Framework

The researcher sought to assess the influence of electronic communication on service delivery in public hospitals. The dependent variable was service delivery in public hospitals and the independent variable was electronic communication. In addition, the utilization of electronic forms of communication enables the sharing of sounds, writing, data, signals, and images sent via an electronic device, which increases efficiency in service delivery.

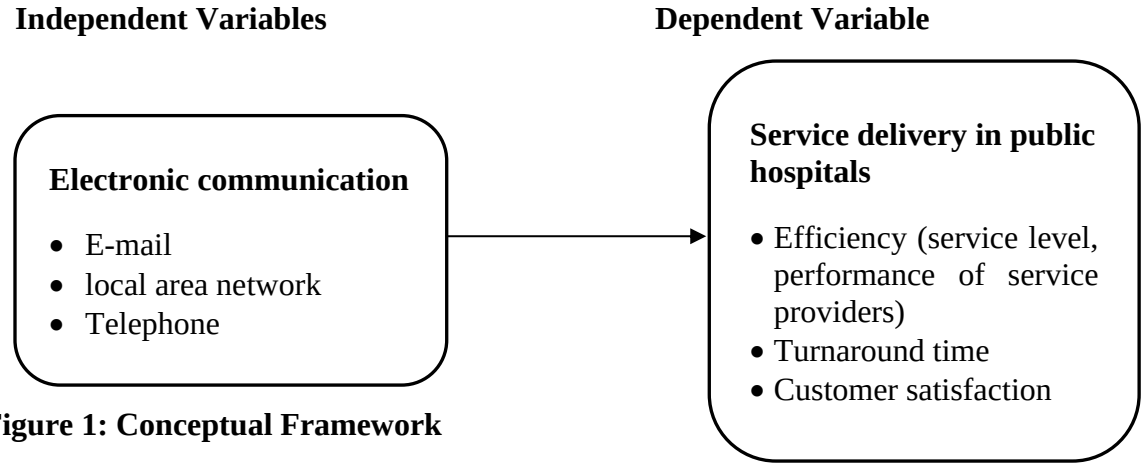

Figure 1: Conceptual Framework

Research Methodology

The pragmatism paradigm was adopted for this study and hence the study combined both qualitative and quantitative research methods. In addition, the study used a mixed-method research design, descriptive research design, and correlational research design. The target population was made up of all the professional employees working at Moi Teaching and Referral Hospital and Kenyatta National Hospital. The employees included medical specialists/consultants, medical doctors, nurses, pharmacists, clinical officers, medical physicists, laboratory technicians, public health officers, nutritionists, accountants, dentists, and registrars. According to Kenyatta National Hospital (2015) report, there were 760 staff working in the hospital in various departments. Moi Teaching and Referral Hospital's (2015) annual report indicates that the hospital has 438 staff working in various departments. The target population included 1381 outpatients treated in KNH per day and 460 outpatients treated in MTRH per day. The target population was therefore 3048.

The Sample size was chosen with the help of Krejcie and Morgan's sample size determination formula.

The formula used for these calculations was:

$$n = \frac{x^2 NP(1-P)}{\left(ME^2(N-1)\right) + (x^2 P(1-P))}$$

Where:

n=sample size

x^2=Chi-square for the specified confidence level at 1 degree of freedom

N=Population size (0.5)

Desired margin of Error (Expressed as a proportion)

$$n = \frac{1.96^2 3048 * 0.5 * 0.5}{(0.05^2 * 3047) + (1.96^2 * 0.5 * 0.5)}$$

$$n = 341$$

The study used consecutive sampling to select the outpatients. In addition, a stratified random sampling method was used to select a sample of 341 staff from the target population. Proportionate sampling was used to select the number of staff per category (strata).

Table 1: Sample Size

	Target population			Sample Size		
	KNH	**MTRH**	**Total**	**KNH**	**MTRH**	**Total**
Medical Specialist/Consultants	65	45	110	7	5	12
Medical Doctors	123	54	177	14	6	20
Nurses	208	56	264	23	6	30
Pharmacists	21	18	39	2	2	4
Clinical Officers	43	32	75	5	4	8
Medical Physicists	12	11	23	1	1	3
Laboratory Technicians	87	76	163	10	9	18
Public Health Officers	16	15	31	2	2	3
Nutritionists	65	45	110	7	5	12
Accountants	19	16	35	2	2	4
Dentists	54	32	86	6	4	10
Registrars	43	38	81	5	4	9
IT Staff	7	6	13	1	1	1
Outpatients	1381	460	1841	155	51	206
Total	**2144**	**904**	**3048**	**240**	**101**	**341**

The study used primary data, which was collected by use of key informant interview guides and semi-structured questionnaires. A pilot test was done to test the research instrument's validity and reliability. In this study pretesting involved 34 staff (10% of the sample size) in Mbagathi District Hospital. The improvement of validity was achieved by the use of expertise from 3 professionals in the field of study who gave recommendations to improve the questionnaire, particularly the supervisors. The reliability of the questionnaire was quantified using Cronbach's alpha. This measures internal consistency and was used to test the instruments' internal reliability.

The research instruments generated both qualitative and quantitative data. Qualitative data from the open-ended questions and interview guide was analyzed using thematic analysis. The findings were presented in a narrative form. Quantitative data analysis involved inferential and descriptive statistics and was conducted with the assistance of the Statistical Package for Social Sciences (SPSS version 22). Descriptive statistics included mean, standard deviation, percentages, and frequencies. Multivariate regression analysis and Pearson's Product Moment Correlation analysis(r) were used to test the relationship between the study variables.

The regression model used was as follows;

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Whereby;

Y = Service delivery in public hospitals

B_0 = Constant

β_1 =Coefficients of determination

X_1 = electronic communication

ε = Error term

Research Findings and Discussions

Out of 341 questionnaires that were distributed, 125 questionnaires were received from the personnel and 195 questionnaires were received from outpatients. The drop-off and pick-up-later method yielded a high response rate of 93.84%. Kothari (2012) indicates that a response rate of 50% should be considered average, 60% to 70% considered adequate while a response rate of above 70% should be regarded as excellent. This implies that the response rate of 95.65% was adequate for analysis, conclusion, and reporting.

Service Delivery in Public Hospitals

Service delivery in public hospitals was the dependent variable and was measured by the use of efficiency (average time of service delivery), turnaround time, and customer satisfaction. The outpatients in Moi Teaching and Referral Hospital and Kenyatta National Hospital were requested to indicate their agreement level on various aspects of service delivery in public hospitals. With a mean of 4.041 (Std. dv = 2.292), the outpatients agreed that the hospital ensured proper services were provided to the patients. They also agreed that the hospital has well-trained and experienced doctors and nurses who provide health services as shown by a mean of 4.030 (Std. dv = 0.896). These findings are in line with Lee et al. (2016) findings that health facilities employed competent staff who were responsive to the needs of the patients. Moreover, they agreed that the hospital provided a clean and conducive environment for the patients as shown by a mean of 3.953 (Std. dv = 0.915). Besides that, they agreed that the hospital provided high-quality services to the patients as shown by a mean of 3.933 (Std. dv = 0.963).

In addition, they agreed that the hospital provided all the key health services required by patients as shown by a mean of 3.800 (Std. dv = 0.997). With a mean of 3.764 (Std. dv = 1.018) they agreed that the hospital ensured customers were satisfied with its services. Further, they agreed that the hospital provided timely service delivery to the patients as shown by a mean of 3.594 (Std. dv = 1.159). These findings are contrary to Musila's (2011) findings that most of the health facilities in Kenya offered low-quality services and the hospitals did not provide a clean and conducive environment for the patients. They also agreed that the waiting time in the hospital is low as shown by a mean of 3.549 (Std. dv = 1.189). However, they moderately agreed that there was a queuing of patients in the hospital as shown by a mean of 3.333 (Std. dv = 1.338).

Table 2: Service delivery in public hospitals (Outpatients)

	Mean	Std. Deviation
The hospital ensures customers are satisfied with its services	3.764	1.018
The hospital provides timely service delivery to the patients	3.594	1.159
There is a queuing of patients in our hospital	3.333	1.338
The waiting time in the hospital is low	3.549	1.189
The hospital provides all the key health services required by patients	3.800	0.997
The hospital has well-trained and experienced doctors and nurses who provide health services	4.030	0.896
The hospital provides a clean and conducive environment for the patients	3.953	0.915
The hospital ensures proper services are provided to the patients.	4.041	2.292
The hospital provides high-quality services to the patients.	3.933	0.963
Composite Mean	**3.777**	**1.196**

The personnel in Moi Teaching and Referral Hospital and Kenyatta National Hospital requested to indicate their agreement level on various aspects of service delivery in public hospitals. From the findings, the health personnel agreed with a mean of 4.360 (SD =0.901) that the hospitals ensure proper services are provided to the patients. They also agreed with a mean of 4.312 (SD=.874) that the hospitals have well-trained and experienced doctors and nurses who provide health services. In addition, the health personnel agreed with a mean of 4.232 (SD=0.951) that the hospitals provide a clean and conducive environment for the customers. Further, they agreed with a mean of 4.224 (SD=0.998) that the hospital staff is well dressed, clean, and neat portraying the image of the hospital. Also, the health personnel agreed with a mean of 4.224 (SD=1.014) that their hospitals ensure the patients get value for their money.

With a mean of 4.168 (SD=1.068), the health personnel agreed that their hospitals provide timely service delivery to the patients. They also agreed with a mean of 4.144 (SD=0.973) that the revenue in the hospitals has been increasing over the years. In addition, the personnel agreed with a mean of 4.120 (SD=0.955) that the hospital provides all the key health services required by patients. Further, they agreed with a mean of 4.088 (SD=1.164) that the hospitals ensure customer satisfaction. Also, they moderately agreed with a mean of 3.192 (SD=1.248) that there is no queuing of patients in their hospitals. The findings are contrary to Wanjau, Muiruri, and Ayodo's (2012) findings that public healthcare facilities in Kenya are characterized by long queues, inefficiencies in service delivery, and high cost of service delivery.

Table 3: Aspects of Service Delivery (Personnel)

	Mean	Std. Deviation
Our hospital ensures customer satisfaction	4.088	1.164
Our hospital provides timely service delivery to patients	4.168	1.068
Our hospital ensures the patients get value for money	4.224	1.014
The revenue in the hospitals has been increasing over the years	4.144	.973
There is no queuing of patients in our hospital	3.192	1.248
The hospital provides all the key health services required by patients	4.120	.955
The hospital has well-trained and experienced doctors and nurses who provide health services.	4.312	.874
The hospital staff are well dressed, clean, and neat portraying the image of the hospital.	4.224	.998
The hospital provides a clean and conducive environment for the customers	4.232	.951
The hospital ensures proper services are provided to the patients.	4.360	.901
Composite Mean	**4.106**	**1.014**

Utilization of electronic communication

The indicators of the utilization of electronic communication included the use of e-mail, local area network, and telephone. The outpatients and health personnel in Moi Teaching and Referral Hospital and Kenyatta National Hospital were also requested to specify whether the healthcare professionals in the hospital used electronic means to communicate. The personnel were asked to indicate the electronic communications used in Hospitals. From the findings, 82.4% indicated that electronic communications used include mobile phones, 72.8% indicated emails, 56.8% indicated local area networks, 26.4% indicated Personal digital assistants and 24.0% indicated Social media platforms.

These findings imply that emails were the most commonly used electronic communications followed by local area networks, mobile phones, personal digital assistants, and social media platforms. These findings are in agreement with Broussard and Broussard's (2013) findings that healthcare providers frequently use electronic devices such as tablets, mobile phones, computers, bar coding scanners, monitoring devices, and smartphones to communicate with the patients and other employees of the health care facility.

Table 4: Electronic Communications used by healthcare professionals

	Frequency		Percent	
	Yes	**No**	**Yes**	**No**
Emails	91	34	72.8	27.2
Local Area network	71	54	56.8	43.2
Mobile phones	103	22	82.4	17.6
Personal digital assistants	33	92	26.4	73.6
Social media platforms	30	95	24.0	76.0

The outpatients in Moi Teaching and Referral Hospital and Kenyatta National Hospital were requested to indicate their agreement level on various aspects of electronic communication in public hospitals. With a mean of 4.169 (Std. dv = 0.757) the outpatients agreed that improved communication has led to improvements in service delivery. They also agreed that the hospital used a telephone network to enhance communication as shown by a mean of 4.153 (Std. dv = 0.757). The findings also agree with Margalit et al. (2016) findings that healthcare providers in the same facility can better communicate using electronic mail, mobile phones, and local area networks. Moreover, they agreed that the hospital has integrated computer systems as shown by a mean of 4.112 (Std. dv = 0.784). With a mean of 4.056 (Std. dv = 0.0874) they agreed that the hospital used electronic communications that have led to easy accessibility of patient records by clinicians. Besides that, they agreed that the use of mobile technologies has improved service delivery as shown by a mean of 4.046 (Std. dv = 0.937). These findings are in agreement with Broussard and Broussard's (2013) findings that healthcare providers frequently use electronic devices such as tablets, mobile phones, computers, bar coding scanners, monitoring devices, and smartphones to communicate with the patients and other employees of the health care facility.

In addition, they agreed that the health facility has adopted information technology in communication as shown by a mean of 4.046 (Std. dv = 0.788). They also agreed that the hospital used electronic communication to improve on accessibility of health information on the internet sites as shown by a mean of 4.030 (Std. dv = 0.818). These findings concur with Schabetsbergera *et al.* (2006) augment that today patients can learn more about health as they easily access information via such means as the Internet. With a mean of 3.984 (Std. dv = 0.815) they agreed that the hospital used e-mails in internal and external communication. Further, they agreed that the hospital used a local area network from various service providers as shown by a mean of 3.948 (Std. dv = 0.967). Furthermore, they agreed that there is one-to-one electronic communication between nurses and patients in the hospital as shown by a mean of 3.871 (Std. dv = 1.078).

Table 5: Aspects of Electronic Communication (Outpatients)

	Mean	Std. Deviation
The health facility has adopted information technology in communication	4.046	0.788
The hospital uses E-mails in internal and external communication	3.984	0.815
The hospital uses a local area network that services various service providers	3.948	0.967
The hospital uses a telephone network to enhance communication	4.153	0.757
Improved communication has led to improvements in service delivery	4.169	0.757
The hospital uses electronic communication to improve on accessibility of health information on internet sites	4.030	0.818
The hospital uses electronic communications that has led to easy accessibility of patient records by clinicians	4.056	0.874
The hospital has Integrated computer systems	4.112	0.784
Using mobile technologies has improved service delivery	4.046	0.937
There is one-to-one electronic communication between nurses and patients in our hospitals	3.871	1.078
Composite Mean	**4.041**	**0.857**

The health personnel in Moi Teaching and Referral Hospital and Kenyatta National Hospital were requested to indicate their agreement level on various aspects of electronic communication in public hospitals. The personnel agreed with a mean of 4.256 (SD=0.879) that the hospital uses a telephone network to enhance communication. In addition, they agreed with a mean of 4.184 (SD=0.883) that electronic communications have led to easy accessibility of patient records by clinicians. These findings are in line with Hernandez-Jayo *et al.* (2015) findings that through electronic communication healthcare providers can get educative information from clinical practice guidelines and reference materials that are found online. Further, they agreed with a mean of 4.184(SD=0.970) that hospitals use local area network that services various service providers. Also, the personnel agreed with a mean of 4.160 (SD=0.953) that their hospital has Integrated computer systems. These findings are in line with Ross's (2004) findings that clinicians can easily access lab test results and patient records electronically in addition to placing orders using systems that have integrated medical records.

With a mean of 4.145 (SD=0.985), the personnel indicated that electronic communication increases health information on internet sites. They also agreed with a mean of 4.144 (SD=0.997) that their hospitals use e-mails in internal and external communication. These findings agree with Niiland et al. (2011) findings that the use of social networks such as Twitter and Facebook is not common in health provision however this is a communication strategy that can be utilized. They further agreed with a mean of 4.136 (SD=0.883) that their

hospitals use mobile technologies to improve service delivery. In addition, the health personnel agreed with a mean of 4.104 (SD=0.923) that improved communication has led to improvements in service delivery. Further, they agreed with a mean of 4.048 (SD=1.156) that their health facilities had adopted information technology in communication. Additionally, the personnel agreed that there is one-to-one electronic communication between nurses and patients in our hospitals as shown by a mean of 3.720 (SD=1.202). These findings agree with Hernandez-Jayo *et al.* (2015) findings that healthcare professionals can also communicate electronically with patients and provide them with personal care via means such as emails.

Table 6: Utilization of Electronic Communication (Personnel)

	Mean	**Std. Deviation**
Our health facility has adopted information technology in communication	4.048	1.156
Our hospital uses e-mails in internal and external communication	4.144	.997
Our hospitals use a local area network that services various service providers	4.184	.970
The hospital uses a telephone network to enhance communication	4.256	.879
Electronic communication increases health information on internet sites	4.145	.985
Improved communication has led to improvements in service delivery	4.104	.923
Electronic communications have led to easy accessibility of patient records by clinicians	4.184	.883
Our hospital has Integrated computer systems	4.160	.953
Our hospital uses mobile technologies to improve service delivery	4.136	.883
There is one-to-one electronic communication between nurses and patients in our hospitals	3.720	1.202
Composite Mean	**4.108**	**0.983**

The health personnel were asked to indicate whether the utilization of electronic communication influences service delivery in public hospitals in Kenya. From the findings, they indicated that electronic communication increases health information on the Internet, increases productivity among workers, increases efficiency in service delivery, and reduces queuing. In addition, the personnel indicated that it enables one-to-one electronic communication between nurses and doctors in the hospital. Further, they indicated that the use of mobile technologies to improve service delivery and local area networks that service various health service providers' efficiency was improved. These findings concur with Baumgart's (2015) findings that the features of mobile technologies that render them appropriate for the improvement of care delivery in health facilities include their mobility, popularity, and capabilities in terms of technology.

Correlation analysis

The study used correlation analysis in the assessment of the influence of electronic communication on service delivery in public hospitals in Kenya. The results, as shown in Table 4.28, show that there is a positive correlation between the utilization of electronic communication and service delivery in public hospitals (r=0.740, p-value=0.000). These findings agree with Aqil-Burney, Mahmood, and Abbas's (2010) findings that the utilization of electronic communication improves service delivery in the health sector.

Table 7: Correlations for Utilization of Electronic Communication and Service Delivery

		Service delivery in public hospitals	**Utilization of electronic communication**
Service delivery in public hospitals	Pearson Correlation	1	
	Sig. (2-tailed)		
	N	125	
Utilization of electronic communication	Pearson Correlation	.740**	1
	Sig. (2-tailed)	.000	
	N	125	125

**. Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

A univariate analysis was conducted to investigate the influence of the utilization of electronic communication on service delivery in public hospitals in Kenya. The alternative hypothesis was:

$H_1$2: Utilization of electronic communication has no significant influence on service delivery in public hospitals in Kenya.

As indicated in Table 8, the r-squared shows the variation in the service delivery in public hospitals in Kenya that can be explained by the utilization of electronic communication. The R-squared for the relationship between utilization of electronic communication and service delivery in public hospitals in Kenya was 0.547. This implies that the utilization of electronic communication can be 54.7% of the service delivery in public hospitals in Kenya.

Table 8: Model Summary

Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.740[a]	.547	.543	.49857

a. Predictors: (Constant), Utilization of electronic communication

The F-calculated (148.615) is greater than the

F-critical (3.8415), which shows that the model can be used in predicting the influence of the utilization of electronic communication on service delivery in public hospitals in Kenya. In addition, the p-value (0.000) is less than the significance level (0.05), which shows that the model is a good fit for the data.

Table 9: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.941	1	36.941	148.615	.000[b]
	Residual	30.574	123	.249		
	Total	67.515	124			

a. Dependent Variable: Service delivery in public hospitals

b. Predictors: (Constant), Utilization of electronic communication

From the results, the regression equation can be presented as;

Y= 1.080 + 0.736 (Utilization of electronic communication)

From the findings, the utilization of electronic communication had a positive influence on service delivery in public hospitals in Kenya as indicated by the regression coefficient of 0.715 (p-value=0.000). This implies that a unit improvement in the utilization of electronic records management would lead to a 0.715 improvement in service delivery in public hospitals in Kenya. Since the p-value (0.000) is less than the significance level (0.05), the null hypothesis was rejected and hence utilization of electronic records management has a significant influence on service delivery in public hospitals in Kenya. These findings are in agreement with Broussard and Broussard's (2013) findings that healthcare providers frequently use electronic devices such as tablets, mobile phones, computers, bar coding scanners, monitoring devices, and smartphones to communicate with the patients and other employees of the health care facility.

Table 10: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.080	.252		4.281	.000
Utilization of electronic communication	.736	.060	.740	12.191	.000

a. Dependent Variable: Service delivery in public hospitals

Conclusions and Recommendations

The objective of the study was to determine the influence of the utilization of electronic communication on service delivery in public hospitals in Kenya. The inferential statistics (correlation analysis and regression analysis)

showed that electronic communication influences service delivery in public hospitals in Kenya. The researcher established that electronic communication influences service delivery in public hospitals in Kenya.

The results indicated that public hospitals in Kenya were moderately using personal digital assistants, social media platforms, and local area networks. The researcher therefore recommends that health facilities in Kenya should improve the utilization of personal digital assistants, social media platforms, and local area networks to improve service delivery through a reduction in queuing and turnaround time.

Suggestions for Further Research

The study was delimited to the national referral hospitals in Kenya. Different levels of hospitals in Kenya have varying resources and their level of adoption and utilization of electronic communication is different. Therefore, similar studies should be conducted on the influence of the utilization of electronic communication on service delivery in public hospitals in Kenya. The study found that electronic communication could explain 53.7% of the service delivery in public hospitals in Kenya. Therefore, further studies should be conducted on other factors influencing service delivery in public hospitals in Kenya. In addition, the study recommends further studies on the impact of Kenya National E-health Policy 2016-2030 on service delivery in public hospitals in Kenya.

References

Achampong, E.K. (2012). The State of Information and Communication Technology and Health Informatics in Ghana. *Online J Public Health Inform*, *4*(2), 41-91.

Achia, T. O., & Mageto, L. E. (2015). Individual and contextual determinants of adequate maternal health care services in Kenya. *Women & Health*, *55*(2), 203-226.

Akacho, E.N. (2014).*Factors Influencing Provision of Health Care Service Delivery in Kenya. A Case of Uasin Gishu District Hospital in Eldoret.* Retrieved from repository.uonbi.ac.ke/handle/11295/74195

Aksan, H. D., Ergin, I., & Ocek, Z. (2010). The change in capacity and service delivery at public and private hospitals in Turkey: A closer look at regional differences. *BMC Health Services Research*, *10*, 300-308.

Allen, M, Iezzoni, L. I., Huang, A., Huang, L., & Leveille, S. G. (2018). Improving patient-clinician communication about chronic conditions: Description of an internet-based nurse e-coach intervention. *Nursing Research, 57*, 107–112.

Aqil-Burney, S.M., Mahmood, N. & Abbas, Z. (2010).Information and Communication Technology in Healthcare Management Systems: Prospects for Developing Countries. *International Journal of Computer Applications*, *4*(2), 27-32.

Baptist, A. P., Thompson, M., Grossman, K. S., Mohammed, L., Sy, A., & Sanders, G. M. (2011). Social media, text messaging, and email preferences of asthma patients between 12 and 40 years old. *The Journal of Asthma, 48*, 824–830.

Baumgart, D.C. (2015). Personal digital assistants in health care: Experienced clinicians in the palm of your hand? *Journal of the American Medical Association, 36*, 6, 1210–1222.

Broussard, B.S. & Broussard, A. B. (2013). Using electronic communication safely in health care settings. *Nurse Women Health*, *17*(1), 59-62.

Celik, I., Sahin, I., & Aydin, M. (2014). Reliability and Validity Study of the Mobile Learning Adoption Scale Developed Based on the Diffusion of Innovations Theory. *International Journal of Education In Mathematics, Science And Technology*, *2*(4), 300-316.

Chuang, S. & Inder, K. (2013). An effectiveness analysis of healthcare systems using a systems theoretic approach. *BMC Health Services Research*, 9, 195.

Cline, G.B. & Luiz, J.M. (2013). Information technology systems in public sector health facilities in developing countries: the case of

South Africa. *BMC Medical Informatics and Decision Making, 13*(13), 1-12.

Cohen, R A, Stussman B. (2014). *Health information technology use among men and women aged 1864: Early release of estimates from the national health interview survey, January–June 2009.* Retrieved from www.cdc.gov/nchs/data/hestat/

Duplaga, M. (2012).The Impact of Information Technology on Quality of Healthcare Services in Poland. *Springer*, 3039, 1118-1125

Flessa, S., Moeller, M., Ensor, T., & Hornetz, K. (2011). Basing care reforms on evidence: The Kenya health sector costing model. *BMC Health Services Research*, *11*(1), 128-142.

Free, C., Phillips, G., Watson, L., Galli, L. & Felix, L. (2013). The Effectiveness of Mobile-Health Technologies to Improve Health Care Service Delivery Processes: A Systematic Review and Meta-Analysis. *PLoS Med, 10*(1), e1001363.

Hazarika, I. (2015). Medical tourism: its potential impact on the health workforce and health systems in India. *Health Policy & Planning*, *25*(3), 248-251.

Hernandez-Jayo, U., Lopez-Garde, J., & Rodriguez-Seco, J. E. (2015). Addressing Electronic Communications System Learning Through a Radar-Based Active Learning Project. *IEEE Transactions on Education*, *58*(4), 269-275.

Kast, F. E., & Rosenzweig, J. E. (2011). General System Theory: Applications for Organization and Management. *Academy Of Management Journal*, *15*(4), 447-465.

Kenya National Bureau of Statistics (2014).*Kenya Demographic and Health Survey 2014: Key Indicators.* Nairobi: Ministry of Health.

Kirigia, J. M., Mwabu, G. M., Orem, J. N., & Muthuri, R. K. (2016). Indirect cost of maternal mortality in the WHO African Region, 2013.*International Journal of Social Economics*, *43*(5), 532-548.

Kothari, C. R. (2012). *Research methodology*: *Methods and techniques*. New Delhi: New Age International (P) Limited Publishers.

Kripalani, S., LeFevre, F., Phillips, M., Williams, M.V., Basaviah, P. & Baker, D.W. (2017). Deficits in Communication and Information Transfer between Hospital-Based and Primary Care Physicians: Implications for Patient Safety and Continuity of Care. *JAMA, 297*(8), 831-841

Lee K, Yang S and Choi M. The association between hospital ownership and technical efficiency in a managed care environment. *Journal of Medical Systems*, 33, 307-315.

Litho, P. (2010). ICTs and health in Uganda: benefits, challenges and contradictions. *Health Informatics*, 21, 23-35.

Makary, M.A. & Daniel, M. (2016). Medical error—the third leading cause of death in the US. *BMJ*, 353, 21-39

Margalit, R.S., Roter, D., Dunevant, B.N., Larson, N. & Reis, N. (2016). Electronic medical record use and physician–patient communication: An observational study of Israeli primary care encounters. *Patient Education and Counseling*, 61, 134–141.

Masys, D.R. (2012). Effects of Current and Future Information Technologies on the Health Care Workforce. *Health Affairs* 21(5), 33-41.

Mbuthia, H. K. (2013).*Service quality practices in public healthcare facilities in Mombasa County, Kenya.* Retrieved from http://hdl.handle.net/11295/62261

McCullough, J.S., Casey, M., Moscovice, I. & Prasad, S. (2010). The Effect of Health Information Technology on Quality in U.S. Hospitals. *Health Affairs*, *29*(4), 647-654.

Muemi, C. & Rotich, G. (2015). Influence of Records Management on Service Delivery in the Public Sector in Kenya: a Case of Lands Department, Ministry of Lands, Housing and Urban Development. *Strategic Journal, 2*(69), 667-688.

Murtuza, S. & Bakshi, H. (2012). Healthcare Information Technology Service Assessment: A Healthcare Leader Prospective. *International Journal of Advanced Research in Computer Engineering & Technology, 1*(4), 410-418.

Musila, P. M. (2011). *Appropriateness of drug prescriptions among children on treatment for Tuberculosis at Kenyatta National Hospital, Nairobi-Kenya*. Retrieved from http://www.researchkenya.or.ke/

Niiland, N., van Gemert-Piinen, J. E., Kelders, S. M., Brandenburg, B. J., Seydel, E. R. (2011). Factors influencing the use of a Web-based application for supporting the self-care of patients with type 2 diabetes: A longitudinal study. *Journal of Medical Internet Research, 30*(13), e71.

Peery Jr., N. S. (1972). General Systems Theory: An Inquiry into Its Social Philosophy. *Academy Of Management Journal*, *15*(4), 495.

Rivard, S., Lapointe, L., & Kappos, A. (2011).An Organizational Culture-Based Theory of Clinical Information Systems Implementation in Hospitals. *Journal Of The Association For Information Systems, 12*(2), 1-40.

Ross, S.E., Moore, L.A., Earnest, M.A., Wittevrongel, L. & Lin, C. (2004). Providing a Web-based Online Medical Record with Electronic Communication Capabilities to Patients with Congestive Heart Failure: Randomized Trial. *J Med Internet Res, 6*(2), e12

Schabetsbergera, T., Ammenwertha, E., Andreattab, S., Gratlc, G., Hauxa, R., Lechleitnerd, G., Schindelwigd, K., Starkd, C., Vogld, R., Wilhelmyd, I. & Wozaka, F. (2006). From a paper-based transmission of discharge summaries to electronic communication in health care regions. *International Journal of Medical Informatics, 75*(3), 209–215

Velo, G.P & Minuz, P. (2009). Medication errors: prescribing faults and prescription errors. *Br J Clin Pharmacology, 67*(6), 624–628.

Von Bertalanffy, L. (1972). The History and Status of General Systems Theory. *Academy Of Management Journal*, *15*(4), 407-426.

Wanjau, K.N., Muiruri, B.W. & Ayodo, E. (2012). Factors Affecting Provision of Service Quality in the Public Health Sector: A Case of Kenyatta National Hospital. *International Journal of Humanities and Social Science, 2*(13), 114-117.

Weiner, J.P. (2012). Doctor-patient communication in the e-health era.*Israel Journal of Health Policy Research*, 1, 33.

Wilson, R. (2012). Patient safety in developing countries: retrospective estimation of scale and nature of harm to patients in hospital. *BMJ*, 344, e832

World Health Organization (2015).*Health Care Around the World*. Geneva: World Health Organization.

Zenko, Z., Rosi, B., Mulej, M., Mlakar, T., & Mulej, N. (2013). General Systems Theory is Completed by Dialectical Systems Theory. *Systems Research & Behavioral Science*, *30*(6), 637-645.