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Information Security and Performance of Public Hospitals in Garissa County, Kenya

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Therefore, this study aimed to establish the effect of information security on performance of public Hospitals in the Garissa County, Kenya. Descriptive research design was used. The target population was 2 public hospitals; Garissa provincial general hospital and Garissa county hospital with a total population of 1403 employees. The study's respondents were 62 information technology specialists working in the two hospitals. Due to a small number, the study was a census. Questionnaires were used to gather primary data. The process of drop and pick later was used. Descriptive and inferential statistics was used to analyze quantitative data. Qualitative data was analysed through the use of content analysis. Information security is an essential part of the healthcare industry for protecting confidential patient information and complying with regulations. As such, better healthcare information security solutions are needed to help reduce the risks of malicious data attacks or technical failure. The study indicates that the information security in the public hospitals in Garissa was alarming. The system enables the hospital gather information about patients, checking quality by comparing perception of services delivered with expected standards was easy and it was possible to communicate safely with the patient electronically. It is clear that the public hospitals in Garissa county did not create a standard around the acceptable use of the hospital's information technology, including networks and applications to protect data confidentiality, integrity, and availability of information. The system providers should be advised that there is a need to distribute health management information systems sufficiently in all public hospitals in Garissa County.

Abstract

Public hospitals in Garissa are unable to track results related to hospital facilities and disease statistics and these has adversely affected speed, efficiency and utilization of hospital resources. The public hospital costs are too huge, the fees collected are too small and that the public hospitals are heavily dependent on the government. The support provided by the government by allocating funding and using the required equipment has not been reflected in the timely, convenient services provided by electronic data bases to patients, administrators and doctors.

1.0 Introduction

The public hospital efficiency is determined by five factors, according to Chien, (2004); the culture of organization, human resource policy, leadership style and climate, the nature of jobs and motif model. Organizational results are determined by the business model, the market,

the quality of capital and the role of the company in relation to its competitors. Public health is critical to health care in the 21st century and shares overall objectives such as premature mortality, illness and disability reduction and accident minimis (the World Health Organization (WHO) 2003). MDG 5, in reality, aimed at achieving universal maternal health by 2015 by 2015 (Booth, 2014). Public health aims primarily at promoting a healthy community. This is absolutely vital to a sustainable health care

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system and, due to improved efficiency, also offers economic and social benefits to the country.

Health information management systems include a network of institutions consisting of various information on the medical, financial and management functions of a hospital (Abraham & Junglas, 2011). The initial uses of these systems are limited to patient information recording and billing. New modules such as appointment over the Phone, follow-up patients, analytical requests and view results have also been applied to patient information systems. Thus, doctors have been able to send their applications via automation systems to laboratories directly and track results online (Mansar, 2016).

Worldwide, the development of health information technology enhances the effectiveness of health care services, reduces medical errors, improves the quality of care and provides patients and physicians with better information (Pollak & Lorch, 2012). The general aim of the information management feature is for information to be obtained, managed and used to enhance health and health outcomes, efficiency, governance and management and support processes. In managing costs for health care and improving care quality, IS has plenty to say (Kolodner, 2015). Furthermore, Piontek (2016) notes that the quality of life and work of society is determined by health care. Health errors have significant repercussions that can impact social and productive activities. Recent studies show the seriousness of negative incidents in hospitals and the risks to individuals and the public posed by these events. In the last decade and the last few years, health information systems have radically changed the healthcare industry (Abraham & Junglas, 2011).

Competitive pressures and developments in healthcare technology drive hospitals to meet the trend (Kolodner, 2015). Paperless health systems are inevitable and any health institutions not following this pattern are behind the remainder of the industry (Abraham & Junglas, 2011). The health information system is a must and the more accurate it is, the faster it is enforced (Swanson et al., 2010). One of the most quoted models of IT services, Delone and Mclean (2013) aims at providing a thorough understanding of successful information system systems through the identification, definition and explanation of the connections between six categories of performance variables: system quality, quality of information, user content, personal effect, and organizational impact. The Delone and

Mclean (2003) model offers systematic framework work to measure information system service delivery and to improve the understanding of the performance of information systems.

Despite large resources and time spent developing and implementing health information systems, health data are scarcely being used for planning and decision-making in service delivery by health workers (Abraham & Junglas, 2011). The overall culture of information generation and usage remains underdeveloped and processes for validation and reliability have not been optimally functional. The results are largely indicated by information management lag behind other industries (Pollak & Lorch, 2012).

1.1 Performance of Public Hospitals in Garissa County

The performance of the public hospital depends on clinical or administrative roles or the set goal (Flint, 2010). The main objective of all health care services is to improve the health of the majority of patients, but there are numerous intermediate steps, results and procedures. The aim of this healthcare could be conventional functions including treatment, diagnosis, recovery, and study and teaching in hospitals. Many hospitals are undergoing transformations, with a focus moving away from inpatient treatment and toward ambulatory care, healthcare networks, and community outreach initiatives (Swanson *et al.*, 2010).

Hospitals' functions are also likely to include aspects of public and community care, as well as jobs and social needs. Garissa County hospitals have faced a variety of management and performance issues, ranging from budgeting to facility expansion (Manyani, 2011). The availability of services and medical service delivery to the County would be used to gauge hospital performance. The county requires a total of 707 Nutrition workers, according to the Garissa Human Resources for Health Management and Development strategy (136 officers, 353 technologists and 218 technicians). However, just 33 nutritionists are available, leaving a 674-person shortage.

However, according to the Garissa Human Resources for Health Management and Development plan, only 17% of the HRH criteria are expected to be met. Human Resources are a valuable resource for health management and development. Despite the fact that no new employees were hired in the 2012/2013 fiscal year, 17 employees were hired in the 2015/2016 fiscal year and 14 in the 2016/2017 fiscal year.

There hasn't been any new recruitment since then. Nutritionists are widely dispersed throughout the various levels. The CNC claims that the distribution was based on the workload at various levels.

As a means of enhancing the health of its citizens, Garissa County has invested in a community health strategy. As a result of the assessment, overall health performance metrics such as average hospital stay, bed occupancy rate, treatment expenses, and patient room turnover rate, as well as community health seeking behaviors, have improved slightly. The number of community units that have been formed and are operational is significantly less than the recommended total of 177 CUs (MOH, Garissa County, Capacity Assessment, 2019). Most of the public health workers are concentrated in one or two facilities or locations, with the remainder of the health facilities largely lacking health worker (Health Sector Performance Report, 2019)

1.2 Statement of the Problem

Despite government assistance, public hospital doctors in Garissa County are having trouble transmitting requests directly to labs, making appointments over the internet, requesting research, monitoring, and displaying results due to a lack of proper health management information systems. As a result the public hospitals in Garissa are unable to track results related to hospital facilities and disease statistics and these has adversely affected speed, efficiency and utilization of hospital resources. The public hospital costs are too huge, the fees collected are too small and that the public hospitals are heavily dependent on the government (County Government of Garissa, 2019). The government's support, expressed in the allocation of funds and the provision of relevant facilities, has not translated into timely and convenient services for patients, administrators, and physicians through an electronic database.

Shekelle et al., (2016) also carried out research involving a comprehensive assessment of data about the costs and benefits of HIT programs in the United States. The study showed that health information technology can change medical care dramatically and make it safer, accessible and more efficient. The study shows a contextual gap as the links have not been seen between the sanitary information system and the provision of services in public hospitals. In a report by HIMSS Analytics (2018) on health information security, the healthcare sector is experiencing a continuing increase in data security violations in

health care organizations and a drastic rise in the number of threats to this region. The study used qualitative data and therefore methodological knowledge gap was evident. The current study will use both qualitative and quantitative data.

There is poor data storage, information security, information integration and service delivery which have affected performance of public hospitals interms of the costs of services, patient satisfaction and infrastructure growth. In addition, the extent to which the health information system has been applied and the extent to which this has improved performance of public hospitals is still not clear. This study aimed to determine the effect of health management information system capability on performance of public hospitals in Garissa County, Kenya.

1.3 Objective of Study

- i. To examine effects of information security on the performance of public hospitals in Garissa County, Kenya.

1.4 Research Question

- i. How does information security affect public hospital's performance in Garissa County, Kenya?

1.5 Significance of the Study

The production and use of high-quality health data and knowledge is critical at all levels of the health system. This study establishes a foundation for evaluating HIMS in the public sector, allowing for the identification of the system's strengths and flaws in order to improve the health system's overall performance. This study lays the groundwork for future research on evidence-based health-care administration in general, as well as specific insights into enhancing and improving healthcare facilities around the world.

The study's findings and recommendations will assist the Minister of Health in developing a stronger health management system that will assist health care personnel and facilities in identifying their weaknesses and suggesting better ways to increase their efficiency through better use of expertise. The findings of the study will be used by both health care professionals and managers, who will no longer rely on haphazard personal perceptions, arbitrary personal judgments, or advice from friends or family, but rather on objective facts, allowing them to reinvent themselves as problem solvers.

2.0 Literature Review

2.1 Technology Acceptance Model

Davis created the technology acceptance model (TAM) in 1986, and it is one of the most well-

known frameworks for technology clearance and utilization. TAM has proven to be a theoretical model for describing and predicting customer behavior in the information technology sector (Yoon, 2016). The Idea of Reasoned Action (TAM) is a significant development of the theory of reasoned action (TRA). TAM was recommended by Ashraf, Narongsak (Tek), and Seigyoung (2014) were able to identify whether a client accepts or rejects information technology by acclimating to TRA. TAM is used to determine how external circumstances influence the idea, sentiments, and target that will be utilised. TAM recommends two cognitive principles. These characteristics can be seen in terms of utility and simplicity of usage (Holden et al., 2016).

The actual use of a TAM technology system by the individual is dependent on the comportment, thinking, apparent system usability and apparent system ease directly, or in some ways according to Mortenson and Vidgen (2016). Furthermore, TAM suggests that external influences have an effect on an apparent usefulness and easy to use by media impacts. The study will use this model to explain how information systems are implemented in Kenyan public hospitals. As a result, it will provide a theoretical understanding of how ICT can improve efficiency in public hospitals by enhancing data storage, information security, and information integration.

2.2 Empirical Review

According to a report conducted by HIMSS Analytics (2018) on security in health information systems and service delivery in the United States' health-care industry, The number of data security breaches in health-care organizations has increased significantly, as has the number of threats in this area. Between 2013 and 2017, over 1.5 million names were exposed to data breaches in hospitals alone, according to the study. Internal challenges to the health information system include employee indifference, curiosity, recklessness, inadequate behavior, using someone else's password, and giving the password to other employees, according to the report. Since the analysis relied on secondary data, it has methodological knowledge gaps. Primary data was used in this analysis.

In 2010 over 110 health organizations recorded loss of confidential and secure health information, according to a 2016 Sedlack and Tejay review, carried out on the basis of a safety survey. Personal identifying information has impacted over 5,306,000 individuals since

January 2008, with annual damages from patient information losses reaching \$6 billion in 2010. The study report detailed theft (stolen computers, phones, or media), negligence or neglect by employees or third parties, malicious insiders, computer hacks, web exposure, and virus attacks. The study was a descriptive research and did not present the relationship between variables. The Current study filled the knowledge gap by presenting the relationship between variables.

Asai and Fernando (2017) on a study on effect of information system security on health care performance. Human factors are responsible for 80% of privacy violations, according to the report, which also confirms that human errors account for a significant portion of privacy breaches in the United States. In addition, a study by Deloitte (2017) found that 91 per cent of participant participants are concerned about safety deficiencies of employees and that 79 per cent of respondents mention human factors as the primary cause of security information. Users of health information systems must be trained and aware about risk assessment biases, as well as the severity and consequences of possible security breaches. The study knowledge was based health care performance but the current study focussed on performance of public hospitals

3.0 Research Methodology

A descriptive survey research design was adopted in this study, which explained the phenomenon in its natural setting, free of distractions. With a total population of 1403 personnel, the study focused on two public hospitals in Garissa county: Garissa referral general hospital and Garissa County hospital. The study's respondents were 62 information technology specialists working in the two hospitals. The unit of observation included staff in the following categories; 11 network specialists 15 database administrators, 9 programmers and 27 lab technicians.

This study used primary data. The questionnaire for this analysis included both open-ended and closed-ended questions. With the help of SPSS, the data was analyzed using descriptive and inferential statistics. To make data entry in the questionnaire easier, all of the surveys were referenced and coded. All quantitative variables for descriptive data, such as frequencies, proportions, mean score, and standard deviation, were calculated after the data was cleaned up, which included entry error checking, and the information was presented in the form of frequency tables. Content analysis was used to examine and interpret qualitative data from the open questions. Inferential data was analyzed

using multiple regression analysis. To define the link between the independent and dependent variables, regression analysis was performed.

4.0 Research Findings and Discussion

4.1 Analysis Based on Information Security

To examine the effects of information security on the performance of public hospitals in the

Table 1 Analysis Based on Information Security

	Mean	Std. Deviation
The hospital is able to detect frauds by utilizing health management information systems.	3.3871	1.2721
The systems enables us gathering information about patients	3.7903	.9605
Checking quality by comparing perception of services delivered with expected standards is easy	2.3548	1.0258
The information systems enables us to detect errors	2.7516	1.0663
It is possible to communicate with the patients electronically	2.3065	1.4996
Aggregate Mean	2.9181	1.1649

For the healthcare industry to preserve personal patient information and comply with regulations, information security is a must. As a result, more effective healthcare information security solutions are required to assist mitigate the risks of hostile data attacks and technical failure. According to the claims, the information security in Garissa's public hospitals was frightening, with an aggregate mean of 2.9181 and a standard deviation of 1.1649. The hospital was able to detect fraud (M=3.3871) by using health management information systems and the assertions presented and their mean (M), the system enables the hospital gather information about patients (M=3.7903), checking quality by comparing perception of services delivered with expected standards was easy (M=2.3548) and it was possible to communicate safely with the patient electronically (M=2.3065). It is obvious that the public hospitals in Garissa County have not established a standard for the permissible use of the hospital's information technology, including networks and apps, to ensure data security, integrity, and availability.

According to a report conducted by HIMSS Analytics (2018) on security in health information systems and service delivery in the United States' health-care industry, supported the

Table 2 Performance of Public Hospitals

	Mean	Std. Deviation
There is adequate solution reliability to the patients in public hospitals in Garissa County	2.4355	1.4357
The patients are satisfied by the health care services offered	2.9194	.9286
The hospital generated revenues are sufficient to cover the operating costs	1.4129	.5614
The cost per patient has been revised to ensure affordability by majority of the patients	1.6935	.7594
The ratio between patient and doctors is sufficient	1.4194	.8811
Aggregate Mean	1.9761	.9132

hospitals under study, respondents were provided with five statements stating the importance of information security and asked to rate their agreement to the statements. The results helped to determine the level of information security in public hospitals in Garissa County, Kenya.

findings that information security breaches in health-care organizations has increased significantly, as has the number of threats in hospitals. Asai and Fernando (2017) on a study on effect of information system security on health care performance agrees that Human factors are responsible for 80% of information security violations, which also confirms that human errors account for a significant portion of information security breaches. In addition, a study by Deloitte (2017) found that 91 per cent of participant participants are concerned about safety deficiencies of employees and that 79 per cent of respondents mention human factors as the primary cause of information security threat. Training on health information systems is vital as well as the severity and consequences of possible security breaches.

4.2 Performance of Public Hospitals

This was aimed at finding out how the hospitals under study were generally performing. To capture this information, respondents were to rate their agreements against statements on performance of public hospitals. The expectation from the study was that public hospitals in Garissa were not performing well.

Source: Study Results (2021)

The findings in table 2 indicates that there was inadequate solution reliability to the patients in public hospitals in Garissa County (M=2.4355, Std. Dev. =2.4355). The patients were not satisfied by the health care services offered (M=2.9194, Std. Dev. = 0.9286). The hospital generated revenues were insufficient to cover their operating costs (M=1.4129, SD= 0.5614). Majority of the respondents disagreed that there was cost per patient revision to ensure affordability by majority of the patients (M=1.6935, SD=.7594). The ratio between patient and doctors was not sufficient (M=1.4194, SD=.8811). The study generally indicated that the performance of public hospitals in Garissa County was poor as indicated by very low patient vs doctor ratio, cost per patient, low fees collected and low patient satisfaction.

Inequities and inefficiencies are created by obstacles in the distribution of facilities and inpatient beds, according to Seitio-Kgokgwe, Gauld, Hill, and Barnett (2014). Inadequate resources hinder the hospitals' ability to provide services. In Botswana, there are severe problems with the quality of care. Service delivery is hampered by a lack of resources. Lack of finance, equipment, drugs, oversight, political involvement, and insufficient staffing are all key difficulties in public hospitals, according to Kakooza, Tusiime, Odoch, and Bagire (2015). The configuration of effective use of money, professional management, and competent governing structures are all required for good hospital management.

5.0 Conclusions and Recommendations

5.1 Conclusion of the Study

Majority of the information technology specialists working in public hospitals as well as other health care providers have justified that HMIS has played a great role in ensuring health care is provided at its best but the state of HMIS in Garissa County public hospital is worrying. HMIS has played a major role in ensuring information is securely stored. This is because hospitals operations are fully supported by the system which is distributed sufficiently but public hospitals in Garissa County do not adhere to the service providers. Error detection can also be concluded to be much easier when the system is in use but in case of Garissa, detection is not easy due to poor storage, poor information security and poor information integration.

5.2 Recommendation

The system providers should be advised that there is a need to distribute health management information systems sufficiently in all public hospitals in Garissa County. The hospital management and the system handlers should also ensure that they fully adhere to the service providers guidelines. This will ensure that information is integrated in the right way. Generally the hospitals should direct all their efforts in ensuring information integration is achieved by using the health management information systems.

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