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# INFORMATION TECHNOLOGY AND SERVICE DELIVERY: GOVERNMENT HOSPITAL, KENEMA

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**ABSTRACT**

Hospitals began investing in health IT during the 1960s. Information technology was first used to support billing and financial services. Subsequently, the role of IT grew to manage pharmacy, laboratory, and radiology service lines. This research aimed to assess the use of Information Technology and service delivery at a Government hospital, Kenema, concerning Government Hospital, Kenema.

The study also determines the extent to which information and communication technology practices are implemented in Government Hospital, Kenema, determine the type of information and communication technology used for service delivery in the Government Hospital, Kenema, determine the benefits of using IT in their service delivery at Government Hospital, Kenema, determine the challenges faced in implementing information and communication technology in the Government Hospital, Kenema, and to examine the relationship between information technology and service delivery in Government Hospital, Kenema.

The study relied mostly on primary data sources and data was collected using semi-structured questionnaires with both close-ended and open-ended questions. The researcher selected 50 staff from Kenema Government Hospital that represented the entire population of the departments. The analysis was done using an in-depth interview, questionnaire, and Analyzed by using SPSS were presented in charts.

***Keywords:*** Technology, Information, Hospital, Radiology, Government, Laboratory, etc.

## 1.0 Introduction

Hospitals began investing in health IT during the 1960s. Information technology was first used to support billing and financial services. Subsequently, the role of IT grew to manage pharmacy, laboratory, and radiology service lines (Collen, 1995). Although their primary purpose was to support billing and capture revenues (commonly referred to as charge capture) these applications began to monitor and support basic clinical activities. These systems frequently provided services such as pharmacy and laboratory process management as well as documentation of patients' radiology histories. These systems were nearly ubiquitous by 2000 (McCullough, 2008).

Information technology can affect hospital productivity through a variety of mechanisms. Although hospitals may gain the same benefits from IT as any other service firm (e.g., improved supply chain management or enhanced labor productivity), three mechanisms are particularly important for hospitals: billing management, provider monitoring, and clinical decision support. Improved billing may be the most widespread effect of hospital IT investments.

Hospitals provide a wide range of services, and the prices of these services depend upon patients' clinical characteristics as well as contracts negotiated between payers and providers. For example, the reimbursement rate for cardiac surgery often depends upon whether a patient is a diabetic or has hypertension, as these comorbidities affect hospital costs. Price schedules and clinical documentation requirements depend on contracts with private insurers as well as government regulations. Although hospitals have long employed conventional IT for billing support, EMRs are increasingly used to document care and facilitate charge capture.



### 1.1 Government Hospital, Kenema

The Government hospital, Kenema is located at the center of the city of Kenema and, it is on the axis of Eastern Technical University, the Kenema Town-field Healthcare is provided by Government, private and non-governmental organizations (NGOs). The Ministry of Health and Sanitation (MoHS) is responsible for health care. Following the civil war in 2002, the Ministry moved to a decentralized structure of health provision to increase coverage. In Kenema, the medical facilities are 21 community health centers (CHC), 17 community health posts (CHP), 44 maternal child health posts (MCHP) and 1 government hospital, 1 government clinic, 2 mission clinics, 1 mission hospital, 1 NGO clinic, and 3 private clinics. Traditional medicine forms part of the primary health care system in Sierra Leone. Endemic diseases are Yellow Fever and Malaria in Sierra Leone.

### 1.2 Problem Statement

Preventable diseases and premature deaths still inflict a high toll in developing countries. The inequity of access to basic health services affects districts, regions, communities, and social groups. Under-financing of the health sector in most countries like Sierra Leone has led to quantitative and qualitative deficiencies in service delivery and growing gaps in facility and equipment upkeep. Inefficient allocation of scarce resources and lack of coordination among key stakeholders have made duplication of efforts, overlapping responsibilities, and resource wastage common and troublesome problems. Sierra Leone stage of health sector reform, trying to provide expanded and equitable access to quality services while re-

ducing or at least controlling the rising cost of healthcare. Health reform processes have many facets and no single model is being adopted by all countries (PAHO, 1998). ITs have the potential to make a major contribution to improving access and quality of services while containing costs. Improving health involves improving public health and medical programs designed to provide elective, emergency, and long-term clinical care; educating people; improving nutrition and hygiene, and providing more sanitary living conditions. These in turn ultimately involve massive social and economic changes, as many health challenges go well beyond the health sector.

### 1.3 Aim and Objectives

This research aims to assess the use of Information Technology and service delivery at the Government Hospital, Kenema. In other to achieve the aim of the research the following objectives of the study were considered:

i. To determine the type of information and communication technology used for service delivery in the Kenema Government Hospital.
ii. To determine the extent to which information and communication technology practices are implemented in Kenema Government Hospital,
iii. Determine the benefits of using IT in their service delivery at Government Hospital, Kenema.

### 1.4 Research Questions

To meet the research objectives, the following research questions will be considered:

i. What extent to which information and communication technology practices are implemented in the Government Hospital, Kenema?
ii. What type of information and communication technology is used for service delivery in the Government Hospital, Kenema?
iii. What are the benefits of using IT in their service delivery at Government Hospital, Kenema?



### 1.5 Definition of Key Terms

**Radiology:** is a branch of medicine that uses imaging technology to diagnose and treat disease. Radiology may be divided into two different areas, diagnostic radiology, and interventional radiology.

**Laboratory:** is a facility that provides controlled conditions in which scientific or technological research, experiments, and measurement may be performed physicians' offices, clinics, hospitals, and regional and national referral centers.

**Information Technology (IT):** This is the use of any computers, storage, networking, and other physical devices, infrastructure, and processes to create, process, store, secure, and exchange all forms of electronic data.

**Electronic Medical Record:** This is an electronic medical record (EMR) is a digital version of all the information you'd typically find in a provider's paper chart: medical history, diagnoses, medications, immunization dates, allergies,

lab results, and doctor's notes.

### 2.1 Literature Review

Hospitals need to be accessible to all types of patients regardless of one's socio-economic status. There are still individuals who do not have a smartphone or even a computer to contact through e-mails on updates at a faster pace. According to the research of Hospitals and Health Networks (2009), hospitals with a high percentage of poor patients lag in developing digital technology than hospitals with a low percentage of poor patients so it is difficult for administrators to change their system to become more digital. This issue of the digital divide could potentially lead to health care disparities.

Adesina (2011) states that securing data over a mobile network is challenging because medical information is not stored in a private software drive. Anyone could potentially tap the information of a mobile phone, especially with the Patriot Act, which could potentially turn into a potential controversy.

There have been many complaints and concerns from hospitals that there is a lack of control of how an individual could get access to certain information and who could potentially get a hold of other people's information. According to Heron (2010), technology has gotten advanced to a point where anyone could collect large amounts of information without people's knowledge. This issue has led to many concerns over the confidentiality of one's private information. Heron (2010) has stated that confidentiality information on mobile technology is limited by requiring passwords. Anyone can potentially tap into one's phone on accident which could potentially lead to many problems.



The main issue with mobile technology is that it is challenging for health administrators to use mobile technology that the hospital requires many privacy laws. Knox (2007) states that about 65% of companies are using software to block sites. However, 35% of companies are a lot of companies that are not being strict on medical privacy which could lead to many problems for patients and their families. Patients may want certain individuals in their lives like their boss to not know about their health conditions which could be a disadvantage on their jobs or family members that could take advantage of the information that the patient does not wish to share with. According to Avancha (2012), hospitals have strong regulations like the Health Insurance Portability Accountability Act (HIPAA) that require confidentiality between patients and their doctors.

### 2.2 Conceptual Framework

Conceptually, the framework of this study is to examine the impact of the following relatively new health services (which are considered the independent variables) on the role of IT in health services (which is the dependent variable):

i. Telehealth services focus on remote consultation, saving time, and ensuring emergency services. Tele-health Service is the delivery of health-related services and information via telecommunications technologies.
ii. Mobile health services focus on reducing transport costs, ensuring prompt service, and improving efficiency. Local people can receive free health suggestions by calling mobile numbers without coming to hospitals physically.

iii. Internet health services focus on facilitating collaboration, supporting effective health research, and improving the dissemination of lessons.
iv. Computer Health Service refers to using any computer-based routine reporting system for population-based health services, medical research, online reference databases, differential diagnostic tools, medical practice, and hospital management systems.

### 2.3 Information Technology in Health Sector

Today, technology is changing the landscape of the world and leading us towards a sophisticated technical world. The emerging role of IT has created a huge impact on Health Sector. It enhances the quality of care, increases patient security and data protection, and reduces operating & administrative costs.

There are various challenges faced by the Health Sector sectors such as storing the medical record of the patient, maintaining Hospital Information systems, maintenance of medical equipment, medication error, and a lot more. Now, the Hospitals depend on IT to revamp the whole process of the Health Sector. Through IT the urban-rural disparities have been broken & shortened.

### 2.4 IT in Service Delivery

Numerous issues related to IT in service delivery are being explored by researchers. One foundational issue is the locus of service creation. The vast majority of extant research is built upon a closed model that emphasizes interaction between products and services inside of an organization.

Many studies have investigated the effectiveness of IT when delivering services on the Web (e.g., Song et al. 2007, Bharati and Chaudhury 2004). The use of cloud computing has been one particular focus, with researchers observing an improvement in service as well as a corresponding increase in the responsibility of the vendor (Vouk 2008, Chen et al. 2012). With the development of mobile and cloud computing, location-based services, and near-field communication services, new opportunities exist to provide information to customers. Some have noted that the growth of cloud computing changes businesses' scope by creating value throughout the services development and delivery process, which in turn significantly impacts firm performance (Bharadwaj et al. 2013). Similarly, researchers have noted that services can now be provided at a notably lower cost (Marston et al. 2011).

### 2.5 The Use of IT in Hospitals

The specific advancements that computers have brought to everyday hospital life can be seen in four different categories: clinical implication, administration, research, & community settings.

In clinical implication, computers are used for; (i) Assessment, (ii) Patient Monitoring (iii) Documentation (iv) Telemedicine (v) Electronic Medical Records (EMR).

The use of computers in assessment helps in gathering and storing data about the patient. IT is used in settings such as emergency, intensive care, ICCU, and the NICU for vital sign monitoring, calculations of cardiac output, and even pulmonary artery pressure.

### 2.6 The Main Benefits of Using IT in the Health Sector

The benefit of these new technologies can be summarized in the following main areas: (i) one of the most important flaws of this sector is the fragmentation of health care and the difficulties of efficiently transmitting the information. IT can help improve patient safety through direct access to the medical case story, checking the treatments online, keeping track of the patients' progress, and anticipating possible medical errors, (ii) the Possibility to carry on brand new health models. IT has been defined as a technology with high transformative potential since it introduces new ways to carry out medicine and develop health care.

## 3.0 Research Methodology

### 3.1 Research Design

Research Design refers to a plan that describes how, when and where data are to be collected and analyzed to get an overall for answering the research question or testing the hypothesis (Polit et al (2001:167)). The research design which was used in this research was descriptive. Cooper and Schindler, (2003) defined a descriptive study as one that is concerned with determining the frequency with which something occurs or the relationship between variables. Based on the nature of research objectives the researcher used descriptive research design to determine to assess the use of Information Technology and service delivery in the Government Hospital, Kenema.

### 3.2 Sampling Procedure

Sampling may be defined as the selection of some part of an aggregate or totality based on which judgment or inference about the aggregate or totality is made. It is the process of obtaining information about an entire population by examining only a part of it (Kothari, 2004:152). The study used a stratified sampling technique by selecting staff from Kenema Government Hospital in a different department. The researcher selected 50 staff from the Government Hospital, Kenema to represent the entire population of the department. The stratified sampling technique was chosen because it exudes the advantages of focusing on important subpopulations and ignores irrelevant ones; it allows the use of different sampling techniques for different subpopulations and improves the accuracy of estimation.

### 3.3 Data Collection

The study relied mostly on primary data sources and Primary data was collected using semi-structured questionnaires with both close-ended and open-ended questions. Out of the 50 questionnaires distributed only 45 (which is about were 90%) were received due to the pandemic atmosphere of the country. A questionnaire is a set of questions, which are usually sent to selected respondents to answer at their own convenient time and n back the filled questionnaire to the researcher (Kothari, 2006; Cohen et al., 2000). Kothari (2006) contends that questionnaires are the most important means of data collecting instrument. The use of questionnaires has some advantages; less expensive, convenient, and unbiased.

### 3.4 Source of Data Collection

For the sake of this work, both primary and secondary data were used. The primary data are collected by the researcher

through the use of questionnaires while the secondary data are collected from already published accounts. The following parameters were also considered in the sampling process, age, gender, job position experience and some of the research questions stated in chapter one. The variable of age ranged from 20-50 years and the specific age of each respondent will be required on the questionnaire. Therefore, this study employed simple random sampling and stratified sampling.

### 3.5 Method of Data Analysis

The data were sorted out according to the various categories of respondents involved in the research. The data was then coded and analyzed using the Statistical Package for the Social Science (SPSS 23.0) software, which is the most used and efficient software package for analyzing any type of data. Information gathered from the data was analyzed and presented descriptively using tables and charts.

## 4.0 Data Presentation, Analysis, and Research Findings

### 4.1 Data Presentation and Analysis

A questionnaire as a data collection instrument was designed to capture the responses of the staff at Government Hospital, Kenema which was a case for this study. A sample of medical officers was drawn out of the total number of staff in the Government Hospital, Kenema, and a case study for this research.

### 4.2 Distribution of the respondents by Department.

The study sought to determine the different departments of the respondents. Details of the analysis are presented in table 4.1 and figure 4.1 below.

**Table 4.1: Distribution of the respondent by Department**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Anesthesia | 9 | 22.5 | 22.5 | 22.5 |
| | Dentistry | 4 | 10.0 | 10.0 | 32.5 |
| | General Surgery | 6 | 15.0 | 15.0 | 47.5 |
| | Medicine | 15 | 37.5 | 37.5 | 85.0 |
| | Pathology | 6 | 15.0 | 15.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

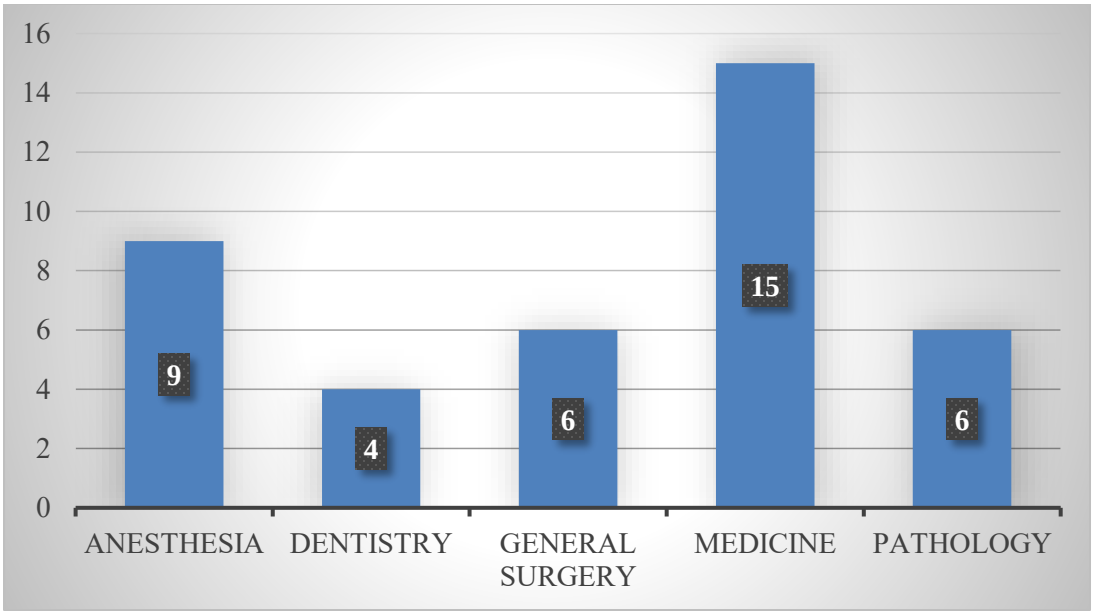


***Figure 4.1: Distribution of the respondents by Department.***

Table 4.1 and figure 4.1 above, show that the majority of the respondents are working in the medicine department and the least is the Dentistry department. This is shown as 38% of the respondents are working at the medicine department, 22% of the respondents are working at the Anesthesia department, 15% of the respondents are working at general surgery, 15% in the pathology and 10% of the respondents are working at Dentistry department.

### 4.3 IT knowledge and Type of IT use

The researcher wants to know the level of knowledge of the respondent in IT, several questions were asked with relation to the knowledge and use of IT by the respondents. Analysis of this is shown in the below figures and tables.

### 4.3.1 Respondents' level of knowledge about IT

The study sought to determine the level of the respondents' knowledge in using IT. Details of the analysis are shown in table 4.2 and figure 4.2 below.

**Table 4.2: Respondents' level of knowledge about IT**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Basic | 22 | 55.0 | 55.0 | 55.0 |
| | Intermediate | 9 | 22.5 | 22.5 | 77.5 |
| | Advanced | 9 | 22.5 | 22.5 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

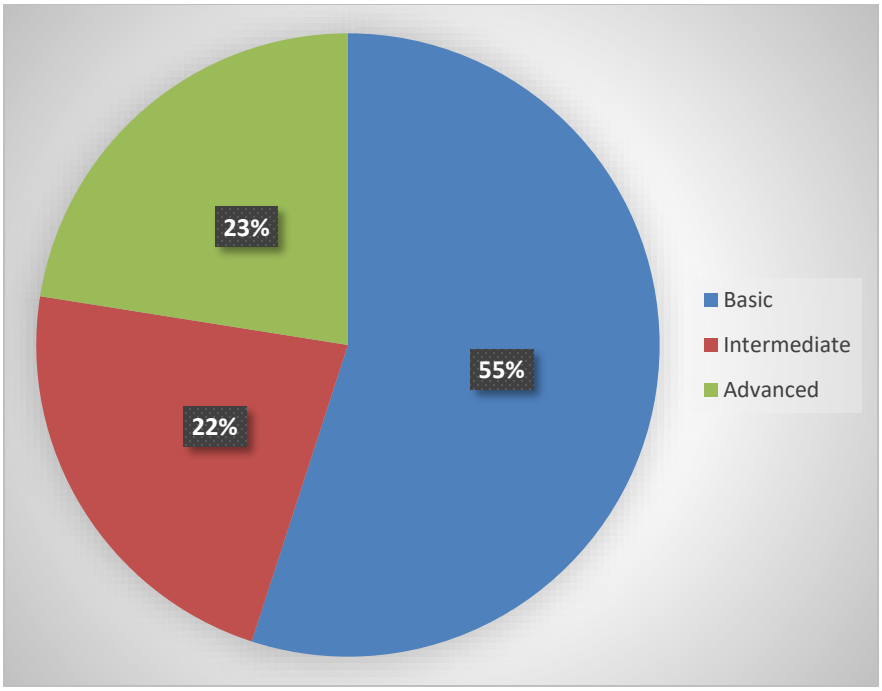


*Figure 4.2: Respondent's level of knowledge about IT*

From table 4.2 and figure 4.2, it illustrates that 55% of the respondents say they have basic knowledge about IT, 23% of the respondents say they have advanced knowledge about using IT, and 22% of the respondents say they are at an intermediate level in using IT. This shows that a good number of the respondents have vast knowledge in using IT.



### 4.3.2 Respondent type of ICT tools used in their department

The study sought to determine the type of IT tools respondents are using in their different departments. Therefore, the respondents were asked to indicate the type of IT tool they are using in their department. The detail of the analysis is illustrated in table 4.3 and figure 4.3 below.

**Table 4.3: Respondent type of tools of IT tools used in their department.**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Computer | 15 | 37.5 | 37.5 | 37.5 |
| | Defibrillators | 9 | 22.5 | 22.5 | 60.0 |
| | Patient Monitoring system | 1 | 2.5 | 2.5 | 62.5 |
| | Tele Monitoring system | 10 | 25.0 | 25.0 | 87.5 |
| | X-ray viewer | 5 | 12.5 | 12.5 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

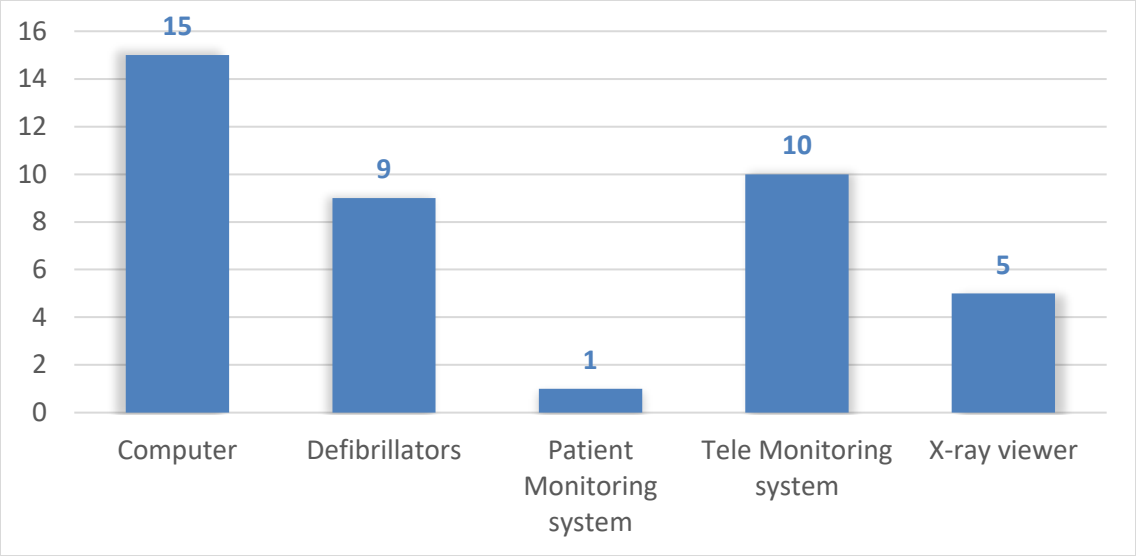


***Figure 4.3: Respondent type of IT tools used in their department***

The analysis in table 4.3 and Figure 4.3 above illustrate that 37% of the respondents say they are using a computer in their department, 25% of them says they are using a Tele-monitoring system in their department, 22% of the respondents say they are using defibrillators in their department, 13% of the respondents say they are using X-ray viewer machine in their department, and 3% of the respondents say they use patient monitoring system in their department. This shows that Government Hospital, Kenema is using modernized IT tools in each of their department.



**4.4: Frequency of IT tools usage**

The study sought to determine how often respondents use the IT tools they have. Details of the analysis are presented in table 4.4 and figure 4.4 below.

**Table 4.4 Frequency of IT tools usage**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | On Extreme cases | 21 | 52.5 | 52.5 | 52.5 |
| | Frequently | 13 | 32.5 | 32.5 | 85.0 |
| | On Rare cases | 6 | 15.0 | 15.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

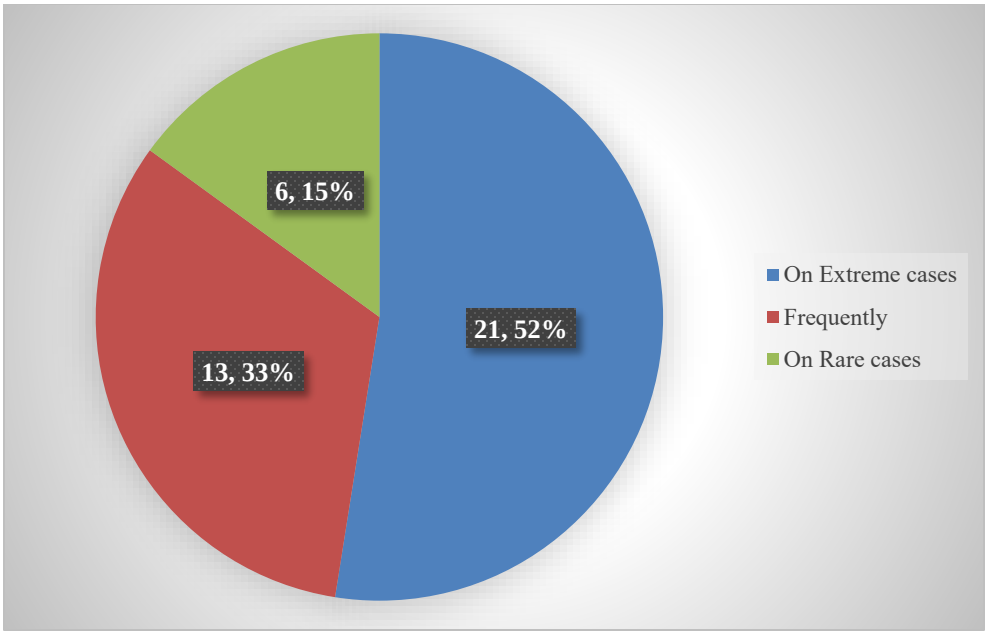


***Figure 4.4 Frequency of IT tools usage***

The analysis in table 4.4 and figure 4.4 above shows that the IT tools available at the Government Hospital, Kenema are used in Extreme Cases. This means that out of the 40 respondents, 21 (52%) of the respondents says the IT tools they have been used in Extreme cases, 13(33%) of the respondents said the IT tools they have are used frequently, while 6(15%) of the respondents said the IT tools they have been used on rare cases.



### 4.5 Benefit of Using ICT in Service Delivery of the Hospital

One of the objectives of this study is to determine the benefits of using IT in their service delivery at the Government Hospital, Kenema. Therefore, the respondents were asked to indicate the influence of ICT practice and also determine the benefit they drive from adopting ICT.

### 4.5.1 Influence of ICT practices at Kenema Government Hospital

The study sought to determine the influence of Information and Communication Technology practices at Kenema Government Hospital. Details of the analysis are presented in table 4.5 and figure 4.5 below, follow by its discussion.

**Table 4.5: Influence of ICT practices at the Government Hospital, Kenema**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Improvement in treatment | 24 | 60.0 | 60.0 | 60.0 |
| | Emerging new technology | 11 | 27.5 | 27.5 | 87.5 |
| | Manage time | 5 | 12.5 | 12.5 | 100.0 |

| | | | | | |
|---|---|---|---|---|---|
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

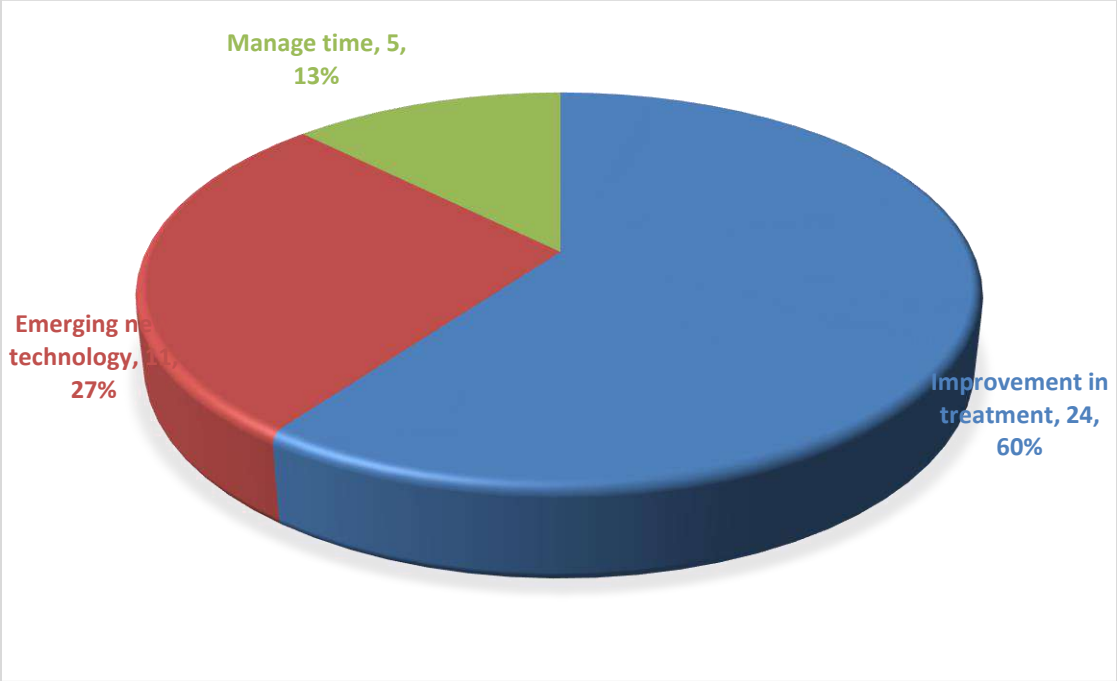


***Figure 4.5: Influence of ICT practices at Government Hospital, Kenema***

Table 4.5 and Figure 4.5 shows that out of the 40 respondents, 24(60%) of the respondents say the influence of ICT in practice is because of the improvement in treatment. Also, 11(27%) of the respondents say emerging new technology is the influence of ICT practice at Kenema Government Hospital and 5(13%) of the respondents say time management is the influence of ICT practice at Kenema Government Hospital. This means that Government Hospital, Kenema is influenced by the benefits driven by information and communication technology.

### 4.5.2 Benefit drive from adopting ICT

The study sought to determine the benefits driven from adopting information and communication technology by Kenema Government Hospital. The respondents were asked to indicate the benefits driven by using ICT in their daily operations. The detail of the analysis is illustrated in table 4.6 and figure 4.6 below.

**Table 4.6 Benefit drive from adopting ICT**

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Provide an easy way of treatment | 16 | 40.0 | 40.0 | 40.0 |
| | Improve the way of treatment | 16 | 40.0 | 40.0 | 80.0 |

| | | | | | |
|---|---|---|---|---|---|
| | Time Management | 8 | 20.0 | 20.0 | 100.0 |
| | Total | 40 | 100.0 | 100.0 | |

**Source:** Research Survey 2022

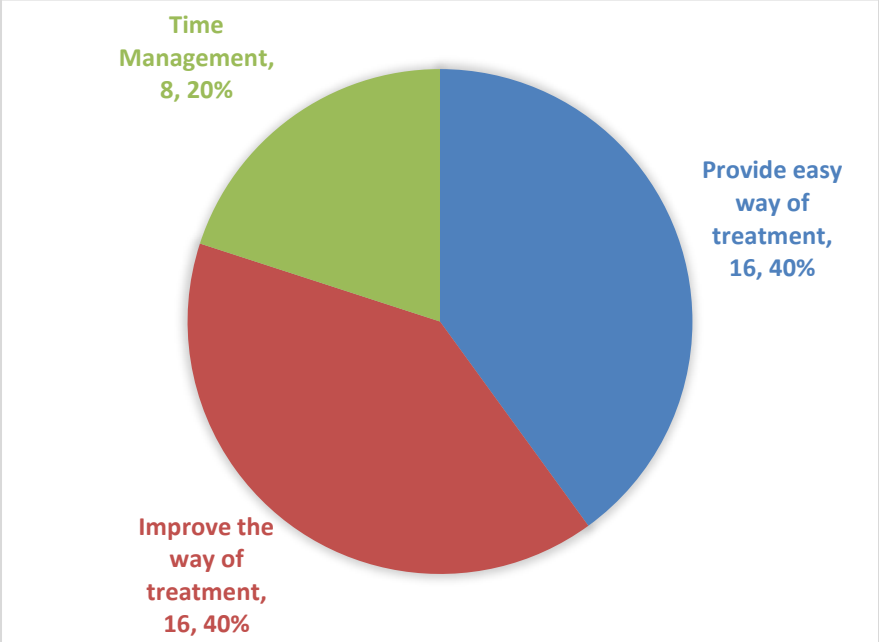


***Figure 4.6: Benefit drive from adopting ICT***

The illustration in table 4.6 and figure 4.6 above, shows that 16(40%) of the respondents say one of the benefits they drive from information and communication technology provides an easy way of treatment. Also, 16(40%) of the respondents say they drive an improvement in the way of treatment as a benefit from ICT, and 8(20%) of the respondents say information and communication provide time management, which makes it easier for them to do more work than before. This shows that there is great benefit in using information and communication technology in hospitals and other organizations.

## 5. Conclusion

The study sought to assess the determined use of Information Technology and service delivery at the Government Hospital, Kenema. A total of 40 questionnaires were administered and the study obtain all questionnaires completely representing a 100% response rate. The questionnaires contained questions that addressed the objectives of the study.

The study established that all the respondents know information and communication technology and know-how to use some of these tools. Also, the study finds out that all the various departments at the Government Hospital, Kenema are using information and communication technology tools. Furthermore, all the information and communication technology tools are directly relevant to their work and help make their work easier.

The study found out that Government Hospital, Kenema is influenced by the improvement in treatment, emerging new technology, and time management as the reasons for adopting/implementing information and communication technology

at the hospital.

The study found out that most hospitals are influenced by the benefit of information and communication technology, and the study, therefore, recommends that those hospitals that have not adopted information and communication in their daily operations should try so that they can reap its benefits.

Arising from this study, the following directions for future research should be carried out. This research only covered Government Hospital, Kenema. However, other hospitals are using information and communication technology in the country. Researchers are encouraged to research them. In the future, other big hospitals in other towns should be involved to enable the researcher to make adequate conclusions.

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