DEDICATION

This Lis 4014 final fourth year report is dedicated to our families, friends, colleagues, and trainers whose unwavering support helped see us through all the thin and thick into having our dream turn into a shaped reality.
ACKNOWLEDGEMENTS

This research would not have been a success without the assistance of a number of individuals. Sincere gratitude goes to the Health Centre In-Charge at N’gombe Health Centre and the entire team who allowed us to conduct our research by granting us time to conduct an interview and collect information for this research. We would also like to thank the almighty God for granting us the good health that we have had during the course of this research.

Many thanks also go to our classmates and family members for the moral support they rendered to us during our study. Our gratitude will not be complete if we do not mention our Supervisor, Mr. Crispin Hamooya, for the guidance, patience, wisdom, help and advice he rendered to us during the entire study.

In conclusion, we wish to pay tribute to all stakeholders, organisations and individuals whose input though not specifically mentioned, contributed to shaping this document in one way or the other.

Thank you all for your contributions
**LIST OF ABBREVIATION AND ACRONYMS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>Acquired Immunodeficiency Syndrome</td>
</tr>
<tr>
<td>CDC</td>
<td>Centre for Diseases Control and Prevention</td>
</tr>
<tr>
<td>CSO</td>
<td>Central Statistical Office</td>
</tr>
<tr>
<td>EMR</td>
<td>Electronic Medical Record</td>
</tr>
<tr>
<td>EHR</td>
<td>Electronic Health Record</td>
</tr>
<tr>
<td>HMIS</td>
<td>Health Management Information Systems</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immunodeficiency Virus</td>
</tr>
<tr>
<td>ICTs</td>
<td>Information Communication Technologies</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>UNZA</td>
<td>University of Zambia</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
ABSTRACT
Electronic Health Records were created for service delivery in health institutions. They have the advantage of paper-based patient records in that they are easy to use, retrieve information and have unlimited storage as well solve the problem of storage faced in the paper-based record system. As indicated in most studies, EHRs come with own challenges. Therefore, the main aim of this study investigate the effectiveness of Electronic Health Records Management System for improving health service delivery at Ng’ombe Health Centre. The specific objectives of the study were; to find out the optimal benefits utilization of e-health records management system at the health care facilities; To determine whether the introduction of e-health records at health care facilities has reduced on the number of medical errors; to determine the cost effectiveness of e-health records at health care facility and to establish the challenges faced in using e-health records at the health care facility. The study used both quantitative and qualitative method to collect and analyses data. 300 respondents were picked and using simple random sampling and 1 key-informant using purposive sampling. The major findings revealed that EHRs are faster to use than paper-based records and saves filing space. Findings also showed that most respondents indicated that EHRs are cost effective in terms of time in that less time is spent by staff to access records and no time is wasted in queues to retrieve records compared to the paper-based. Findings also showed that most of respondents pointed out that the major medical error reduced was that of loss of patient records and repeating of diagnostic tests. The major challenge pointed was that of electricity power outages and it was recommended that back-up measures should be put in place such as procuring power generators. Finally, there is need too for other researchers to consider finding out whether all other institutions use EHRs as N’gombe does and establish if the benefits and challenges are the same.
# TABLE OF CONTENTS

LIST OF ABBREVIATION AND ACRONYMS ........................................................................... 1  
TABLE OF CONTENTS ........................................................................................................ 4  
CHAPTER ONE ....................................................................................................................... 7  
1.0 OVERVIEW ...................................................................................................................... 7  
1.1 INTRODUCTION .............................................................................................................. 7  
1.2 BACKGROUND ................................................................................................................ 9  
1.3 STATEMENT OF THE PROBLEM .................................................................................. 9  
1.4 GENERAL OBJECTIVES ............................................................................................... 10  
1.4.1 SPECIFIC OBJECTIVES .......................................................................................... 10  
1.4.2 RESEARCH QUESTIONS ......................................................................................... 10  
1.5 SIGNIFICANCE OF THE STUDY .................................................................................. 11  
1.6 ETHICAL CONSIDERATIONS ....................................................................................... 11  
1.7 DEFINITION OF KEY TERMS ...................................................................................... 11  
1.8 SUMMARY .................................................................................................................... 12  
CHAPTER TWO ..................................................................................................................... 14  
LITERATURE REVIEW ......................................................................................................... 14  
2.0 INTRODUCTION ............................................................................................................. 14  
2.1 THE BENEFITS OF UTILIZATION OF E-HEALTH RECORDS MANAGEMENT ......... 14  
   SYSTEM IN HEALTH CARE CENTERS ............................................................................ 14  
2.2 HAS E-HEALTH RECORDS AT HEALTH CENTERS REDUCED THE NUMBER OF  
   MEDICAL ERRORS? ......................................................................................................... 16
CHAPTER ONE

1.0 Introduction

The purpose of this study was to investigate the effectiveness of Electronic Health Records management system for improving health service delivery at Ng’ombe Health Centre. Health was noted health care delivery which was one of the critical components of basic social services having a direct linkage to the growth and development of a country as well as to the wellbeing of the society. It was the core of responsive health systems as the daily business of health relies on information and communication and, increasingly, on the technologies that enable it, at every level and in every country (WHO, 2012).

The use of Information and Communication Technologies (ICTs), was concerned with improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems. ICT provides significant benefits not only in achieving health goals, but also in demonstrating what has been attained and at what cost. From the local to the national level, ICT is changing how health care is delivered and how health systems are run. It supports critical functions by improving the ability to gather, analyze, manage and exchange information in all areas of health, from research on molecular genetics to large-scale humanitarian interventions and disaster relief (Battaye 2009).

According to WHO (2005), Information Communication Technology (ICT) is a key area for improving service delivery, promoting easier information exchange, assisting in decision making processes, and improving the effectiveness of operations. Governments and organizations around the world are mainstreaming ICT as a tool in all sectors of activities. In this regard, organizations need to invest a lot of resources to use ICT as a supportive tool for the effective and efficient delivery of services. ICT is a cross cutting area which supports all function and operation areas by facilitating the automation of various processes. Health institutions globally have recognized the benefits of Information and Communication Technology (ICT) as a tool to support the health sector (Health Matrix Network, 2006).

The Health Management Information System was referred to as a computerized patient tracking and caring system. The term Health Management Information System has sometimes included other systems which keep track of medical information, such as the Smart care system which
supports the electronic medical record. HMIS is an essential technology for health care and a necessary tool for improving patient safety and the quality of care (WHO, 2006).

Smart Care was said to be an Electronic Health Record System which is a customized card and carries an encrypted copy of a patient’s entire health history. It uses a SIM chip, familiar to those who use cell phones, to store the data. A soft copy of the health record is saved in the Smart Care database of every health facility the patient visits. The Smart Care main purpose is to enable electronic data entry of patient health information so that health facility staff does not have to manually collect and aggregate data. (Ministry of Health, 2011). Implementation of EHRS has been reported to offer improvements in the quality, efficiency and safety of health care services.

According to various researches done in various countries around the globe, the use Electronic Health Record System has brought about numerous benefits such as ; improvements in the quality, efficiency and safety of health care services ; demonstrated in terms of reducing health care costs and improving the quality of health care in the primary care ensuring patient safety, data collection, quality management, disease surveillance and many more such ; reduction of duplication of patient’s records , reduction of loss of patients records, and reduction in time taken to retrieve patients records.

The following were discovered as the advantages of using Electronic Health Records System (EHRS) in Health Care facilities; systemic storage of medical information reduction of records storage space. It also allows for easy data collection for research and disease management purposes. At the same time, paper resources were saved and the space for documentation minimized. Physicians believe that EHRS improve communication, encourage information sharing and promote work efficiencies among departments in the health institutes. , convenience in checking patient medical records which was time saving. Having patient medical information readily available and easily accessible would make up for the shortcomings of human memories. Another advantage that EHRS could offer was the timely access to laboratory results and radiology images as soon as they were available, which could help to speed up diagnosis process and treatment decision-making. The faster diagnosis process could benefit the patients with better
health care services. Individual medical information could be retrieved by medical staff efficiently and systematically. Medication repetition and drug allergy could be avoided by having convenient access to patient medication history. Availability of patient medical history in the system would also help with making diagnosis for the patients is another advantage. (Weng Chi Chao et-al, 2013)

1.2 Background

N’gombe Health Centre is one of the Urban Health Centres of Lusaka District in the Lusaka Province of Zambia. The facility is located in N’gombe Township and offers health services to a total population of Sixty thousand people (60,000) in the following areas; Out-patient General Screening, Mother and Child Health, Anti-Retroviral, Obstetric, Laboratory and Pharmaceutical services.

The Health Centre operates 24 hours 7days a week and attends to an average of Three Thousand (3000) patients and clients on a monthly basis and is manned by Seventy Five (75) members of staff.

The Health Centre in providing Health services to its patients and clients creates Records, either paper based or Electronic Records are created for its clientele. To create electronic records, the facility uses the Smart care System which comprise of the Smart care Computers and other ICT accessories as well as Care Cards. Smart Care is a fully integrated electronic health record system to provide continuity of care and a clinical management information system at a health facility level, district level and national Level.

Currently facility has a total of Fifteen (15) Smart care Computers in the various service point and use a Local Area Network (LAN) to link the computers. Despite the availability of the Smart care system in creating electronic medical records in this facility, there is a problem.

1.3 Statement of the Problem

Smart Care electronic management system was developed to improve continuity of care and provide timely data on maternal and child health, HIV/AIDS, Tuberculosis and malaria interventions for public health purposes. Despite Ng’ombe Health Centre using e-health record management system, Patients wait for a long time in queues before being attended to and it goes
as far as sending them back home without being attended. Hence patients’ treatment is delayed in some cases.

Consequently, it is not known whether the intended objective of e-health record management system has been achieved or not. As such, it is difficult to determine the appreciation of e-health record management system at Ng’ombe Health Centre. To this effect, this study sought to investigate the effectiveness of e-health records management for improving health service delivery at Ng’ombe Health Centre.

1.4 General Objectives

The general objective of the study was to investigate the effectiveness of e-health records management system for improving health service delivery at Ng’ombe Health Centre

1.4.1 Specific Objectives

i. To find out the optimal benefits utilization of e-health records management system at the health care facilities.

ii. To determine whether the introduction of e-health records at health care facilities had reduced on the number of medical errors.

iii. To determine the cost effectiveness of e-health records at health care facility.

iv. To establish the challenges faced in using e-health records at the health care facility.

1.4.2 Research Questions

i. What are some of the medicals errors reduced with the introduction of E-health records management system?

ii. What are the benefits of using E-health records at the health care facilities?

iii. How are electronic health record effective at health care facility?

iv. What are the challenges faced in using e-health records at the health care facility?
1.5 Significance of The Study

The choice of the topic was based on the application of e-health records management system at Ng’ombe health Centre. It was hoped that the study would produce important information that would help the policy makers in the government and other stakeholders involved in the management of e-health records. So that there is improves in the services that will be provided. Consequently, this would assist to adopt suitable interventions in resolving shortfalls in the application of Smart Care. Furthermore, it is hoped that the results of this study may draw the attention of the general public on Smart Care electronic management system and hence more appreciation by all its users. The study would also provide additional knowledge to the already existing in the field of electronic management.

1.6 Ethical Considerations

The study endeavoured to observe the participants’ anonymity and confidentiality to avoid exposing participants to mental stress. The research sought informed consent from the participants before interviews and questionnaires are administered. The information from the respondents was obtained without cohesion and an appropriate language, which English was used as it is assumed that all the target groups in this study understood English.

The results obtained from the study were reported objectively and honestly. The study included free participation and the right to withdraw from the study where the respondents felt uncomfortable. Those who refused were not be forced to change their positions. Respondent’s names were not published in the research findings. Permission was sought from the District Health Director before commencing the study.

1.7 Definition of Key Terms

**Electronic Health Record**: An electronic health record (EHR), or electronic medical record (EMR), is the systematized collection of patient and population electronically-stored health information in a digital format. It designed to store data accurately and to capture the state of a patient across time. It eliminates the need to track down a patient's previous paper medical records and assists in ensuring data is accurate (Van Bemmel J.H., Musen, (1997)).
**Smart Care**: This is an Electronic Health Record system (EHR) that has been developed and deployed by the Zambia Ministry of Health (MoH) in collaboration with the **MOH** and many other implementing partners (Ministry of Health [MOH], 2012).

**Health Centre**: A health Centre is, in general, any location where healthcare is provided (The World Health Report, 2008).

**ICTs**: This refers to technologies that provide access to information through telecommunications, this includes; computers, internet, wireless networks, cell phones and other communication mediums.

**Computers**: A computer is a machine mostly electronic that is able to take information input, and process it to make new information output (David V, 2007).

**MOH**: The abbreviation stands for Ministry of Health. It is responsible for the coordination, management, monitoring and supervision of health care services within the country. (Ministry of Health [MOH], 2012).

**Local Area Network (LAN)**: This is a group of computers and associated devices that share a common communications line or wireless link to a server. Typically, a LAN encompasses computers and peripherals connected to a server within a distinct geographic area such as an office or a commercial establishment. (Federal Ministry for Economic Co-operation and Development, 2013).

### 1.8 Summary

Information Communication Technology (ICT) is a key area for improving service delivery, promoting easier information exchange, assisting in decision making processes, and improving the effectiveness of operations. Therefore, the general objective of the study is to investigate the effectiveness of e-health records management system for improving health service delivery at N’gomba Health Centre using an electronic health record (EHR), or electronic medical record (EMR), this is defined as the systematized collection of patient and population electronically-stored health information in a digital format.

N’gomba Health Centre is one of the Urban Health Centres of Lusaka District in the Lusaka Province of Zambia. The facility is located in N’gomba Township and offers health services to
a total population of Sixty thousand people (60,000). Despite N’gombe Health Centre using ehealth record management system, Patients wait for a long time in queues before being attended to and it goes as far as sending them back home without being attended. Hence patients’ treatment is delayed in some cases. Therefore study will endeavor investigate the effectiveness of e-health records management for improving health service delivery at N’gombe Health Centre so as to provide solutions to challenges faced in using the system and in long improve service delivery. Consequently, this would assist to adopt suitable interventions in resolving shortfalls in the application of Smart Care.

In the study ethical considerations will be considered i.e to observe the participants’ anonymity and confidentiality to avoid exposing participants to mental stress. The research will seek informed consent from the participants before interviews and questionnaires are administered. In the research, a number of terms will be encountered among them is, an electronic health record (EHR), or electronic medical record (EMR), and this is the systematized collection of patient and population electronically-stored health information in a digital format.
CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

A comprehensive search of the literature a researcher enables to avoid the duplication of research work and broadens the understanding of the research problem. It provides a framework for establishing the importance of the study as well as a benchmark for comparing the results with other findings. Therefore this literature review will focus on the following research themes; To find out the optimal benefits utilization of e-health records management system at the health care facilities; To determine whether the introduction of e-health records at health care facilities has reduced on the number of medical errors; To determine the cost effectiveness of e-health records management at health care facility; To establish the challenges faced in using e-health records management system at the health care facility.

2.1 The Benefits Utilization of E-Health Records Management System in Health Care Centers

Several publications have documented benefits of the use of EHRs in Africa including greater data accuracy, improved timeliness and availability of routine reports. A review by Foster et al (2008) however showed that more effort is still required to optimize the benefits of EHRs in developing countries. EHRs allow medical professionals a seamless approach for coordinating and managing their patient records. They can help reduce paperwork, eliminate duplicate tests, and facilitate code assignment for billing. However, it should be noted that recent reports indicate physicians are concerned about system interoperability, documentation overload, and untested billing systems (Friedberg et al, 2013). WHO (2006) argues that the benefits of computerized Information Systems for the information needs of the healthcare system are countless, particularly in developing countries. Implementing e-health in developing countries showed significant improvement in ability to track patients, monitor adherence of patients to the treatment regime, and keep track of those who do not follow up their treatments and appointments.
Aminpour et al. (2014) conducted a study on the utilization of open source electronic health record (EHR) systems in different countries all over the world. The result showed that open source EHRs had the following advantages and benefits for various stakeholders. For the hospital, recording is done systematically as compared to a paper-based record system, that is no chance of misfiling, it brings about efficiency in service delivery, meaning correct diagnosis and management of patients, easy follow ups with patients. Easy collection of patient data to be used for further research, reporting to the next level of health care and patient data sharing between or among health facilities. It was also discovered that there was a cost reduction in terms of having paper based medical stationary used in the day to day clerking of patients.

For a patient it means convenience of checking records and carrying their own wherever they going, drug safety and reduction of duplication of medical tests and records since the record stores and show what medical test where undertaken by the patient unlike in a paper-based system evidence of a medical test might have fallen of the patient’s record.

For a Physician benefits include; convenient of accessing patient’s or client’s records since they are the system and also carried in an electronic card, easy monitoring of any drug side effects and any other changes when treating a patient. It also saves time, in that medical tests on a patient reflect as soon as it is done (laboratory or radiological test). Easy communication when consulting with Physicians and sharing of data is easily facilitated.

Menachemi and Collum (2011) carried a study by reviewing and summarizing the literature on the benefits and drawbacks of electronic health records (EHR) systems in the United States of America (USA). The results of the study describes the potential benefits of EHRs that include clinical outcomes such as (improved quality, reduced medical errors), organizational outcomes such as (financial and operational benefits), and societal outcomes such as (improved ability to conduct research, improved population health, reduced costs). However, regardless of these benefits, the study highlighted drawbacks associated with EHRs, which include the high upfront acquisition costs, on-going maintenance costs, and disruptions to workflows that contribute to temporary losses in productivity that are the result of learning a new system. In conclusion, the study noted that, EHRs are associated with potential perceived privacy concerns among patients, which are further addressed legislatively in the Health Information Technology for
Economic and Clinical Health (HITECH) Act. Therefore, the study recommended that experts and policymakers should implement policies that optimize the benefits to patients, professionals and society when EHRs are widely adopted.

Mweebo (2014) carried a study on the security issues related to the operationalization of SmartCare, an electronic medical record (EMR) used to manage Human Immunodeficiency Virus (HIV) health information in Zambia. The study found some of benefits of smart-care program include: supporting quick access to patient records, which saves physicians time; sharing of patient HIV records is made easier through integrated national databases and updated patient smart cards; and the presence of national, provincial and district databases has made monitoring and evaluation of HIV programs easier. The main disadvantages were found to be privacy and security. In conclusion the study highlighted that, In Zambia; smart-care has expanded since its initiation in 2004 to integrate more than 500 health facilities and has harmonized patient records of more than 308000 individuals across the country. Therefore, recommends that as health professionals gain improved access to patient health information electronically, there is need to ensure this information is secured, and that patient privacy and confidentiality is maintained.

2.2 Has Electronic Health Records at Health Centers reduced the number of Medical errors?

Sharon Silow-Carroll,et al ,2012 in their study carried out in 2012 to establish the reduction of medical errors with the introduction of Electronic Health records in nine (9) concluded that ,with the advent of EHRs a number of medical errors have reduced as mentioned below ; late diagnosis of patients leading to mortalities reduced ,misdiagnosis due to miss up of patient medical tests in paper based records reduced, late referral to specialized facilities for complicated cases reduced. Lack of follow ups monitoring of chronic patients reduced, delay in commencing treatment due to loss of patient records also reduced drastically, above Surveillance of contagious diseases which was not easily done in the paper based record was enabled in the electronic record enabling quick identification ,isolation and treatment to prevent the disease spreading further.
2.3 The Cost Effective of Electronic Health Records in Health Care Centers

JMIR Med Inform, 2017 conducted many studies on the cost-effective benefits of using EHRs in Health care facilities in 2017 and it evaluated quantitatively that the studies conducted around the world from 288 facilities presented mixed and inconclusive results, leaving us unable to draw a definitive conclusion about cost-effectiveness. The analysis of costs was more limited than the evidence on quality and efficiency.

The study concluded that cost-effective was mainly on time as follows; HER reduced charting time Electronic surveillance achieves equal or better sensitivity than manual surveillance. Several studies also reported time savings of 60% to 99.9% or a reduction in chart reviews of 40% to 90.5. Increased time spent on direct patient care and reduced the occurrence of errors (medication errors, intravenous and ventilation incidents) thereby Improving in clinical outcomes. Such outcomes improved accuracy, legibility, data accessibility, and decision support. Although further studies are recommended for validation

Ken Choi ,2017 stressed that ,there are short term benefits and long term benefits of using HER in a health care facility such as the following ; Short Term Cost-Benefits are ;Reduce employee time spent on filing, retrieving, and organizing physical charts and documents, Reduce the amount of physical space used to store filing cabinets and other storage areas for papers, time saved with information exchange between medical professionals and insurance companies (information is sent instantly instead of mailed)

Long term cost-benefits include ;Significantly reduce risks of data breach and data loss ,transferring large amounts of data is simpler and faster when changing locations ,less physical papers are needed, along with the reduced necessity for paper products (printers, copiers, office supplies) ,easier to adopt new regulations in the future with a technologically-appropriate system, handwritten charts can be difficult to comprehend by future healthcare providers, making EHRs that much more efficient for future users
2.4 Challenges in using Electronic-Health Records

According to Azubuike (1999) a greater challenge in the management of smart care facility may be “the patients’ unwillingness for their clinical data to be shared”. Some patients may want to withhold certain information from doctors, such as a history of mental illness or sexually transmitted diseases. Physicians like Dr. Adrian Gropper, CTO of the non-profit Patient Privacy Rights, are concerned that current systems are interfering with physician-patient and physician-to-physician relationship (Mengesha, 2011). Bramson and Liebovitz (2010) identified ‘failure to use human factors design principles’ as a major factor that impede usability and user satisfaction in their use of EHR. According to them, management, designers and vendors of EHR systems often fail to apply human and social factors when designing the system, rather they just concentrate on the technological aspect. These results in little time dedicated to appreciating the context of use. Designers of the system thus focus on workflow (for instance, click here to fill a data or open here to access this file) at the neglect of what Schumacher et al. (2010) described as “less obvious, but often more important, ‘thought flow’ the review and thinking which physicians inherently do before finishing a task”. They also identified other challenges to the use of EHRs as “Physician's attitudes that they want a computer system to mimic a paper system as closely as possible as well as IT staff's attitudes that technology solutions are more important than the purpose of the solution and the problem it was intended to solve”.

Maxwell et al. (2011) conducted a study on the use of electronic health records in sub-Saharan Africa: Progress and challenges. It was found that 91% use of open source healthcare software, with open MRS being the most widely used. Challenges to adoption of EHRs included high cost of procurement and maintenance, poor network infrastructure and lack (Compare this to cost effectiveness) of comfort among health workers with electronic medical records. In conclusion the study noted that there has been an increase in the use of EHRs in sub-Saharan Africa, largely driven by utilization by HIV treatment programs penetration is still however very low. Therefore, the study recommended that government institutions in sub-Saharan Africa should be quick in implementing EHRs and other appropriate ICTs which are required to improve healthcare on the continent.
Chao et al. (2013) conducted a study on the benefits and challenges of electronic health record system on stakeholders: A qualitative study of outpatient physicians in New York City. Semistructured interviews were conducted with 32 physicians who worked in the outpatient department. The results showed that 78% physicians interviewed used EHRS frequently during their daily practice despite individual preferences of documentation methods. They agreed that systemic health record offered by EHRS allowing smooth communication was beneficial to the health institutes, patients and physicians. However, privacy and confidentiality concerned both the health institutes and patients. In conclusion the study highlighted that inefficiency of the EHRs that only allowed retrieval of limited medical information of the patients hindered physicians’ acceptability of EHRS. Therefore the study recommended that the health institutes should take into consideration interests of different stakeholders when designing and implementing EHRS.

2.5 Summary

Review covered; The benefits of utilization of e-health records management system in health care centers; Challenges in using e-health records management system; The cost effectiveness of e-health records management system in health care centers and the challenges in using e-health records management system.

In summary, several publications have documented benefits of the use of EHRs in Africa including greater data accuracy, improved timeliness and availability of routine reports. Improved patient care, increased patient participation, improved care coordination, improved diagnostics and patient outcomes, practice efficiencies and cost savings are some of the major benefits of the EHRs. The implementation of EHR systems in most health facilities has largely decreased the paperwork for clinicians. This has in turn reduced record-keeping time thus leading to the optimization of workflow efficiency and increase in the general productivity of health professional. However highlighted that inefficiency of the EHRs in that they only allowed retrieval of limited medical information of the patients and this hindered physicians’ acceptability of EHRs.
CHAPTER 3

RESEARCH METHODOLOGY

3.0 Overview

This chapter covered, the following; the research design which will be used in the research; the total population where the study will be carried out; the sample size and sampling procedure; the data collection instruments and the data analysis method.

3.1 Research Design

The research design refers to the overall strategy that you choose to integrate the different components of the study in a coherent and logical way, thereby, ensuring you will effectively address the research problem; it constitutes the blueprint for the collection, measurement, and analysis of data describes a research design as a plan that describes how, when and where data are to be collected and analysed.

This study focused on the effectiveness of use of electronic health record system in service delivery to the clientele of N’gombe Health Centre.

Mathiyazhagan .T and Deoki Nandan ,2010 defined a Survey research “As a method of descriptive research used for collecting primary data based on verbal or written communication with a representative sample of individuals or respondents from the target population.”

This study was a Case study, according to Qualitative Research Methods ,2011 “A case study is a method used in both qualitative and quantitative research methodologies”. This entails that a mixed method of study will be to investigate the effectiveness of e-health records at N’gombe Health Centre . In order to collect data from the facility whose levels of education are diverse both questionnaires and Interview guides will be used to collect the data

The word qualitative implies an emphasis on the qualities of entities and on processes and meanings that are not experimentally examined or measured in terms of quantity, amount,
intensity, or frequency. Qualitative researchers stress the socially constructed nature of reality, the intimate relationship between the researcher and what is studied, and the situational constraints that shape inquiry. Such researchers emphasize the value-laden nature of inquiry. They seek answers to questions that stress how social experience is created and given meaning. In contrast, quantitative studies emphasize the measurement and analysis of causal relationships between variables, not processes. Qualitative forms of inquiry are considered by many social and behavioural scientists to be as much a perspective on how to approach investigating a research problem as it is a method. (Merriam, B, 2009)

The advantages of using qualitative are: Obtain a more realistic view of the lived world that cannot be understood or experienced in numerical data and statistical analysis; Provide the researcher with the perspective of the participants of the study through immersion in a culture or situation and as a result of direct interaction with them; Allow the researcher to describe existing phenomena and current situations; Develop flexible ways to perform data collection, subsequent analysis, and interpretation of collected information; Yield results that can be helpful in pioneering new ways of understanding and Provide a holistic view of the phenomena under investigation.

3.2 Total Population

Ng’ombe is a compound located within the outskirts of Zambia’s capital city of Lusaka. Ng’ombe is a high-density, low-income community that lacks many social services, such as running water and proper waste disposal. Ng’ombe has a population of over 60,000 residents, many of which are under 18 years of age and in a month, the health centre attends to 3000 clients.

3.3 Sample Size

The sample size of the research was 300 members of the community (Ng’ombe community/compound) who seek medical services at the facility. It was believed that in the research, at least 80 members from each age group will be included in our research and the findings will generalized to the entire community, this excludes children.
3.3.1 Sample Procedure

The method used in this research was is a simple random sampling. Frerichs, R.R. Rapid Surveys, 2008) states, “A simple random sample is a subset of a statistical population in which each member of the subset has an equal probability of being chosen” Subjects in the population are sampled by a random process, using either a random number generator or a random number table, so that each person remaining in the population has the same probability of being selected for the study and the findings will be generalized to the entire population being studied.

Sampling of the participants was done as follows; assistance of the head of the facility will be sought to identify potential participants, these are the facility’s clients and the research proposal will be explained to the prospective participants who will be short-listed and they will be asked personally if they want to take part in the research.

3.4 Data Collection Instruments

Accurate and systematic data collection is critical to conducting scientific research. Data collection allows us to collect information that we want to collect about our study objects. Depending on research type, methods of data collection include: documents review, observation, questioning, measuring, or a combination of different methods. A Data collection instrument is a research instrument is a tool used to collect data. It is used to measure knowledge attitude and skills. It is used to obtain data from participants with different experience and prevents information biasness and thus increasing credibility regarding the information collected.

In this research questionnaires and Interview guides were used for data collection. A questionnaire is a data collection instrument consistent of a series of questions and other prompts for the purpose of gathering information from respondents. (The Free Encyclopedia, September 2012.) A questionnaire is simply a tool for collecting and recording information about a particular issue of interest. It is mainly made up of a list of questions, but should also include clear instructions and space for answers or administrative details. Questionnaires should always have a definite purpose that is related to the objectives of the research, and it needs to
be clear from the outset how the findings will be used. Respondents also need to be made aware of the purpose of the research wherever possible.

An interview guide helps a researcher to engage in a conversation with subjects of a study for the sole purpose of gathering data or collecting data for the study. It is the process of the researcher asking questions and respondents responding to those questions. Interviews can be conducted face-to-face or over the telephone. In this case, face-to-face interviews will be conducted. The advantages of using interviews for this study are that; Interviews is a quick way of obtaining data from respondents within a short period of time since answers are given as soon as they asked. It is also advantageous because clarifications are given there and then where the question is not clearly understood. Above interviews will help to collect data from respondents who are illiterate who do not know how to read and understand English used in the questionnaires. (Merriam, B, 2009)

3.5 Data Analysis

Data analysis means to organize, provide structure and elicit meaning. Analysis of qualitative data is an active and interactive process, it is the process of bringing order, structure and meaning to the mass of collected data. Data was analyzed using Microsoft Excel.

The ability to analyze data is a powerful skill that helps you make better decisions. Microsoft Excel is one of the top tools for data analysis and the built-in pivot tables are arguably the most popular analytic tool. In addition, Excel formulas can be used to aggregate data to create meaningful reports. (Analysing Data Using Excel, 2017)

3.6 Summary of Chapter

A research design is an overall strategy that one chooses to integrate the different components of the study in a coherent and logical way.

In order to determine the effectiveness of use of electronic health record system in health service, research will be carried out at Ng’ombe clinic targeting the clients who seek medical services at the facility. In order to come up with generalized finding 300 people will be included
from each category of age group and these respondents will be picked from clients of Ngombe Health Centre.

To collect data from the participants Simple Random Sampling method will be used, questionnaires will be used. A questionnaire is a data collection instrument consistent of a series of questions and other prompts for the purpose of gathering information from respondents. Final analysis of data will be done using an Excel computer application to present our findings to help to analyse the data.
CHAPTER FOUR (4)
PRESENTATIONS OF FINDINGS

4.0 Introduction

This chapter presented the information obtained from all respondents using self-administered questionnaires and an interview guide. It should be noted that the research involved one hundred (300) respondents and so 300 questionnaires were distributed. However, 288 were collected and 12 were not returned, meaning 96% of the intended respondents participated in the study. Furthermore, data analysis was done using Microsoft Excel and the data is presented in quantitative form. Data was analyzed in two parts; the first was based on the analysis of frequency while the second one was based on cross tabulation of important variables. Lastly, the frequency of the statistics is expressed in form of percentages (%).

<table>
<thead>
<tr>
<th>Response rate</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned</td>
<td>288</td>
<td>96%</td>
</tr>
<tr>
<td>Unreturned</td>
<td>12</td>
<td>4%</td>
</tr>
<tr>
<td>Distributed</td>
<td>300</td>
<td>100%</td>
</tr>
</tbody>
</table>

Section A :4.1 Background Information of Respondents

This section presented the demographic characteristics of the sample which includes; gender, age as well as level of education, residence of respondents and frequency of visit to the health facility.

4.1.1 Respondent’s age
Figure 1: Age Distribution

The first figure above shows the age distribution of participants. The majority were aged between 25-34 years with 37.50% of the sample frequency of 108. The second highest age group of respondents were ages between 35-44 years with 23.60% of the sample frequency 68, followed by the age group 45 years and above with 20.10% of the sample frequency of 58.

The least age group was between 16-24 years with 18.75% of the sample frequency of 54.

4.2.2 Respondent’s Gender Distribution
Figure 2 : Gender Distribution

The figure above shows the gender distribution of respondents. The majority were female with 61% percentage with a frequency of 176 and males with a percentage of 39% with a frequency of 112. The results show that, the research was biased towards the female respondents.

4.2.3 Respondent’s level of Education

Figure 3 : Level of Education
The figures above show the respondent’s Level of Education. The highest percentage of respondent on the level of education is others with 27.70% with a frequency of 80. The second ones are Diploma holders with 20.80% with a frequency of 60. The third ones are certificate holders with 19.70% with a frequency of 57. The grade twelve (12) certificate with 16.60% with a frequency of 49 and the least were the Degree Holders with 14.90% with a frequency of 42.

4.2.4 Respondent’s residence

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ng’ombe</td>
<td>44%</td>
<td>127</td>
</tr>
<tr>
<td>Foxdale</td>
<td>20.40%</td>
<td>59</td>
</tr>
<tr>
<td>Roma Township</td>
<td>11.80%</td>
<td>34</td>
</tr>
<tr>
<td>Kalundu</td>
<td>9.30%</td>
<td>27</td>
</tr>
<tr>
<td>Others</td>
<td>14.20%</td>
<td>41</td>
</tr>
</tbody>
</table>

Table 1: Respondent’s Residence

Table one above shows that, most of the respondents were coming from Ng’ombe at 44% with a frequency of 127. The second highest group of respondents were from Foxdale at 20.40% with a frequency of 59. The least group of respondents were from Kalundu at 9.30% with a frequency of 27.

4.2.5 Respondent’s frequent visits to the health Facility

<table>
<thead>
<tr>
<th>Number of Visits</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Once a Month</td>
<td>23.26%</td>
<td>67</td>
</tr>
<tr>
<td>Once every three months</td>
<td>36.45%</td>
<td>105</td>
</tr>
<tr>
<td>Once every six months</td>
<td>20.80%</td>
<td>60</td>
</tr>
<tr>
<td>Once a year</td>
<td>4.10%</td>
<td>12</td>
</tr>
<tr>
<td>Others</td>
<td>15.27%</td>
<td>44</td>
</tr>
</tbody>
</table>

Table 2: Respondents Visit to the Health Facility

Table two above shows that the most frequently visits of respondents were once every three months at 36.45% with a frequency of 105 and the second highest were once a month at 23.26% with a frequency of 67. The least were those who visit once a year at 4.10% with a frequency of 12.
4.3.0 Section B: Benefits of Using E-Health Records Management System in Health Care Facilities

4.3.1 The experience of using an Electronic Health Record

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>73.20%</td>
<td>211</td>
</tr>
<tr>
<td>Agree</td>
<td>18.75%</td>
<td>54</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>3.40%</td>
<td>17</td>
</tr>
<tr>
<td>Disagree</td>
<td>2.40%</td>
<td>7</td>
</tr>
<tr>
<td>Not Sure</td>
<td>2%</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 3: Respondents’ experience.

Table 3 above shows that 73.20% of respondents with a frequency of 211, strongly agreed the experience of using EHRs is of good benefits. While 2% with a frequency 6 were not sure of the benefits of using EHRs at the health facility.

4.3.2 Electronic Health Records are better than using paper-based Health Records

![Pie chart showing the percentage of respondents' views on using EHRs vs paper-based records.]

Figure 4: Paper-based Records Vs EHRs

The figure above revealed that 92% of the respondents agreed that EHRs are better than paper-based records to use.
4.3.3 Benefits of using Electronic Health Records

Figure 5: Benefits of EHRs.

Figure 5 above revealed that the primary benefit of using EHRs is faster to use compared to using Paper-based records.

4.4.0 Reduction of Medical errors in Health Care Facilities

4.4.1 Electronic Medical Health Records have reduced Medical errors.

Figure 6: Reduction of medical errors
It is evident from the figure above that EHRs has reduced medical errors as 72% of the respondents indicated so, 27% of the respondents disagreed and 1% of the respondents were not sure.

4.4.2 Medical errors Electronic Medical Health Records reduced.

<table>
<thead>
<tr>
<th>Medical Errors</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of patients records</td>
<td>50.00%</td>
<td>144</td>
</tr>
<tr>
<td>Misplaced records</td>
<td>35%</td>
<td>100</td>
</tr>
<tr>
<td>Multiple patient records</td>
<td>7%</td>
<td>20</td>
</tr>
<tr>
<td>Misdiagnosis</td>
<td>3.00%</td>
<td>10</td>
</tr>
<tr>
<td>Others</td>
<td>5.00%</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 4 : Medical Errors

Table 4 above shows that the major medical errors reduced is loss of patients records at 50% with a frequency of 144 and the least reduced Medical Error is Misdiagnosis at 3% with a frequency of 10.

4.5.0 Cost effectiveness of Electronic Health Records Management System at Health Care Facilities.

4.5.1 Cost effectiveness of Medical Health Records in terms of time.

![Cost effectiveness of EHRs](image)

Figure 7: Cost Effectiveness

The figure above revealed that, the use of EHR is cost effective in terms of time than the use of paper-based records. 43.5% of the respondents indicated so whereas 48.61% disagreed.
4.5.2 Reasons for answer above.

90% of the respondents explained that it is cost effective in terms of time was because no time is spent to retrieve patient’s records as the records are carried around by patients using the care card.

4.6.0: Challenges in using Electronic Health Records Management System at Health Care Facilities.

4.6.1 Challenges faced in using Electronic Medical Health Records

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Percentage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power outages</td>
<td>91%</td>
<td>262</td>
</tr>
<tr>
<td>System freezing</td>
<td>7%</td>
<td>20</td>
</tr>
<tr>
<td>Lack of staff training</td>
<td>2%</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 8: Challenges

Table 8 above shows that 91% of the respondents indicated that the major drawback, is the constant electricity outages which hinder the use of the system.

4.6.2 Solutions to challenges faced with using Electronic Medical Health Records.

87% of the respondents indicated that there is need to procure power generators to be used as back-up when the facility experiences electricity power outages, while 3% recommended that power cuts should not apply to health care facilities. 5% of the respondents suggested that ICT personnel at all times to constantly check on the system and ensure that it is in good working condition all the time. The remaining 5% of the respondents recommended that there should a plan to train staff more especially new staff on how to operate the system for efficient and effective service delivery.

4.6 Other Information from the Key Informant

4.6.1 Benefits of using Electronic Health Records

The key informant stated that using EHRs has brought about many benefits to both the staff and the clients. EHRs has sorted out the issue of filing space for patients records. Now there is little or no need for filing as the EHRs are carried by the patients themselves.
4.6.2 Reduction of Medical errors in Health Care Facilities

The key informant indicated that with the use of EHRs follow-up of patients is now easy this was impossible with paper-based record system as notification pop-ups can easily be seen on the electronic record system.

4.6.3: Cost effectiveness of Electronic Health Records Management System at Health Care Facilities

This key informant alluded to the fact that now it is easy and faster to produce patient medical reports with a click of a button. EHRs saves time of doing reports.

4.6.4: Challenges in using Electronic Health Records Management System at Health Care Facilities.

We were informed the key informant that there are some faced with using the system. Apart from the power cut challenge the system also tends to freeze time and again while attending to clients.
CHAPTER 5

DISCUSSIONS OF FINDINGS

5.0 Overview

This chapter presents the findings as presented in the research questions. The four themes that underpin the presentation are; Benefits of using Electronic Health Records, Reduction of Medical errors in Health Care Facilities, Cost effectiveness of Electronic Health Records Management System at Health Care Facilities. Challenges in using Electronic Health Records Management System at Health Care Facilities.

5.1 Back ground information

The majority of the respondents were aged between 25-34 years with 37.50% of the sample frequency of 108. The second highest age group of respondents were ages between 35-44 years with 23.60% of the sample frequency 68, followed by the age group 45 years and above with 20.10% of the sample frequency of 58. The least age group was between 16-24 years with 18.75% of the sample frequency of 54. Furthermore 61% of the respondents were female and male 39%. This indicates that the study was biased towards the female respondents.

The levels of education of respondents was discovered as indicated below:

The highest percentage of respondents on the level of education is others with 27.70% with a frequency of 80. The second ones are Diploma holders with 20.80% with a frequency of 60. The third ones are certificate holders with 19.70% with a frequency of 57. The grade twelve (12) certificate with 16.60% with a frequency of 49 and the least were the Degree Holders with 14.90% with a frequency of 42. Most of the respondents came from Ngómbe at 44% with a frequency of 127. The second highest group of respondents were from Foxdale at 20.40% with a frequency of 59. The least group of respondents were from Kalundu at 9.30% with a frequency of 27.

Again, it was established that the majority of respondents visited the health facility at least once every three (3) months at 36.45% and the least were those who visited once a year at 4.10%.
5.2 Benefits of using Electronic Health Records

It was discovered from the findings that, using EHRs is beneficial as 92% of the respondents agreed that EHRs are better to use than paper-based records. It was also revealed that the chief benefit of using EHRs is faster to use compared to the paper-based records. According to Neame (2013) quick access to patient’s records saves on time sharing of patient information is easier through integrated nationwide data bases and updated patient smart card. Hornbrook (2010) adds on to say use of smart card is cost effective from less paper work, and elimination of repeated investigations. An electronic health record has made data use easier because health professionals can quickly filter and select relevant reports to make quick decisions. The use of electronic health record also allows physicians more time to spend with patients to discuss issues of concern which are easily accessible and also advice them.

Another benefit of electronic health records is that it is now easy to compile a list of patient’s schedules just at a click because all relevant information is stored in system. (WHO, 2013) A comprehensive list of patients booked for review also helps to identify and follow up those who miss their appointments, in order to reduce the number of those who default treatment and reduce the emergency of drug resistance (MOH, 2012). An electronic health record has made it easier to analyse the entire cohort of patients at a clinic instead of sampling, as it occurs with paper-based records in most cases since it is usually not feasible to analyse all the case files in a given period (Tassie et al., 2010). Finally, the lessons learnt will be used to improve the program before the planned rolling out of EHR to other service areas in 2020 (AIHW, 2012).

5.3 Reduction of Medical errors in Health Care Facilities

It was revealed that ,the major medical errors reduced was loss of patients records as 50% of the responses indicated so. A research conducted by Sharon Silow-Carroll,et al ,2012 in their study carried out in 2012 to establish the reduction of medical errors with the introduction of Electronic Health records in nine (9) hospitals in the United States of America, concluded that ,with the advent of EHRs a number of medical errors have reduced as mentioned below ;

Late diagnosis of patients leading to mortalities reduced, misdiagnosis due to miss up of patient medical tests in paper-based records reduced, late referral to specialized facilities for complicated cases reduced. Lack of follow ups monitoring of chronic patients reduced, delay in commencing
treatment due to loss of patient records also reduced drastically above all, Surveillance of contagious diseases which was not easily done in the paper-based record was enabled in the electronic record enabling quick identification, isolation and treatment to prevent the disease spreading further.

Another advantage of electronic health record is that it is now easy to compile a list of patient’s schedules just at a click because all relevant information is stored in system. (WHO, 2013) A comprehensive list of patients booked for review also helps to identify and follow up those who miss their appointments, in order to reduce the number of those who default treatment and reduce the emergency of drug resistance (MOH, 2012). An electronic health record has made it easier to analyse the entire cohort of patients at a clinic instead of sampling, as it occurs with paper-based records in most cases since it is usually not feasible to analyse all the case files in a given period (Tassie et al., 2010). Finally, the lessons learnt will be used to improve the program before the planned rolling out of EHR to other service areas in 2020 (AIHW, 2012).

5.4 Cost effectiveness of Electronic Health Records Management System at Health Care Facilities

The study discovered that EHRs were cost effective in terms of time because no time is spent to retrieve patient’s records as the records are carried around by patients using the care card. 90% of the respondents explained agreed to this. JMIR Med Inform, 2017 conducted many studies on the cost-effective benefits of using EHRs in Health care facilities in 2017 and it evaluated quantitatively that the studies conducted around the world from 288 facilities presented mixed and inconclusive results. The study concluded that cost-effective was mainly on time as follows; EHR reduced charting time resulting in increased time spent on direct patient care and reduced the occurrence of errors.

Ken Choi, 2017 stressed that, there are short term benefits and long term benefits of using EHRs in a health care facility such as the following ; Short Term Cost-Benefits are ;Reduce employee time spent on filing, retrieving, and organizing physical charts and documents, Reduce the amount of physical space used to store filing cabinets and other storage areas for papers, time saved with
information exchange between medical professionals and insurance companies (information is sent instantly instead of mailed)

5.5: Challenges in using Electronic Health Records Management System at Health Care Facilities.

The research discovered that the major challenge in using EHRs as indicated by 91% of the respondents was the constant electricity outages which hinder the use of the system.

According to Azubuike (1999) a greater challenge in the management of smart care facility may be “the patients’ unwillingness for their clinical data to be shared”. Some patients may want to withhold certain information from doctors, such as a history of mental illness or sexually transmitted diseases., Physicians like Dr. Adrian Gropper, CTO of the non-profit Patient Privacy Rights, are concerned that current systems are interfering with physician-patient and physician-to-physician relationship (Mengesha, 2011). Bramson and Liebovitz (2010) identified ‘failure to use human factors design principles’ as a major factor that impede usability and user satisfaction in their use of EHR. According to them, management, designers and vendors of EHR systems often fail to apply human and social factors when designing the system, rather they just concentrate on the technological aspect. These results in little time dedicated to appreciating the context of use. Designers of the system thus focus on workflow (for instance, click here to fill a data or open here to access this file) at the neglect of what Schumacher et al. (2010) described as “less obvious, but often more important, ‘thought flow’ the review and thinking which physicians inherently do before finishing a task”. They also identified other challenges to the use of EHRs as “Physician's attitudes that they want a computer system to mimic a paper system as closely as possible as well as IT staff's attitudes that technology solutions are more important than the purpose of the solution and the problem it was intended to solve”.

Maxwell et al. (2011) conducted a study on the use of electronic health records in sub-Saharan Africa: Progress and challenges. It was found that 91% use of open source healthcare software, with open MRS being the most widely used. Challenges to adoption of EHRs included high cost of procurement and maintenance, poor network infrastructure and lack (Compare this to cost effectiveness) of comfort among health workers with electronic medical records. In conclusion the study noted that there has been an increase in the use of EHRs in sub-Saharan Africa, largely
driven by utilization by HIV treatment programs penetration is still however very low. Therefore, the study recommended that government institutions in sub-Saharan Africa should be quick in implementing EHRs and other appropriate ICTs which are required to improve healthcare on the continent.

Chao et al. (2013) conducted a study on the benefits and challenges of electronic health record system on stakeholders: A qualitative study of outpatient physicians in New York City. Semistructured interviews were conducted with 32 physicians who worked in the outpatient department. The results showed that 78% physicians interviewed used EHRS frequently during their daily practice despite individual preferences of documentation methods. They agreed that systemic health record offered by EHRS allowing smooth communication was beneficial to the health institutes, patients and physicians. However, privacy and confidentiality concerned both the health institutes and patients. In conclusion the study highlighted that inefficiency of the EHRs that only allowed retrieval of limited medical information of the patients hindered physicians’ acceptability of EHRs. Therefore the study recommended that the health institutes should take into consideration interests of different stakeholders when designing and implementing EHRs.

6.0 Conclusions

This study was aimed at investigating the effectiveness of e-health records for improved health services at Ng’ombe Health Facility and it was discovered that the major benefit of using EHRs is faster than using paper-based records. The other issue is that, the use of EHRs has reduced medical errors and the major medical error was that of reduced loss of patients records which was very pronounced with paper-based records. In terms of cost effectiveness, EHRs are cost effective in terms of time as little or no time is wasted to retrieve and access patients’ records as well as compile patient medical reports. Despite these benefits using EHRs is challenging because operating the system is dependent on power, and the health facility is faced with constant power outages which hinder the use of the system at times.
7.0 Recommendations

It is recommended that to mitigate the challenge of power outages in the health facilities, power generators should be procured and used as power backups when there is no electricity and also the electricity utility company to avoid cutting power at health facilities.
REFERENCES


Bouvé College of Health Sciences, Northeastern University, Boston, Massachusetts, USA.


## Annex 1: Work Plan

<table>
<thead>
<tr>
<th>Activities</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Apr’ 18</td>
</tr>
<tr>
<td>Approval of research topics and objectives</td>
<td></td>
</tr>
<tr>
<td>Approval objectives</td>
<td></td>
</tr>
<tr>
<td>Submission of chapter one for review.</td>
<td></td>
</tr>
<tr>
<td>Final Submission of chapter one</td>
<td></td>
</tr>
<tr>
<td>Submission of chapter two for review</td>
<td></td>
</tr>
<tr>
<td>Final submission of chapter two</td>
<td></td>
</tr>
<tr>
<td>Submission of chapter three for review</td>
<td></td>
</tr>
<tr>
<td>Final Submission of chapter three</td>
<td></td>
</tr>
<tr>
<td>Final submission of the e-proposal</td>
<td></td>
</tr>
<tr>
<td>Data Collection</td>
<td></td>
</tr>
<tr>
<td>Report Writing</td>
<td></td>
</tr>
<tr>
<td>Final submission of Research Report</td>
<td></td>
</tr>
</tbody>
</table>
## ANNEX 2
### BUDGET

<table>
<thead>
<tr>
<th>NO</th>
<th>DESCRIPTION ITEM</th>
<th>DESCRIPTION</th>
<th>UNIT PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reams of paper</td>
<td>Paper for jotting down notes and printing out the proposal, report and interview guides.</td>
<td>K120</td>
</tr>
<tr>
<td>2</td>
<td>Printing</td>
<td>Printing of interview guides, research proposal, work plan and budget.</td>
<td>K180.00</td>
</tr>
<tr>
<td>3</td>
<td>Binding</td>
<td>Binding of research proposal and report</td>
<td>K40.00</td>
</tr>
<tr>
<td>4</td>
<td>Airtime</td>
<td>Airtime for communicating with group members and supervisor</td>
<td>K350.00</td>
</tr>
<tr>
<td>5</td>
<td>Transport</td>
<td>Transport to and from the field for data collection.</td>
<td>K750.00</td>
</tr>
<tr>
<td>6</td>
<td>Internet</td>
<td>For research purposes</td>
<td>K300.00</td>
</tr>
<tr>
<td></td>
<td>TOTAL PRICE</td>
<td></td>
<td><strong>K1,740.00</strong></td>
</tr>
</tbody>
</table>
Annex 3 : Questionnaire

THE UNIVERSITY OF ZAMBIA
SCHOOL OF EDUCATION
DEPARTMENT OF LIBRARY AND INFORMATION STUDIES
LIS 4014: RESEARCH IN DEVELOPMENT INFORMATION SYSTEM

RESEARCH QUESTIONNAIRE FOR NG’OMBE HEALTH CENTRE CLIENTS

TOPIC: To investigate the effectiveness of Electronic Health Records Management System for improved health services in Zambia: A case study at Ng’ombe Health centre.

Dear Respondent: This questionnaire is for academic purposes in the fulfillment of a fourth-year course LIS 4014 at the University of Zambia. You have been selected conveniently to participate in this research. Be assured that the information you provide will be used purely for academic purposes and will be treated with maximum confidentiality. Your cooperation will be highly appreciated.

Instructions:
1. Do not indicate your name on the questionnaire
2. Mark the answer that expresses your view with an X
3. Write answers where required in blank spaces provided

SECTION A: Background Information of Respondents
1. How old are you?
   A. 16-24 [ ]
   B. 25-34 [ ]
   C. 35-44 [ ]
   D. 45 and above [ ]
2. What is your Gender?
   A. Male  [ ]
   B. Female [ ]

3. What is your highest level of education?
   A. Grade 12  [ ]
   B. Certificate holder [ ]
   C. Diploma [ ]
   D. Degree [ ]
   E. Others Specify: .................................................................

4. Where do you stay?
   A. Ng’ombe  B. Foxdale  C. Roman Township  D. Kalundu
   E. Others Specify.................................................................

5. How often do you come to the health centre? {Tick}
   A. Once a month [ ]
   B. Once every three months [ ]
   C. Once every six months [ ]
   D. Once a year [ ]
   E. Others Specify .................................................................

SECTION B: Benefits of Using of Electronic Health Records in Health Care Facilities.

6. Have you used an Electronic Medical Health Record, how did you find it?
   A. Very good  B. Good  C. Not Good  D. Bad  E. Not sure

7. Do you think using Electronic Medical Health Records is better than using Paper based Medical Health Records?
   A. Strongly Agree  B. Agree  C. Strongly Disagree  D. Disagree  E. Not Sure

8. In your view what are some of the benefits of using Electronic Medical Health Record?
   A. It is fast  B. Too slow  C. Not Sure  D. None of the above
SECTION C: Reduction of Medical Errors in Health Care Facilities.

9. Do you think Electronic Medical Health Records have Reduced Medical errors?
   A. Strongly Agree  B. Agree  C. Strongly Disagree  D. Disagree  E. Not Sure

10. What medical errors has Electronic Medical Health Records reduced? (Tick all which apply)
   A. Loss of patient records  [   ]
   B. Misplaced records  [   ]
   C. Multiple patient records  [   ]
   D. Missed diagnosis  [   ]
   E. Other specify……………………………………

SECTION D: Cost Effectiveness of Electronic Health Records at Health Care Facilities in terms of time.

11. Do you think Electronic Medical Health Records are cost effective in terms of time?
   A. Strongly Agree  B. Agree  C. Strongly Disagree  D. Disagree  E. Not Sure

12. Explain the reason for your answer on question 11.
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................

SECTION E: Challenges in Using E-Health Records Management System at Health Care Facilities

13. What challenges do you face in using Electronic Medical Health Records?
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
    ........................................................................................................................................
14. In your opinion what are some of the solutions to challenges faced with using Electronic Medical Health Records?

……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………
……………………………………………………………………………………………………

THE END AND THANK YOU FOR YOUR TIME.

THE UNIVERSITY OF ZAMBIA

SCHOOL OF EDUCATION

DEPARTMENT OF LIBRARY AND INFORMATION STUDIES

COURSE TITLE AND CODE: Research in Development Information System (LIS 4014)

RESEARCH TOPIC: To investigate the effectiveness of Electronic Health Records Management System for improved health services in Zambia: A case study at Ng’ombe Health centre.

We are fourth year students in School of the Education from the University of Zambia pursuing a Bachelor of Arts in Library and information Studies. We are carrying out a research on the aforementioned topic. For this reason, we wish to inform you that you have been purposively sampled to help us with information which will successfully make our research findings representative for the Ng’ombe Health Centre. We therefore wish to inform you that the information you will give us will be purely used for academic purposes. Utmost confidentiality is guaranteed.

NAME OF THE INSTITUTION…………………………………………………………………………………………

DATE OF INTERVIEW………………………………………………………………………………………………

JOB TITLE OF THE KEY INFORMANT (S)…………………………………………………………………………

1. What are the benefits of using e-health records management system at a health care facility?
2. Has e-health records management system reduced medical errors?
3. The cost effectiveness of e-health records management System in health care centers

4. What are the challenges in using e-health records management system?