“ASSESSMENT OF ICT SKILLS AMONG HEALTHCARE STAFF FOR EFFECTIVE HMIS UTILIZATION: A CASE STUDY OF LOSS TO FOLLOW-UP IN MBEYA URBAN AND RURAL”

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ART IN MONITORING AND EVALUATION

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CERTIFICATION

The undersigned certifies that he has read and here by recommends for acceptance by The Open University of Tanzania a dissertation entitled: "**Assessment of ICT Skills Among Healthcare Staff for Effective HMIS Utilization: A Case Study of Loss to Follow-Up in Mbeya Urban and Rural**" In partial fulfillment of the requirements for the award of Degree of Masters of Art in Monitoring and Evaluation (MAME).

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DECLARATION

I, Said Nassoro Mohamedi, declare that, the work presented in this dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfillment of the requirement for the Degree of Masters of Art in Monitoring and Evaluation (MAME)

……

Signature

……

Date

DEDICATION

This thesis is dedicated to my family who have supported me throughout my studies and encouraged me to pursue my dreams, all healthcare workers across the country who provide health services of prevention and treatment of HIV/AIDS and lastly to the people who living with HIV/AIDS across the continental who made commitment to adhere ARV Treatment throughout of their life.

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Lastly, I wish to thank my family for their patience, understanding, and constant encouragement throughout the study without forget my lovely mother Zainabu Said Kassele may Allah bless you mom.

ABSTRACT

This study was conducted in two districts of the Mbeya Region Mbeya City and District Council (DC). It aimed to assess the ICT competencies of healthcare workers (HCWs) for effective utilization of the Health Management Information System (HMIS), determine the limitations of ICT infrastructure in healthcare settings, and identify weaknesses within the current monitoring and evaluation (M&E) system that contribute to patient loss to follow-up in Antiretroviral Therapy (ART) programs. A sample of 142 healthcare workers 71 from each district was selected using purposive and convenience sampling techniques. The sample size was calculated using Cochran's formula. Data were collected through a semi-structured questionnaire and analyzed using both descriptive and inferential statistics. The findings revealed that 49% of HCWs possessed only basic computer skills. Approximately one-third of healthcare facilities faced challenges related to IT infrastructure. Key weaknesses in the current M&E system contributing to loss to follow-up included inadequate patient tracking systems, lack of validation of patient information, falsification of client data, absence of linked CTC2 databases across clinics, economic barriers such as transport costs, issues of HIV status disclosure, privacy concerns, and inadequate data collection practices. This study strongly recommends that the government, through the Ministry of Health, invest further in improving ICT infrastructure and strengthening ICT capacity-building programs for healthcare workers to enhance HMIS effectiveness and reduce patient loss to follow-up.

Key Words*: Health Management Information System, Healthcare staff, Computer Literacy, HIV/AIDS, Loss to Follow up.*

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ART	Antiretroviral Therapy
CTC	Care and Treatment Clinic
DC	District Council
DHIS	District Health Information Software
EHR	Electronic Health Records
EMRS	Electronic Medical Records Systems
HCWs	Healthcare Workers
HIMS/HMIS	Health Information Management System
HIV	Human Immunodeficiency Virus
HRM	Human Resource Management
HRMH	Human Resource Management in Health
MoH	Ministry of Health
NHLS	National Health Laboratory System
OPD	Out Patient Department
PITC	Provider Initiated Testing and Counseling
PMCT	Prevention of Mother to Child Transmission
SPSS	Statistical Package for the Social Sciences
TACAIDS	Tanzania Commission for AIDS
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

In today's data driven world, health systems globally are transitioning toward digital solutions to improve service delivery, resource allocation, and health outcomes. Health Management Information Systems (HMIS) play a critical role in this transformation by enabling the collection, analysis, and use of health data for informed decision-making. When effectively utilized, HMIS can improve healthcare quality, monitor program performance, and strengthen disease surveillance (World Health Organization, 2021). However, the success of HMIS implementation is highly dependent on the digital competencies of healthcare workers and the presence of reliable ICT infrastructure.

Globally, inadequate ICT skills among health professionals hinder the full potential of HMIS. A WHO global health observatory report indicated that over 40% of health programs in low- and middle-income countries face data quality challenges due to manual data entry and insufficient digital literacy among healthcare workers (WHO, 2021). The situation is compounded by limited infrastructure and resistance to digital systems, particularly in under-resourced settings (UNICEF, 2020).

In Sub-Saharan Africa (SSA), reliance on paper-based health data collection systems continues to slow digital transformation in the health sector. These systems are error-prone, time-consuming, and often lead to incomplete or inaccurate records (Mutale et al., 2013). Fragmentation of health data across platforms, lack of interoperability,

and weak ICT capacity further constrain the utility of HMIS (Saur & Edelman, 2020). A multi-country study including Tanzania emphasized the limited use of routine health data in decision-making due to these systemic weaknesses (Mutale et al., 2013).

In Tanzania, despite national efforts to introduce electronic health information platforms such as DHIS2, Electronic Medical Records (EMRs), and the National Health Laboratory System (NHLS), manual data entry remains widespread, especially in rural and primary health care facilities (Kimaro, 2017; Ayebazibwe et al., 2019). Paper-based systems, though still widely used, are associated with high error rates. Ishabakaki and Kaijage (2015) reported a 17% error rate in health surveys conducted using paper tools. These inefficiencies compromise the accuracy of health data and hinder timely reporting and planning.

Incomplete data remains a critical concern in Tanzania's health sector. Rumisha et al. (2020) found that up to 40% of clinical data was missing between outpatient departments (OPD) and laboratories, primarily due to human resource shortages and system inefficiencies. In HIV/AIDS care and treatment programs, these data gaps significantly affect patient tracking and follow-up. TACAIDS (2008) reported inconsistencies between national databases and actual care records, noting that one region had over 123,000 patients registered for care despite only 71,439 being recorded in the national HIV database. This discrepancy undermines efforts to achieve national and global HIV targets.

Loss to follow-up (LTFU) among patients on Antiretroviral Therapy (ART) remains a major challenge in Tanzania. Factors contributing to LTFU include poor referral systems, delays in ART initiation, economic constraints, and gaps in patient information systems (Mboggo et al., 2024). These issues impede progress toward the UNAIDS 95-95-95 targets, which aim for 95% of people with HIV to know their status, 95% of those diagnosed to receive sustained treatment, and 95% of those treated to achieve viral suppression.

The Mbeya Region is one of the high HIV-burden areas in Tanzania and experiences significant challenges in patient retention within ART programs. Weak ICT capacity, especially among healthcare staff, limits the potential of HMIS to support timely follow-up and treatment continuity. A considerable proportion of healthcare workers in Tanzania lack formal ICT training, and older staff members often struggle with adapting to new technologies (Kimaro, 2017; Alsanad & Al-Gahtani, 2019). Even when systems are in place, healthcare workers report difficulty navigating complex software interfaces and a lack of confidence in data handling (Saur & Edelman, 2020).

Substandard ICT infrastructure also continues to affect data flow and reporting. Many health facilities operate with limited computers, unstable electricity, and poor internet connectivity, leading to delayed or missing reports (Paltola, 2019). Multiple disconnected data systems for PMTCT, PITC, immunizations, and laboratory results also contribute to inefficiencies in patient care and hinder accurate monitoring and evaluation (Mboera et al., 2015; Wilms et al., 2014).

Given these challenges, it is critical to assess the digital capacity of healthcare workers and their ability to utilize HMIS effectively, particularly in high-burden regions like Mbeya. This study focuses on evaluating the ICT skills of healthcare staff in Mbeya Urban and Rural districts and how these competencies impact HMIS usage and the management of loss to follow-up in ART programs. By identifying existing gaps and limitations, the study aims to support improvements in data systems, ultimately contributing to better patient care and health outcomes in Tanzania.

1.2 Statement of the problem

This study was looking on three variables that identified from the problem analysis, the first variable is computer skills of healthcare staff on effective utilization of HMIS in primary healthcare settings (Rumisha et al., 2020) and second variable is availability of ICT infrastructure in primary healthcare settings (Alsanad et al., 2019) and the third variable is identified weakness of current M&E system that ontribute to loss to follow of client in ART program.

The study chose to look on healthcare worker computer literacy due to the shift from paper to electronic systems can be tricky for workers used to manual methods. This lead to data errors, reduced efficiency, and frustration, ultimately impacting data quality and adoption. The study was aims to address this by developing training and support systems that empower healthcare workers to feel confident using the new technology.

The study chose to look on IT infrastructure issues without a reliable IT infrastructure, the entire system suffers, and frequent outages, slow performance, and limited access to computers and internet hinder data entry and disrupt workflows. The study was highlight the need for infrastructure upgrades or alternative solutions to ensure consistent and efficient system operation. Also, look on low the impact on treatment to achieve the second goal of 95%, if the system doesn't translate to better treatment outcomes, it fails its core purpose. Inaccurate data, delays in referrals due to system difficulties, and limited data analysis capabilities can all hinder the system's ability to improve patient care and reduce the prevalence of HIV/AIDS in community.

The study was identify ways to optimize the system for improved data quality, streamlined processes, and ultimately, better health outcomes for the community. The study was used those three variables to create the research objectives or questions to conduct the study.

1.3 Study Objectives

This study have one general research objective and three specific research objectives.

1.3.1 General Objective

Assess the capacity of healthcare staff and facilities in effectively utilizing Health Management Information Systems (HMIS) to support Antiretroviral Therapy (ART) programs in Mbeya Urban and Rural in 2024

1.3.2 Specific Objectives

i. To assess the level of computer skills of healthcare staff in effectively utilization of health management information systems at Mbeya Urban and Rural in 2024
ii. To determine availability of ICT infrastructure in primary healthcare settings on the implementation and utilisation of health management information systems at Mbeya Urban and Rural in 2024
iii. To identify weaknesses within the current M&E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs in primary healthcare settings at Mbeya Urban and Rural in 2024

1.4 Research Questions

i. What are the levels of computer skills possessed by healthcare staff on effectively utilization of health management information systems at Mbeya Urban and Rural in 2024?
ii. How does the availability ICT equipment affect the successful implementation of health information systems in primary healthcare facilities at Mbeya Urban and Rural in 2024?
iii. What are the limitations within the current M&E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs in primary healthcare settings at Mbeya Urban and Rural in 2024?

1.5 Significance of Study

The significance of this study lies in its potential to enhance the effectiveness,

efficiency, and overall quality of healthcare delivery by addressing critical issues related to health information systems, IT infrastructure, and patient retention in antiretroviral therapy programs. By determining how low computer skills among healthcare staff affect data quality, the study can lead to targeted training initiatives that improve data accuracy, supporting better patient care and decision-making. Evaluating the impact of limited IT infrastructure highlights the need for technological investments, ensuring that healthcare facilities operate efficiently and can leverage advanced health technologies. Identifying weaknesses in the current monitoring and evaluation (M&E) system for antiretroviral therapy programs enables the development of strategies to improve patient follow-up, reducing treatment interruptions and enhancing health outcomes for individuals with HIV/AIDS. Collectively, these insights can inform policy adjustments, optimize resource allocation, and contribute to the overall improvement of healthcare systems, benefiting healthcare providers, administrators, policymakers, and patients alike.

1.6 Scope of the Study

This study is confined to assessing the capacity of healthcare staff and facilities in utilizing Health Management Information Systems (HMIS) in support of Antiretroviral Therapy (ART) programs in Mbeya Region, Tanzania. Specifically, the study focuses on three key areas; the level of computer skills among healthcare staff, the availability and adequacy of ICT infrastructure in primary healthcare settings, and the weaknesses within the current monitoring and evaluation (M&E) systems that contribute to patient loss to follow-up.

Also; the study covers two districts within Mbeya Region Mbeya City (urban) and Mbeya District Council (rural) to capture a representative understanding of both urban and rural challenges in HMIS implementation. The study targets healthcare workers directly involved in data collection, management, and reporting processes within ART service delivery.

The research is limited to the year 2024, reflecting the current situation and recent developments in health information systems. It does not cover secondary or tertiary healthcare facilities outside of Mbeya Region, nor does it focus on clinical outcomes of ART treatment. Instead, it concentrates on system-level and human resource-related factors influencing data quality and continuity of care.

The findings of this study are expected to inform policy makers, healthcare managers, and stakeholders in identifying key gaps and opportunities for strengthening digital health systems, particularly in the context of HIV/AIDS care and treatment programs.

1.7 Limitation of the Study

The study was subject to some limitations such as possible bias to participants due to use of convenience sampling on picking HCWs during data collection, small number inclusion of the health facility due to budget constraints and inclusion of 2 districts out of 7 of Mbeya region. Despite the limitations, the study objectives were attained by careful planning and effective use of available resources to collect data within time arranged.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter explain the terminology used in the study, critical review of supporting theories of the study, empirical literature review on Assessing ICT skills of healthcare staff on effective HMIS utilisation, research gap and conceptual framework.

2.2 Definition of Key Concepts

2.2.1 Computer literacy

National Center for Education Statistics in (2020) define computer literacy as the knowledge and skills required to understand and use computers and related technology effectively for various purposes, including communication, information retrieval, problem-solving, and creating content.

2.2.2 Evaluation

Means systematic process of collecting, analyzing, and interpreting information to determine the value, effectiveness, or merit of something (Yarbrough et al., 2024).

Health is a complex state of physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, 2014).

2.2.3 HIV/AIDS

Refers to the human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS). HIV is a virus that attacks the body's immune system, while

AIDS is the most advanced stage of HIV infection and compromises the body's ability to fight infections (UNAIDS, 2024).

2.2.4 Information system (IS)

Is a set of interrelated components that collect, store, retrieve, and process data to information products, and distribute the information products to support decision making, communication, planning, control, analysis, and visualization (Laudon & Laudon, 2021).

2.2.5 ICT infrastructure

Refers to the underlying hardware, software, networks, data centers, and other resources that support the operation of information technology services within an organization (TechTarget, 2024).

2.2.6 Management

Is the process of organizing and coordinating resources (human, financial, material, and informational) to achieve organizational goals efficiently and effectively (Daft, 2022).

2.2.7 Monitoring

Refers to the systematic collection of data at regular intervals to assess the progress of something or to identify any deviations from a planned course (Mathison & Suter, 2024). Primary healthcare settings are the first point of contact for individuals seeking healthcare services and provide a range of preventive, curative, and rehabilitative care (World Health Organization, 2020).

2.3 Theoretical Review

The concept of Human Resource Management in Health (HRMH) theory was employed in this study first introduced by James Buchan (2004) as a pivotal figure in the Human Resource Management (HRM) in Healthcare, his work has had significant impact of Human Resource practices and theories in health sector who derived from an Australian Elton Mayo (1994) who explain about HRM who modified the theory of Human Resources (HR) from the father of personnel management (Owen, 1813). World Health organization (1978) explain the human resources management it covers all matters related to health workers and largely determines the productivity of healthcare services, this include recruitment, staff performance evaluation, work analysis and development of position descriptions.

Japan International Cooperation Agency (JICA) support a better Human Resource for Health policy and planning, efforts were made by HRH development partners recently to obtain sensible HRH data and information. Two information systems have been developed called Human Resource for Health Information System (HRHIS) and Training Institution Information System (TIIS). The former is for health facilities and the latter is for training institutions. HRHIS is installed in all regions, councils and referral hospitals, and TIIS in all training institutions and universities that produce health professionals. The systems are capable of assisting users to collect quality information and help them generate varieties of reports from individual staff reports to country aggregate. However the system is not without challenges (HRHSP, 2014).

The Benjamini Mkapa Foundation (BMF) has been instrumental in supporting Human Resource for health policy and planning through various initiatives, including those related to Information and Communication Technology (ICT). One notable aspect of their work involves improving the digital infrastructure and training healthcare professionals to effectively use ICT tools. This support helps in enhancing healthcare delivery, data management, and communication within the healthcare system (BMF, 2023).

2.4 Empirical Literature Review

2.4.1 Determine the Factors Affecting the Health Information System in Achieving Healthcare Goals

The low budgeted allocated in implementation of health information systems become major challenge in attaining healthcare goals in Kenya (Njeri, 2018), the government fund support is insufficient to ensure easily operation and training in health information system in healthcare setting reported by study conducted in (Faloye, Ndlanzi, & Ajayi, 2021).

But different in Nigeria where the willingness, and adoption of healthcare workers on using the electronic health information system identified due to number of reasons like low literacy level and experience in using the health information system, lack of motivation, poor organizational and management policies (Zayyad & Toycan, 2018). Also, Kivinen and Lammintakanen (2013) revealed that complexity of the health information system is a one of challenge that affect the healthcare worker on performing their working smoothing in Finland but in Malaysia found low IT staff

shortage in health care setting brings difficult in update the system on time to all hospital departments (Ab Aziz and Mohamadali, 2015).

Blumenthal in 2006 report on high cost of implantation of electronic health technology including the upfront capital investment, ongoing maintenance and short-term productivity loss, this similar to Canada where concluded that the major barriers to allowing achieving healthcare goals are lack of data standards, lack of security and privacy regulations, organizational resistance to change, risk adversity, absence of business plans and leadership in United State of America (Mercer, 2001).

2.4.2 Assess the Level of Computer Skills of Healthcare Staff in Primary Healthcare Settings

The study done by Nkanata et al (2018) revealed that 28% of private and 37% of public health care worker were incompetent in using computer in Kenya. This similar to the study done in Uganda show that 20% of health care worker has low computer skills (Kabukye, J. K., de Keizer, N., & Cornet, R. 2020). Also, 64% of health care personnel have low skills in computer in South Africa (Nicol, Philips & Dudley., 2013). This also, happen in Ghana were the health care staff with older age had no computer skills this affect mainly on adaption of electronic health records (Mensah, 2023). The study done in Ethiopia in 2020 by Kebede et all found that 63.7% of all respondent were not aware with using of Health management information system this lead to timeliness of report, registration completeness, report completeness, and data accuracy level of the selected facilities were 70, 78.2, 86, and 48% respectively.

Also, Htun (2021) reported that in Myanmar, 24% of healthcare workers self-identified as having low computer literacy. Similarly, a study in Malaysia found that only 24.7% of healthcare workers could perform basic computer tasks (Jayawardena & Ratnayake, 2018). In contrast, a study in Australia by Keuk and Hakkennes (2020) indicated that 83% of clinicians possessed computer literacy. In Sweden, recent research highlights the need to strengthen digital health literacy among healthcare professionals. A study by Schölin Bywall et al. (2024) emphasized the importance of developing a national strategy to enhance digital health literacy, particularly for vulnerable groups at risk of digital exclusion. Additionally, Rydell et al. (2025) explored nurses' experiences with digital triage in Swedish primary healthcare centers, revealing that adapting to new digital tools required nurses to develop new competencies and adapt their communication methods.

2.4.3 Determine Availability of IT Infrastructure in Healthcare Settings on the Implementation and Utilisation of Health Information Systems

Egwar (2020) show that there is limited IT infrastructure in health care setting in Uganda which caused by financial constraints from government and donors, this also seen in the study conducted in Kenya were inadequate computers in health care setting lead to effects in report delayed, incompleteness of data and missing out of data (Ngugi et al., 2021).

Also the study done show that 66% of Health care settings lack IT infrastructure, lack of electricity 40% and availability of software and hardware 70% in Ghana (Addo & Agyepong, 2020) but this is different to the study conducted in Ethiopia

which reported that lack of ICT infrastructure 18.2% (8/44), lack of internet connection 13.6% (6/44), lack technical support system 13.6% (6/44), and lack of electricity 6.8% (3/44) (Sagaro et al., 2020). The challenges of electricity availability, slow system delivery and lack of technical support also revealed by Harahap et al (2021) in Malaysia.

Modernized the U.S.A healthcare information infrastructure improve the quality, expediency, efficiency, and successful delivery of healthcare while decreasing costs to patients and payers and Secure, always available wireless LAN systems in hospitals are rapidly introduced, improving information sharing and patient safety (Kaufman, 2005)(Hanada & Tsumoto, 2013).

2.3.4 Identify Weaknesses within the Current M&E System That Contribute To Patient Loss to Follow-Up for Antiretroviral Therapy (ART) Programs

Recent studies underscore the critical role of digital health systems in enhancing HIV monitoring and evaluation (M&E) across sub-Saharan Africa. In Kenya, the implementation of fingerprint biometric technology has been evaluated for its effectiveness and acceptability in uniquely identifying patients within electronic health record (EHR) systems, thereby improving patient tracking and reducing duplications (Ngugi et al., 2021). Similarly, in Zambia, healthcare workers and patients have expressed positive perceptions of biometric technologies, highlighting their potential to streamline patient identification processes in healthcare settings (Mwansa et al., 2024).

In Zimbabwe, a pilot evaluation of an HIV case-based surveillance system integrated with EHRs revealed challenges such as underreporting due to limited staff training and lack of reporting guidelines. However, the study also demonstrated improvements in data completeness and timeliness, indicating the potential benefits of EHR integration in enhancing HIV surveillance (Takarinda et al., 2021).

Retention in antiretroviral therapy (ART) programs remains a significant challenge. A systematic review focusing on sub-Saharan Africa found no significant difference in retention rates before and after the implementation of universal test and treat (UTT) policies, suggesting persistent barriers to long-term retention (Doe et al., 2024). In the Central African Republic, factors such as social unrest, stigma, and food insecurity have been identified as key drivers of poor retention in ART programs (Tekpa et al., 2024).

Addressing the issue of patients lost to follow-up (LTFU), a study across six countries in Southern Africa highlighted the importance of tracing efforts. The study found that a substantial proportion of patients LTFU could not be traced, and among those traced, a significant number had died, emphasizing the need for robust patient tracking systems (Smith et al., 2024).

These findings collectively highlight the necessity of integrating advanced digital tools, such as biometric technologies and EHRs, to improve patient identification, enhance data quality, and strengthen retention and follow-up mechanisms in HIV care programs across sub-Saharan Africa.

2.5 Research Gap

While existing research explores the influence of health management information systems (HIS) on healthcare delivery, there majority of studies focus on healthcare system but few where focus on investigating the sufficient computer capacity of Health Care Workers in ICT for Health Management Information System (HMIS) (Nicol, Philips & Dudley., 2013) that are the factors affecting HIS effectiveness in achieving healthcare goals within a defined regional context. This research contribute valuable insight to improve HMIS effectiveness in achieving public healthcare goals.

2.6 Conceptual Framework and Theoretical Framework

2.6.1 Conceptual Framework

The conceptual framework outline below adapted and modified from Teklegiorgis et all (2016) provides a comprehensive understanding of the factors influencing low computer capacity among healthcare workers.

Figure 2.1. Flow of factors influencing low computer capacity among healthcare workers and its impacts

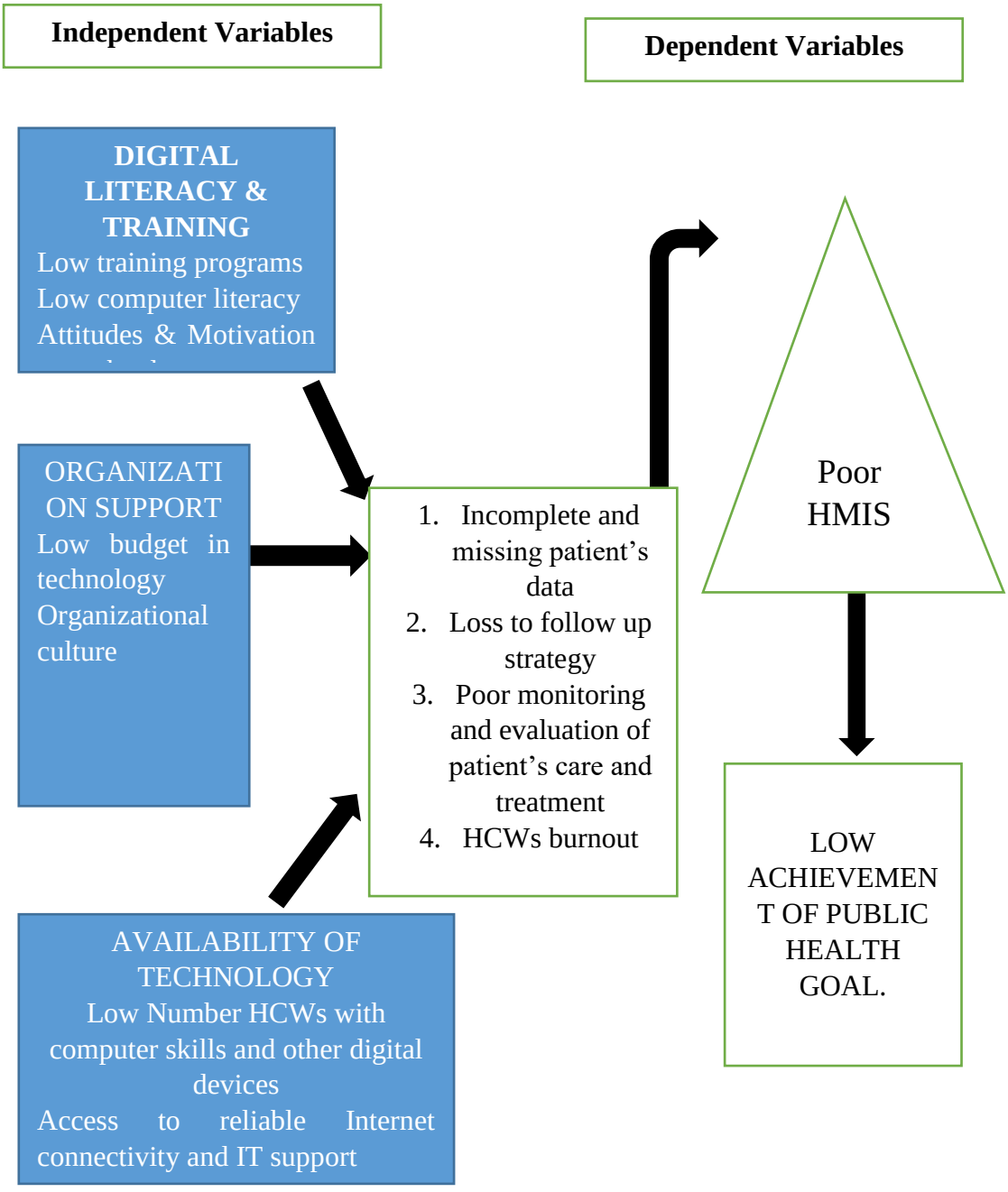

Figure 2.1 Conceptual Framework

Source: Adapted and Modified from Teklegiorgis et all (2016)

2.6.2 Theoretical Framework

In the above diagram of Teklegiorgis et all (2016) shows the relationship between variables as follow, low training programs, Low computer literacy, Attitudes & Motivation on technology and the availability and access of Technologies equipment's cause low achievement of public healthcare goal. Also, the low budget in Health information System cause the deficient the IT infrastructure in health care settings lead delay and incomplete information which affect low achievement of public health goal.

This conceptual framework use these variables which are low computer literacy of HCWs, Limited IT infrastructure in healthcare settings and Weaknesses within the current M&E system that contribute to patient loss to follow-up. This study involved questioning Healthcare workers about their computer literacy, availability of IT infrastructure at their health settings and leverage M&E system to improve loss to follow up to the people who are living with HIV/AIDS.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter presents the study methodologies which involves research philosophy, research design, area of the study, population of the study, inclusion and exclusion criteria, sampling size and sampling criteria, data collection method, data analysis method, validity and, reliability and ethical consideration.

3.2 Research Philosophy

The study employed Pragmatism philosophy, because pragmatism is problem center focus which emphasizes solving or addressing real word issues which aligns with assessment of factors affecting HIS and second reason, the study was used mixed methods which combine quantitative and qualitative techniques by using semi structure questionnaire which involves closed and open questions.

3.3 Research Design

The study design undertaken was Cross sectional descriptive design because based on obtained factual on phenomena about the natural existing situation among the HCWs in healthcare facility for the single time. The research technique was a case study because it gives in-depth examination of a study unit. It provides detailed information about HCWs.

3.4 Area of the Study

The study was conducted at the two districts out of seven which are Mbeya DC and Mbeya City council because those are the two districts with high number of

healthcare settings and people which 371,259 (173,158 male and 198,101 female) people and 541,603 (253,813 male and 287, 790 female) people respectively (NBS, 2022). The people of those two districts are most involved in agriculture like farming and livestock, business as a main market of southern Highlands regions. Mbeya can be reached by road on the A-7 highway from Dar es Salaam, there are paved road which connects Mbeya city with other towns like Tukuyu through uyole, Tunduma via TANZAM highway and Chunya to Tabora through Isanga. The tribes found are Wasafwa, Wanyakyusa, Wandali, Wasangu, Wamalila, Wanyiha, Wakimbu and Wanyamwanga.

Mbeya is one of three regions with highest HIV prevalence of 9% apart from Iringa 11% and Njombe 12% according to survey done by THIS, (2022-20223). Mbeya region is the number one city with highest HIV prevalence in Tanzania of 9% according to THIS 2022-2023. Mbeya city council and Mbeya DC are leading with higher number of population with 45 and 69 primary health centers respectively. The factors that driven HIV in urban area high rate of risky behaviours, drug injections, mobility and anonymity, and men who sex with men but in rural area limited access to education and prevention, limited health access, poverty and migration patterns but those factors affecting drug adherence due to stigma, side effects, substance abuse and social economic issues (Ndoro et al., 2022).

3.5 Population of the Study

Study population of this study were healthcare workers in dispensaries of two districts which are Mbeya DC and Mbeya City council who provide the services to

the people who living with HIV/AIDs. The healthcare workers who provide services to people who living with HIV/AIDs was involved in the study by filling questionnaire. The number of HCWs in Mbeya DC and Mbeya city is approximately 224.

3.5.1 Inclusion Criteria

The study will include all health care workers who is working within Mbeya City Council or Mbeya District Council in primary healthcare settings and the HCWs who provide the services to the people who living with HIV/AIDS, HCWs who is willing to participate in the study.

3.5.2 Exclusion Criteria

Were on leave or absent during the data collection period, not involved in providing services to the people who living with HIV/AIDS and declined to participate or withdrew consent at any point during the study.

3.6 Sampling Size, Frame and Procedures

3.6.1 Sample size

The sample size was determined by using a Cochran's formula for estimation of single population proportion with the assumption of 95 % confidence interval, 05 % margin of error, and prevalence 50% (Mremi et al., 2021)

The sample size calculation obtained by Kish and Leslie formulae as follows:

$$N=\frac{Z^2P\,(1-P)}{\varepsilon^2}$$

Whereby,

N=minimum sample size required

Z=standard normal deviation set at 1.96 (corresponding to 95% confidence interval)

P=10%, 0.1

ε=maximum error allowed, 0.05

$$N = \frac{(1.96)^2 \times 0.50 \times (1-0.50)}{0.05^2} = 384.16$$

***N*=** The initial sample size estimate is approximately **384**

Adjusting for finite population, the following formula was used

n= n0/1+(n0−1/N)

n0=384 (initial sample size)

N=224 (total population size)

n = 384/1+(384-1/224)

n = 142

For the population of 224 healthcare workers who provide services of ARVs/AIDS, the adjusted sample size would be approximately 142.

3.6.2 Sampling Frame

The sampling frame for this study consisted of healthcare workers (HCWs) working in primary healthcare facilities within Mbeya Region, specifically in Mbeya City Council and Mbeya District Council. These councils were purposively selected to represent both urban and rural settings, thereby capturing the diversity of ICT

infrastructure, skill levels, and health system challenges across different geographical contexts.

The study targeted HCWs involved in the documentation, reporting, and management of patient data, particularly those participating in HIV/AIDS care and treatment clinics (CTCs), including but not limited to Clinical officers, Nurses, Health record officers, Laboratory technicians, Pharmacists, Monitoring and evaluation (M&E) personnel and other healthcare workers who provide the services to people who living with HIV/AIDS.

3.6.3 Sampling Procedures

3.6.3.1 Purposive/judgmental sampling

The study employed non probability sampling design which is purposive or judgmental sampling method in selecting healthcare settings because only that serve on dispensing ARVs was selected in the study because they provide the services to the people who living with HIV/AIDS and the criteria of large number of clients were criteria in addition to get 10 health facility in every district in order to collect data.

3.6.3.2 Convenience Sampling

The study used convenience sampling in select the Healthcare Workers in respected healthcare facility for those who were provide the HIV/AIDS services because of the few number of HCWs available in the healthcare settings. The seven HCWs in every ten (10) health facilities in each district were involved in the study. The sample size

were 142 healthcare workers, 71 healthcare workers from Mbeya District and 71healthcare workers from Mbeya City.

Table 3.1 Distribution of Sample size

Area of Council	Mbeya City Council	Mbeya District Council
Number of Participants HCWs	71	71
Total	142	

3.7 Variables and Measurement Procedures

The data was obtained from the following variables, factors affecting utilization of the HMIS, level of HCWs computer literacy, the availability of the IT infrastructure in health facility and weakness of current M & E system in tracking loss to follow up patient who living with HIV/AIDS. These data were collected in primary health facility and sample unit were HCWs who specifically provide services to people who living with HIV/AIDS by using administering questionnaire. The pilot study was employed in two District hospitals in Mbeya DC which are Mbalizi designated district hospital and Mbalizi army hospital to ensure validity and reliability of data collection tool and those dispensary and health center were not used during data collections. The questionnaire was employed to healthcare worker and supervised by researcher in order to ensure accurate data quality, completeness and to reduce error during data collection.

3.8 Type and Source of Data

The study was used primary data and data collection method was administering questionnaire which was supervised by researcher and data collection tool was semi structured questionnaire which consisted closed and open-ended questions.

3.9 Data collection Method

Semi Structured Questionnaire was used method of data collection. The questionnaire have five parts which were demographic information with 8 questions, computer skills 8 questions, IT infrastructure of healthcare settings with 7 questions, factors affecting HIS with 1 question and weakness within the current M&E system with 2 questions. The questionnaire has total questions of 26. Semi structured questionnaire which consisted closed and open-ended questions. The data were obtained from ten primary health facility with higher number of clients of HIV/AIDS services in each district and seven HCWs from each facility which makes of 20 health facilities and 142 HCWs from both two districts.

3.10 Data Analysis Methods

3.10.1 Analysis of Quantitative Data

The method of data analysis of quantitative data were descriptive analysis (frequency and crosstabs) and inferential analysis (ANOVA). Data analysis start at field by checking the completeness of questionnaire field by HCWs. Coding of the questions then data entry and preparation which involves enter data into the SPSS data editor followed by data cleaning by checking errors, inconsistencies and missing values, define the characteristics of each variable and then data transformation. Data

exploration is the second phase after data entry and preparation which involves descriptive statistics, frequency distribution, cross tabulation and data visualization by create graphs and charts to visualize data patterns and trends. Data analysis is the third phase which include hypothesis testing (relationship between groups), regression analysis (relationship between dependent and independent variables) and correlation analysis (measure the strength and direction of relationships between variables).

3.10.2 Analysis of Qualitative Data

The qualitative data analysis were content analysis, the comments of the respondents were paraphrased in single word of meaning from open end questions of semi structured questionnaire and introduced into SPSS software for analysis of descriptive features.

3.11 Ethical Consideration

The study adhered right and welfare of research participant as follow. Respect for persons, the participants had autonomy to participate in the study willing without force and treated with respect for their capacity of self-determination. Beneficence was employed by maximize the benefits and minimize the harms, the principle gives rise to norms requiring that the risks of harm by research to be reasonable in the light of the expect benefits. Investigators are competent to both conduct the study and safeguard the welfare of the study participants this goes together with non-maleficence (to do no harm). Justice is one of the ethical principle the study executed by treat each person in accordance with what is morally right and proper, this involves fairness and equitable distribution.

Also, the permission was asked to Mbeya Regional Administrative Secretary and District Administrative Secretary of both two districts and at Open University of Tanzania Research Committee to allow the conduction of the study.

3.12 Limitation of the Study

The study was subject to some limitations such as possible bias to participants due to use of convenience sampling on picking HCWs during data collection, small number inclusion of the health facility due to budget constraints and inclusion of 2 districts out of 7 of Mbeya region. Despite the limitations, the study objectives were attained by careful planning and effective use of available resources to collect data within time arranged.

3.9 Research work plan and budget

3.9.1 Work Plan

The Ghantt chart indicate the plan of work and expected time to conduct research as shown below

Table 3.2 Work plan of research study

S/N	Activity	Expected time (Eight months)								
		Feb	**March**	**Apr.**	**May**	**Jun.**	**Jul.**	**Aug.**	**Sept.**	**Oct.**
1	Proposal writing									
2	Literature review									
3	Data collection									

4	Data presentation, analysis and discussion									
5	Final report writing and presentation									

3.9.2 Estimated research budget

The overall budget to conduct the study is summarized as shown below in different categories.

Table 3.3 Estimated Research Budget

Activity	Resource	Unit	Number unity	Cost	Total cost
Preparation cost of research writing	Pen	Box	4	6000/=	24,000/=
	Notebook	Pc	2	4000	8000
	Internet	GB	50	100,000/=	100,000/=
	Communications	phones	-	100,000/=	100,000/=
	Total				**132,000/=**
Data collection Tool	Questionnaire	Copy	150	600/=@	90,000/=
	Bag	Pc	2	25,000/=	50,000/=
	Total				**140,000/=**
Data Collector	2 Researcher per diem	days	6	50,000/=	600,000/=
	Transportation	days	10	20,000/=	200,000/=
	Total				**800,000/=**
Data Analysis	Data analysis consultation	All days		300,000/=	300,000/=
	Total				**300,000/=**
Finalizing of research submissions	Publishing fee		1	300,000/=	300,000/=
	Printing fee	copy	4	100,000/=	100,000/=
	Binding fee	copy	4	200,000/=	200,000/=
	Report presentation cost				300,000/=
	Total				**900,000/=**
Emergency 10%					**272,000/=**
Grand total					**2,546,000/=**

CHAPTER FOUR

STUDY FINDINGS AND DISCUSSION

4.1 Chapter Overview

This chapter explain the results of the study by integrate social demographic data of participants which are gender, age, education level, professional and working experiences with objectives results of level of levels of computer skills possessed by healthcare staff at primary healthcare facilities, availability and functionality of IT equipment affect the successful implementation of health information systems in healthcare facilities and limitations within the current M & E system hinder the effective tracking and identification of patients who drop out of ART programs in healthcare facilities within Mbeya region. The presentation of the results and discussion are stipulated below in terms of section and sub sections.

4.2 Socio Demographic Characteristics of Respondents

Frequency and percentage analysis were used to gain understand of socio demographic characteristics of the respondents. The data collected from 142 Health Care Workers with question of socio demographic characteristics which are gender, age, education level, professional and working experiences.

4.2.1 Gender of Respondents

The gender distribution of the respondents is categorized into male and female in this study. Even though the gender respondents is not main topic of this study but it gives the picture of respondents.

Table 4.1 show the results of respondents in terms of gender are 74 (52.1%) were female and 68 (47.9%) were male respondents. This findings show that there are more female health care workers compare to the male. Similar findings obtained by Amiri (2022) which shown 43(43.0%) were male and 57(57.0%) were female respondents. This also supported by WHO and ILO report in 2022, which show that 67% of workforce in healthcare are female.

Table 4.1 Gender of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	74	52.1	52.1	52.1
	male	68	47.9	47.9	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

4.2.2 Age of Respondents

Table 4.2 show that the age of respondents, 18-30 years were 62 (43.7%), 31-45 years were 49 (34.5%) and 46-60 years were 31 (21.8%). This results show that there is large number of healthcare workers who are younger age. This is different to the study done in Nigeria which show low number of healthcare workers in younger age 18-30 years were 17% and higher number shown on 31-40 years were 40% of all healthcare workers (Alasia & Maduka, 2021).

Table 4.2 Age of Distribution of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-30	62	43.7	43.7	43.7
	31- 45	49	34.5	34.5	78.2
	46-60	31	21.8	21.8	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

4.2.3 Education level of respondents

Table 4.3 show that the educational level of respondents, Certificate were 42 (29.6%), Diploma 85 (59.9) and Degree 15 (10.6%). This findings reveal that there is higher number of healthcare workers of diploma level in primary healthcare settings. This similar to the study done in Arusha which found 44% of healthcare worker were having diploma and certificate were 28.8% of the healthcare workers (Arra, M., 2023).

Table 4.3 Education Level of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	degree	15	10.6	10.6	10.6
	certificate	42	29.6	29.6	40.1
	diploma	85	59.9	59.9	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

4.2.4 Professional of Respondents

Table 4.4 show professional of respondents as follow 59 (41.5%) were Nurses, 36 (25.4%) were Doctors, 25 (17.6%) were other healthcare workers like Medical attendants or Health attendants, social workers and data clerk, 13 (9.2%) were

Medical laboratory and 9 (6.3%) were Pharmacists. This show there is large number of nurses professional in healthcare settings. This supported by World Health Organization which explained that nearly half of all healthcare workers are nurses in worldwide (WHO, 2022).

Table 4.4 Professional of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pharmacist	9	6.3	6.3	6.3
	Medical lab	13	9.2	9.2	15.5
	Others	25	17.6	17.6	33.1
	Doctor	36	25.4	25.4	58.5
	Nurse	59	41.5	41.5	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

4.2.5 Years of working experience of respondents

Table 4.5 show data on working experience of respondents as less than 1 year were 15 (10.6%), 1-3 years were 68 (47.9%), 3-5 years were 22 (15.5%) and above 5 years were 37 (26.1%). This pictured that large number of respondents healthcare workers had 1 to 3 years' experience in healthcare settings but this is different to the study done in Mbeya region which show 59% of healthcare workers had experience of five (5) yeas above (Amiri, S., 2022).

Table 4.5 Years of working experience of respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	below_1_yr	15	10.6	10.6	10.6
	3_5_yrs	22	15.5	15.5	26.1
	above_5_yrs	37	26.1	26.1	52.1
	1_3_yrs	68	47.9	47.9	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

4.2 Levels of Computer Skills Possessed by Healthcare Staff

The level of computer were categorized into four level where lowest level named Poor which level the healthcare worker who do not know switch on/off the computer, typing skills, use the computer application, the second level from lower named Basic where the healthcare workers knew switch on/off the computer, typing skills and minimal use the computer application, the third named as Intermediate where the healthcare worker lack the ability to do data analysis and fourth named as Advanced has capable of doing analysis of the data. This level gives picture on how HMIS can be utilized in the healthcare settings due to level of healthcare worker.

Table 4.6 Level of Computer Skills of Healthcare Staffs

		Frequency	Valid Percent	Cumulative Percent
Valid				
	Advanced	11	7.7	7.7
	Basic	69	48.6	56.3
	Intermediate	51	35.9	92.2
	Poor	7	4.9	100.0
	Total	142	100.0	

Source: Research Data (2024)

The Table 4.6 show the level of respondents worker on computer literacy, poor were 7 (4.9%), basic were 69 (48.6%), intermediate were 51 (35.9%) and advanced were 11 (7.7%). This show that around half of healthcare worker were having basic level of computer skills. This similar to the study done by Sinha & Joy (2022) which found more than 70% of nurses had good computer skills and knowledge. Also supported by study found more than half of healthcare workers have computer literacy (Al-Balawi & Alsesei., 2020).

Despite the respondents learn computer skills at college while pursing there professional educations. Table 4.7 show that 133 of respondents (93.7%) receive computer basic skills at college and 9 (6.3%) of HCWs did not receive computer basic skills at college. This shown highly integration of the computer skills to the medical courses to ensure highly adaption of new system as supported by Kihonza et al (2016) integrartion of education and computer skills help to have a graduate with computer skills.

Table 4.7 Respondents who Learning Computer Skills at College

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	9	6.3	6.3	6.3
	Yes	133	93.7	93.7	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

According to the table 4.7 above show that 93.7% of HCWs taught computer in college this help to first introduce computer capacity to the healthcare workers,

prepare them on easily understand different HMIS which will be used in hospital settings and encourage in using technology to improve the services (Holmes, 2022). Despite of 132 of HCWs received computer skills but 69 (52%) of HCWs have basic level. This happen due to high ratio of computers and students, low number of facilitators and low number of hours for computer skills (Pondiwa, 2024). However, there are few HCWs with Advanced level this argue due to the study found that 82% of medical students are not skilled on using SPSS Application or DHIS2 (Harerimana & Mtshali., 2019) this supported by study done in Saudi Arabia which show 81 % of nurses were incompetent on using data analysis tool (Ramukumba, M. M., & El Amouri, S., 2017). This implied teaching on healthcare workers on using of data analysis tool to enhance effective utilization of patient's information (Harerimana & Mtshali., 2019).

4.2.1 Levels of Computer Skills Possessed by Gender

The gender distribution of the respondents is categorized into male and female in this study. The table 4.8 show that male who had poor level were 2 (2.9%), basic were 32 (47.1%) intermediate were 29 (42.6%) and advanced were 5 (7.4%). In female gender who had poor level were 5 (6.8%), basic were 40 (54.1%), intermediate were 22 (29.7) and advanced were 7 (9.5%).

Table 4.8 of Cross Tabulation Gender and Level of Computer Skills

		Level of computer skills				
		Poor	**Basic**	**Intermediate**	**Advanced**	**Total**
Gender	**Male**	2	32	29	5	68
		2.9%	47.1%	42.6%	7.4%	100.0%
	Female	5	40	22	7	74
		6.8%	54.1%	29.7%	9.5%	100.0%
Total		7	72	51	12	142
		4.9%	50.7%	35.9%	8.5%	100.0%

Source: Research Data (2024)

According to the table 4.8, there is more female at basic level (54.1%), more male at intermediate level (42.6%) and more female at advanced level (9.5%). This means that male have high computer skills compared to female who have more at a basic level (54.1) and poor level (6.8%). The linear regression were conducted to identify the implication of the gender into level of computers skills but the result show that F(1,136)=1.390 P is 0.240 as show in the table 4.9 below.

Table 4.9 Analysis of Variance (ANOVA) of Gender and Level of Computer Skills

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.713	1	.713	1.390	.240[a]
	Residual	69.722	136	.513		
	Total	70.435	137			

a. Predictors: (Constant), Gender

b. Dependent Variable: What is the level of computer skills of healthcare staff

Source: Research Data (2024)

However, the significant obtained from ANOVA is 0.240 which is greater than 0.05 so this show that there is no statistical significant between gender and level of computer skills, this happen due to integration of computer subject in all subject who pursing medical course (Kihonza et all., 2016) but explained different by Sukums (2014) which found that the female healthcare workers have lower level compared to the male health care workers.

4.2.2 Levels of Computer Skills Possessed by Level of Education

The education level categorized into certificate, diploma and degree. Table 4.10 show that the educational level of respondents according to their level of education where certificate had poor level were 4 (9.5%), basic were 34 (81.0%), intermediate were 4 (9.5%) and no advanced. Diploma with poor level were 2 (2.4%), basic were 35 (41.2%), intermediate were 39 (45.9%) and advanced were 9 (10.6%). Degree with poor level were 1 (6.7%), Basic were 3 (20%), Intermediate were 8 (53.3%) and advanced 3 (20.0%).

Table 4.10 of Cross Tabulation for Education Level and Level of Computer Skills

		Level of computer skills				Total
		poor	Basic	Intermediate	Advanced	
Education level	**Certificate**	4	34	4	0	42
		9.5%	81.0%	9.5%	.0%	100.0%
	Diploma	2	35	39	9	85
		2.4%	41.2%	45.9%	10.6%	100.0%
	Degree	1	3	8	3	15
		6.7%	20.0%	53.3%	20.0%	100.0%
Total		7	72	51	12	142
		4.9%	50.7%	35.9%	8.5%	100.0%

Source: Research Data (2024)

According to the table 4.10 show that, the HCWs with certificate level have more basic level of computer skills about 81% for the diploma and degree have many with intermediate level of computer skills of 45.9% and 53.3 respectively. Also 20% of degree level have advanced computer skills. This show that as education increase and computer skills increase. Also, the linear regression (ANOVA) computed to analyzed education level and level of computer skills, the result found are F(1,136)=33.263 P is less than 0.001, which interpreted that as the level of education increase and the level of computer skills increased.

Table 4.11 Analysis of Variance (ANOVA) of Education Level and Level of Computer Skills

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.842	1	13.842	33.263	.000[a]
	Residual	56.593	136	.416		
	Total	70.435	137			

a. Predictors: (Constant), What is your education level

b. Dependent Variable: What is the level of computer skills of healthcare staff

Source: Research Data (2024)

According to the table 4.11 above, the significant value is approximately 0.001 which is less than 0.05 which means that there is statistical relationship between level of education and level of computers skills. This imply that as education increase and computer skills increase. This supported to the study done in Arusha which found 27.2% Bachelor degree with highest computer skills compared to 44% of healthcare with Diploma and 28.8% Certificate (Arra, M., 2023). Due to large number of diploma and certificate HCWs in primary healthcare lead to have more

supervision in data entry and utilization due to their low computer skills, this goes directly also with gender as female with lower level of computer skills compared to male are many in healthcare settings (Amiri, 2022) (WHO &ILO, 2022).

4.2.3 Levels of Computer Skills Possessed by Professional

According to the table 4.12 show cross tabulation of different professional of health care workers and their level of computer skills as follows. For the Nurses who had poor level were 3 (5.1%), basic were 40(67.8%), intermediate were 14 (23.7%) and advanced were 2 (3.4%). Doctors who had poor were 0, basic 8 (22.2%), intermediate were 23 (63.9%) and advanced were 5 (13.9%). Pharmacist who had poor were 0, basic 7 (77.8 %), intermediate were 2 (22.2 %) and advanced were 0. Medical laboratory who had poor were 0, basic were 8(61.5 %), intermediate were 5 (38.5%), and advanced were 0. Other healthcare workers like social workers, Health attendants, ICT, Computer Engineer who had poor level were 4(16%), Basic were 9 (36%), intermediate were 7 (28%), and Advanced were 5 (20%%).

Table 4.12 Show Cross Tabulation between Professional and level of computer skills

		Level of computer skills				
		Poor	**Basic**	**Intermediate**	**Advanced**	Total
Professional	Nurse	3	40	14	2	59
		5.1%	67.8%	23.7%	3.4%	100.0%
	Doctor	0	8	23	5	36
		.0%	22.2%	63.9%	13.9%	100.0%
	Pharmacist	0	7	2	0	9
		.0%	77.8%	22.2%	.0%	100.0%
	Medical Lab	0	8	5	0	13

		.0%	61.5%	38.5%	.0%	100.0%
	Others	4	9	7	5	25
		16.0%	36.0%	28.0%	20.0%	100.0%
Total		7	72	51	12	142
		4.9%	50.7%	35.9%	8.5%	100.0%

Source: Research Data (2024)

The table 4.12 above, show that there is large number of nurses, pharmacist and Medical laboratory technician with basic computer skills (67%) (77%) (61%) respectively, large number of doctors with intermediate computer skills (63.9%) but with large number with advanced computer skills shown by others (20%). This show that large number of healthcare workers have basic level of computer skills. The integration of the computer skills in every course pursing in college and university increase the awareness of computer skills in workers but its high in course that specialized in computer application like information communication technology and computer engineering (Msambwa, 2024). However, analysis of variance (ANOVA) show that there is no statistical significant between professional possessed by healthcare workers and their level of computer skills.

Table 4.13 Analysis of Variance (ANOVA) of Professional and level of computer skills

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.429	1	.429	.833	.363[a]
	Residual	70.006	136	.515		
	Total	70.435	137			

a. Predictors: (Constant), @ What is your Professional

b. Dependent Variable: What is the level of computer skills of healthcare staff

Source: Research Data (2024)

Despite of World Health Organization found that nearly half of all healthcare workers are nurses in worldwide (WHO, 2022). There is no statistical relationship between health professional and level of computer skills due to integration of all medical professional course and computer skills (Msambwa, 2024) but it increase with the level of education due to high exposed to different computer applications (Ghavifekr & Rosdy, 2015). Even though, there is spike number of doctors in intermediate level (63.9%) due highly exposed in using different health information system in caring of patient in health settings which makes them learning more on using computer and its applications due to fit with system requirement (Ghavifekr & Rosdy, 2015).

4.3 Availability of IT infrastructure in healthcare settings

This section will looking into availability of IT Infrastructure in primary healthcare settings on the implementation and utilisation of Health Management Information Systems. This look on availability on equipment to ensure smooth data entry and utilization at healthcare settings.

4.3.1 Availability on equipment to ensure smooth data entry and utilization

Table 4.14 show that 55 (38.7%) respondents said no on availability of the electronic devices to ensure smooth data entry and 87 (61.3%) said yes.

Table 4.14 of Frequency on Enough IT infrastructure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	55	38.7	38.7	38.7
	Yes	87	61.3	61.3	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

The table 4.14 implied that there are deficiency of IT infrastructure in healthcare settings that smooth the process of data entry and utilization of HMIS by 38.7%. This give the picture of lack IT infrastructure in primary healthcare settings (Darcy, 2017) and this emphasize of using paper based which increase the risk of national data utilization (Neelima et al., 2024). By using Cross Tabulation table 4.15 below show that there is 20 (36.4%) of healthcare workers who have intermediate level and 2 (3.6%) of advanced level but do not have an IT infrastructure to work on. This show that we do not utilize the human resources well.

This similar to the study done by Darcy (2017) which reported that many hospital lack computers and report are paper based, supported by Abdirahman, I. A. (2022) which explained the lack of electronic device at hospital affect data entry and show poor data utilization. Health Management Information systems are crucial tools for evidence based policy formulation, planning and decision-making at all levels of health systems to ensure better health of community (Kikoba, 2019).

Table 4.15 Cross Tabulation of Enough IT infrastructure and Level of Computer Skills

		Level of computer skills				
		Poor	**Basic**	**Intermediate**	**Advanced**	**Total**
Enough IT Infrastructure	**Yes**	6	40	31	10	87
		6.9%	46.0%	35.6%	11.5%	100.0%
	No	1	32	20	2	55
		1.8%	58.2%	36.4%	3.6%	100.0%
Total		7	72	51	12	142
		4.9%	50.7%	35.9%	8.5%	100.0%

Source: Research Data (2024)

The lack of computer(s) or IT infrastructure lead to production of the paper based report (Darcy, 2017) this hinder the immediate report on patient tendency, required many human resources to organize the patient information and error of the data are common observed (Ishabakaki, P., & Kaijage, S. 2015). Also, affecting data utilization for the benefit of national level like planning and resources allocation (Neelima et al., 2024).

4.4 Weaknesses within the current M & E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs

Table 4.16 show the summary of the contents analysis which presented by majority of respondents on weakness of the current Monitoring and Evaluation system that contribute loss to follow up among patient using Antiretroviral Therapy.

Table 4. 16 Weaknesses within the current M & E system that contribute to patient loss to follow up for Antiretroviral Therapy (ART) programs

	Frequency	Valid Percent	Cumulative Percent
Falsification of client info	36	25.4	25.4
Disclosure of status	31	21.8	47.2
Self Transfer (movement)	10	7.0	54.2
No connections of system btn clinics	22	15.5	69.7
Economic issues	8	5.6	75.4
Validation of client info	11	7.7	83.1
Difficult of Regime	24	16.9	100.0
Total	142	100.0	

Source: Research Data (2024)

The table 4.16 above show the results of respondents as follow, falsification of client information which means that the client give wrong information about names, phone number and address were 36 (25.4%), patient do not disclose about his/her HIV/AIDS status were 31 (21.8), self transfer due to movement or other factor were 10 (7%), the CTC 2 database are not connected between clinics were 22 (15.5%), economic issues like lack of money for transport were 8 (5.6%), validation of client information were 11 (7.7%) and difficult of regime and protocol 24 (16.9%). This give major seven weakness current M& E system that affecting the patient loss to follow up for ART programs. Weak patient tracking system shown as the weakness in M & E system as patient loss to follow up for ART program due lack of CTC 2

database connections between clinics this supported by in Tanzania which revealed that the needed of CTC2 database integration in order to manage loss to follow up (Wenga et al., 2024).

However, Disclosure of HIV status among of the patient is another weakness caused by fear of stigma tend the patient to give false information like false names, address and phone number this also explained by kogi et al (2024) the patient give the false detail to fear stigma and other change their location and phone number. Insufficient of resource stipulated as one of the weakness observed by respondent which correlated with the study which conclude that some hospitals lack skilled human resource among the 38 districts assessed, one-half did not have a biostatistician, less than one-quarter had staff trained in the basics of M&E or data analysis, and less than one-quarter had an M&E plan (Sebuliba et al., 2018) also reported on dencrease of man power increase loss to follow up (Habte et al., 2022).

Also the strategies to reduce loss to follow-up included outreach teams, community-based organizations and checking death registry data, implementation of all three strategies substantially reduced losses to follow-up (Kogi et al., 2024) Financial difficulties seem to be one the weakness identified that affect the M & E system that affect the loss to follow up of the patients due to lack of money to travel come back to the hospital this supported by study done in Tanzania which explained the causes of attrition of HIV patient on treatment is including lack of transportation money (Madawa, 2022). Similar to the systematic review by Becker et al. (2019) highlighted the effectiveness of addressing transportation and financial barriers in reducing LTFU in low income community.

On other hand, difficult regime of drug treatment is another weakness of current M & E system which involves of taking drugs for every month at clinic for the first six months and taking drug every day, this supported by study done in Morogoro found that one of the factor affecting loss to follow up is taking drug monthly at clinic (Machumu et al., 2024).

4.4.1 Level of computer skills of healthcare workers and loss to follow up for ART clients

As the Table 4.12 describe above, show that only 44.4% healthcare workers who has ability of good data entry and analyze the data this lead to delay data uploaded in the system, incorrect data entry and poor data quality. This similar to the study done in Uganda show that there is data incompleteness of about 19% in DHIS2 in the hospital of clients of below 2500 but increase as number of clients increase (Akankunda, 2014). This lead due to some healthcare settings lack computer and technical expertise (Abdirahman, 2022). Despite of Human error DHIS2 was found to be simple, flexible, stable and DHIS2 has improved report completeness and timeliness (Ojo et al., 2018). It is imperative to give healthcare personnel sufficient computer skills training and assistance. By investing in technology and training, healthcare facilities can improve patient care, reduce LTFU rates, and enhance the overall effectiveness of ART programs (Abdirahman, 2022).

4.4.2 Gender of healthcare workers and loss to follow up for ART clients

The study has shown that 52% of the healthcare workers are female which provide the care to the primary healthcare settings by looking on how gender contribute to loss to follow of client on ART program on different perspectives. On caring the

female nurses scoring higher points compare to male (Tong et al., 2023) this give picture that loss to follow of patient does not depend on gender of healthcare worker. This also supported by study done in Bangladesh which conclude that female nurses are more easily accessible, reliable and have an empathy compared to the male nurse. This continue to give picture that as number of female healthcare workers available in our health settings and every setting have a challenge of loss to follow up so there is no relationship between loss of follow of ART clients and gender of healthcare workers.

4.4.3 Professionals of healthcare workers and loss to follow up for ART clients

Table 4.17 show professional of respondents as follow 59 (41.5%) were Nurses, 36 (25.4%) were Doctors, 25 (17.6%) were other healthcare workers like Medical attendants or Health attendants, social workers and data clerk, 13 (9.2%) were Medical laboratory and 9 (6.3%) were Pharmacists.

Table 4.17 Number of Professional of Respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Pharmacist	9	6.3	6.3	6.3
	Medical lab	13	9.2	9.2	15.5
	Others	25	17.6	17.6	33.1
	Doctor	36	25.4	25.4	58.5
	Nurse	59	41.5	41.5	100.0
	Total	142	100.0	100.0	

Source: Research Data (2024)

Despite of having many nurses but every health settings have different health care workers, in looking into the loss of follow up, does not affected by professional

because the customer the key causes of LTFU is stigma attitudes and discrimination shown by healthcare workers (Nyblande et al., 2019). However, Merten et al. (2018) suggested that inadequate communication skills and patient education can lead to LTFU of the patient in ART program. Also, the healthcare workers who provide the fragment care are more likely to have high number of LTFU compare to others (Mugavero et al., 2018). Layer et al. (2019) emphasize on friendly and deliver of emotional support of the client on every visit and when necessary because unfriendly and lack of emotional support lead to LTFU. This does not depend on professional but depend on how professional deliver care to patients.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter explained a summary of the study that describe key elements like determination of the study, specific objectives, research methodology applied, major findings and results. Also, this chapter conclude the research findings and recommendations to different stakeholders.

5.2 Summary

5.2.1 General Summary

This study examined on assessment of Information Computer Technology skills of healthcare staff on effective Health Management Information System (HMIS) utilisation at Primary Healthcare centers in Mbeya region specifically in Mbeya City and Mbeya District. The study deployed pragmatic philosophy in order to use mixed method to combine qualitative and quantitative. The study employed descriptive cross sectional study since the data collections, analysis and interpretation done only once. 142 Healthcare workers were include in the study half from each two district, the data collection tool was questionnaire. Data in this study analysed by descriptive for quantitative data and content analysis for qualitative data.

5.2.2 Specific Summary

5.2.2.1 Level of Computer Skills of Healthcare Staff in Primary Healthcare settings

Regarding level of computer skills of healthcare staff in primary healthcare results show that only 4.9% of healthcare workers had poor or lowest level of computer

literacy or skills. This results suggested that most of healthcare workers have at least basic level of computer skills which is essential in the utilization of HMIS.

5.2.2.2 Availability of IT infrastructure in healthcare settings

On availability of IT infrastructure in healthcare setting results, the study found 55 (38.7%) respondents said no on availability of the electronic devices to ensure smooth data entry and 87 (61.3%) said yes. This implied that there is deficiency of electronic devices in healthcare settings to smooth the process of data entry and utilization of HMIS.

5.2.2.3 Weaknesses within the current M&E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs

Lastly, on Weaknesses within the current M&E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs result found that weak patient tracking system, inadequate data collection and reporting, limited data quality and analysis and insufficient Human Resources shown as the weakness in M & E system as patient loss to follow up for ART program.

5.3 Conclusion

5.3.1 Level of computer skills of healthcare staff in primary healthcare settings

Regarding level of computer skills of healthcare staff in primary healthcare the study conclude that majority healthcare workers has basic and above level of computer skills this is due to learnt computer in college as integrated subject in health. Has ability on turn on and off, using Microsoft word, internet and email but few

healthcare workers had ability to enter data and analyze data in HMIS like CTC2 and DHIS2. These findings suggested that healthcare workers had ability to use health Information System in enter data but extractions of these data is difficult due to their level of understand. This will lead to affect the global health goals of second 95 95 95 on HIV which is target to ensure 95% of all PLHIV are on treatment of ARV. To ensure this target is reach the level of computer skills of healthcare workers must be raised.

5.3.2 Availability of IT infrastructure in healthcare settings

On availability of IT infrastructure in healthcare setting results, the study conclude that one third of healthcare settings had challenges on IT infrastructure like computers, IT expert, Internet availability budgets for maintenance in case of system errors that hinder smoothly data entry and utilization of patients information when required. But have been encounter by using personal computer or smartphones to create the word document of patients summary send to the district data officer to enter in the system which lead to over work on district level.

Easy way of tracking of PLHIV who lost to follow up is my using computer technology system which facilitated by enough IT infrastructure in healthcare settings. Due to the results this study one third of health facility do not have enough IT infrastructure this affect to reach the second goal of 95 95 95. To ensure this goal is reached there should be enough investment in IT infrastructure in healthcare facility.

5.3.3 Weaknesses within the current M&E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs

Lastly, on Weaknesses within the current M & E system that contribute to patient loss to follow-up for Antiretroviral Therapy (ART) programs the study conclude that that weak patient tracking system due lack of validation of patient information, falsification of client problem, lack of CTC2 database linked between clinics, economic issues like transport, lack of disclosure of HIV status, privacy policies, inadequate data collection and reporting due continue use paper base in some points, limited data quality and analysis and insufficient Human Resources shown as the weakness in M & E system as result to patient attrition to ART program. These weakness if continue to persist and not solved will affect to reach second goal of 95 95 95 in order to each this target will need to clear these weakness.

5.4 Recommendations

The study made recommendation based on the conclusion drawn to different stakeholders concerning HIV/AIDS.

5.4.1 Recommendation for the Government

The Government through Ministry of Health have been continuous improve healthcare sector in terms of infrastructure and Human resources every year according to the budget national budget, the study recommend on also continue strengthen ICT Infrastructure in Primary Healthcare Settings (dispensaries and Health centers) like enough computer and reliable internet which are crucial for improving patient management and encounter loss to follow up.

5.4.2 Recommendation for the Non-Government Organizations

NGOs that have been pay the health workers if they get the client with HIV positive should strengthen then system that to pay the staff to keep the patient on ART program. Also, the study recommend on improving the ICT skills of healthcare workers to ensure are well equipped to using the system and improve ICT infrastructure to ensure easily monitoring and evaluation of the client in center wise.

5.4.3 Recommendation for the Policy Maker

The M & E system have been affected most by misinformation which done by client, that make difficult to get patient when loss. The study recommend to use national identity number or fingerprint to track the patient and close guardian of the patient when the get loss and allow to disclose the information of the client in case of loss to follow up in children below 18 years old and Minor. Also, to integrate the DHIS2 and CTC2 to other hospital system and between clinics for HIV services in order to link and get client information instant after searching their names, this will help to encounter loss to follow up. Lastly, to remove the confidentiality to the patient who lost to follow up to ensure easily catch up of the client and this is for the advantage of the community to prevent Drug resistance.

5.4.4 Recommendation for the Health care workers

The study recommend to continue learn and improve themselves on computer skills most on the analysis applications which are essential on give the picture of the magnitude. Also improve the customer care services with quality of care.

5.4.5 Recommendation for the further researcher

The study is limited to primary healthcare settings in dispensaries and health centers which are lowest level of patient/client entry hence the future studies may focus to secondary and tertiary healthcare settings. Second, this study focused awareness of ICT skills, availability of IT infrastructure and weakness of M & E in loss to follow of patient in ART program. The future studies may focus on awareness of DHIS2. Lastly, this study was descriptive cross sectional were data collection, analysis and interpretation were done once, hence future studies to be longitudinal to observe changes of health management information system over time, and whether similar factors could be found.

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APPENDICES

Appendix 1: Semi structured Questionnaire

QUESTIONNAIRE FOR ASSESSMENT ON ICT SKILLS OF HEALTHCARE STAFF ON EFFECTIVE HMIS UTILISATION: THE CASE OF LOSS TO FOLLOW UP IN MBEYA URBAN AND RURAL

INSTRUCTIONS

1. The questionnaire involves 5 sections please answer all questions based on best of your knowledge and experiences.
2. If you don't understand the question please ask before you answer
3. Answer the questions in the space provided
4. Your answer will be confidential and would not be disclosed to anyone

PART ONE: DEMOGRAPHIC INFORMATION

1. What type of your healthcare settings?
   a) Dispensary
   b) Health center
   c) District hospital
2. Which district you are working on?
   a) Mbeya DC
   b) Mbeya City
3. How old are you?
   a) 17-30
   b) 31-45
   c) Above 45

4. Sex

   a) Male

   b) Female

5. What is your marital status?

   a) Single

   b) Married

   c) Others

6. What is your education level?

   a) Certificate

   b) Diploma

   c) Degree

   d) Masters /PhD

7. What is your Professional?

   a) Nurse

   b) Doctor

   c) Pharmacist

   d) Medical laboratory

   e) Other

8. How long have you work in healthcare settings?

   a) Below 1 year

   b) 1-3 years

   c) 3-5 years

   d) Above 5 years

PART TWO: COMPUTER SKILLS OF HEALTHCARE WORKERS

1. Did you learn computer skills at the college?

   a) Yes

   b) No

2. How long have you been using computer before starting working at Healthcare settings?

   a) Never

   b) Less than 1 year

   c) 1-3 years

   d) Above 3 years

3. Do you currently have regular access to a computer?

   a) Yes

   b) No

4. How would you rate your own computer literacy?

   a) Poor

   b) Adequate

   c) Good

   d) Excellent

5. How would you rate your own internet literacy?

   a) Poor

   b) Adequate

c) Good

d) Excellent

6. How would you rate your current typing skills?

a) Poor

b) Adequate

c) Good

d) Excellent

7. How would you rate your computer skills? Please put a tick () in the box at the appropriate spot: ‘None’, ‘Basic’, ‘Intermediate’ or ‘Advanced’.

		Poor	**Basic**	**Intermediate**	**Advanced**
1	**Word processing Applications**				
2	**E-mail Applications**				
3	**Communication Applications**				
4	**Data base application**				
5	**Spreadsheet applications**				
6	**Presentation Applications**				
7	**Video conferencing Applications**				
8	**SPSS Application**				

8. Please indicate the extent to which you agree or disagree with the following ideas expressed by putting a tick ( ) in the box at the appropriate spot: ‘Strongly agree’, ‘Agree’,‘Neutral’, ‘Disagree’ or ‘Strongly disagree’.

		Strong Agree	**Agree**	**Neutral**	**Disagree**	**Strong Disagree**
1	**I enjoy using computers**					
2	**I feel comfortable using computer**					
3	**I am willing to learn more about computer**					
4	**I think that computers are difficult to use**					
5	**I feel threatened when others talk about computers**					
6	**I believe that it is important for me to learn how to use computer**					
7	**I would like to use computer in the healthcare settings**					
8	**I think that my services can be improved by using computer**					
9	**I think that computer can make Swahili language**					

PART THREE: IT INFRASTRUCTURE IN HEALTHCARE SETTINGS

1. What type of electronic device do you use to enter data in healthcare system?
    a) Computers
    b) Tablets
    c) Personal smartphone
    d) No device

2. Is there enough equipment's to enable smoothly data entry in electronic system?
    a) Yes
    b) No

3. How many number of electronic device (s) do you have in dispensary/health center?
    a) None
    b) 1
    c) 2-3
    d) More than 3
4. Is there enough internet availability during working hours in dispensary/health center?
    a) Yes
    b) No

5. Does facility have electricity availability?

   a) Yes 

   b) No

6. Does facility have backup electricity system?

   a) Yes 

   b) No

7. Can you explain the status of IT infrastructure in your healthcare facility?

   ……

   ……

   ……

   ……

   ……

   ……

PART FOUR: FACTOR AFFECTING HEALTH INFORMATION SYSTEM IN ACHIEVING PUBLIC HEALTHCARE GOALS

1. Select the correct answer according your current working experience and knowledge by put tick on space provided as ‘Strongly agree’, ‘Agree’,‘Neutral’, ‘Disagree’ or ‘Strongly disagree’.

		Strong Agree	Agree	Neutral	Disagree	Strong Disagree
1	Lack of proper training					
2	Lack of ICT facilities					
3	Insufficient knowledge about importance of using ICT in health					
4	Increased workload					
5	Lack of electricity					
6	Failure of equipment's (hardware and software)					
7	Complexity of HIS system					
8	Low hospital budget					
9	No ICT expert support					
10	Lack of willingness and adaption HCWs					
11	lack government and shareholder support					

PART FIVE: WEAKNESSES WITHIN THE CURRENT M&E SYSTEM THAT CONTRIBUTE TO PATIENT LOSS TO FOLLOW-UP FOR PEOPLE WHO LIVING WITH HIV/AIDs.

1. Did you encounter the challenge of loss to follow up for ART patient/client at healthcare settings?
   a) Yes 
   b) No
2. Explain what weakness of M&E system that lead to problem of loss to follow up and how to improve system in loss to follow up.

   ……

   ……

   ……

   ……

   ……

   ……

   ……..……

Thank you for your Participation

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/PG202185983 **17th Sept, 2024**

Regional Administrative Secretary,

P.O Box 754,

MBEYA.

Dear Regional Administrative Secretary,

RE: RESEARCH CLEARANCE FOR MR. SAID NASSORO MOHAMED NO: PG202200009

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Said Nassoro Mohamed Reg. No (PG2022000049),** pursuing **Master of Arts in Monitoring and Evaluation (MAME).** We here by grant this clearance to conduct a research titled **"Assessing ICT Skills of Health Care Workers on HMIS Utilization : The case of loss follow up in**

Mbeya .".He will collect his data at your area from 19 th Sept, 2024 to 30th October , 2024.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

THE OPEN UNIVERSITY OF TANZANIA

Gwahula Raphael Kimamala

For: VICE CHANCELLOR

Kinondoni Biafra, Kawawa Road; P.O 23409; Dar es Salaam; Tel: +255 22 2668 445;
E-Mail:vc@out.ac.tz|| Website:www.out.ac.tz

UNITED REPUBLIC OF TANZANIA
PRESIDENT'S OFFICE
REGIONAL ADMINISTRATIONS
AND LOCAL GOVERNMENTS

MBEYA DISTRICT COUNCIL

30TH SEPTEMBER, 2024

In reply please quote:

Ref. NO.MDC/S.10/8. VOL VI/193

To Clinical Officers/Medical Doctors,
Mbalizi, Iwindi, U/Usongwe, Mshewe and Itimba Dispensaries,
Inyala, Ilembo, Santilya, Mbalizi and Swaya Health Centers,
Mbeya District Council,
P.O.BOX 599,
MBEYA.

REF: PERMISSION FOR DATA COLLECTION AND RESEARCH

Refer to the above caption subject.

2. The office have receive a letter of reference No.DC.63/109/01 with the date 26th September, 2024 titled permission to conduct research.
3. May I introduce Mr. Said Nassoro Mohamed with registration No. PG202200009 pursuing Master of Arts in Monitoring and Evaluation (MAME) Who is a bonafide student from the Open University of Dar es Salaam (UDSM). Who is required to collect data and research.
4. The title of the research is "***ASSESSING ICT SKILLS OF HEALTH CARE WORKERS ON HMIS UTILIZATION: The case of loss follow up in Mbeya.***" He will collect his data at your area from 19th September, 2024 to 30th October, 2024.

Please assist him/her accordingly.

Fransisca Fletcher Nzota

FOR: MBEYA DISTRICT COUNCIL EXECUTIVE DIRECTOR

KNY. MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA YA MBEYA

COPY: 1. Mr. SAID NASSORO MOHAMED
2. DEPUTY VICE CHANCELLOR,
OPEN UNIVERSITY OF TANZANIA (OUT),
P.O.BOX 23409,
DAR ES SALAAM.

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA JIJI MBEYA

Unapojibu tafadhali taja:

KUMB NA. MCC/B.50/1/VOL.XXIX/.....

Tarehe: 18/09/2024

KWENDA

MKUU WA KITUO,
KITUO CHA AFYA KAMPALA, RWANDA, NZOVWE
S.L.P 149 MBEYA

YAH: OMBI LA KUFANYA UTAFITI

Tafadhali husika na mada tajwa napo juu.

2. Napenda kukujulisha kuwa Mwanafunzi SAID MASSORO Anayetokea OPEN UNIVERSITY OF TANZANIA anahitaji kufanya utafiti mdogo katika Halmashauri ya Jiji la Mbeya katika mada isemayo; ASSESSING ICT SKILLS OF HEALTH CARE WORKERS ON HMIS UTILIZATION A case of LOSS TO FOLLOW UP

3. Ruhusa hii ni kuanzia tarehe 19/09/2024 hadi tarehe 30/10/2024 Hivyo ombi lako limekubaliwa.

4. Nakutakia ushirikiano mwema.

George Magembe
FOR: CITY DIRECTOR
MBEYA CITY COUNCIL
MBEYA

Kny: MKURUGENZI WA JIJI
HALMASHAURI YA JIJI LA MBEYA

Nakala: Mkuu wa Chuo/Naibu Mkuu wa Chuo
Chuo cha OPEN UNIVERSITY OF TANZANIA
S.L.P 13224
DAR-ES-SALAAM

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA
HALMASHAURI YA JIJI MBEYA

Unapojibu tafadhali taja:

KUMB.NA. MCC/R.50/1/VOL.XXIX/.....

Tarehe: 18/09/2024

KWENDA:
MKUU WA KITUO.
ZAHANATI YA IGANZO, IWAMBI, ITUHA, TEMBELA, ITUHA,
ITENDE, ISYESYE, NA NDANIELA
P.O BOX 149 MBEYA

YAH: OMBI LA KUFANYA UTAFITI

Tafadhali husika na mada tajwa napo juu.

2. Napenda kukujulisha kuwa Mwanafunzi : SAID NASORO
Anayetokea OPEN UNIVERSITY OF TANZANIA anahitaji kufanya utafiti mdogo katika Halmashauri ya Jiji la Mbeya katika mada isemayo; ASSESSING ICT SKILLS OF HEALTH CARE WORKERS ON HMIS UTILIZATION A case of LOSS TO FOLLOW UP

3. Ruhusa hii ni kuanzia tarehe 19/09/2024 hadi tarehe 31/10/2024 Hivyo ombi lako limekubaliwa.

4. Nakutakia ushirikiano mwema.

George Magembe
Kny: MKURUGENZI WA JIJI
HALMASHAURI YA JIJI LA MBEYA

N.Y. MKURUGENZI
HALMASHAURI
MBEYA

Nakala: Mkuu wa Chuo/Naibu Mkuu wa Chuo
Chuo cha OPEN UNIVERSITY OF TANZANIA
S.L.P 13224
DAR-ES-SALAAM

Assessment of Computer Literacy among Healthcare Staffs for Effective Utilization of Health Management Information Systems in Mbeya Urban and Rural, Tanzania

Mohamedi Nassoro Said *[1]

Address: Department of Economics & Community Economic Development, Faculty of Art and Social Sciences, Open University of Tanzania, Dar es salaam, Tanzania.

Email: sainass177@gmail.com

Abstract

Background: Inadequate computer literacy among healthcare Staffs (HCWs) impedes the effective use of Health Management Information Systems (HMIS) in Tanzania. This study assessed the level of computer skills among HCWs in Mbeya Urban and Rural districts and examined its implications for HMIS utilization in the management of HIV/AIDS care.

Methods: A cross-sectional descriptive study was conducted among 142 HCWs using a semi-structured questionnaire. Data were analyzed using descriptive and inferential statistics through SPSS. Computer literacy levels were categorized into poor, basic, intermediate, and advanced. Associations between literacy and demographics were explored using ANOVA.

Results: Nearly half (48.6%) of HCWs demonstrated basic computer skills, while only 7.7% reached an advanced level. A significant relationship was found between level of education and computer skills ($F(1,136)=33.263$, $p<.001$). However, gender and profession were not significantly associated with skill levels.

Conclusion: Although most HCWs possess foundational computer skills, the shortage of advanced competencies limits effective HMIS usage. Targeted digital literacy training and increased access to practical computer-based learning are recommended.

Introduction

The digital transformation of health systems globally has placed increasing emphasis on the competence of healthcare Staffs in information and communication technology (ICT). In Tanzania, the use of HMIS, including platforms like DHIS2, is critical for effective health data management and monitoring, especially in HIV/AIDS programs (World Health Organization [WHO], 2021).

However, studies across sub-Saharan Africa have shown that limited computer literacy among HCWs is a significant barrier to successful HMIS implementation (Kebede et al., 2020; Nicol et al., 2013). In Tanzania, while efforts have been made to integrate ICT training into medical education, challenges remain, particularly in rural and primary healthcare settings (Kimaro, 2017; Ayebazibwe et al., 2019).

This study focused on Mbeya Region—a high HIV-burden area—where data gaps and loss to follow-up are persistent issues. Understanding the ICT competence of HCWs is vital for identifying capacity-building needs and strengthening health information systems.

Methods

Study Design and Setting

A cross-sectional descriptive study was carried out in Mbeya City (urban) and Mbeya District Council (rural), Tanzania. These two districts were purposively selected due to their high population density and HIV prevalence.

Participants and Sampling

The study involved 142 HCWs selected through purposive and convenience sampling. Participants were drawn from 20 primary healthcare facilities, with 71 respondents from each district. Inclusion criteria included HCWs involved in HIV/AIDS care and data reporting.

Data Collection

Data were collected using a semi-structured questionnaire covering demographic details and eight items related to computer skills. Computer literacy was assessed across four levels: poor, basic, intermediate, and advanced.

Data Analysis

Descriptive statistics were used to determine skill levels. ANOVA was applied to examine relationships between demographic variables (gender, education level, professional cadre) and computer literacy. All analyses were conducted using SPSS.

Results

Distribution of Computer Skills among HCWs

A total of 142 healthcare Staffs participated in this study. Table 1 summarizes their levels of computer skills. Nearly half (48.6%) of participants were categorized under the "Basic" skill level, while only 7.7% demonstrated advanced proficiency.

Table 1. Distribution of Computer Skills Levels among Healthcare Staffs

Level of Computer Skills	Frequency (n)	Percentage (%)
Poor	7	4.9%
Basic	69	48.6%
Intermediate	51	35.9%
Advanced	11	7.7%
Total	**142**	**100%**

Figure 1. Distribution of Computer Skills Among HCWs *(Bar chart displaying skill levels — insert chart here in your Word doc)*

Computer Skills by Gender

While a slightly higher percentage of female HCWs had only basic skills, more males had intermediate proficiency. However, ANOVA showed no statistically significant difference based on gender ($p = 0.240$).

Table 2. Computer Skills by Gender

Gender	Poor (%)	Basic (%)	Intermediate (%)	Advanced (%)	Total (n)
Male	2.9	47.1	42.6	7.4	68
Female	6.8	54.1	29.7	9.5	74

Figure 2. Computer Skills by Gender *(Side-by-side bar chart of male vs. female levels — insert chart)*

Computer Skills by Education Level

Education was significantly associated with computer skill level ($p < 0.001$). HCWs with degrees showed the highest proportion of advanced and intermediate skills, while certificate holders were primarily concentrated at the basic level.

Table 3. Computer Skills by Education Level

Education Level	Poor (%)	Basic (%)	Intermediate (%)	Advanced (%)	Total (n)
Certificate	9.5	81.0	9.5	0.0	42
Diploma	2.4	41.2	45.9	10.6	85
Degree	6.7	20.0	53.3	20.0	15

Figure 3. Computer Skills by Education Level *(Clustered bar chart by certificate, diploma, degree — insert chart)*

Table 4. ANOVA Results for Education Level and Computer Skills

Source	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	13.842	1	13.842	33.263	< .001
Residual	56.593	136	0.416		
Total	70.435	137			

Discussion

The study's findings highlight that while foundational computer literacy exists among HCWs in Mbeya Urban and Rural, higher-level skills remain limited. This

finding reflects broader regional trends (Kabukye et al., 2020; Nicol et al., 2013) and suggests the need for enhanced training, particularly in data analytics and system-specific software like DHIS2.

The significant link between education level and computer literacy underscores the importance of integrating ICT training into both pre service and in-service medical education. Notably, professional role and gender did not significantly affect computer proficiency, likely due to universal inclusion of basic computer courses in medical curricula (Msambwa, 2024; Kihonza et al., 2016).

Without higher proficiency levels, HCWs may struggle with tasks such as accurate data entry, timely reporting, and utilizing health data for decision-making—critical for improving ART program performance and minimizing patient loss to follow-up (Rumisha et al., 2020).

Conclusion

Most healthcare Staffs in Mbeya exhibit only basic computer skills, which limits the optimal use of HMIS. Since education level was significantly associated with ICT skills, targeted in-service training focused on applied health informatics and system-specific tools is recommended. Improving ICT capacity among HCWs is essential for enhancing ART program monitoring and overall service delivery.

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