# ADOPTION OF TECHNOLOGY ON IMPROVING COMMUNITY HEALTH CENTRES SERVICES: A CASE OF COMMUNITY HEALTH WORKERS IN NYAMAGANA DISTRICT

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SOCIAL WORK OF THE OPEN UNIVERSITY OF TANZANIA**

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## CERTIFICATION

The undersigned certified that he has read and hereby recommends for acceptance by the Open University of Tanzania as research title: "***Adoption of Technology on Improving Community Health Centres Services: A Case of Community Health Workers in Nyamagana District"*** in partial fulfilment of the requirements for the Degree of Master of Social Work of the Open University of Tanzania.

……..……

Dr. Emmanuel Patroba Mhache

(Supervisor)

…….……

Date

## COPYRIGHT

## DECLARATION

I, **William Bundala**, do hereby declare that, this dissertation is my own original work and that it has not been and will not be submitted to any other University for the similar or any other degree award.

...…….

Signature

……

Date

## DEDICATION

This dissertation is dedicated to the family of Mr. Bundala William and Mrs Neema Bazir who specifically brought me up from the infant stage of life until this stage. Moreover, the dissertation is dedicated to my beloved wife Madam Susana Seleka for her moral and financial support of this study. My wife, on behalf of the family had tirelessly been giving me words of courage which inspired me to keep on struggling up to the end of this study.

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## ABSTRACT

This study assessed adoption of technology particularly on Health Information Technology on improving Community Health Centres services. The study was carried out in Nyamagana District in Mwanza City Council. Three objectives this study was; to identify factors influencing adoption and use of health information technology of health workers; to assess challenges facing CHW towards adoption of health information technology; and to examine perceptions of health workers towards adoption of health information technology in community health centres. Cross-section research design was adopted under guidance of three theories; Technology Acceptance Model (TAM), Diffusion Innovation Model (DIM) and Unified Theory of Acceptance of Technology Model (UTAUT). Sample sizes of 120 respondents were picked and responded to questionnaires and interviews. Findings revealed that, factors which influence adoption and use of HIT included IT knowledge, attitude, ICT infrastructure, training, fund availability, and experience. However, adoption of HIT is constrained by several challenges which specifically associates with education level, lack of ICT skills, English language barrier, limited ICT resources, and lack of financial support. In addition, findings disclosed that, perceived factors including perceived usefulness of HIT, perceived ease of use of health technology, social influence, and facilitating conditions significantly influence adoption of health information technology. The study recommends government and policymakers to develop a unique approach to safeguard an appropriate e-Health domestic plan as well as financing for the application of HIT.

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| | |
|---|---|
| BI | Behavioural Intention |
| CHC | Community Health Centres |
| CHWs | Community Health Workers |
| DIM | Diffusion Innovation Model |
| e-LMIS | Electronic Logistic Management Information System |
| EMR | Electronic Medical Records |
| HIT | Health Information Technology |
| HMIS | Health Management Information System |
| PEOU | Perceived Ease of Use |
| PU | Perceived Usefulness |
| SPS | Statistical Package for Social Science |
| TAM | Technology Acceptance Model |
| TRA | Theory of Reasoned Action |
| UTAUT | Unified Theory of Acceptance of Technology |
| USA | United States of America |

# CHAPTER ONE

# INTRODUCTION

## 1.1 Introduction

This chapter presents background of the problem, statement of problem, objectives of the study, research question and significance of study.

## 1.2 Background of the Study

Health information technology is recently deemed as significant entity that can improve health care efficiency, safety and quality (Furukawa *et al.,* 2014). Besides, it plays crucial role in decreasing health disproportions particularly on keeping health records and patient registries (Chib *et al.,* 2015). In the same vein, health information technology is regarded as solution towards minimizing challenges facing community health care systems in delivering their services to the community (De Grood *et al.,* 2016). For example, medication errors occurrences have been ascertained to be reduced by electronic medical records (EMR). This technology also improves compliance by patient to medication regimes and prescription errors (Ross *et al.,* 2016).

Adoption of health information system has shown significant impact on health care systems specifically on cost savings and reduction of hospital visits (De Grood *et al.,* 2016). For instance, Agha (2014) reports that, USA had planned to spend $30 billion in medicare and medicaid between the period of 2011 to 2019. However, adoption of Health Information Technology (HIT) estimated to lower costs of medical expenditures and federal spending to $19 billion by preventing medical errors, cutting

redundant tests, and improving health outcomes. There is evidence of positive perception towards adoption of technology across the globe. Some countries in Europe and America dedicates substantial amount of resources to support implementation of e-health technology. For instance, US and European Union have implemented health information technology by 29% and 17% respectively with a budget of over $19 billion (Mackert *et al.,* 2016). According to US Department of Health and Human Services (2013), nearly 72% of the community health centers have adopted electronic health records more than the double adoption rate in 2009 implying steady increase of the technology adoption.

At global scale, shortage of healthy workers has been a crucial challenge particularly in developing countries (Braun *et al.,* 2013). The scarcity is likely to be fuelled by various factors including ineffective investment in national health system, migration of competent health workers to developed countries, and devastation of major epidemics such as malaria, HIV/AIDS, and tuberculosis (Macinko and Harris, 2015). Meanwhile, different health stakeholders such as donors, health ministries, health advocates and local leaders expect great achievement from these health systems (McMurray and Clendon, 2015). Besides, several campaigns have been established such as decentralized distribution of health services and task shifting to improve health services provision in community health centers in order to attain Sustainable Development goals (SDGs) (Awoonor-Williams, 2015).

Community health centers can be considered as bridge between communities and formal healthy systems as it enhances accessibility, acceptance, and relevance of

health services particularly in settings of low resources (Cresswell *et al.,* 2013). Workers in community health centers serves a wide range of tasks including counselling, referrals, disease assessment and treatment, patient home visits, data collection, and education provision (Frishkopf *et al.,* 2016). Through direct visit of households, health workers enhance services access to individuals who are difficult to reach such as extremely poor group and secluded women (Braun *et al.,* 2013).

In addition, community health canters minimise the cost of services provision by migrating high level physicians' tasks to less specialised workers hence enhance healthy systems productivity (Sonderman *et al.,* 2018). Various scholars claim intervention of community health centre plays crucial role in behaviour change of society, low mortality rate and morbidity, and reliability of health services to community (Braun *et al.,* 2013; Sonderman *et al.,* 2018). However, it is evidently these healthy centers do not acquire adequate investment particularly in quality trainings, supervision, supportive organization policies, program resources and mentorship (Holt *et al.,* 2015).

The use of technology in community health services is rapid increasing as they assist health workers perform basic tasks (Surka *et al.,* 2014). Research shows there are tens of thousands of health application developed ranging from 30,000 and 90,000 worldwide (Steinhubl *et al.,* 2013). For instance, United States launched a remarkable health system known as m-Health (mobile health), which was referred as the largest health technology in 2011 (Steinbul *et al.,* 2013). The system assisted its consumers to self-diagnose their acute systems as well as monitor, track, and communicate various biometric details such as level of glucose, blood pressure and oxygen saturation. The

use of technology in health services creates capability to enhance patient healthy as well as reducing official visit rate by patients (Spratt *et al.,* 2015).

Various studies around the world have articulated adoption of technologies in community health center is likely to be associated with perception of health workers. For example, in Malaysia, Zakaria and Yusof (2016) found adoption of technology increased workflows efficiency and time saving. They also revealed positive attitude among health workers during training and throughout the learning process. Similarly, Almeida *et al.,* (2017) stresses that, there are eight drivers that influence adoption of technology in health care which include, innovativeness, felt needs, level of the patient demand, internal ICT resources, organizational leadership, and norms of the social systems.

On the other hand, Kim *et al.,* (2015) concluded that, higher adoption of health information technology particularly in rural areas is likely to be influenced by federal and state investments. Further, community health centres lacks were challenged by lack of continued support, inefficient capital for investment as well as poor infrastructure for their betterment. In the same manner, Phichitchaisopa and Naenna (2013) revealed positive relationship between behavioural intention among health workers and adoption of technology. Besides, effort expectancy, facilitating conditions, and performance expectancy had significant effect on acceptance of health care technology.

Tanzania like many other sub-Saharan countries is currently struggling to uplift community health centers as primary health care system in the country. Following the

SDGs, sub-Saharan Africa aimed to employ and train roughly 1 million community health workers (CHWs) by 2015 (Singh and Sachs, 2013). However, the process may be costly as it is estimated US$6.56 per Community Health Worker (CHW) thus there is concern to deploy a system, which can facilitate an extensive community needs without incurring substantial expenses.

The problem of a weak health information technology (HIS) is widely recognized in Tanzania and the country has made several efforts to improve CHW services through adoption of the HIS and Health Management Information System (HMIS). According to the Royal Tropic Institute (2012), there is a wealth of M-health programs that test their achievement and sustainability. Although in Tanzania there are many m-health programs, four programs in particular can support a large number of people: "Phones for health," "SMS for life," e-IMCI and the project Mwana. "Phones for health" and "SMS for life" are both backed by public partnerships with private entities, while e-IMCI and Project Mwana are endorsed by non-profit and research organisations.

### 1.3 Statement of the Problem

Effective health information technology adoption in community health centres plays crucial role in improving performance and quality of treatments (Phichitchaisopa and Naenna, 2012). Various studies attest that, if community health centers do not adopt health information technology in their services provision as an extra support, they will definitely loose effectiveness and credibility among patients (Calman *et al.,* 2007; Lue *et al.,* 2005; Phichitchaisopa and Naenna, 2012).

Tanzania is currently termed as one of the countries experiencing global health workforce crisis whereas for every 10,000 people, only 0.3% are doctors, 4.4%

midwives and nurses (WHO, 2014). This implies that, when a health worker is urgently needed such as during a complicated labour or when a child has high fever, there is high possibility of finding none. According to WHO (2015), less than 46.7% of all births in the country are solely attended by skilled health worker which on the other hand contributes to high child mortality rate as among 10,000 live births 48.7% of children die before their fifth birthday.

In addition to shortage of health workers there are also several factors, which are deemed to influence unreliability of health services including long distances between health centres, inadequate transportation availability, insufficient medical supplies distribution and lack of fund. Besides, there are evidences of poor adoption and implementation of health information technology particularly in community health centres (URT, 2013).

Several efforts have been made to improve service provision in health sectors using health technology. Among the efforts done include development of Tanzania National eHealth Strategy (2012-2018), electronic logistic management information system (eLMIS) and mobile-health (M-health) These systems have proven to be useful in improving healthcare delivery through coordinating government healthcare interventions therefore foster healthcare quality in referral hospitals (Kajirunga and Kalegele, 2015). Despite these efforts that have been made to uplift health sector still their services are unsatisfactory and use of technology in provision of services is questionable particularly in community health centres. This is due to the fact that, most of the efforts were subjected at national level health services without creating

significant attention at local level healthcare such as community health centres (Kajirunga and Kalegele, 2015). Besides, few studies have been carried out to scrutinise perception of health workers towards adoption of the technology. Based on the forwarded arguments, this study intends to assess perception of CHW towards adoption of the technology in health services.

## 1.4 Objectives of the Study

### 1.4.1 General Objective of the Study

The main objective of this study is to determine perception of health workers towards adoption of health information technology in community health centres.

### 1.4.2 Specific Objectives of the Study

(i) To identify factors influencing adoption and use of health information technology of health workers.

(ii) To assess challenges facing CHW towards adoption of health information technology.

(iii) To examine perceptions of health workers towards adoption of health information technology in community health centres.

## 1.5 Research Questions

(i) What are the factors influencing health workers towards adoption and use of technology?

(ii) What are the challenges facing CHWs towards adoption of technology?

(iii) How perceptions of CHWs influence adoption of technology?

## 1.6 Significance of the Study

Significance of this study is subjected across various stakeholders that are affected by the impact of technology adoption in community health centres. Thus, the study adds value to perception of CHWs towards adoption of technology. CHWs will be aware of the usefulness and use of technology in provision of health services. Findings of this study are important to the Government as they provide reflective insights on perception of CHWs. Therefore, government can be able to take appropriate measures as far as health technology is concerned. On the other hand, present study helps researchers uncover detailed findings on critical areas of adoption of technologies in community health centres, and also act as a guide for future reference in the future studies.

## 1.7 Delimitations of the Study

Delimitations of this study can be traced through methodology, and sample size. This study adopts mixed research methods which comprise qualitative and quantitative techniques. Therefore, analysis of the findings provided extrinsic and intrinsic evidence factors for examining the relationship between the study key variables. Furthermore, sample size of this study comprised community health workers from Nyamagana community health centers whose sample size number was achievable and the geographical area was accessible.

## 1.8 Organisation of the Study

Chapter one describes an introductory section, including the background to the study, the problem statement, study objectives, research questions, and scope. Chapter two covers the literary review, concepts and critical theory review, empirical analyses of

appropriate studies, the identification of study gaps, conceptual frameworks, theoretical framework and overview. Chapter 3 covers study design and methodology (study methodology): Overview, study approaches, study population, research or survey areas, design and processes of sampling, variables and measuring processes, data collection techniques and data processing and analysis. Chapter four presents results and discussions. Chapter five presents summary, conclusions, recommendations and recommendations for further research.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Introduction

Chapter two focus on the review of literature with bearing to the title of the study. This chapter presents theoretical and empirical literatures relevant to adoption of technologies in community health centres. It further includes conceptual definitions of key terms, research gap and conceptual framework.

## 2.2 Definition of Concepts

### 2.2.1 Community Health Workers

Community Health Workers is abbreviated as CHW. Community Health Workers are trusted, knowledgeable frontline health personnel who typically come from the communities they serve (Kok *et al.,* 2017). Community Health Workers are community members selected from their communities or organisations to provide their communities with fundamental and medical services capable of offering these communities with preventive, promotional and rehabilitation care (Duffy *et al.,* 2019). However, CHW is a leading health care worker who is a reliable member of the communities served and/or has an unusual understanding of them (WHO Report, 2016).

### 2.2.3 Technology

Technology is the application of scientific knowledge to the practical aims of human life or, as it is sometimes phrased, to the change and manipulation of the human environment (Spratt *et al.,* 2015). According to Stewart (2016), technology is the set

of techniques, abilities, methods and procedures used for the manufacturing or fulfilment of products or services, such as scientific investigation. Turkle (2017) defined technology as the purposeful implementation of knowledge in the design, manufacture, use and organisation of products and services.

### 2.2.4 Health Technology

Health technology is the application of organized knowledge and skills in the form of devices, medicines, vaccines, procedures and systems developed to solve a health problem and improve quality of lives (WHO Report, 2016). Shuren and Califf (2016) pointed out that, health technology is a technology developed to improve the productivity of hospitals, clinics and health services and to improve the access and quality of healthcare. Health technology can also be referred to a generic concept for any procedure to support health and deter, diagnose or treat rehabilitation or long-term care diseases. The word includes medicines, equipment, clinical treatment and healthcare (Levine *et al*., 2016).

## 2.3 Theoretical Literature Review

### 2.3.1 Technology Acceptance Model (TAM)

Technology acceptance model was primarily proposed by Davis (1989) basing on the Theory of Reasoned Action (TRA) which was developed by Ajzen and Fishbein (1980). TRA states that, individual behaviour is driven by attitude and intention or social norm towards that particular behaviour. Furthermore, the theory stresses intention is predicted by individual attitude and can be shaped by his/her behaviour.

According to TAM, degree of technology acceptance of an individual is determined by Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) (Davis, 1989).

Davis (1989) defined PEOU as the extent to which an individual believes technology would set him/her free from using energy while PU is the extent to which individual believes technological means would improve performance of a job. TAM stresses that, PEOU determines PU as user find technology "useful" when it is "ease to use". The theory provides causal relationship of the two core variables (PEOU and PU) and three other variables including attitude, actual use, and behavioural intention as depicted on Figure 2.1. Both PEOU and PU are deemed to determine user attitude towards using technology as user develop positive attitude when he/she finds technology is ease to use and useful.

Davis (1989) on the other hand, defines BI as the extent to which individual has constructed ideas or set his/her mind ready on carrying out or not to carry out specific behaviour. According to TAM, BI is determined by PU and attitude as user develop positive intention when he/she finds technology useful. Likewise, user develop intention to use specific technology when acquire positive attitude. Therefore, technology actual use is shaped by behavioural intention of a user.

Several studies found TAM useful and predictive to explain perceptions of user and technology acceptance including Alharbi *et al.* (2014); Revythi and Tselios (2017); Ghavifekr and Rosdy (2015) and Fathema *et al.* (2015). Contrary, the theory was criticised to be limited in studying educational application in the past as it was designed for studying technology acceptance in health science studies (Fathema *et al.,* 2015). However, recently TAM has become one of the most useful theory on studying e-learning processes and modern technologies acceptance in social sciences (Park, 2008). Present study adopted TAM to explain the extent to which CHWs perceive

modern technologies influences ease of use and usefulness of technology in community health centres.

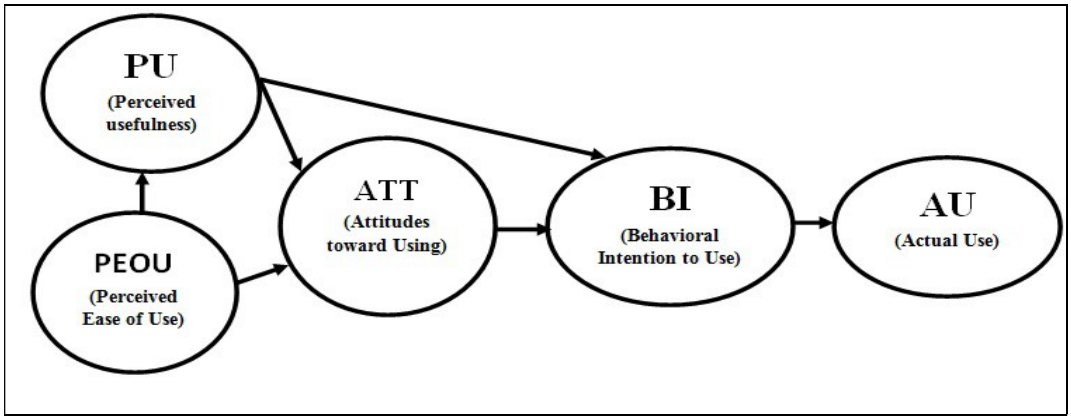


**Figure 2.1: Technology Acceptance Model**

Source: Davis (1989)

### 2.3.2 Diffusion of Innovation Model (DIM)

This model was developed by Katz *et al*. (1963) providing the understanding on the process of technical and social changes with regards to information technology (IT). The theory stresses that, most of the businesses involving IT happens to prove failure. According to Robertson *et al*. (2011), failure of the business is likely to be linked with ineffective implementation rather than innovation failure. Technology diffusion plays crucial role in diffusing innovation, several agencies of technology diffusion can be associated with this scenario including complexity, triability, relative, observability, compatibility, and relative advantage (Rogers, 1995). Diffusion can be defined as an acceptability of process or ideas by organisations or individuals influenced by communication mechanism merged with set of values and social entity over specific period of time (Katz *et al*., 1963). Modelling of innovation diffusion have proven substantial growth in the past several decades (Skiadas and Skiadas, 2011). This

model assumes that, innovation uses specific channels to reach intended technology adopters with regards to period of time.

### 2.3.3 Unified Theory of Acceptance of Technology Model (UTAUT)

This model was proposed by Venkatesh (2003) based on the examinations of eight technology acceptance models. The integrated models included Theory of Reasoned Action (TRA), Technology Acceptance Model (TAM), Theory of Planned Behaviour (TPB), Combination of TAM and TPB, Personal Computer (PC) Utilisation, Diffusion of Innovation (DIM), Motivational Models, and Social Cognitive Theory as depicted on Figure 2.2. It emerged as the model that unifies and integrates elements and characteristics of technologies acceptance models. UTAUT model conclude a 70% variance in technology usage intention. (Venkatesh *et al*., 2003).

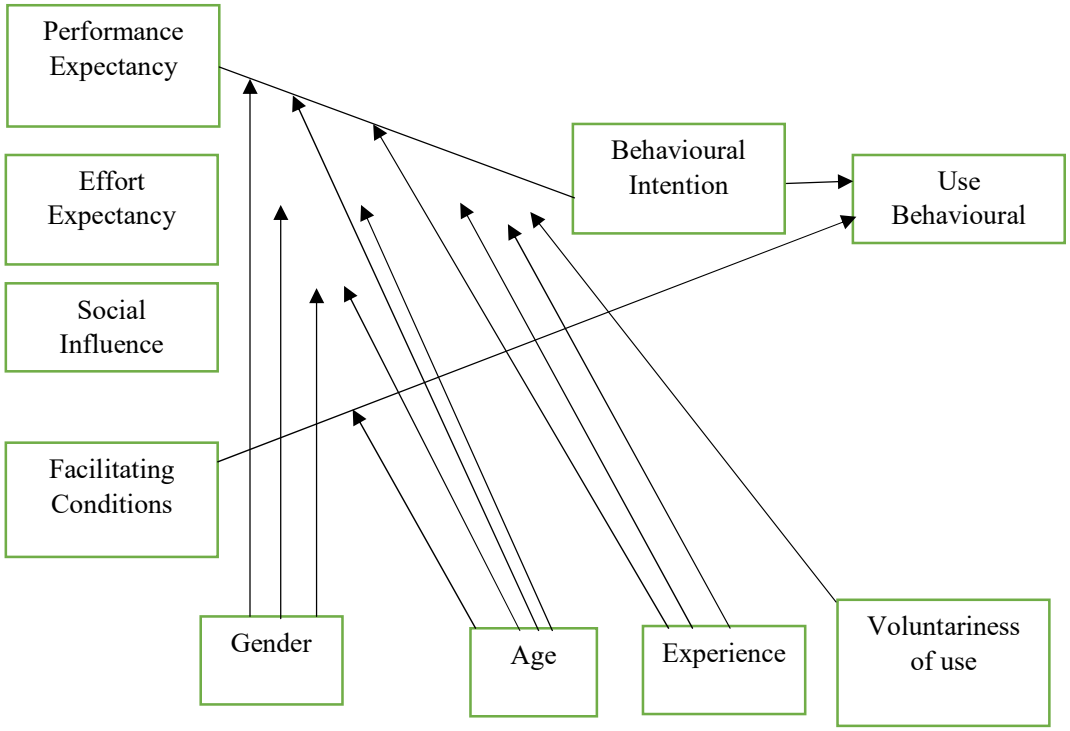


**Figure 2.2: UTAUT Model**

Source: (Venkatesh, 2003)

Three technology theories were adopted in the current study in order to capture broader range of facets imposed in the study specific objectives. For instance, TAM conceptualise how perception of CHWs influence adoption of technology. DIM guides the study on challenges facing CHWs towards use and adoption of technology in terms of complexity, triability, and observability. On the other hand, UTAUT wrap up all human aspects that influence adoption of technology such as social influence, personal characteristics, and expectancy. The theory therefore guides this study on establishing relationship between perceptions of health workers and adoption of health information technology.

## 2.4 Empirical Literature Review

### 2.4.1 Factors Influencing CHWs on the use of Health Information Technology

Scholars have articulated various factors that affect health workers towards effective use of health information technology. For instance, Lee (2015) assessed factors affecting health information usage in Californian hospitals, USA. His study employed secondary data for the past five years from 2000 to 2006. Analysis of finding using generalised linear model showed that, teaching hospitals, health IT expenditure of the neighbourhood hospitals, and competition has positive relationship with health IT usage. In addition, his study found significant clinical IT adoption after consecutive seven years of investment in heath IT. However, Lee (2015) did not examine the perception of health workers on the extent of affection caused by such factors. Another study was done by Kijsanayotin *et al.* (2009) to investigate factors influencing adoption of health IT in Thailand community health centres using UTAUT model. Their study employed observational research design with a random

sample size of 1607 selected from 9806 community health centres. Partial least square model results showed that, health IT adoption was affected by effort expectancy, voluntariness, social influence, and performance expectancy. Additionally, their result suggested that, health workers displayed higher degree of health IT use and acceptance.

Similarly, Nematollahi *et al*. (2017) investigated factors that affect the use and adoption of electronic medical records in Iran hospitals. Their study adopted cross-sectional design with a sample size of 235 employing UTAUT (Unified Theory of Acceptance and Use Theory) standard questionnaire. Results of their study revealed positive relationship between effort expectancy, behavioral intention, and use of EMR (electronic medical records). However, Nematollahi *et al.* (2017) did not assess level of usefulness of the technology among health workers in which the present study aims to investigate.

### 2.4.2 Perception among Health Workers on Adoption of Health Information Technology

Review of the peer studies shows adoption of technology in health sector has significant effect particularly on performance and development of the sector. In addition, perception and attitude of the CHWs towards technology also seem to directly link with level of acceptance of technology. For instance, Villalba-Mora (2015) investigated adoption level of health information technology among specialized primary care physicians in Spain. Descriptive statistics were used in analysis followed by principal component analysis. Result found three main application of technology including electronic health record, Prescription and patient

and telemedicine services. Further, frequency of technology use was directly connected to perceived usefulness of physicians.

Several researchers have assessed the impact of health IT adoption in individual health care settings, and a large number of studies in this area can be found in four systematic reviews covering the period 1995–2013 (Cresswell and Sheikh, 2013; Charles *et al*., 2013; Lee and Coughlin, 2015). Research in this area includes studies of interventions in U.S. and non-U.S. ambulatory and non-ambulatory settings with a wide range of characteristics (Kidd et al., 2016). The measurements used to evaluate the effect of the interventions cover many different dimensions of care such as quality of care, efficiency, satisfaction and patient safety.

Furthermore, research in this area has shown mixed results of the effectiveness of IT interventions. While some studies show positive results in health care outcomes (Furukawa *et al*., 2014), others show the opposite, even within highly computerized environments (Mennemeyer *et al*., 2016; Mackert *et al*., 2016). In a recent systematic review commissioned by the Office of the National Coordinator for Health IT (ONC), Henry *et al*. (2016) analysed studies published between 2010 and 2013 and concluded that in addition to mixed results, the current literature has not increased our understanding of the effect of health IT adoption or how it can contribute to improving health care outcomes. Possible contributing factors to these findings include insufficient measurement and reporting of information regarding the implementation and context of health IT use, such as settings, implementation approach, and IT intervention details, as well as the use of non-standardized protocols and simple measurement approaches. Henry *et al*. (2016) analyzed and classified the

results from the studies according to outcomes (positive or negative), health IT infrastructure (commercial vs. homegrown), and meaningful use functionality used.

They did not analyse or categorize the individual outcome measures used to evaluate the effect of IT interventions in health care, nor did they report the characteristics of settings and IT interventions tested. Using the same studies reviewed by Henry *et al*. (2016) present study analyse and categorize the different variables used to evaluate the effectiveness of technology adoption in community health centres.

## 2.5 Research Gap

Majority of scholars (i.e Kijsanayotin *et al.*, 2009; Lee, 2015; Nematollahi *et al*., 2017) reviewed in the literature describe the aspect of technology adoption in promoting health service delivery and health professional's efficiency. However, the facet of CHWs on adoption of technology have received little attention particularly in sub-Saharan countries. In addition, very few literatures (Mennemeyer *et al*., 2016; Mackert *et al*., 2016; Henry *et al*., 2016) have discussed the perception of CHWs towards health information technology. Present study therefore aims at filling this gap by examining how perception of CHWs on adoption of health technology can improve community health centres.

## 2.6 Conceptual Framework

Conceptual framework of this study is informed from theoretical approach of Technology Acceptance Model (TAM), Diffusion of Innovation Model (DIM), and Unified Theory of Acceptance of Technology Model (UTAUT) as depicted on Figure 2.3 Factors that influence use of technology by CHWs were treated as independent

variable involving variable such as training, technical sophistication, and attitude. On the other hand, adoption of technology was treated as dependent variable including item such as usefulness and ease of use. Challenges facing CHWs towards adoption of technology were depicted as intervening variables indicating that, they affect the link between factors influencing and adoption of technology. The relationship between dependent and independent variables was measured using multiple regressions.

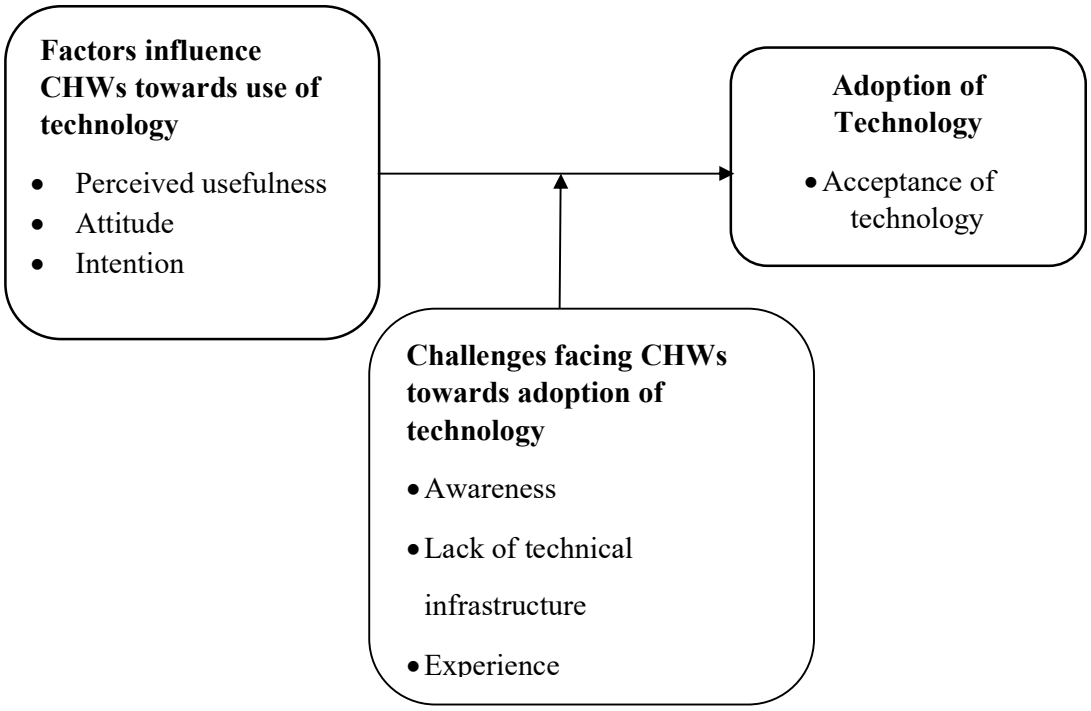


**Figure 2.3: Conceptual Framework Showing Relationship of Study Variables**

**Source:** Researcher, 2019

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 Introduction

This chapter presents research methodologies and approaches adopted in this study. It comprises study area, research design, survey population, sampling techniques, data collection methods and data analysis. It further presents validity and reliability of the research instruments and ethical issues.

## 3.2 Study Area

This study was conducted in Nyamagana District located in Mwanza Region. The Nyamagana District is one of the seven districts in Mwanza Region. The district is bordered by Ilemela District to the north, Magu District to the east, Misungwi District to the south and Lake Victoria to the west. By 2012, Nyamagana had a population of 363,452. A total of 299 dispensaries are listed as reflecting the present state of medical facility status, of which the government owns 228; nine are private of the 37 health centres. The government owns 6 of the 14 hospitals (Mwanza Investment Guide, 2016). The district was selected because it comprises a large number of community health centres compared to the rest of Mwanza Districts such that Nyamagana (85), Ilemela (60), Magu (45), Misungwi (38), Sengerema (32), Ukerewe (32), Kwimba (25) and Buchosa (14). In addition, the current status of CHWs performances was unknown, there is no recent study showing service delivery of CHWs in the district. Therefore, results that obtained from the sample size were useful in generalising conclusion and respective implications.

### 3.3 Research Design

Kothari (2004) defines research design as group of tasks that have been categorised in logical order essential for data collection, analysis, and measurement. Research design identifies suitable approach to be employed in analysis and collection of data. Selltiz and Cook (1962), stresses that research design comprises conditions to guide a researcher in data collection and analysis in a way that ascertain relevance of research. This study adopts cross-sectional research design, which is based on number of contacts as claimed by Kumar (2014).

Cross-sectional design is a type of observational research analysing demographic information or a representative subset at a particular moment. Cross-sectional design is notably useful when conducting a research aiming to investigate ubiquity situation, phenomenon, problem, or attitude, it is carried out by cross-section of study population. Researcher adopts this design because it allows a researcher to decide what should be investigated, identify population of the study, sample size selection, as well as contacting the study participants for data collection.

### 3.4 Population of the Study

Population of the study comprises a total of 250 CHWs from 85 community health centres located in Nyamagana district. In particular, the study targets public community health centres which totals 40 with 150 CHWs located in 10 wards namely, Igogo, Mabatini, Isamilo, Nyakabungo, Mbugani, Mahina, Buhongwa, Nyegezi, Mkolani, and Igoma.

### 3.5 Sample Size

Mason (2000) defines sample size as a collection of individual samples or observations, such as a scientific experiment or a public opinion survey, in any statistical environment. Sample size of the study was obtained by using Slovin (1967) formula. This formula estimates the proportion of sample to be studied from the total population of the study. The calculated sample size was 120 community health workers as shown below.

$$n = \frac{N}{1 + N(e)^2}$$

Where,

n = minimum sample size

N =Population size (150)

e = Standard error (0.05)

n = **120** Community Health Workers

### 3.6 Sampling Procedures

#### 3.6.1 Purposive Sampling

Purposive sampling is a form of non-probability sampling in which decisions concerning the individuals to be included in the sample are taken by the researcher, based upon various criteria. Purposive sampling starts with a purpose in mind and the sample is thus selected to include people of interest and exclude those who do not suit the purpose (Cohen *et a*l., 2000). The researcher employed purposive sampling on the fact that, the respondents had appropriate characteristics such as having information, insight, experiences and understanding concerning on perception of CHWs on

adoption modern technologies. Therefore, purposive sampling was used to select medical officials including doctors, nurses, clinical officers and CHWs supervisors who had insight concerning health information technology.

### 3.6.2 Simple Random Sampling

To acquire study participants, a researcher used a simple random sampling method. This is a sample probability that all respondents in the population have equal opportunities to be chosen for a sample (Adam and Kamuzora, 2008). This technique was employed to select CHWs during survey. Microsoft excel was used to generate random participation code and distributed to the study population. Individual who selected the participation code were asked to join in the survey.

## 3.7 Data Collection Methods

### 3.7.1 Questionnaires

Questionnaire is referred as the data collection instrument that entails questions form used for enquiring research respondents' information (Olsen, 2004)**.** It encompasses distinctive type of conversation. According to Kothari (2004), questionnaire is a data collection tool with numerous advantages including, low cost even when geographical area is widely spread, bias-free since it is based on respondents' own words, sufficient time for respondents' answers, and convenient tool in approaching difficulty respondents. Questionnaire was adopted as the data collection tool in this specific study. The tool was distributed and administered to participants using collective administration. However, before administering questionnaires pilot study was carried out so as to measure reliability of the instrument. Kothari (2004) recommends pilot survey to be carried out for testing reliability of the questionnaires as it is imitation

and preparation of the main survey. CHWs who were selected using purposive sampling were the respondents in questionnaire administration.

### 3.7.2 Interview

Interview is a process of communication or interaction in which the subject or interviewee gives the needed information verbally in a face-to-face situation. Kothari (2004) defined interview as the method of collecting data that involves presentation of oral verbal stimuli and reply in terms of oral verb responses. This method was used through personal interview. Thus, interview was conducted to 12 community health workers who were selected from 12 community health centres. The number of interviewees chosen is based upon the ratio 1:10 of sample size which is 120 as each centre provided 10 respondents.

## 3.8 Data Analysis, Interpretation and Presentation

Data were cleaned, prepared and analysed using Statistical Package for Social Science (SPSS) 23rd Version and Microsoft Excel 2016. Quantitative techniques were employed in data analysis including inferential and descriptive statistics based on specific objectives. The first objective which aims at identifying factors influencing CHWs on the use of technologies was measured using descriptive statistics including frequency, and percentage. The second objective which aims at examining challenges facing CHWs in community health centres was measured using frequency and percentage. The third objective on the other hand was measured using linear regression to determine relationship between perception of CHWs and adoption of the modern technology in community health centres. Results were presented in figures and tables.

### 3.9 Validity and Reliability of the Research Instruments

#### 3.9.1 Reliability of the Research Instruments

Reliability refers to the ability of an instrument to produce consistent results (Creswell *et al*., 2003). The instrument is considered reliable if it produces the same or consistent results whenever it is repeated (Best and Khan, 2006). Also, reliability looks at the levels at which there are correlations between information given by the same people but with differences in time. To ensure reliability, SPSS software was used to determine Cronbach's Alpha Coefficient, where value greater than 0.7 indicates significantly high reliability of the data instrument. Cronbach's Alpha is a reliability coefficient that measures well how the items in a dataset are positively correlated to one another (Sekeral, 2003). The findings of the test in Table 3.1 showed that, the data instruments were statistically accurate by more than 70% of the Cronbach coefficient in all variables.

**Table 3.1: Cronbach's Alpha Coefficient Showing Reliability Analysis**

| Variable | Sample size | Cronbach's Alpha | Number of items |
|---|---|---|---|
| Factors influencing adoption and use of HIT | 120 | 0.921 | 14 |
| Challenges facing CHWs | 120 | 0.891 | 11 |
| Level of HIT adoption | 120 | 0.882 | 5 |

#### 3.9.2 Validity of the Research Instruments

Validity refers to the technique of testing how truthfully the research instrument can measure intended data and how openly research results are (Joppe, 2000). In other words, validity can be defined as the extent to which research tool is valid. However, an instrument can be reliable without being valid (Kimberlin and Winetrstein, 2008).

In this study, validity was ensured through pilot study by test-re-test method in which 20 questionnaires were administered to CHWs. The same procedure was repeated to the same respondents after one week. Researcher discovered that, responses were same in both first and second pilot survey indicating the tool was valid. Saunders et al. (2009) suggest that, a pre-test before final administration is suitable in terms of validity.

### 3.10 Ethical Considerations

Ethics can be described as standard of behaviour of people and their relationship (Blumberg, 2005). Research ethics requires a researcher to follow appropriate guidelines and rules for protecting participants' dignity as well as publishing relevant and ethical oriented information (Fouka and Mantzorou, 2011). In this study, appropriate values of ethical guidelines and rules were observed including, anonymity, confidentiality, privacy, and plagiarism. The considerations were followed by requesting introduction letter from the Open University of Tanzania. Respondents were assured of the right to privacy, anonymity and confidentiality. The real names of the participants were not used to observe anonymity. According to Mugenda (2003), anonymity refers to keeping secret and observing ethnic or cultural background of respondents. Also, the information collected were treated with confidentiality so as to maintain people's integrity.

# CHAPTER FOUR

# DATA PRESENTATION AND DISCUSSION OF THE FINDINGS

## 4.1 Introduction

This chapter provides analysis of the findings in regards to specific objectives. The study comprises three objectives which were to identify factors influencing adoption and use of health information technology; to assess challenges facing CHW towards adoption of health information technology and to examine the influence of perceptions of health workers towards adoption of health information technology in community health centres. The chapter begins with summary of the socio-demographic characteristics of the study participants.

## 4.2 Socio-Demographic Characteristics

Descriptive statistics were carried out to summarise demographic characteristics of the respondents. Five issues were covered under this part; age of the respondents, gender, educational level, marital status, and working experience of the respondents.

### 4.2.1 Gender of the Respondents

Table 4.1 presents gender of the respondent. It was found that, 57.5% of the respondents were males while 42.5% were females. This result implies that, majority of CHWs employed in CHC are males compared to females. This can be influenced by the nature of activities assigned to CHWs, which sometimes requires more personal energy such as walking long distances for delivery of services or carrying patients to the health care centres. These activities tend to favour more males than females.

**Table 4.1: Gender of the Respondents**

| Sex | Frequencies | Percentages |
|---|---|---|
| Male | 69 | 57.5 |
| Female | 51 | 42.5 |
| **Total** | **120** | **100** |

### 4.2.2 Age of the Respondents

Table 4.2 depicts age categories of the respondents. Age of the respondents was classified into four categories. About 55% of the respondents were aged between 20 and 30 years, 13.3% aged between 31 and 40 years, whereas 28.3% were above 40 years of age. Results indicated that, majority of CHWs were youth with an age from 20 to 30 years old. This was due to the fact that, majority of youth prefer this type of work compared to the old aged individuals as the most of activities requires use of personal energy.

**Table 4.2: Age of the Respondents**

| Age | Frequencies | Percentages |
|---|---|---|
| 20 - 30 | 66 | 55.0 |
| 31 – 40 | 16 | 13.3 |
| Above 40 | 34 | 28.3 |
| **Total** | **120** | **100** |

### 4.2.3 Education Level of the Respondents

Majority of the respondents (50%) had secondary education. About 30% had primary education holders while 20% had college education as shown on Table 4.3. Based on the status of education, it shows that most of the respondents had acquired at least basic education, which ensured his/her participation in the study.

**Table 4.3: Level of Education of the Respondents**

| Education level | Percentages | Frequencies |
|---|---|---|
| College | 24 | 20.0 |
| Secondary education | 60 | 50.0 |
| Primary education | 36 | 30.0 |
| **Total** | **120** | **100** |

### 4.2.4 Marital Status of the Respondents

In terms of marital status, most of the respondents (55.8%) were single while 44.2% were married (Table 4.4). Majority of the respondents were single regarding their ages as most of them were aged between 20 and 30 years old.

**Table 4.4: Marital Status of the Respondents**

| Marital Status | Percentages | Frequencies |
|---|---|---|
| Single | 67 | 55.8 |
| Married | 53 | 44.2 |
| **Total** | **120** | **100** |

### 4.2.5 Working Experience of the Respondents

Working experience of the respondents was summarised in Table 4.5. Majority of the respondents had experience of between 6 and 10 years (52.5%), followed by 27.5% of the respondents with the age between 1 and 5 years of experience and 20% had over 10 years of working experience.

**Table 4.5: Working Experience of the Respondents**

| Working experience | Percentages | Frequencies |
|---|---|---|
| 1 year – 5 years | 33 | 27.5 |
| 6 years – 10 years | 63 | 52.5 |
| Over 10 years | 24 | 20.0 |
| **Total** | **120** | **100** |

## 4.3 Factors Influencing Adoption and use of Health Information Technology of Health Workers

Factors which influences adoption and use of HIT included Information Technology knowledge, attitude, Information Communication Technology (ICT) infrastructure, training, fund availability and experience (Table 4.6).

**Table 4.6: Factors Influencing Adoption and use of HIT**

| Factor influencing use of technology | Percentages | Frequencies |
|---|---|---|
| IT knowledge | 18 | 15.0 |
| CHWs attitude | 26 | 21.7 |
| ICT infrastructure | 15 | 12.5 |
| Training | 15 | 12.5 |
| Fund availability | 26 | 21.7 |
| IT experience | 20 | 16.7 |
| **Total** | **120** | **100** |

### 4.3.1 IT Knowledge

Information technology (IT) knowledge can be defined as the general knowledge concerning fundamental personal computer (PC) parts and basic PC functions as well as internet features.15% of the respondents suggested IT knowledge as one of the most factors which influence adoption and use of HIT. Respondents claimed that, acquiring of at least basic computer application knowledge provide a wide room for adoption and effective use of HIT.

Similar findings were supported by Student and Wangia-Anderson (2019) who also found that, IT knowledge played a crucial role in influencing adoption of technology in health care. Interview findings also support acquisition of IT knowledge as one of the most factors influencing adoption of HIT. One government official commented that;

> "*Many CHWs do not have sufficient knowledge and skills in ICT. Majority of them belong to the computer literacy class of beginners. Such rates have accused government hospitals of the adequate use of e-health equipment. Every CHW now needs to know the technology which promotes healthcare, because technology is the way to go now in the medical sector*."- (Doctor 1).

In addition, another respondent noted that;

> "*CHWs don't take the time to get familiar with and learn about the available health technology. Moreover, in the hospitals, there are no eHealth training sessions. The ICT levels remain low without these training courses*."- (Clinical officer 1)

**Figure 4.1: Medical Staff Helping a Community Health Worker to Understand how to use the Medical Application**

### 4.3.2 CHWs Attitude

CHWs stand for Community Health Workers. Attitude is the way a person judge and evaluate the ultimate objective of an act or behaviour in different dimensions. Based on the findings, 21.7% of the respondents suggested that, CHWs attitude towards use

of HIT influence its adoption. The extent to which an individual perceives the significance of using HIT determines the level of adoption as well as use of the technology. Same notion was underpinned in TRA theory as suggested by Ajzen and Fishbein (1980) that, individual behaviour is driven by attitude and intention or social norm towards that particular technology.

Results from the interview sessions also indicate that, attitude towards use of HIT determine the extent of CHWs adoption of the health technology. one respondent claimed that;

> "*CHWs have been trained to use short hand so if they were to use ICT facilities it takes away their time with the patient. They prefer conversion from voice to text*". -(Nurse 1).

Similarly, another respondent commented that;

> "*I consider the technology helpful in medical care because, in cases where the doctor is not needed, I offer medical advice to patients using my mobile device. I inform you that physicians always contact their patients with this strategy*."- (Nurse 2).

However, one respondent has negative attitude towards use of HIT, he stressed that:

> "*Personally, I think it is harder to use e-health systems than paper documents*."- (CHWs' supervisor).

### 4.3.3 ICT Infrastructure

ICT infrastructure is an essential preliminary requirement for the use of information communication services. 12.5% of the respondents indicated ICT infrastructure as an important aspect in adoption of HIT. Implementation of sophisticated ICT infrastructure encourages physical access to ICT facilities such as computer, printers, smartphones, and tablets in provision of health services. These results were consistent

with Kanyua (2015), which says that ICT infrastructure is a significant issue, preventing access to data, as most individuals are unable to access digital data because they lack the required infrastructure in health services. In regards to interview schedules, participants also had different views concerning role of ICT infrastructure on adoption of HIT. One respondent commented that;

> "*Without the necessary infrastructure, community health centres become unable to implement health information technology systems to improve the provision of health services.*" -(Doctor 2).

Also, another respondent stressed that;

> "*There is inadequacy of infrastructure that supports the use of e-health at the community health centre. Many innovations are needed for implementing electronic health services, including pcs, mobile devices and surveillance phones*."- (Nurse 3).

**Figure 4.2: Community Health Worker uses Old Tablet to Record Medical Information of Patients**

### 4.3.4 ICT Training

Training is usually referred to an organized work to convey data or guidelines that can enhance the output of the recipient or assist him or her to reach a necessary level of understanding or ability. 12.5% of respondents suggested training in ICT has an

influence on adoption and use of HIT. They posited that, training in ICT basic skills in community health centres can encourage CHWs to make their decisions and enhance operational efficiency, thereby enhancing the quality of medical care. These results conform to Patty *et al.* (2018) on the fact that, developed countries continue to implement HIT in order to reduce costs and enhance the quality of care. Some medical officials also supported the fact that, availability of ICT infrastructure influence adoption of HIT. For instance, one respondent noted that;

> "*Some community health centres such as this do not have an IT department that can provide support and training on understanding of ICT instruments*."- (Doctor 3).

Another respondent from another community health centre claimed that;

> "*The computer skills of our IT guy are limited; they hesitate to learn new emerging technologies*." -(Clinical officer 2).

Similarly, another respondent also commented that;

> "*Implementation of training on health technology is not simple because community healthcare centres are lowly supported. In turn, the cash required to acquire ICT resources for electronic health training is not sufficient*." – (Doctor 4)


**Figure 4.3: Community Health Worker Receiving Training through Internet Video on a Tablet Explaining how to Look After Kids**

### 4.3.5 Fund Availability

Influence of adequate fund availability in the community health centres was also assessed based on the participants' views. It was found that, 21.7% of the respondents suggested availability of fund influences adoption and use of HIT. It was claimed that, implementation of sufficient HIT services such as routine maintenance, ICT accessories, and repair requires reliable availability of fund. Therefore, absence of reliable fund may diminish quality of services which on the other hand discourage use of the technology.

In harmony with these findings, Callahan (2018) claims that, in all fields of account, the facilitated technology has proved very costly compared to traditional types of hospital services.

In regard to the interview session, one respondent commented that;

> "*Electronic health infrastructure implementation is expensive and requires enhanced funding in the health sector*."- (Doctor 5)

### 4.3.6 IT experience

IT experience is an expertise or knowledge in a specific information communication activity or job that one gathers in a specific period of time. 16.7% of the respondents suggested IT experience as an important aspect on adoption and use of HIT. The time spent by an individual in using ICT facilities determines level of skills and adoption on using that particular technological facility. TAM theory and Cabrita (2018) support these findings by postulating that, very often behaviours on technology use are subject to practices and experience, thereby enhance adoption of technology.

In the same vein, some respondent found that, experience on health information not only influence adoption and use of HIT but also encourage relationship with patients. For instance, one respondent stressed that;

> "*I think with the advent of technology, my relationship with patients has improved. Patients can seek medical advice using mobile phones, for example, Skype or WhatsApp*."- (Doctor 6).

## 4.4 Challenges Facing CHWs towards Adoption of Health Information Technology

The second objective of this study was to assess challenges facing CHW towards adoption of health information technology Challenges which were found to hinder CHWs towards adoption of HIT included, education level, lack of ICT skills, English language barrier, limited ICT resources, and lack of financial support (Table 4.7).

**Table 4.7: Challenges Facing CHWs Towards Adoption of HIT**

| Challenges facing CHWs | Percentages | Frequencies |
|---|---|---|
| Lack of ICT skills | 24 | 20.0 |
| English language barrier | 30 | 25.0 |
| Limited ICT resources | 20 | 16.7 |
| Low education level | 21 | 17.5 |
| Lack of financial support | 25 | 20.8 |
| **Total** | **120** | **100.0** |

### 4.4.1 Lack of ICT Skills

ICT skills are skills or abilities required for efficient use of the basic tasks of information and communication technology in order to obtain, evaluate, store, present and exchange data, and to interact through Internet as well as engaging in cooperative

networking. 20% of the respondents pointed out lack of ICT skills as the major challenges facing CHWs towards adoption of HIT. Respondents claimed that, CHWs lacks basic skills such as using smart phones applications, access and use of computer office applications, and operating printer. Orji and Moffatt (2018) also found that, lack of skilled human resources in health sector affected promotion and adoption of HIT in underdeveloped countries.

### 4.4.2 English Language Barrier

Most of the technological facilities particularly personal computers are installed with international languages instructions commonly English, thereby requires a user to have at least basic understanding of the language. Results shows that, 25% of the respondents mentioned English language barrier as one of the challenges hinders CHWs towards on adoption of the HIT. Most of the CHWs tend to fail using ICT tools due to low level of knowledge of the language. These findings were supported by Hamilton *et al.* (2018) who also identified language barrier as an obstacle towards use of digital health services in developing countries.

### 4.4.3 Limited ICT Resources

ICT resources include devices which store, process, send, transform, duplicate, or receive data electronically such as: apps for software and operating systems; data and apps on the Internet. Based on the findings, 16.7% of the respondents suggested that, limited ICT resources in community health centres affected their adoption and use of HIT. Community health centres are hindered by intensive scarcity of ICT resources such as computers and printers.

### 4.4.4 Low Education Level

Education level serves as an extra advantage on adoption of health information technology. A literate person can easily adopt and use of health ICT facilities compared to illiterate ones due to features existing in these devices as they require basic knowledge of language and technology aspects. 17.5% of the respondents suggested that, CHWs had low education level that hinders their effective use and adoption of HIT. Mackert *et al.* (2016) was in consistent with current findings as they also found that, new medical technologies are more likely to be adopted by more educated people.

### 4.4.5 Lack of Financial Support

Most of the ICT facilities are expensive. It is therefore requiring a certain amount of money in order to own one. 20.8% of respondents claimed that, CHWs are faced by lack of financial support that can enable them to possess ICT facilities for provision of health services such as smartphones, tablets, and personal computers.

## 4.5 Perceptions of CHWs Towards Adoption of Health Information Technology

Frequency and percentage were also calculated to establish how CHWs perception influences adoption of HIT. A total of four perceived factors including perceived usefulness of HIT, perceived ease of use of health technology, social influence, and facilitating conditions were established as indicated in the Table 4.8.

**Table 4.7: Factors Influencing Perceptions of CHWs Towards Adoption of HIT**

| Factor influencing perceptions | Percentages | Frequencies |
|---|---|---|
| Perceived usefulness of HIT | 33 | 27.5 |
| Ease use of health technology | 29 | 24.2 |
| Social influence | 27 | 22.5 |
| Facilitating conditions | 31 | 25.8 |
| **Total** | **120** | **100.0** |

### 4.5.1 Perceived usefulness of HIT

Perceived usefulness refers to what extent an individual think that system use improves effectiveness and achieves the required objectives. 25.7% of the respondents posited that, CHWs had perceived usefulness of HIT. CHWs perceived that, HIT was useful in saving time and storage of information.

### 4.5.2 Perceived ease of use of Health Technology

Perceived ease of use describes the degree to which the user believes that technology will make work easier. 24.2% of the respondents suggested that, adoption of HIT was influenced by perceived ease of use of CHWs.

### 4.5.3 Social Influence

Social influence is an extent a person considers it is important to apply the system from another's point of view. Based on the findings, 22.5% of the respondents suggested that, adoption of CHWs on HIT was influenced by social impact. Tavares and Oliveira (2016) align with findings on the fact that, in the choice to use electronic medical records, social effects have a significant function.

### 4.5.4 Facilitating Conditions

Facilitating conditions refers to the extent at which the technological and organizational infrastructure supports the use of the system. 25.8% of the respondents claimed that, CHWs perceived available facilitating conditions influenced their adoption of HIT.

## 4.6 Discussion of the Findings

### 4.6.1 Factors Influencing Adoption and use of Health Information Technology

Based on the analysis of the findings, six factors were identified to influence adoption and use of HIT. These six factors included IT knowledge, attitude, ICT infrastructure, training, fund availability, and experience. This gives an implication that, perception of CHWs has a significant role on their behaviour changes as suggested by Davis (1989) on TAM theory. For instance, results indicate that, majority of CHWs who evinced positive attitude and intention towards use of HIT tend to have access on technological facilities such as smart phones, tablets, and computers. Moreover, results imply that, IT knowledge factor influence performance and effective use of HIT as some of the CHWs claim that, the more they perceive HIT is helpful in their work, the more, their job efficiency increases. However, despite the influence of ICT infrastructure variable on adoption of HIT, some CHWs perceived the technology was cumbersome, rigid, and not flexible. This provides a different notion that, having an intention to use technology and reliable ICT resources is not enough but acquisition of necessary skills and knowledge.

These findings were reflected on Jia *et al.* (2019) on the conception that, factors the influence health workers on adoption of HIT basically falls under two categories;

individual and environmental factors. However, these factors are mostly constructed on perception indices such as attitude and intention towards a health information technology. In the same perspective, Mapesa (2016) also found that, in developing countries, a number of factors influence the adoption of HIT, from the lack of resources to a lack of skills. Health leaders in developing countries, however, often lack strategies to successfully implement HIT. Findings also concurs with Zayyad and Toycan (2018) suggesting that, the perception that, the perceived usefulness, conviction, readiness, and attitudes of healthcare professionals have an important influence on their intention to adopt and utilize e-health technology applications.

### 4.6.2 Challenges Facing CHW Towards Adoption of Health Information Technology

In regards to the findings, challenges facing CHWs towards adoption of HIT were split into five aspects, which include education level, lack of ICT skills, English language barrier, limited ICT resources, and lack of financial support. Results obtained provide several implications, first, considering the fact that, inadequacy of potential ICT skills among CHWs was the most dominant challenge, it implies that, majority of CHWs lacks basic technological skills such as computer application skills. In addition, limited ICT resources means that, CHWs do not have effective access to technological facilities as well as possession. Second, challenges based on awareness implies that, health facilities do not have appropriate training policies which supports effective implementation of ICT training in order to equip their staffs particularly CHWs with basic ICT knowledge and skills. Third, lack of financial support provides another implication that, health facilities give low priority an investment of ICT

infrastructure as majority of health facilities were found to lack comprehensive ICT infrastructure due to insignificant budget allocation and insufficient ICT resources such as computers, tablets, and smart phones.

Curran *et al.* (2019) concurs with present findings on the fact that, financing difficulties and infrastructural difficulties were found to be the key obstacles to implementation of HIT in developing nations. Health sector should therefore work on strategies to overcome these barriers. In the same vein, Al-Hadban et al. (2017) found that, challenges facing CHWs towards adoption of HIT are mostly likely to fall into four aspects; personal, organizational, technological, and environmental issues.

### 4.6.3 Perceptions of CHWs Towards Adoption of HIT

Findings revealed that, there is a powerful relationship between perceptions of CHWs and adoption of HIT. Perceived usefulness and perceived ease of use were found to attribute a significant effect on acceptance of HIT. These results imply that, perception of an individual has a direct link with behaviour on using health technology. Positive perception on HIT influence intention to use technology and encourage access to HIT.

Several studies were in harmony with these findings, for instance, Ryan et al. (2014) found that, perception of CHWs towards use of technology enhanced HIT adoption and expanded outreach of patients as well as access to care. Similarly, Zhao *et al.* (2018) revealed that, the perceived usefulness, perceived ease of use, perceived vulnerability and perceived severity all have important impact on the health worker attitude, and behavioural intent is considerably affected by the perceived usefulness,

perceived ease of use, a subjective norm, and behaviour. Dutta et al. (2018)'s results also endorsed the fact that, the intention of persons to use HIT was considerably affected by their perceived usefulness, ease of use and attitude towards HIT.

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Introduction

This chapter presents the summary, conclusion and recommendations.

## 5.2 Summary of the Findings

This study was set to examine the adoption of technology on improving community health centres services. The study was underpinned in three specific objectives; to identify factors influencing adoption and use of health information technology of health workers; to assess challenges facing CHW towards adoption of health information technology; and to examine the influence of perceptions of health workers towards adoption of health information technology in community health centres.

Socio demographic were summarised before the main analysed such that, 57.5% were males while 42.5% were females. Summary of the age shows that, 55% were aged between 20 and 30 years, 13.3% aged between 31 and 40 years, whereas 28.3% and 3.3% were above 40 and below 20 years of age respectively. Further, majority of the participants had secondary education (50.0%). Working experience of the respondents indicates 52.5% had experience between 6 and 10 years followed by respondents with between 1 and 5 years of experience (27.5%), and only 20% had over 10 years of working experience.

First objective revealed three categories of factors that influence adoption of HIT. Factors which were found to influence adoption and use of HIT included, IT

knowledge, attitude, ICT infrastructure, training, fund availability, and experience. 15% of the respondents suggested IT knowledge as one of the most factors that influence adoption and use of HIT, 21.7% of the respondents suggested that, CHWs attitude towards use of HIT influence its adoption. 12.5% of the respondents indicated ICT infrastructure as an important aspect in adoption of HIT. Implementation of sophisticated ICT infrastructure encourage physical access to ICT facilities such as computer, printers, smartphones, and tablets in provision of health services. 12.5% of respondents suggested training in ICT has an influence on adoption and use of HIT. 21.7% of the respondents suggested availability of fund influences adoption and use of HIT. 16.7% of the respondents suggested IT experience as an important aspect on adoption and use of HIT.

Challenges which hinder CHWs towards adoption of HIT included, education level, lack of ICT skills, English language barrier, limited ICT resources, and lack of financial support. 20% of the respondents pointed out lack of ICT skills as the major challenges facing CHWs towards adoption of HIT. Results also shows that, 25% of the respondents mentioned English language barrier as one of the challenges hinders CHWs towards on adoption of the HIT, 16.7% of the respondents suggested that, limited ICT resources in community health centres affected their adoption and use of HIT. 17.5% of the respondents suggested that, CHWs had low education level that hinders their effective use and adoption of HIT. 20.8% of respondents claimed that, CHWs are faced by lack of financial support that can enable them to possess ICT facilities for provision of health services such as smartphones, tablets, and personal computers.

Third objective analysis yielded that; A total of four perceived factors including perceived usefulness of HIT, perceived ease of use of health technology, social influence, and facilitating conditions were established; (25.7%) perceived usefulness of HIT, (24.2%) perceived ease of use of CHWs, (22.5%) social impact, and 25.8% of the respondents claimed that, CHWs perceived available facilitating conditions influenced their adoption of HIT.

## 5.3 Conclusions

This study aimed at assessing the adoption of technology on improving community health centres services. Based on the findings, adoption of health information technology was significantly influenced by perception of CHWs in terms of perceived usefulness and perceived ease of use. Perception of the CHWs linked directly with behavioural intention such as access and use of technology, which in turn influence acceptance of HIT. The study also attested the existence of significant factors, which influence adoption of HIT. These include IT knowledge, attitude, ICT infrastructure, training, fund availability, and experience. These factors greatly enhance an individual behaviour on effective use of HIT. For instance, positive attitude attribute to increase job efficiency and encourage adoption of HIT in various health activities as technology saves time, quicken carrying out of tasks, and simplify data storage.

Despite the contribution of perceived ease of use, perceived usefulness, and attitude on acceptance of HIT, there are several challenges tend to hinder effective adoption of HIT. Challenges were found to rely on several disciplines, which include education level, lack of ICT skills, English language barrier, limited ICT resources, and lack of

financial support. Most of the challenges constrained CHWs due to contemporary policy in health sector particularly community health centres which do not encourage ICT training. For instance, majority of CHWs were computer illiterate and lacks basic ICT skills due to absence of implementation ICT training programs. In a nutshell, the study provides a statistical proof that, positive perception of CHWs on HIT influence adoption of the technology. Besides, HIT plays an important role on improving efficiency of health services in community health centres. However, there are contemporary challenges which require an immediate action and amendments.

## 5.4 Recommendation of the Study

(i) This study recommends that, government and policymakers should develop a unique approach to safeguard an appropriate eHealth domestic plan as well as financing the application of HIT. National priorities should be the establishment of the legal framework for its implementation and long-term sustainability.

(ii) Second, government investment in fundamental HIT infrastructure and the enhancement of human resources must also be given priority, as well as the execution of appropriate domestic policies and rules must also play a vibrant part in implementing HIT.

(iii) In order to preserve CHW's relevance and efficiency, government and practitioners should implement a well-developed training programs concerning use of HIT.

(iv) The study recommends stakeholders and government to allocate sufficient budget in order to accommodate implementation of health information technology system as well as maintenance in community health centres.

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# APPENDICES

## Appendix I: Questionnaire for Community Health Workers

1. Gender:

☐ Female ☐ Male

2. Age:

☐ Below 18 ☐ 18-27 ☐ 28-37 ☐ 38-47

☐ 48-57 ☐ Above 57

3. Education Level

☐ Primary Education ☐ Ordinary Level ☐ Advance Level

☐ College Education ☐ Higher Education ☐ Not Educated

4. Experience

☐ Less a year ☐ 1 year - 3 years ☐ 3 years - 5 years

☐ Above 5 years

### I. Factors influencing adoption and use of health information technology of CHWs

Please indicate your opinion on each of the item with a tick "√" based on scale 1-5:

1=strongly disagree, 2=disagree, 3=neutral, 4 =agree, 5=strongly agree.

| Perceived | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| Using HIT system enables me to | | | | | |
| Using HIT system increases my | | | | | |
| Using HIT system enhances my | | | | | |
| Using HIT system makes it | | | | | |
| | | | | | |
| Attitude | 1 | 2 | 3 | 4 | 5 |
| Using HIT system gives me greater | | | | | |
| Using HIT system improves my | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Using HIT system saves me time to | | | | | |
| Using HIT system improves the | | | | | |
| | | | | | |
| Intention to | 1 | 2 | 3 | 4 | 5 |
| Using HIT system is | | | | | |
| The HIT is rigid and | | | | | |
| I find it cumbersome to use | | | | | |
| I find the HIT system | | | | | |
| I find the HIT | | | | | |

**Challenges facing CHWs on adoption of health technology**

Please indicate your opinion on each of the item with a tick "√" based on scale 1-5: 1=strongly disagree, 2=disagree, 3=neutral, 4 =agree, 5= strongly agree.

| CHWs | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| I have sufficient knowledge of | | | | | |
| I am aware of the potential benefits | | | | | |
| The hospital has IT experts to train staff in | | | | | |
| | | | | | |
| Awareness | 1 | 2 | 3 | 4 | 5 |
| The e-health system enhances information | | | | | |
| The e-health system enhances information | | | | | |
| The hospitals' policies and regulations do not affect the | | | | | |
| Overemphasis on protecting patients' privacy affects the | | | | | |
| | | | | | |
| Technical | 1 | 2 | 3 | 4 | 5 |
| There are available computers to support the | | | | | |
| The hospitals' IT budget is enough to | | | | | |
| The hospitals' existing infrastructure is enough to | | | | | |
| There is a system in place to maintain the | | | | | |
| | | | | | |

**Adoption of HIT**

Please indicate your opinion on each of the item with a tick "√" based on scale 1-5: 1=very low extent, 2=low extent, 3=average, 4 =high extent, 5= very high extent.

| **Variable** | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| How well has the organization achieved user adoption of HIT? | | | | | |
| | | | | | |

## APPENDIX II: INTERVIEW GUIDE FOR HEALTH OFFICIALS

1. Your name/position…….
2. For how long you have worked in that position?
3. What are your main activities?
4. How IT is here?
5. What factors influenced user acceptance of HIT?
6. What barriers did you encounter and how did you overcome them?
7. How well has the organization achieved user acceptance?
8. What, if any, were the concerns regarding adoption and perception of CHWs?
9. How has your organization benefited from HIT adoption?

## APPENDIX III: OBSERVATION GUIDE

Appendix III.A: Health officials use smartphones to retrieve medical information of inpatients and outpatients.


Appendix III.B: Doctor retrieve medical information of patient from a computer.

Appendix III.C: Community health worker use laptop to record patients' information in the community health centre