UTILIZATION OF THE HEALTH INFORMATION MANAGEMENT SYSTEM BY COMMUNITY HEALTH WORKERS IN THE AMREF FACILITY IN KIBERA, NAIROBI COUNTY, KENYA

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DECEMBER, 2014
DECLARATION
I confirm that this thesis is my original work and has not been presented for a degree in any other university or for any other award.

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DEDICATION

To my parents, Mr. Herman and Mrs. Elizabeth who have given me continued support throughout this process.
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DEFINITION OF OPERATIONALIZATION TERMS

HIMS- An integrated effort to collect, process, report and use health information and knowledge to influence policy making, programme action and research.

Computerized system-A component of the Health information management system.
# Abbreviations and Acronyms

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<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>AMREF</td>
<td>African Medical Research Foundation</td>
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<tr>
<td>APHIA</td>
<td>AIDS, Population and Health Integrated Assistance</td>
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<td>CBHMIS</td>
<td>Community based health management information system</td>
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<td>CHEW</td>
<td>Community Health Extension Worker</td>
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<td>CHW</td>
<td>Community Health Worker</td>
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<tr>
<td>CORP</td>
<td>Community Owned Resource Person</td>
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<tr>
<td>CU</td>
<td>Community Unit</td>
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<td>CHC</td>
<td>Community health committee</td>
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<tr>
<td>CHW</td>
<td>Community Health Worker</td>
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<tr>
<td>FGD</td>
<td>Focus Group Discussions</td>
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<td>GOK</td>
<td>Government of Kenya</td>
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<td>HMIS</td>
<td>Health management information system</td>
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<tr>
<td>HIV</td>
<td>Human Immuno Deficiency Virus.</td>
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<tr>
<td>KCO</td>
<td>Kenya country Office</td>
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<tr>
<td>MOH</td>
<td>Ministry of Health</td>
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<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
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<td>PHC</td>
<td>Primary Health Care</td>
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<tr>
<td>SPSS</td>
<td>Statistical Package for Social Sciences</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Health Information Management System is a system that entails collecting, processing, reporting and using health information and knowledge to influence decision making. AMREF facility provides services in urban informal settlements where Health Information Management System is used. The objective of the study was to determine factors that influence utilization of the HIMS in the AMREF-Kibera facility. It further sought to establish the current status of the HIMS in place in the Kibera facility, to determine the extent of use of the HIMS by the Community Health Workers in the Kibera facility. To establish factors that motivate utilization of the HIMS in the Kibera facility and to establish barriers to the utilization of the HIMS in the Kibera facility. Community health workers are tasked with the role of being change agents of health indicators in the community. A cross-sectional study design was employed. The study employed both the quantitative and qualitative data collection methodology. Data was collected using questionnaires, focused group discussion and key informant interviews. A sample size of 196 Community Health Workers was recruited using simple random sampling method. Quantitative data was analyzed using SPSS version 16 while qualitative data was transcribed, categorized into themes for easier interpretation and analysis. Chi square test showed a relationship between system quality, individual and institutional characteristics and utilization of the system by community health workers. The findings indicate that 27% have had access to the computers. The level of education, mentors that champion use of the system and organizations culture, motivate the utilization of the system. Age, community health worker engagement level, inaccessibility of the output information and lack of resources are barriers to the utilization of the system. The recommendations therefore include; Channel more resources to the facility to improve Community Health Workers participation i.e improve use of computers, offer more openings to the Community Health Workers who are not permanent in the facility to increase their involvement in the facility and to ensure they are retained in the facility and have periodic training and retraining in computer packages and the system for sustainability of the programme. The findings of the study will be very informative to the various health sector stakeholders and more so reinforce the good practices for better health care service delivery in the long run.
CHAPTER ONE: Introduction

1.1 Background of the study
The World Health Organization (WHO) defined the health information management system as an "integrated effort to collect, process, report and use health information and knowledge to influence policy making, programme action and research,(WHO,2011). Health information is much more than collecting figures. Data have no value in themselves; value and relevance come when they are analyzed, transformed into meaningful information and used. “The ultimate objective of a health information management system is to produce information for taking action in the health sector. Performance of such a system should therefore be measured not only on the basis of the quality of data produced, but on evidence on the continued use of these data for improving health systems operations and health status,”(WHO, 2003).

According to WHO, 2011 on analyzing disrupted health systems in countries in crisis training course, the investment in Health Information Management Systems (HIMS) now could reap multiple benefits, including: Helping decision makers to detect and control emerging and endemic health problems, monitor progress towards health goals, and promote equity. Empowering individuals and communities with timely and understandable health-related information, and drive improvements in quality of services is also among the benefits. Strengthening the evidence base for effective health policies, permitting evaluation of scale-up efforts, enabling innovation through research and improving governance, mobilizing new resources, and ensuring accountability in the way they are used all form the vital aspects of the HIMS (Lau F et al,2006).
Without reliable, relevant health information, health care managers and providers cannot make decisions to allocate resources effectively, improve the quality of health services, or address epidemics such as HIV/AIDS.

As health systems were re-structured, the demand for sound information and the skills to manage and use information are increasing significantly. Health Information Management Systems based on modern ICT technologies linking the various levels of the health system and addressing information needs cannot be ignored. In Kenya, the health information needs have changed over time due to health sector reforms and decentralization of health planning to districts (AMREF, 2005). Against this background, HIMS was reviewed and recommendations used to improve and automate the information system. A pilot HIMS was developed and automated for Ministry of Health in Kwale district, Coast Province. Lesson Learnt when developing an integrated HIMS, it is important to use a finite number of indicators to monitor and evaluate the health system's performance. Information collected and the information flow must be streamlined and simplified. While negotiation and selection of a smaller set of indicators can be difficult, it encourages managers at different levels of the health system to determine their critical needs. It requires them to ask how much information they can legitimately require from already overburdened front-line health providers to collect (Gething et al, 2009).

In recent years has the widespread acceptance and use of computer systems and Internet-derived technologies allowed HIM departments of all types and sizes to be physically
untethered from their organizations and exist virtually. From a technical perspective, an HIM department function can be performed remotely if:

- the department function is completely automated by an information system;
- there is no need to access any line-of-business, “physical” object within the HIM department, such as the paper medical record, the patient, or a medical device; and
- there are adequate, deployed networking technologies (including the Internet) for access purposes (Kohn, 2009).

A computerized HIMS comes with easy and timely accessibility to updated information provides regular statistics to support reports, and gives feedback, which improves reporting and data quality (Heeks, 2006) on Information systems and developing countries: failure, success, and local improvisations. Though that was not the case since very few facilities have been equipped with computers and have staff trained on their use.

Kenya is a signatory to the international declaration for achieving health for all by the year 2000 through a conference held at the Alma-Ata in the Soviet Union in 1977 which was later endorsed by the World Health Organization (WHO) in 1978. The efforts to achieve the goals of this declaration and that of the Bamako initiative of 1988 are yet to be realized (MOH, 2006). The community health strategy is one way of working towards providing health care for all by lowering the costs of health through strengthening primary health care and providing low cost interventions at the community levels through Community Health Workers.
The community-based approach, as set out in the Community Strategy, is the mechanism through which households and communities strengthen their role in health and health-related development by increasing their knowledge, skills and participation. The intention is to strengthen the capacity of communities to assess, analyse, plan, implement and manage health and health-related development initiatives so that they can contribute effectively to the country’s socio-economic development. The approach recognizes that all communities are already actively engaged in health activities for the survival of their households. Their actions for health could be strengthened through an increased knowledge and skills base as well as by better planning of their activities. In addition, the approach recognizes the pivotal role of the health system in supporting community efforts. It is through partnership between the system and the communities that improvement can be realized and sustained. According to the community strategy, community health workers are expected to be mature, responsible and respected members of the community, men or women chosen by the community to provide basic health care. They should be good communicators and leaders who have shown signs of healthy practices as a parent or caregiver in their own household. In many communities there are community-based resource persons such as community-based distributors (CBDs), TB ambassadors and others. All these resource persons at the community level should be incorporated into the strategy as community health workers (MOH, 2007).

As WHO defined them Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the
communities for their activities, should be supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers.

Community Health Workers have a vital role to play, not only in raising awareness of key health issues in the community, but also in providing basic health care in the community, especially in areas where health facilities are few and far between. In this project, they are able to follow clinician’s instructions and provide essential home-based care which reduces the number of individuals defaulting from treatment.

Kibera is located in southwest in Nairobi county, roughly 5 kilometers from the city centre. Much of its southern border is bounded by the Nairobi river and the Nairobi Dam, an artificial lake that provides drinking water to the residents of the city.

Kibera is divided into 13 villages, including Kianda, Soweto, Gatwekera, Kisumu Ndogo, Lindi, Laini Saba, Siranga/Undugu, Makina, Mashimoni, Olympic Ayany and Raila village.

The 2009 Kenya Population and Housing Census reported Kibera's population as 200,000.

AMREF is located in laini saba one of the community units. Working at the community level are the CHWs who are the change agents in these areas.

Kibera was chosen because it was one of the sites where AMREF has the HIMS in place for utilization by the CHWs.

This study intended to look at challenges of using the computers in the facility, inadequate generation and use of data at the facility level and answer how system, individual and institutional factors influence the use of HIMS by CHW in the AMREF facility in kibera. CHWs are important change agents at the community level in their community
units as they are used to pass important health messages to the community members. Investing in the development of effective health information systems would have multiple benefits and would enable decision-makers at all levels to:

Detect and control emerging and endemic health problems; monitor progress towards health goals; and promote equity.

- Empower individuals and communities with timely and understandable health-related information; and drive improvements in quality of services.

- Strengthen the evidence base for effective health policies; permit evaluation of scale-up efforts; and enable innovation through research.

- Improve governance; mobilize new resources; and ensure accountability in their use.
1.2 Problem statement

Utilization of data from the HIMS in improving interventions has not been documented in relation to the community health workers.

This study looked at how well the health information management system was functioning and how system, individual and institutional factors influence the utilization of the health information management system by community health workers.

It had been realized that there was inadequate participation of grass-root organs in: generation and use of information at community and rural health facilities. An ineffective referral system was also significantly contributing to loss of life arising from obstetric emergencies as well as preventable childhood illnesses. The project attempted to address these challenges using information as its main strategy to create awareness with a community health worker approach to increase the number of change agents (WHO, 2011).

The goal of the project was to improve the capacity of the community to prevent diseases and promote health.

There was inadequate data from the facility on the utilization of the health information system by the Community Health Workers in benefiting health care service delivery and the factors influencing this.
1.3 Justification
An effective health information system should provide information in the right form, at the right place and at the right time. Such information was necessary for putting in place appropriate health plans and making the right management decisions.

Where resources are scarce, it’s more important that evidence informs decisions for wise use of limited resources (Kaen, 2006). Unfortunately it is rare hence inefficient and ineffective use of resources.

This study will inform the relevant stakeholders of the benefits of having the system in place and having community health worker knowledgeable on using the system to improve health in the area since they are important change agents at the household level. Also an indepth look on the factors that influence the utilization of the system will shed light on what needs to be reinforced. Having quality information is key in improving interventions and eventually health indicators.

This study will provide evidence based information to improve interventions and have cost effective interventions relevant to the need of the area.

Outcome of the study will inform health care service providers on information utilization in low income areas.

Research will strengthen data utilization for better evidence based interventions by community health worker. The study will in addition improve data utilization in the district through understanding of unique strengths and weaknesses of the system and providing innovative solutions for improvement of the system.
1.4 Objectives

1.4.1 Broad Objective
To determine factors influencing utilization of the HIMS in the AMREF-Kibera facility.

1.4.2 Specific Objectives
1. To establish the current status of the HIMS in place in the Kibera facility.
2. To determine the extent of use of the HIMS by the CHWs in the Kibera facility.
3. To establish factors that motivate utilization of the HIMS in the Kibera facility.
4. To establish barriers to utilization of the HIMS in the Kibera facility.

1.5 Research Questions
The research questions for this study were:

1. What is the current status of the HIMS in the Kibera facility?
2. What is the extent of use of the HIMS by the CHWs in the Kibera facility?
3. What factors motivate the utilization of the HIMS in the Kibera facility?
4. What are the barriers to the utilization of the HIMS in the Kibera facility?

1.6 Null Hypothesis
There is no influence of system quality, individual and institutional factors on utilization of the HIMS among CHWs in the AMREF-Kibera facility.
CHAPTER TWO: Literature review

2.0 Introduction
The World Health Organization (WHO) defined the health information management system as an "integrated effort to collect, process, report and use health information and knowledge to influence policy making, programme action and research" (WHO, 2011).

Health information management (HIM) is the practice of maintenance and care of health records by traditional (paper-based) and electronic means in hospitals, physician's office clinics, health departments, health insurance companies, and other facilities that provide health care or maintenance of health records. With the widespread computerization of health records and other information sources, including hospital administration functions and health human resources information, health informatics and health information technology are being increasingly utilized in information management practices in the health care sector (Stansfield, 2005).

Proper collection, management and use of information within healthcare systems “will determine the system’s effectiveness in detecting health problems, defining priorities, identifying innovative solutions and allocating resources to improve health outcomes (Stansfield, 2005). For example, health information administrators have been described to "play a critical role in the delivery of healthcare in the United States through their focus on the collection, maintenance and use of quality data to support the information-intensive and information-reliant healthcare system" (La Tour et al., 2010).
As the field grows and information technology becomes a more crucial part of the medical world, health information management is experiencing a transition from traditional managing practices with paper to more efficient electronic management, such as with Electronic Health Records (EHRs).

For HMIS to function fully there is need to integrate data from different sources (Talisuna et al., 2000). Secondly, data should be analyzed and interpreted so that recommendations are made to improve the performance of health services. An important principle of the HIMS is that information must be transformed into actions at all levels. It therefore requires adequate capacity for collection, analysis, interpretation and use of the information that the system generates.

2.1 Global Perspective
In Pakistan, before the 1990s, several vertical programs with categorical disease-specific information systems resulted in fragmented data transmission, which made assessment of program effectiveness difficult for managers (MOH, 1991). In 1991-92, the Ministry of Health (MOH) undertook an assessment study of existing health information systems and, based on its recommendations, transformed the reporting systems into a comprehensive National Health Management Information System through a consultative process that continued through 1993 (Lippeveld et al., 1991). The national feedback reports on the new HMIS acknowledged a gradual improvement in scope and reporting regularity, but also noted the continued need for improvement in the quality and utilization of information at various levels (MOH, 1996). A study carried out in 2000 pointed out that the information generated through HMIS was irrelevant and the data did not help managers to make decisions (Moazzam et al., 2002).
Later, Pakistan's MoH, in view of provincial managers' growing concerns about the HMIS, organized a number of workshops and acknowledged the continued existence of vertical information systems and a culture of non-evidence-based decision-making, usually without use of relevant information (MOH, 2007). Under the devolution initiative, Pakistan's MoH has recommended strengthening of health information systems for informed decision-making in planning, management, monitoring and supervision of health services for improved service delivery in the districts (Multi-donor support unit, 2001). However, the attempts at strengthening information systems have generally proved unfruitful and sometimes counterproductive (WHO, 1994). Analyses of the failures often overlook the perceptions of stakeholders as an important factor (Heeks et al., 1999).

The importance of organizational factors such as organizational culture, development of staff skills, commitment, and initiative in managing informatics implementation. They pointed out that the national culture can also have an important impact on the style of management and the nature of an organization (Lorenzi et al. 1997).

According to (Mitchell, 1997) the effectiveness of information technology in health care depends on the position of organization in health care institution and on the organization's own internal structure. He argued that the organization needs strong leadership with sufficient means and abilities to manage change in the organizational and work paradigm.

Information system failures occur for various reasons, including lack of psychological ownership, communication problems, cultural problems (such as hostile cultures within the information systems organization), underestimation of complexity (missed deadlines, cost overruns and lost credibility), failure to define and maintain success criteria, organizational
factors (such as lack of a clear vision of change, ineffective reporting structure, rapid staff turnover, low staff competency, lack of full support from higher management, confusion on roles and responsibilities, inadequate resources, failure to benchmark existing practices, inability to measure success etc.), technological factors (e.g. system too technology oriented), and training factors (e.g. inadequate or poor-quality training, poor timing of training, i.e., too early or too late) (Lorenzi et al.1997)

A study on the management and utilization of health management information system in busia district, Uganda in 2001 showed that there were also clear signs of under-utilization of databases that had been developed and many managers were not capable of or willing to analyze data for decision-making purposes. The main obstacle to implementation of the systems was lack of a functional centralized system for routine health data, and using individual patient tick-sheets for scanning. The result of the above was non-standardized data / information with the clinics reporting far less data items than is expected. Records assistant who were recruited on a permanent basis to manage the information system, did not have proper training in information management. They found out that there was need, as a matter of urgency, to determine the minimum data set, develop a realistic set of indicators and to train all district staff in information management and use.

There was a strong drive from the DDHS's to improve its own health information system. Although the District did not yet have large amounts of data in the computer the aim was to have sufficient data for simple analysis and interpretation to be used for decision making, research, budgeting and resource allocation.
The district has HMIS on the agenda and a number of new initiatives have been started. Busia district, which had no electricity had been influenced and speeded up the process of getting power so that the development of the computerized database is accomplished. With regard to the reporting systems based on processing of reports, it was found out that they had been set with problems due to scarcity of funds and equipment. A number of efforts during the past years to boost the health sector ended up as one-offs, and overall expenditure on HMIS being low.

When asked that in the past 3 months or one year, state exactly how the data from the HMIS had been used, it was discovered that majority of the Health Units were actually using the HMIS data though not to its full potential. Some of the respondents did not actually know they were taking some decision based on the outcome of the data until asked a question like, "How do you know the amount of drugs needed by the health unit?". The findings indicate weakness in timeliness, completeness and usage of HMIS, which is due to various constraints.

The general problems in the HMIS process at the Health Units levels included the general lack of stationery, inadequate and unskilled manpower, lack of transport, poor motivation and no proper storage facilities and that records are usually misplaced. Records are poorly kept in usually a box and hence most health units need a filing cabinet. There are no enough filing covers and hence compiling different items in one file is difficult given the limited resources. There was a shortage of counter books, and monthly summary report forms. No Health Unit had a room or a Resource Centre for the proper storage of records, which resulted into misplacement and loss of the records.
According to the in charge in Lumino, "most of the staff are not trained and don't have the skills to manage data at the health unit e.g. drawing graphs and interpreting them'. All the health units including the health sub-district lacked and did not have a computerized data management and storage system. They needed training in proper record management and data analysis. The manual analysis that they would not even do often was reported very tiresome. It was at only the DDHS's office where a computerized HMIS database was being developed.

Poor motivation of the staff was also a constraint to proper record management, which resulted into delays of information and omission of data hence inaccurate.

The staffs were no longer getting their lunch allowances. The situation was made worse with the scrapping of cost sharing during the presidential campaigns. Other problems to HMIS highlighted were poor coordination, lack of co-operation by fellow staff and absenteeism (WHO, 2011)

Much of the information recorded by health workers is not relevant to the tasks they perform. Data collected tends to focus on disease reporting and only partially addresses service functions at the health unit or patient/client level. Requirements for recording or reporting data are frequently drawn up without reference to the technical skills of the personnel concerned or to the diagnostic equipment in peripheral health facilities. Furthermore, health workers receive little or no training in methods of data collection. Duplication and waste exist in multiple parallel health information systems instead of addressing management functions comprehensively. There are the UNEPI and Family Planning forms all to be filled in at the health units' level. The result is that health workers
are often overwhelmed by having to prepare monthly overlapping reports. And a considerable amount of time is spent on the collection of redundant information because the data are not cross-referenced between different systems (WHO, 2011)

The process of transmitting, compiling, analyzing and presenting data is so protracted that they are often obsolete by the time a feedback report is prepared, and decisions are consequently made without any information input. In strong vertical programmes, the transmission of data does not follow hierarchical line of communication, with the results that reports often fail to reach line managers, particularly at the district level (WHO, 2011)

Although some good data are available, managers and care providers rely primarily on intuition when making ad hoc decisions rather than using pertinent information, especially at the district, health center and community levels. This makes it harder to decentralize decision-making and build capacity at the district (WHO, 2011)

The process of transmitting, compiling, analyzing and presenting data is so protracted that they are often obsolete by the time a feedback report is prepared, and decisions are consequently made without any information input. In strong vertical programmes, the transmission of data does not follow hierarchical line of communication, with the results that reports often fail to reach line managers, particularly at the district level (WHO, 2011)

HMIS in Uganda, Busia in particular has failed to provide adequate support. Most health care providers at the health unit level are obliged to deliver vast amounts of information on patients and diseases without receiving feedback. The HMIS systems are more or less date driven instead of action driven. The general weaknesses in the district and the structural weaknesses of the public sector continued to be the main obstacle to developing functional
information infrastructures. The information infrastructure is still predominantly paper-based, although there are attempts to develop simple computer applications using Epi-info version 6.04 and SPSS 10.0 (WHO, 2003)

In Malawi, a study of 57 healthcare professionals indicated that they mostly used clinical handover meetings, seminars, and workshops as sources of information; and particularly for their continuing professional development. The study also found that only 5.3% had access to the internet facilities; as such there was a need to explore other ICT tools as vehicles for transmission and delivery of healthcare information in Malawi (WHO, 2003).

2.2 Utilization of Health Information Management System (HIMS)

Utilization of a health information management system can be influenced by factors such as: systems quality, individual and institutional characteristics.

2.2.1 Systems Quality

Quality attributes are the overall factors that affect run-time behavior, system design, and user experience. They represent areas of concern that have the potential for application wide impact across layers and tiers. Some of these attributes are related to the overall system design, while others are specific to run time, design time, or user centric issues. The extent to which the application possesses a desired combination of quality attributes such as usability, performance, reliability, and security indicates the success of the design and the overall quality of the software application (Talisuna et al, 2000)

Some factors that are looked into to ensure systems quality include: Accuracy: state of being correct, Accessibility: quality of being at hand when needed, Comprehensiveness: understand, Consistency: achievement of a level of performance that does not vary greatly in quality over time, Current: information in this case being the latest, Validity: offer truthful
information and Timeliness: information is available in time to make necessary decisions.

Support means that the management offers the needed expertise when a system is down goes a long way in ensuring that the system is put to constant use, other factors include:
Definition, Precision, Relevance.

2.2.2 Individual characteristics
Computer literacy, a health care providers attitude towards the system, level of education and Age among other factors may influence the utilization of an electronic system and eventually impact on the kind of services delivered. The above factors can be both of positive or negative influence.

In Nigeria, a study on Knowledge and Utilization of Information Technology Among Health Care Professionals and Students in Ile-Ife, found that computer possession and utilization among health care professionals and students in a major university teaching hospital in Nigeria were low. Some of the reasons for these occurrence was the lack of a structured training and computer accessibility that may have contributed to the poor knowledge and utilization patterns observed. In addition limited access to the Internet and the relatively expensive nature of Internet cafés may also be contributory. The gains of IT can only be fully harnessed when the majority, if not all, of the staff become knowledgeable and are willing to utilize computers and IT. Such utilization will naturally impact on health information management. The use of Medline, CD-ROMs and interactive software packages would enhance dissemination of medical information, knowledge and teaching among health care professionals. It would also improve health care delivery and collaborative multicenter research, which is still very limited in the developing countries particularly in Africa (Ogunyade et al., 2003).
Digital disparities exist in the adoption and utilization of various forms of health IT. To comprehensively understand these disparities, potential barriers to health IT adoption and utilization must be considered from several perspectives. These include the provider and healthcare system perspective; the perspective of patients, families, and caregivers; the impact of the technology itself; and finally the setting or environment (hospital/clinic, home/community, or safety-net organization) in which the technology is used and the care is delivered and/or received. Barriers, issues, or problems in any one of these domains could impact health IT adoption, utilization, and ultimately outcomes. If the problems are of a nature such that one population benefits more than another from the technology, the adoption of health IT could actually increase or exacerbate existing healthcare disparities or even create new ones (Mitchell, 1997).

Several barriers to physician adoption of health IT have been identified in various literature. For example, positive physician attitudes toward health IT and information systems are associated with adoption and eventual utilization (Castillo et al., 2010). Positive attitudes include interest, perceived usefulness, and motivation in working with technology (Ash et al., 2005). The negative impact of health IT on clinical workflows and the absence of technical assistance for office staff and physicians have also been found to negatively impact physician adoption rates (Ammenwerth et al., 2006). The inability of EHR and health IT systems to communicate with each other (interoperability) has also been identified as a barrier to provider adoption and utilization. Interoperability among IT systems may facilitate provider adoption and utilization because it could potentially reduce rework by care providers as well as improve dissemination of new medical knowledge among physicians (Payne et al., 2006). Finally, positive communication in which providers share thoughts,
opinions, and information by speech, in writing, or through peer professional or social networks has been shown to be associated with provider health IT adoption and utilization (Jerome et al., 2008).

A study on factors influencing acceptance of electronic health records in hospitals highlighted factors that cause end users to embrace or reject information technology (Glandon et al., 2008) according to the Technology Acceptance Model (TAM). Perceived ease of use is the second factor, which is used to indicate how difficult the person believes the proposed system would be to use. Age has an influence in the acceptance and utilization of a system. Younger people tend to embrace new technology more openly as compared to older people. The level of education of the health care worker has a positive influence how fast they will understand concepts (Heeks, 2006).

2.2.3  Institutional characteristics
While change is a naturally occurring phenomenon in our daily lives, it is often approached with skepticism and fear. Most people tend to cling to the routine and known within their lives and shy away from the new and unfamiliar. They may feel personally threatened by impending change (Glandon et al., 2008). The field of information technology (IT) is particularly known for ever-changing innovations, as is the field of medicine. It is no wonder that change is evident yet often feared in the area of health information technology. In the face of inevitable change, a leader of change emerges to direct the organization through the transformation process. One study defines the concept of change management as “the process by which an organization gets to its future state, its vision,” (Lorenzi et al., 2000).
A review of literature in this area suggests that several barriers exist in the implementation of electronic health records. These barriers seem to focus on process barriers, such as interoperability and cost issues. Resistance to change is a natural phenomenon, and strong leadership is needed to aid in the implementation of such technology (Poon et al., 2004). Therefore there is need for strong mentors and a strong culture in the organization to champion its utilization. Availability of resources in the organization also ensures that the system will be sustained.

2.3 **Utilization of Health Information Systems in Kenya**

In 1983, the Government of Kenya (GoK), decentralized the Ministry of Health’s (MoH) decision-making process to the districts. This was in line with World Health Organization (WHO) resolution calling on all WHO member states to strengthen District Health Systems (DHS) (WHO, 1989). For this decentralization to be effective, there was a need to establish information systems to support the DHS managers in their planning, implementation and evaluation functions. The GoK recognized that without an effective and appropriate information system, the MoH’s capacity to cope with its planning and management needs would be severely compromised (Otieno, 2005).

These information systems were to provide the DHS managers who were members of District Health Management Team (DHMT) and District Health Management Board (DHMB) with the information they require. The DHMT members including among others the District Medical Officer of Health (DMOH) as Chairman, the District Health Administrative Officer (DHAO), the District Public Health Nurse (DPHN), the District Public Health Officer (DPHO,) and the Medical Records Officer, were responsible for among other things, developing a strategy for the district health service, monitoring the
health problems that occurred in the district, and coordinating the activities of all health care providers in the district.

The DHMB on the other hand, which consisted of the area DMOH, local community and Non-Governmental Organization (NGO) representatives, among others, played an advisory role in relation to DHMT and worked with DHMT to coordinate and monitor the implementation of government and non-government health programs in the district (Otieno, 2005).

The DHMIS was to provide both the DHMT and DHMB with accurate, reliable and up-to-date information for the management of the DHS. Following this decentralization, Health Information Systems (HISs) at the district level in Kenya have undergone fundamental changes that have resulted in the introduction of different types of information systems. A quick survey of Kenya’s MoH reveals that it operates different versions of District Health Management Information Systems (DHMISs) at the DHS level (Otieno, 2005). The first DHMIS was introduced in Murang’a DHS in 1988 and was funded by UNICEF. This system introduced a total of 26 data collection forms, 11 of which were for collecting health service data and 15 for collecting administrative/management data (MOH, 1991).

Subsequent to the introduction of the Murang’a DHMIS, the following DHSs introduced various versions of DHMISs: Kitui, Embu, Baringo, Nakuru, Nyandarua, Nyamira, Kisumu, Kwale, UasinGishu, Bungoma and Mombasa. Reasons advanced for the introduction of these systems were: (a) health facilities collected information haphazardly and irregularly; (b) information collected was incomplete and unreliable with limited analysis and use at the point of collection; (c) too much data was collected rendering analysis
impossible. The objective of this system was to facilitate the use of selected existing information to support operational decision-making and planning. Relevant information compiled at the District HIS Office was to be extracted, processed and made available regularly to the DHMT and DHMB for action planning, supervision and impact assessment (MOH, 1991) These systems operated along side with the routine HISs which are operational in all DHSs in Kenya.

All these systems within the DHSs in Kenya are characterized by a lack of integration, and are disjointed and widely dispersed, with no effective central co-ordination to ensure that the information which they contain is readily available to those who need it.

The results of a study done by (Sahay, 2000) there was a marked difference in the focus of health workers and DHMIS staff. Whereas the health workers complained about the quality of the information produced, DHMIS staff on the other hand concentrated their complaints on inadequate supplies of basic resources necessary for effective operation of the system.

The information systems are characterized by a lack of integration, and were disjointed with no effective central co-ordination to ensure that the information which they contained was readily available to all who needed it. The DHMISs are found to be fragmented with no mechanisms for information flow that allowed sharing of information among stakeholders. The information systems were basically data-led which routinely collected large amounts of data that was sent to higher levels without analysis and use at the collection point. The variation in data collection tools did not allow comparison in terms of performance among DHSs.
The information requirements of the users were neglected thereby making the systems products (information) irrelevant to potential users.

There is need to foster partnership between information producers and users. Without accurate, timely, relevant and complete information, the existing information systems are not capable of facilitating the DHS managers in their day-to-day operational management. Without people who are trained in techniques of both information production and use, the likelihood is small that a DHMIS will enhance the level of health care management in the DHS.

There is an urgent need to explore the possibilities of computerizing the existing manual systems to take advantage of the potential uses of microcomputers for DHMIS operations within the DHS. Despite the ultimate use of computers, care must be taken in the way data is collected manually. The greatest challenge facing the existing and future DHMISs in Kenya is securing the support of the DHS managers both financially and morally given their low-key perception on information activities.

For long-term internal sustainability, there should be a gradual shift from depending exclusively on donors for financial and technical support for such initiatives to a fully self-supporting situation. To be supportive, existing systems must have a comprehensive and accurate picture of the health situation in the DHS. The existing DHMISs must collect information from other health care providers within their respective DHSs. Only then can DHS managers receive information necessary for the operational management of the DHS. To the extent that this is not being done, current DHMISs are therefore not supportive of the operational management of health services at the DHS level in Kenya.
Health information systems and services can best be conceptualized as a heterogeneous network comprising of people (medical professionals, information professionals, health managers, planners, donor communities etc.) artefacts (computers equipment’s, hardware, computer applications, electronic information resources, databases, data collection and reporting etc.) and social political structures. Conceptualized in this way, access to health information by medical professionals is emphasized as something more than just a technical issue; it includes the interests of various stakeholders, artefacts like computers equipment’s and applications relating to health information systems, the practices of people and organizational routines. The emphases on the multiplicity of stakeholders help to place focus on their different rationalities and the challenges of aligning them (Godlee et al., 2004).

### 2.4 Community Health Workers and their role in HMIS

The core of level 1 health service provision rests on key household practices. In this regard, CHWs who were described as ‘gate keepers’ of health in the community were found to be effective in dialoging with the households on actions for health since they shared a common situation and experience. In all the districts visited, the CHWs had been selected by the community using the MoPHS guidelines with a strong emphasis on the willingness and ability to work as volunteers (MOH, 2007).

According to the community strategy (MOH, 2007), community health workers are expected to be mature, responsible and respected members of the community, men or women chosen by the community to provide basic health care.

Their main role is to promote good health by:

- Teaching the community how to improve health and prevent illness by adopting healthy practices.
• Treating common ailments and minor injuries, as first aid, with the support and guidance of the CHEW.

• Tending the CHW kit with supplies provided through a revolving fund generated from users.

• Referring cases to the nearest healthfacilities.

• Promoting care seeking and compliance with treatment and advice.

• Visiting homes to determine the health situation and dialogue with household members to undertake the necessary action for improvement.

• Promoting appropriate home care for the sick with the support of the CHEWs and level 2 and 3 facilities.

• Participating in monthly community unit health dialogue and action days organized by CHEWs and CHCs.

• Being available to the community to respond to questions and provide advice.

• Being an example and model of good health behaviour.

• Motivating members of the community to adopt health promoting practices.

• Organizing, mobilizing and leading village health activities.

• Maintaining village registers and keeping records of community health related events.

• Reporting to the CHEW on the activities they have been involved in and any specific health problems they have encountered that need to be brought to the attention of higher levels.

2.4.1 How a Community Health Worker is Selected
To the extent possible CHWs should be accepted by the whole community as they are the link-pin between the household system and the health system. It is therefore critical that the community be briefed on the functions of the CHW to enable them to select persons who can work effectively with them in promotion of good health among households. Village
leaders will organize meetings to inform the people about the CHWs’ functions in the community. At a village meeting convened by the elders, consenting nominees are presented for consideration by the villagers. In this forum the villagers select the individual of their choice on the basis of on the following criteria:

- A permanent resident in the area.
- Able to read and write, and enthusiastic to learn more.
- Concerned about the welfare of the people.
- Willing to volunteer.
- Physically fit.
- Willing to visit all village members.
- Respected by villagers as an example of healthy behaviour.
- Having demonstrated attitudes valued by the community.
- Backed by immediate family members (particularly the spouse)

Kibera is located in southwest in Nairobi county, roughly 5 kilometers from the city centre. Kibera is divided into 13 villages, including Kianda, Soweto, Gatwekera, Kisumu Ndogo, Lindi, Laini Saba, Siranga/Undugu, Makina, Mashimoni, Olympic Ayany and Raila village.

The 2009 Kenya Population and Housing Census reported Kibera's population as 200,000.

The Kibera slum was previously thought to be one of the biggest informal urban settlements in the world. Several actors had provided and published over the years growing estimations of the size of its population, most of them stating that it was the largest slum in Africa. The Uganda Railway Line passes through the centre of the neighborhood, providing passengers aboard the train a firsthand view of the slum. Kibera has a railway station, but most residents
use buses and matatus to reach the city centre; carjacking, irresponsible driving, and poor traffic law enforcement are chronic issues.

Kibera is heavily polluted by human refuse, garbage, soot, dust, and other wastes. The slum is contaminated with human and animal feaces, due to the open sewage system and the frequent use of "flying toilets". The lack of sanitation combined with poor nutrition among residents accounts for many illnesses and diseases.

AMREF facility is based in Laini Saba in Kibera, which is one of the villages.
2.5 Conceptual Framework

**SYSTEM QUALITY**
- Accessibility
- Accuracy
- Timeliness
- Current

**INDIVIDUAL CHARACTERISTICS**
- Computer literacy
- Attitude towards the system
- Level of education
- Age

**INSTITUTIONAL CHARACTERISTICS**
- Organizational culture
- Mentors that champion the use of the system
- Resources

**UTILIZATION OF THE HIMS**

Figure 2.1: Conceptual Framework

Source: Adapted from Lorenzi et al. (2000).
System quality, individual and institutional characteristics influence the utilization of a HIMS by supporting clinical decision-making and professional practice (American Nurses Association, 2013). In system quality the elements of interest are:

**Data Accuracy:** The extent to which the data are free of identifiable errors. This ensures that the interventions employed are correct in regard to the target audience.

**Data Accessibility:** Data items that are easily obtainable and legal to access with strong protections and controls built into the process.

**Data Currency:** The extent to which data are up-to-date; a datum value is up-to-date if it is current for a specific point in time, and it is outdated if it was current at a preceding time but incorrect at a later time.

**Data Timeliness:** Concept of data quality that involves whether the data is up-to-date and available within a useful time frame; timeliness is determined by manner and context in which the data are being used.

Individual factors such as the level of education, computer literacy, attitude towards the system, Age influence how an individual learns the required skill, how fast and their understanding on the variables of interest being looked into is. It ensures that the quality of data that is produced is of high quality thus positively influencing the decisions made, a factor that is paramount in improving health indicators in the facilities (Heeks, 2006)
Institutional factors such as, organizational culture, mentors and resources ensure that the
system is run smoothly and the people that use it are accorded the necessary assistance. This
includes having the necessary support for the system to be of benefit to the CHWs in both
learning and being able to make the evidence based decision in the facility; having the
necessary equipment’s to be able to carry out the tasks assigned. Having mentors in the
facility that champion the use of the system ensures that issues with it are addressed
promptly and there are opportunities of improving the system to ease the users work (Heeks, 2006)

The above factors will show how the status of the system is, of the above factors those that
motivate or hinder its utilization and how the information generated from the system is
perceived.
CHAPTER THREE: Methodology

3.0 Introduction
This chapter specifies the materials and methods used in assessing utilization of the HIMS by the Community Health Workers in Kibera, Kenya. It gives a description of the study design, study area, sampling techniques and research tools, data collection techniques and analysis used as well as the ethical considerations for the study.

3.1. Research design
The study employed a cross sectional study design.

3.2 Variables
The independent variables:

1. Systems quality
2. Personal characteristics
3. Institutional characteristics

The dependent variables:

1. Utilization of the HIMS.

3.3 Location of the study
Kibera is located in southwest in Nairobi county, roughly 5 kilometers from the city centre.

Much of its southern border is bounded by the Nairobi river and the Nairobi Dam, an artificial lake that provides drinking water to the residents of Nairobi city.

Kibera is divided into 13 villages, including Kianda, Soweto, Gatwekera, Kisumu Ndogo, Lindi, Laini Saba, Siranga/Undugu, Makina, Mashimoni, Olympic Ayany and Raila village.

The 2009 Kenya Population and Housing Census reported Kibera's population as 200,000.
The Kibera slum is one of the biggest informal urban settlements in the world. Several actors had provided and published over the years growing estimations of the size of its population, most of them stating that it was the largest slum in Africa. The Uganda Railway Line passes through the centre of the neighborhood, providing passengers aboard the train a firsthand view of the slum. Kibera is heavily polluted by human refuse, garbage, soot, dust, and other wastes. The slum is contaminated with human and animal feaces, due to the open sewage system and the frequent use of “flying toilets”. The lack of sanitation combined with poor nutrition among residents accounts for many illnesses and diseases.

AMREF facility is based in Laini Saba in Kibera, which is one of the villages. The study was done in the health facility.

### 3.4 Target population

This comprised of 400 both male and female community health workers who represent the four community units (Laini Saba, Siranga/Undugu, Soweto east, Mashimoni) in the AMREF Kibera health facility.

**Inclusion/ exclusion criteria**

Inclusion Criteria: CHWs working in the AMREF Facility in kibera for the last 6 months.

Exclusion Criteria: CHWs who have not been in the facility in the last 6 months and those who are newly recruited.
3.5 Sampling techniques and Sample determination

In Kibera, the study area there are 13 Community Units. AMREF is currently active in the following four areas ie: Lainisaba, Soweto east, Mashimoni and Siranga where for each of the community units there are 100 CHWs. The community health workers are registered in an excel spread sheet that was used to select 196 CHWs through Simple Random sampling. This method reduced biasness and ensured that each member has an equal chance of being represented in the sample and thus improve the generalizability of the findings. There was one group comprising of eight CHWs for the FGDs. The responses from the FGD, KIIs and questionnaires are expected to build into and complement each other.

The number of Community Health Workers trained in Kibera in the CU supported by AMREF is 400.

Total HCW is 400<10000

Formula to determine sample size is (Fischer et al)

The formula is: \( n = \frac{Z^2pq}{d^2} \) where:

\( n \) is the desired sample size

\( Z \) is the standard normal deviate, usually set at 1.96 which corresponds to the 95% confidence level

\( P \) is the proportion in the target population estimated to have a particular characteristic. If there is no reasonable estimate then use 50% (0.5)

\( q = 1 - p \)
d is the degree of accuracy desired, usually set at the 0.05 level.

So \( n = \frac{(1.96^2 \times 0.5 \times (1.0 - 0.5))}{0.05^2} \)

Therefore \( n = 384 \)

Since the estimated population is less than 10,000 the required sample will be: \( n_f = \frac{n}{1+n/N} \)

Where \( n_f \) is the desired sample size

\( N \) is the estimated total population less than 10000

And \( n \) is the estimated sample when the estimated total population \( N \) is greater or equal to 10000.

So \( n_f = \frac{384}{1+384/400} \)

Therefore \( n_f = 196 \)

### 3.6. Construction and Research Instruments

A structured questionnaire was developed for collection of quantitative data. The questionnaire was pretested to establish its validity and reliability before the actual fieldwork was done. The CHWs questionnaires (Appendix 2) was self-administered. Focus Group Discussion Guides were developed for the CHWs which contained open ended questions that were used to guide discussions during the Focus Group Discussions (Appendix 3). KII’s (Appendix 4) was administered to the in charge of the facility at various capacities to get their view and verify what the CHWs would have said.

### 3.7 Pretest

The pretest of the research instruments was done in kibwezi which is one of the areas where AMREF has a CBHIMS in place functioning like the system put in kibera. In addition to
clearance convenience and logistics. In addition it enabled the research assistants to ascertain its appropriateness, suitability and actual fieldwork logistics. This in addition assisted in the inclusion of more questions in case more information is needed. It also acted as a guide to proper phrasing of vague questions.

3.8. Data Collection Techniques

3.8.1 Focus Group Discussions and Key Informant Interviews.
A Focus Group Discussions (FGDs) with the CHWs was held to get more in depth information on how the HIMS is used by CHWs. All the members were converged in a central place for the discussion using the FGD guide which was for a period of One hour. The principal investigator was the session’s moderator and the research assistant was the repertoire and assisted in the listing of the responses from the participants. An observer was used to control the group dynamics and ensure that everyone contributes to the discussion and others do not dominate. A tape recorder was used to record the information for the purposes of revisiting issues which are not clear and informed consent was sought before beginning the discussions. The information collected here was mainly used to reinforce the quantitative data collected. KIIs were administered to three of the in-charge of the facility in various capacities to get their view and verify what the CHWs said. The qualitative methods above provided information useful to further understand the quantitative data collected earlier it also strengthened and clarified the study findings. Graphs, tables, pie charts were used to present the findings where appropriate. Qualitative data was analysed using content analysis based on key themes generated from the objectives of the study.

3.9. Data analysis
Data was collected, verified whether they have all been entered as required, entered, cleaned and stored. Analysis was done using SPSS where cross tabulations between variables of
interest was done and chi square was used to establish relationships between the variables, of CHWs who use the information from the system and those who do not. The p value was determined to show the significance level between those who used the system and those who did not. The questions were put in a likert scale with five options which were further condensed before the analysis.

3.10. Ethical considerations
Permission to carry out the study was sought from AMREF research office following approval by Kenyatta University Board of Postgraduate Studies (BPS). Confidentiality was assured to the participants. Medical Officers of Health were informed.

Consent and permission was sought from the CHWs before commencing with the study(Appendix 1). All the results were delinked from the participants. The findings were only used for the purpose of the study.
CHAPTER FOUR: Results

4.0 Introduction
This chapter presents the results of the data that was collected, analyzed and further discusses the findings. The aim of the study was to examine the utilization of the Health Information Management System (HIMS) by Community Health Workers (CHWs) in the AMREF facility in Kibera, Nairobi Kenya. The study was guided by the following objective; to determine factors (such as system quality, individual and institutional characteristics) that influence utilization of the HIMS in the AMREF, Kibera facility.

4.1 Socio-demographic profile of respondents
Table 4.1 summarizes the characteristics of the respondents. 54.1% were female, the most populous age clusters was 28 years – 32 years (20%) and 38-42 (20%), in regard to marital status, most of the respondents (55.6%) were married. 39% of the CHWs had completed their secondary education. CHWs who work on part-time basis were (55.6%) while (44.4%) work on full-time basis. 40% of the CHWs are in formal employment.
### Table 4.1: Socio-Demographic characteristics of respondents

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>90</td>
<td>45.9</td>
</tr>
<tr>
<td>Female</td>
<td>106</td>
<td>54.1</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
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<td>18-27</td>
<td>20</td>
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<tr>
<td>28-32</td>
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<tr>
<td>33-37</td>
<td>36</td>
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<tr>
<td>38-42</td>
<td>39</td>
<td>19.9</td>
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<td>53-62</td>
<td>13</td>
<td>6.6</td>
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<tr>
<td><strong>Marital Status</strong></td>
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<td>Single</td>
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<tr>
<td>Married</td>
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<tr>
<td>Widowed</td>
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<td>Divorced</td>
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<tr>
<td><strong>Level of Education</strong></td>
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<td>Primary School Incomplete</td>
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<tr>
<td>Post-Secondary School</td>
<td>37</td>
<td>18.9</td>
</tr>
</tbody>
</table>

### 4.2 Current Status of HIMS-computerized system in Kibera

Figure 4.1 presents the status of the HIMS in the AMREF facility. Of the respondents, only 7% reported the system to be very good, 20% good and 73% were not sure.
4.3 Utilization of HIMS-Computerized system by CHWs

Figure 4.2 presents the proportion of the CHWs who are using and those who are not using the health information management system in the AMREF facility. Of the 196 respondents, 53 (27%) indicated that they use the computerized system at the AMREF facility in Kibera while 143 (73%) confirmed that they have never used the computerized system.
4.3.1 Use of Reports Generated by HIMS

In exploring the question of use of reports generated from the HIMS by CHWs, 137 (69.9%) of the respondents answered in the affirmative whereas 59 (30.1%) of the respondents indicated that they do not use reports generated by the HIMS. This information is presented in figure 4.3.
Figure 4.3 Use of Reports Generated by HIMS

4.3.2 Assessment of User Satisfaction as an Indicator of Extent of Use of HIMS by CHWs

The opinions of the respondents were also sought in view of the extent of user satisfaction. A range of issues were investigated under this segment, including accessibility, timeliness, accuracy and currency of output information from the HIMS. The findings are tabulated in Table 4.2.
Table 4.2 System performance indicators by User Satisfaction levels.

<table>
<thead>
<tr>
<th>Items</th>
<th>Satisfied n (%)</th>
<th>Not satisfied n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility of the output information</td>
<td>71 (36.2)</td>
<td>125 (63.8)</td>
</tr>
<tr>
<td>Accuracy of the output information</td>
<td>110 (56.1)</td>
<td>86 (43.9)</td>
</tr>
<tr>
<td>Timeliness of the output information</td>
<td>125 (63.8)</td>
<td>71 (36.2)</td>
</tr>
<tr>
<td>Currency of the output information</td>
<td>116 (59.2)</td>
<td>80 (40.8)</td>
</tr>
</tbody>
</table>

63.8% of the CHWs who were not satisfied with the access the output information. The percentage of CHWs who were satisfied with how accurate data from the system were, 110(56.1%).

Of the 196 CHWs, 63.8% were satisfied with how timely the data was. Of the CHWs interviewed 59.2% of CHWs are satisfied with how current the data from the system is.

4.4 **Factors that Motivate and Hinder Utilization of the HIMS**

The study explored system user friendliness and ease of use.
4.4.1 The computerized System’s User Friendliness

The study sought the respondents’ views on ease of use of the system to help establish the extent to which the HIMS is user friendly. This was done through measuring their opinions on an interval scale with the items below in Table 4.4.

Table 4.3 The System’s User Friendliness

<table>
<thead>
<tr>
<th>Items</th>
<th>CHW reported system use</th>
<th>CHW reported no system use</th>
<th>Statistical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>System user friendly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never n=78</td>
<td>20 (25.6)</td>
<td>58 (74.4)</td>
<td>Chi=76.463</td>
</tr>
<tr>
<td>Sometimes n=72</td>
<td>62 (86.1)</td>
<td>10 (13.9)</td>
<td>Df=2</td>
</tr>
<tr>
<td>Most of the time n=46</td>
<td>41 (89.1)</td>
<td>5 (10.9)</td>
<td>P=0.000</td>
</tr>
<tr>
<td>System easy to use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never n=97</td>
<td>31 (32.0)</td>
<td>66 (68.0)</td>
<td>Chi=78.182</td>
</tr>
<tr>
<td>Sometimes n=69</td>
<td>63 (91.3)</td>
<td>6 (8.7)</td>
<td>Df=2</td>
</tr>
<tr>
<td>Most of the time n=30</td>
<td>29 (96.7)</td>
<td>1 (3.3)</td>
<td>P=0.000</td>
</tr>
</tbody>
</table>

Among the 123 CHWs who used the system, 86.1% found it user friendly sometimes and 89.1% most of the time. (chi=76.463,Df=2,P=0.000). Of those who use the system 91.3% found it easy to use sometimes. System user friendliness was significant among the system users and non system users.
Ease of use of the system was significant among the system users and non-system users with 96.7% of those who use the system finding it easy to use most of the time. (Chi=78.182, Df=2, P=0.000)

Table 4.4: Comparison of system indicators (accessibility, accuracy, timeliness and currency of output) by level of user satisfaction.

<table>
<thead>
<tr>
<th>Items</th>
<th>CHW system use n %</th>
<th>CHW no use n %</th>
<th>Statistical value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility of output</td>
<td></td>
<td></td>
<td>Chi=38.066</td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
<td>Df=1</td>
</tr>
<tr>
<td>Satisfied</td>
<td>66 (90.4)</td>
<td>7 (9.6)</td>
<td>P=0.000</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>57 (46.3)</td>
<td>66 (53.7)</td>
<td></td>
</tr>
<tr>
<td>Accuracy of output</td>
<td></td>
<td></td>
<td>Chi=32.609</td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
<td>Df=1</td>
</tr>
<tr>
<td>Satisfied</td>
<td>87 (80.6)</td>
<td>21 (19.4)</td>
<td>P=0.000</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>36 (40.9)</td>
<td>52 (59.1)</td>
<td></td>
</tr>
<tr>
<td>Timeliness of output</td>
<td></td>
<td></td>
<td>Chi=2.445</td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
<td>Df=1</td>
</tr>
<tr>
<td>Satisfied</td>
<td>74 (58.7)</td>
<td>52 (41.3)</td>
<td>P=0.118</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>59 (84.3)</td>
<td>11 (15.7)</td>
<td></td>
</tr>
<tr>
<td>Current output</td>
<td></td>
<td></td>
<td>Chi=28.582</td>
</tr>
<tr>
<td>information</td>
<td></td>
<td></td>
<td>Df=1</td>
</tr>
<tr>
<td>Satisfied</td>
<td>87 (79.1)</td>
<td>23 (20.9)</td>
<td>P=0.000</td>
</tr>
<tr>
<td>Not satisfied</td>
<td>35 (41.7)</td>
<td>49 (58.3)</td>
<td></td>
</tr>
</tbody>
</table>

* 2 cases with missing values under current output information
Among the interviewed CHWs, the level of satisfaction for accessibility of the output information was statistically significant among the system users and the non-system users. The percentage of CHWs who reported being satisfied with the accessibility of the output information were 90.4% as compared to only 9.6% of the non-users, while non-system user were overwhelmingly dissatisfied with the system’s output accessibility 53.7% vs. 46.3% (Chi= 38.066, df=1, P=0.000).

The level of satisfaction for accuracy of the output information was statistically significant among the system users and the non-system users. System users who report being satisfied with the system accuracy of output information were 80.6% as compared to only 19.4% of the non-user, while non-system user were overwhelmingly dissatisfied with the system’s output accuracy 59.1% vs. 40.9% (Chi=34.9840, Df=1, P=0.000).

Timeliness of the output information was not statistically significant among the system users and the non-system users. Of the system users who report being satisfied with the systems timeliness were 58.7% are as compared to only 41.3% of the non-user. (Chi=2.445, Df=1, P=0.118)

The level of satisfaction for how current the output information is was statistically significant among the system users and the non-system users. System users who report being satisfied with how the system is current were 79.1% as compared to only 20.9% of the non-user, while non-system user were overwhelmingly dissatisfied with the system’s output accessibility 58.3% vs. 41.7% (Chi=28.582, Df=1, P=0.000).
Among the interviewed CHWs, almost an equal proportion of males (60.2%) to females (64.8%) reported using the system and there were no statistical differences (chi=0.437; 1 df; p=0.509). However, education levels, was found to be statistically significant factor for system use.80% of CHWs with post-secondary education were using the system as compared to 51.2% and only 37.5% of those with primary and secondary education respectively (chi=7.882; df=2; p=0.019).

Table 4.5: Comparison of CHW sex and level of education by reported “use” of the system

<table>
<thead>
<tr>
<th>Items</th>
<th>CHW reported System use n (%)</th>
<th>CHW reported No system use n (%)</th>
<th>Statistical values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex of CHW</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53 (60.2)</td>
<td>35 (39.8)</td>
<td>Chi=0.437</td>
</tr>
<tr>
<td>Female</td>
<td>70 (64.8)</td>
<td>38 (35.2)</td>
<td>Df=1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P=0.509</td>
</tr>
<tr>
<td>CHW level of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>20 (48.8)</td>
<td>21 (51.2)</td>
<td>Chi=7.882</td>
</tr>
<tr>
<td>Secondary</td>
<td>75 (62.5)</td>
<td>45 (37.5)</td>
<td>Df=2</td>
</tr>
<tr>
<td>Post-secondary</td>
<td>28 (80)</td>
<td>7 (20)</td>
<td>P=0.019</td>
</tr>
</tbody>
</table>
85.7% of CHW aged 18-27 used the system more than CHWs from other age groups.

On factors that act as barriers to the CHW’s utilization of the HIMS in Amref’s Kibera facility.

### 4.5 Appointment of Community Health Workers

Table 4.6: Appointment of CHW.

<table>
<thead>
<tr>
<th>CHW</th>
<th>Full time</th>
<th>Part-time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>87</td>
<td>109</td>
</tr>
<tr>
<td>Other engagements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>73</td>
<td></td>
</tr>
<tr>
<td>Casual Worker</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Selection to be a CHW</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHC</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>MOH</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Community</td>
<td>189</td>
<td></td>
</tr>
</tbody>
</table>

In the table above, of the community health workers interviewed 55.6% were in the facility on part time basis. They engaged in other activities as listed in the table, 40.3% are
employed by other institutions. The community members have selected 96.4% of the community health workers.
CHAPTER FIVE: Discussion

5.0 Introduction
The major goal of this study was establishing and testing the paths between system institutional and individual factors and utilization of the HIMS by community health workers in the AMREF, Kibera facility. As seen so far in testing the null hypothesis system quality, individual and institutional factors influence utilization of the HIMS among CHWs in the AMREF-Kibera facility.

The study showed the following demographic characteristics of the CHWs, 39.3% of the CHWs have completed secondary education and 18.9% have even gone ahead and done other courses like teaching, nursing, social work in colleges to improve themselves. The level of education of the health care worker has a positive influence how fast they will understand concepts, (Glandon et al., 2008). The permanent Community health workers in the AMREF health facility are among those with post secondary education. The use of interactive software packages would enhance dissemination of medical information, knowledge and teaching among health care professionals. It would also improve health care delivery and collaborative multicenter research, which is still very limited in the developing countries particularly in Africa (Ogunyade et al., 2003).

Age has an influence in the acceptance and utilization of a system. Younger people tend to embrace new technology more openly as compared to older people. A larger percentage of the Community health workers are young and thus they are open to new ideas that may be introduced in the facility. This may also affect the facility negatively because if they get other opportunities elsewhere they leave easily since they do not have any commitment tying them to the area.
Only 14 of the Community health workers have a pay and are permanent employees in the facility and work in shifts thus a good number of the CHWs are on volunteer basis and get very little if any remuneration from the facility. There was a directive from the community strategy that indicated the government was to issue a stipend of 2000 kshs to the Community health workers but it has not been honored despite the Community health workers views that it should be slightly more. They as Community health workers argue that they use their own funds to assist community members in various ways for example going to other health facilities when referred by the AMREF facility in Kibera and in some severe cases buying food for the community members who are really poor in their respective community units. In addition if there was a token that was to be given after an exercise e.g. vaccination awareness and exercise it is never honored thus the Community health workers choose to be involved in other activities so that they can get a source of livelihood. For example some studies from the united states of America (Ballester,2005; Scott et al., 2006) enhance this fact further by showing a significant drop out of Community health workers due to lack of career prospects and salaries. Therefore these are strong incentives in not only retaining Community health workers but also in enhancing their performance. Studies have also shown that Community health workers with higher education qualifications have opportunities for alternative employment and therefore migrate from one job to another. This can be seen as a factor that is contributing to a large number of the Community health workers working on part time basis. On the other hand it has also been noted that those with higher education could learn and enhance their skills in the diagnosis of common illnesses and thereby deliver better care to the community (Brown et al., 2006).
The most common activity whereby the health worker remains in their current job but increase their income is to engage in moonlighting. Makasa, 2008 highlights there are various factors that influence health workers’ decision to engage in private work. The primary reason is their low incomes. This practice leads to among other things, absenteeism, low output and poor quality health care in the facility (Ipinge et al., 2009).

Community health workers who are from the communities they serve will not only be more accessible but also be able to gain the confidence of the community members. Experiences have shown that Community health workers recruited from local communities have had greater impact on utilization, creating health awareness and health outcomes (Abbatt, 2005).

As WHO defined them Community health workers should be members of the communities where they work, should be selected by the communities, should be answerable to the communities for their activities, should be supported by the health system but not necessarily a part of its organization, and have shorter training than professional workers.

5.1 Current Status of the HIMS in Kibera
All the respondents confirmed the existence and use of HIMS at the AMREF facility with 7% of the community workers having regular contact with the computers. In this regard the respondents point out:

“There are only two computers in that is why only 14 of us who are permanent workers are allowed to use it from day to day. Since the first training no other has been done so most people forgot how to use it,” (OI: Hassan, 3/12/2012).
Each computer caters for two community units ie Soweto east, Mashimoni and Laini Saba, Silanga. A selected community health worker from each of the community units is selected to ensure that they enter the data with the help of the CHEW and that the data entered is a true reflection of what is on the ground, current and representative of what the community unit is. Community health workers (four) who enter the data(with the supervision and help of the CHEWs) are the only ones that have had regular contact with the use of the computers thus ensuring the skills are still intact. There were community health workers who were taken for training in Kibwezi where the CBHMIS program me was started and has been successful and after the training they never got to use their newly acquired skills because they were not used to enter data or train their colleagues and the skills have worn off over time as they have engaged in other activities to be able to meet their daily needs. Also no one has ever done any follow-up to see how the community health workers trained in Kibwezi are faring on in kibera. It can therefore be concluded that there is a good will lacking from the heads of this system. Although AMREF confirms the importance of the usage of HIMS in undertaking its work especially as relates to community health workers but a lot needs to be done to harness it. According to (Health Metrics Network,2006) usage of HIMS especially in a low income area like the slums helps to deal with issues in the community in order of priority. Funding is never enough and therefore the need to see what can be achieved within a specific period of time with the meager resources allocated. It also shows what area needs more resources to achieve a desired effect compared to the other. Information from the system if current and representative of what the community is going through can give one an idea of what the community members priorities are, what they consider a problem in their area. "Health service statistics are fundamental to managing
public health services, identifying health trends, and allocating resources efficiently," (Health Metrics Network, 2006). As stated earlier, the CHEWs are the ones who are in charge of the entry and analysis of the data from the community units. Therefore this ensures issues like currency, accuracy, accessibility of the data is their responsibility. They are assured by regular checkups on some indicators to be sure that what was reported was the true reflection of what is being experienced on the ground. The AMREF facility as an organization is at the forefront through its facility heads championing the use of the system, by stressing the point of bringing information from the ground to the facility to be entered and analyzed and used to prioritize the needs of the community members. However there is a disconnect in that the resources that are channeled towards the system are not enough thus as discuss earlier in this sub-topic only a small fraction benefit from practicing their skill in regards to the use of the system.

5.2 Utilization of the HIMS by CHWs
Of the respondents that said they have never used the HIMS (73%) they gave the following major reason ie the sub-standard training that they got. The teaching method was theoretical and not practical at all as was in Kibwezi. The training in Kibera was for one week two hours each day.

5.2.1 Use of reports generated by the HIMS
Interventions by the majority of the CHWS are centered around the reports generated from the system. This is so because it helps them identify the areas that are not adequately addressed by the various interventions and they also trust the Community health workers who has the mandate of entering the data with the assistance of the CHEW. The ones who do not agree with this view 30.1% do not have faith with the reports since they are not involved in the entry of the data thus they say they do not own it. It must be noted that there
is a chalk board outside the facility that has various indicators and community members can see how they are faring on each indicator and the ones that are not performing as well. This as the head and matron of the facility say is used during dialogue days and assist in planning for action days.

Usage of the reports generated by HIMS is pivotal in enhancing evidence based intervention in the health needs of a given community. According to Health Metrics Network, (2006) reports generated by HIMS are helpful in guiding the design or re-design of interventions. The objective of a HIMS is to produce relevant and quality information to support decision making. The performance of a HIMS should be measured in terms of quality of data produced and evidence of continued use of data for improving the performance of health systems and ultimately the population’s health status.

5.2.2 User Satisfaction as an Indicator of Extent of Use of HIMS by CHWs

Community Health Workers who were not satisfied with accessibility of the output information from the system were 63.8%. They could not access it when they need to, as stated earlier only four community health workers from the respective community units under the supervision of the CHEWs are allowed to use the computers at the facility. 56.1%, 63.8% and 59.2% of the Community health workers were satisfied with the Accuracy, Timeliness and Currency of the output information respectively. Lower satisfaction of the HIMS output information usually alludes to a number of issues (Scott et al., 2006). These include poor participation of the Community health workers in the coming projects because they have lost faith in the organizing team owing to the performance of the previous project. Some may not own the results since it might not be a reflection of what is
going on in their community units and lastly poor job satisfaction in that they have not achieved their targets.

5.3 Factors that motivate and hinder utilization of the HIMS
User friendliness looks at, how easy is the package to use from a non-technical standpoint, how much training is required to understand the package system and how much user control does the package allow. This is an indication that there is low motivation as far as the use of the system is concerned since not many of the community health workers are hands on with the system thus the high percentages as far as its non-use. Inadequate retraining has also contributed to this high number of community health workers not using the system.

Access to research outputs, products and materials is imperative for reproducing results and maximizing the impact of these discoveries. It also shows some level of transparency and the data can be referred to easily. 90.4% of the system users report being satisfied with the system accessibility of output information. This shows that the community health workers are able to get hold of the information that is generated and use it for reasons such as decision making during any forum be it action days or just for their own personal use to know where more efforts need to be channeled.

Most of the community health workers who use the system are confident in how accurate data from the system is. Accurate information provides a reliable and valid representation of reality. The cost of inaccurate or distorted information can be extremely high. Having accurate information is an essential component of any effort to persuade individuals or organizations to make different decisions from the one they would have made in the absence of particular pieces of information. It is also an integral part of any attempt to hold those who make decisions accountable for the consequences of the decisions they make.
Timeliness refers to data being available in time to make the necessary decisions. More than half of the Community health workers reported that the data in the facility is timely and that they are able to make decisions based on the data that they collect.

Of community health workers who use the system 79.1% are sure that the data they use is a true reflection of what is on the ground. How current data is refers to data that is up to date. Data that explicitly shows the situation as it is on the ground at a particular time. This instills confidence in the Community health workers as they make decisions regarding different health parameters.

### 5.3.1 Appointment of Community Health Workers

The appointing authority of CHWs determines their performance. The study determined that there were three possible sources including CHCs, MOH and Community. In this case, the Community appointed up to 96.4% (189) Community health workers. This is an important factor that greatly enhances the performance of the community health workers. A participatory approach to appointing Community health workers that involves the community makes them to cooperate with the in community health workers the course of their work. Further, there is a close connection between the effectiveness of community health workers on the one hand, and their understanding of unique health needs of a given community. This means that when the community is involved in the appointment of the community health workers, those who end up being appointed are the ones the community feels will speak to their needs. As stated earlier, Community health workers who are from the communities they serve will not only be more accessible but also be able to gain the
confidence of the community members. Experiences have shown that community health workers recruited from local communities have had greater impact on utilization, creating health awareness and health outcomes (Abbatt, 2005).

Of the CHWs interviewed, 55.6% work as Community health workers on part-time basis while 44.4% work on full-time basis. This means the time spent by the Community health workers in this work is limited because they give time to other profitable ventures. This shows a nexus between time and income of the Community health workers. Tokens by the heads of the various exercises in the HIMS program me are not honored thus CHWs choose to engage in other activities to get more money. In very recent years, as a strategy to lessen the observed problem of health worker attrition as a result of low salaries there has been an increase in the share of allowances and other forms of incentives which are intended to reduce attrition rates, and enhance the re-distribution of staff between geographical deficit and surplus areas. In spite of the overall observed increase in nominal salaries, health workers salaries have not kept pace with inflation. Thus, there have been real reductions in the salaries of health workers. (Vujicic et al., 2009; Goldsbrough, 2007). This is having an impact upon worker motivation (Vujicic et al., 2004; McCoy et al., 2008).

The second aspect is the level of education of the Community health workers and how this affects the quality of services dispensed by the CHWs to their respective community units. As shown earlier, of the 196 respondents, (39.3%) have completed Secondary Education followed by those who enrolled into Secondary Education but did not complete (21.9%). Sahay,(2000) compared the education of an employee to the quality of service that
is rendered. His conclusion was that there are skills, knowledge and competencies that education imparts to an individual which enhance to a great extent the output of an individual at the workplace. Some of the gains that an educated individual gets which enhance output at the workplace include ability to make correct decisions in emergencies, ability to easily interact with people from different religious, racial and ethnic backgrounds and ability to prescribe solutions to problems which are more accurate.
CHAPTER SIX: Summary, Conclusions and Recommendations

6.0 Introduction

This chapter presents summary of the findings, conclusions and implications of the findings, recommendations and recommended areas for further research.

6.1 Summary of the study

The purpose of this study was to investigate the utilization of the health information management system by community health workers in the AMREFs facility in Kibera. In particular, the study sought to establish whether system quality, individual and institutional factors influence the utilization of the health information management system. Those who were sampled to participate in the study were 196 out of the 400 Community health workers in the facility from four community units in Kibera in Nairobi county.

Demographic characteristics of the Community health workers

The study established that 18.9% of the CHWs had acquired post-secondary education. As for their engagement in the facility, 55.6% of the respondents work as Community health workers on part-time basis while only 44.4% work on full-time basis. Only 14 of the Community health workers are permanent employees in the facility and get payment at the end of each month. Part time engagement can be attributed to the fact that a larger percentage of the Community health workers do not receive a remuneration package that is adequate for them thus the need to engage in other activities to be able to meet their daily needs. There was no significant difference between male and female users and non users of the system. Community health workers who were aged 18-27 used the system more than other age groups.
Current status of the Health Information Management System in Kibera

There is the presence of HIMS in the AMREF facility but those who are in daily contact with the computers are permanent employees (14) in the facility.

Extent of use of the HIMS in Kibera

69.9% of the Community health workers use the reports from the HIMS to influence their day to day activities in the community units.

Factors that motivate and hinder the use of the HIMS IN Kibera

System factors such as accessibility of information from the system, accuracy of the data, how current the data is and timeliness go a long way in instilling confidence in the data produced and thereafter its chance to be used to address various issues in the community units.

Individual factors such as age, level of education, computer literacy and attitude towards the system have a direct impact on the quality of data that is produced.

6.2 Conclusions

Utilization of the system is low and it is attributed to the system quality, individual and institutional factors discussed above. There is limited use of computers as an equipment in the facility due to the limited number.

27% of the Community health workers use the computers in the facility thus are satisfied by its outputs. The Community health workers at the Kibera facility are fully aware of the benefits of an information system and its benefits of helping them achieve their goals in the respective CU. However as discussed there are a few factors that need to be reinforced to ensure that the system is functional eg financial constraints that has hindered the proper functioning of the system since resources are limited.
Level of education, mentors that champion use of system, organizational culture, motivate utilization of the system.

Age, Community health workers engagement level, inaccessibility of the output information, lack of resources hinder the use of the system.

### 6.3 Recommendations

1. Channel more resources to the facility to improve Community health workers participation ie Improve use of computers.

2. Offer more openings to the Community health workers who are not permanent in the facility to increase their involvement in the facility and to ensure they are retained in the facility.

3. Have periodic training and retraining in computer packages and the system for sustainability of the programme.

### 6.4 Further research

1. Look into the effect of adequate training on data utilization among the Community Health Workers.

2. Explore how the use of reporting tools through a qualitative analysis, in order to better understand how it may be better designed to enable the performance of CHWs.
7.0 REFERENCES


Ballester, Gail. (2005). *Community Health Workers Essential to Improving Health in Massachusetts*. Findings from the Massachusetts Community Health Worker Survey. *Boston, MA*: Division of Primary Care and Health Access, Center for Community Health, Massachusetts Department of Public Health. March.


Kaen, K., (2006). Evidence from systematic reviews to inform decision making regarding financing mechanisms that improve access to health services for poor people. Thailand: Alliance for Health Policy and Systems Research.


Appendix one: Informed consent form

My name is Reba Nanjala. I am conducting this research as part of my study for a Masters degree at Kenyatta University.

This questionnaire aims at obtaining information on utilization of the health information management system by community health workers in the Amref facility in kibera, kenya.

As a participant:

- You have a right to decline to participate and to terminate the interview at any point during the interview session. No payments will be given to you for participating in this study and there are no anticipated participation costs on your part. Participants will be informed on the purpose of the study and how study results will be used.

- Confidentiality of participants will be maintained throughout the study. The presentation of results will not display participants name or by any other characteristics that would make them identifiable.

- The study poses no risk to the participant and will benefit them by assisting the ministry of health to develop a policy in terms of improving performance of CHWs while endeavoring to offer quality health service in the household facility and community at large. The questionnaire will take 25-30 minutes.

Would you like to participate in this study? (tick the appropriate response)

YES  NO

Signature of the participant ..............................................
Appendix two: Questionnaire for Community Health Workers (CHWs)

Introduction

My name is….. from Kenyatta University. I am representing Reba Nanjala a student at Kenyatta University who is pursuing a Masters Degree in Public Health. She is currently conducting a research in Kibera which aims at exploring the role of a functional Health management system in improving community health service delivery. A total of 196 Community Health Workers will be interviewed. Is it okay if I interview you on matters regarding this study?

Questionnaire number............................... 

Community Unit.................................

Name of facility.................................

INSTRUCTIONS

Tick the most appropriate.
<table>
<thead>
<tr>
<th>QUESTIONS</th>
<th>OPTIONS</th>
<th>SKIP</th>
<th>CODE</th>
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<tbody>
<tr>
<td><strong>Demographic data</strong></td>
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<tr>
<td>1. Sex</td>
<td>a) Male</td>
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<td>b) Female</td>
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<td>2. Age</td>
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<td>3. Marital status</td>
<td>a) Single</td>
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<td>b) Married</td>
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<td>c) Widowed</td>
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<td>d) Separated</td>
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<td>4. Level of education</td>
<td>a) Primary school not completed</td>
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<td>b) Primary school completed</td>
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<td>c) Secondary school not completed</td>
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<td></td>
<td>d) Secondary school completed</td>
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<td></td>
<td>e) Post secondary</td>
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<td>5. Are you engaged full time as a CHW?</td>
<td>a) Yes</td>
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<td></td>
<td>b) No</td>
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<td>6. If no what other occupation do you engage in?</td>
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<td>7. Who selected you to be a CHW?</td>
<td>a) CHC</td>
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<td>b) MOH</td>
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<td>c) Community</td>
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<td>d) Others Specify</td>
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<tr>
<td><strong>Perceived Usefulness</strong></td>
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<td>1. To what extent do you actually use this system compared to your original?</td>
<td>a) Not at all</td>
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<td>b) Very little</td>
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<td></td>
<td>d) Moderately</td>
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<td>e) Much</td>
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<td>2. To what extent do you actually use the reports or output that are provided to you by the system?</td>
<td>a) Not at all</td>
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<td>b) Very little</td>
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<td></td>
<td>d) Moderately</td>
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<td>e) Much</td>
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<td>3. To what extent do data that you receive from this system require correction?</td>
<td>a) Not at all</td>
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<td>b) Very little</td>
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<td>d) Moderate</td>
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<td>e) Much</td>
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<td>4. To what extent does this system provide report(s) to you that seem to be just about exactly what you need?</td>
<td>a) Not at all</td>
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<td>b) Very little</td>
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<td></td>
<td>d) Moderate</td>
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<td>e) Much</td>
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</table>
5. To what extent do you understand what this system does in assisting you with your job?

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<th></th>
<th>a) Not at all</th>
<th>b) Very little</th>
<th>c) Little</th>
<th>d) Moderately</th>
<th>e) Much</th>
<th>f) Very much</th>
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6. To what extent is the system troublesome for you, or difficult to operate, or to interact with, in order for you to get information to accomplish your job?

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<th>a) Not at all</th>
<th>b) Very little</th>
<th>c) Little</th>
<th>d) Moderately</th>
<th>e) Much</th>
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7. To what extent would you like this system to be modified or redesigned all over again from the beginning?

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<th>a) Not at all</th>
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<th>c) Little</th>
<th>d) Moderately</th>
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### User Satisfaction

**In your opinion to what extent are you satisfied with the following statements**

1. **Accessibility of the output information?**
   (quality of being at hand when needed)
   - a) Very Satisfied
   - b) Satisfied
   - c) Not satisfied

2. **Accuracy of the output information?** (state of being correct)
   - a) Very Satisfied
   - b) Satisfied
   - c) Not satisfied

3. **Timeliness of the output information?**
   (information is available in time to make necessary decisions)
   - a) Very Satisfied
   - b) Satisfied
   - c) Not satisfied

4. **Currency of the output information?**
   (information in this case being the latest)
   - a) Very Satisfied
   - b) Satisfied
   - c) Not satisfied

---

### EASE OF USE

1. **Is the system user friendly?**
   - a. Almost never
   - b. Some of the time
   - c. About half of the time
   - d. Most of the time
   - e. Almost always

2. **Is the system easy to use?**
   - a. Almost never
   - b. Some of the time
   - c. About half of the time
**Decision making**
In your opinion to what extent are you satisfied with the following statements:

1. Utilization of the HIMS has enabled me to make better decisions.
   - a. Strongly agree
   - b. Agree
   - c. Uncertain
   - d. Disagree
   - e. Strongly disagree

2. HIMS has improved the quality of decisions I make in this organization.
   - a) Strongly agree
   - b) Agree
   - c) Uncertain
   - d) Disagree
   - e) Strongly disagree

3. As a result of the HIMS, more relevant information has been available to me for decision making.
   - a) Strongly agree
   - b) Agree
   - c) Uncertain
   - d) Disagree
   - e) Strongly disagree
4. As a result of HIMS, I am better able to set my priorities in decision making.

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<tr>
<td>a) Strongly agree</td>
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<tr>
<td>b) Agree</td>
<td>[ ]</td>
<td>2</td>
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<tr>
<td>c) Uncertain</td>
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<td>3</td>
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<tr>
<td>d) Disagree</td>
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<td>4</td>
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<tr>
<td>e) Strongly disagree</td>
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Appendix three: Focus group discussion guide with CHWs

My name is..... from Kenyatta university. I am representing Reba Nanjala a student at Kenyatta University who is pursuing a Master’s Degree in Public Health. She is currently conducting a research in Kibera which aims at exploring the role of a functional Health Information management system in improving community health service delivery. A total of 8 CHWs will be interviewed. Do you have any objection to participating in the discussion regarding this study?

Perceived Ease of Use and Usefulness

1. What would reinforce use of the HIMS in your opinion?

2. Has the HIMS made it easier to do your job? How?

3. How is the systems interface? Is it easy to use.

Timeliness

1. Is information available when you need it: give an instance(s).

Attitude of the CHW towards the HIMS

1. What do you think of the reports generated from information from the HIMS?

2. What challenges have you experienced in using the HIMS?

Trainings

1. Can you get computer related training when you need it to improve use of the HIMS?

2. Have you had any other training after the initial training? Probe for number of trainings provided and adequacy.

3. What section of the HIMS trainings should be improved or emphasized and why?

4. Are there mentors that champion the continued use of the HIMS?
Appendix four: KIIIs

1. In your view what is the attitude of the CHW regarding the HIMS in place?

2. What role do you as play in ensuring continued use of the system?

3. In your view, does the system offer up to date information in time to make the necessary decisions? give instance(s)

4. Does the information content meet the needs that are addressed by the facility?

5. How do factors like age and level of education of the CHW influence the utilization of the system?
Appendix five: Map of the study area
Appendix six: Letter from AMREF

Ref: AMREF-ESRC P43/12

Date 25th September 2012

Reba Namala,
Student, Department of Monitoring and Evaluation
School of Public Health
Kenya University
NamalaReba@yahoo.com

Dear Reba,

RESEARCH PROTOCOL: ‘UTILIZATION OF THE HEALTH INFORMATION MANAGEMENT SYSTEM BY COMMUNITY HEALTH WORKERS IN THE AMREF FACILITY IN KIBERA, KENYA’.

Thank you for submitting your research protocol to the AMREF Ethics and Scientific Review Committee (ESRC).

This is to inform you that the ESRC has reviewed and approved your above protocol. The approval period is from 25th September 2012 to 24th September 2013.

The approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.

b) All changes (amendments, deviations, violations etc) are submitted for review and approval by AMREF ESRC before implementation.

c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the ESRC immediately.

d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to AMREF ESRC immediately.

e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period (attach a comprehensive progress report to support the renewal).

f) Clearance for export of biological specimens must be obtained from AMREF ESRC for each batch of shipment.

g) Submission of an executive summary report within 90 days upon completion of the study.

This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

Please do not hesitate to contact the ESRC Secretariat (esrc.kenya@amref.org) for any clarification or query

Yours faithfully,

[Signature]

Dr. Mohamed Karama
Chair, AMREF ESRC

Cc: Dr. Meshack Ndirangu, Deputy Country Director, AMREF in Kenya and Vice Chair, AMREF ESRC
Dr. David Ojkia, Health Systems Research Focal Person, AMREF in Kenya
Dr. Lillian Nkau, Project Manager Kibera ART Clinic