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FACTORS AFFECTING THE UTILIZATION OF HEALTH INFORMATION TECHNOLOGY PROJECTS IN NAIROBI COUNTY

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ABSTRACT

Nairobi is one of the most populous cities in Africa. With approximately 4 million people, the city requires efficient health management information system. The government and private institutions have over the years invested huge sums of money into the health sector for the purchase of Information technology equipment's in order to facilitate and improve service delivery. However, it's emerging that these efforts have not borne fruits.

The study aimed at assessing the factors that affect the utilization of health information technology projects in Nairobi while focusing on the following objectives, the role of project identification on the utilization of health information systems (HIS), the role of project planning on the utilization of HIS, the role of project implementation on the utilization of HIS and the role of project monitoring and control on the utilization of HIS.

The researcher adopted the descriptive study design. A sample of 29 facilities from a target population of 97 health facilities owned by the government, private institutions and those owned by faith based organizations were selected using stratified random sampling and simple random sampling. The researcher adopted a questionnaire for data collection. Quantitative data was analyzed using content analysis, whereas qualitative data was coded and analyzed using Statistical Package for Social Science (SPSS) version 22.0 for windows.

From the findings, some of the factors that influence the utilization of health information systems include age, lack of user involvement, lack of adequate knowledge on the use of the health information system, understaffing, change implementation, lack of refresher training, duration taken to repair the system in case it breaks down and motivation.

There is a need to involve users in the development of the system, ensure health facilities are equipped with the right number of staff, ensure the changes noted during testing the system are implemented adequately, ensure staff are trained are trained regularly, ensure the system is repaired immediately it breaks down and lastly, ensure that staff are well motivated.

Key Words: *Health, Information Technology*

Background of the Study

The World health Organization (WHO) defined health information management systems as an" integrated effort to collect, process, report and use health information and knowledge to influence policy making, programme action and research (WHO,2011). The objective of the health information management system is to produce information for taking action in the health sector. The performance of such a system should not only be measured by the quality of data produced, but also on the evidence on continued use of the data for improving the health systems operations and health status (WHO,2003).

According to a report by WHO (2011) on analyzing disrupted health systems in countries in crisis training course, the investment in Health Information Management Systems (HIMS) 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. In addition, it will empower individuals and communities with timely and understandable health related information, and lead to an improvement in the quality of services. The use of HIMS will assist in strengthening the evidence base for effective health policies, permitting evaluation of scale-up efforts, enable innovation through research, improve governance, mobilizing new resources and ensuring accountability. (Lau F *et al*, 2006).

Over the recent years, health information technology (HIT) has been seen as a tool that can be used to improve the quality of health care and patient safety. The critical role of information technology in health care systems is to meet the six aims of care; care that is safe, effective, efficient, timely, equitable and patient-centered (crossing the quality of chasm, 2001). Health information technology involves the exchange of health information in an electronic environment. It is used to support the health care quality and efficiency by providing tools to improve patient care and to reduce administration overhead.

Health information management (HIM) can be defined as the maintenance of health records by traditional (paper-based) and electronic means in hospitals, health departments, health insurance companies, and other facilities that provide health care or maintenance of health records (Stansield, 2005). In order for a HMIS to function fully, data from different sources must be integrated. Secondly, data should be analyzed and interpreted so that recommendations are made to improve the performance of health services (Talisuna *et al.,* 2000). One key important aspect of the HMIS is that information must be transformed into actions at all levels and hence, there is need to have adequate capacity for collection, analysis, interpretation and use of the information that the system generates (Nekesa, 2014).

Electronic health records systems (EHRs) provide patients and their care givers the necessary information required for optimal care while reducing costs and administrative overheads such as those associated with patient registration, admission, discharge and billing. Computerized provider order entry (CPOE) allows providers to electronically order tests, medicine and procedures for patients thus reducing costs associated with hand-written orders and prescriptions (Powner and Koontz, 2005).

In the developed nations, doctors use computers to send live video, sound and high-resolution images between two distant locations as well as examining patients in clinics that may be thousands of miles away. These technologies are being rolled over to developing countries due to their immense abilities in reducing healthcare costs. The global impact of e-Health is being manifested in the reduction of healthcare costs and improved efficiency through better retention and retrieval of records, better management of chronic diseases, shared health

professional staffing, reduced travel times and fewer or shorter hospital stays (McClure, 2007).

On February 2009, through the economic stimulus package, the United States Congress allocated more than U.S $20 billion for health information technology thus making the United States part of other countries that aimed at reaping benefits from such technology on health care quality and savings.
In Pakistan, before the 1990s, several vertical programs with categorical disease-specific information systems resulted in fragmented data transmission, thus making the 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). A report released by the MOH of Pakistan on the national feedback reports in the new HMIS noted an improvement in scope and reporting regularity, but also noted a need for improvement in the quality and utilization of information at various levels (MOH,1996).

Pakistan's MOH further recommended the strengthening of HIS 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, attempts on strengthening the information systems have proved unfruitful and sometimes counterproductive (WHO,1994).
A study conducted among 57 healthcare professionals in Malawi indicated that health professionals enhanced their professional development through information attained from clinical handover meetings, seminars and workshops. The study also found that only 5.3% had access to the internet facilities and as such there was a need to explore other ICT tools as vehicles for transmission and delivery of healthcare information in Malawi (WHO, 2003).
Information system failures occur due to lack of psychological ownership, underestimation of complexity such as (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 and training factors (such as inadequate or poor-quality training, poor timing of training, i.e., too early or too late) (Lorenzi *et al.*1997)

Kenya is clustered among the developing countries in the world with over 46% of its population living under a 1$ per day. This dynamics poses great challenges to the health sector in terms of service delivery and cost of medical care. The millennium development goals categorically (MDGs) identify healthcare and HIV as one of the major challenges to humanity. In order to achieve this, the government of Kenya, under vision 2030 has provided a framework to provide a long-term solution to healthcare problems facing healthcare 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 according to the WHO resolution which called on all WHO member states to strengthen their 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 (Otieno, 2005).

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 survey on 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). This followed the introduction of DHMIS in districts such as Kitui, Embu, Baringo, Nakuru, Nyandarua, Nyamira, Kisumu, Kwale, UasinGishu, Bungoma and Mombasa. This was done to ensure that available information could be used for decision making and panning.

Since 2006, Kenya has put in place an ICT policy framework and implementation strategy. In addition, a national e –health strategy 2011 – 2017 was launched in 2011 whose vision was to develop efficient, accessible, equitable, secure and consumer friendly health care services enabled by ICT". The mission of the strategy is to "promote and deliver efficient healthcare services to Kenyans and consu6mers beyond our borders, using ICT" (Kenya National e health strategy 2011-2017).

Nairobi has approximately four million residents; more than 50% of this population is classified as low or middle income earners while a small percentage are high income earners. Due to these dynamics Nairobi faces major socio-economic and health challenges. These high numbers of inhabitants require health centers with efficient and functioning health information systems. According to the health management information data there are over 5000 health facilities in across the country; the government owns 41% of them, Non-Governmental Organizations owns 15% while private businesses own 43% (Wamai,2009).The government owns most of the hospitals, dispensaries and health centers but clinics and nursing homes are entirely owned by private sector. Nairobi has among the best hospitals followed by central province while Nyanza hospitals have the highest number of bed capacity (Wamai, 2009).

The government, Non-Governmental Organizations and the private sector have been equipping health centers with health information technology systems in order to improve efficiency and to enhance the flow of information within and outside Nairobi. This is aimed at meeting the vision 2030 objectives of providing affordable, quick and effective healthcare services. Unfortunately, this has been often slowed down by underutilization of these systems.

Problem Statement

Enormous investment has gone into computerized information systems worldwide. The estimated cost for each large hospital is about $50m yet the overall benefits and costs of hospital information systems have rarely been assessed (Friedman and Wyatt, 1997).

Over the years the Kenyan government, Non-Governmental Organizations and the private sector have invested heavily in the health sector through the establishment of health information technology projects which are aimed at improving the data collection, storage, dissemination of information and clinical research. However, the intended benefits are partly or never realized due to unsuccessful project implementation (Morris, 1990, Joy 1994). In addition, a casual observation revealed that some of the facilities are using the systems while others aren't using the systems. Thus, the intended results are yet to be realized.

A case study of Kenyatta National hospital to explore the factors affecting the provision of services in the hospital revealed that low employee capacity affects service delivery by 98%, while inadequate use of technology in provision of health service led to a decrease of provision of service quality by 91.7% (Dr.Wanjau *et al*, 2012).Other factors that affected the quality of services include ineffective communication channels and inefficient financial resources by 76.8% and 67.1 respectively.

Health care experts, policy makers, payers and consumers consider health information technologies such as electronic health records and computerized provider order entry to be crucial to transforming the health care industry (Institute of medicine, 2001). While the benefits of health information technology are clear in theory, adapting new information systems to health care has proven difficult and the rates of use have been limited (Valdes et al, 2004).

It is therefore imperative for the government and the development partners to ensure that health information systems are used within all the levels implemented to ensure quality of health is maintained at all times. If not, adverse effects are likely to be experienced. The study therefore seeks to investigate factors affecting the utilization of health information technology projects in Nairobi and provide solutions to these problems.

General Objective

The overall objective of the study was to assess factors affecting the utilization of health information technology projects in Nairobi County.

Specific Objectives

The study was guided by the following objectives:

1. To assess the role of project identification on the utilization of health information systems.
2. To find out the role of project planning on the utilization of health information systems.
3. To assess the influence of project implementation on the utilization of health information systems.
4. To assess the role of project monitoring and control process on the utilization of health information systems.

1.5 Research Questions

In an attempt to achieve the above objectives, the study was geared towards answering the following research questions:

1. What is the role of project identification the utilization of health information systems?
2. How does project planning affect the utilization of health information systems?
3. How does project implementation influence the utilization of health information systems?
4. How does project monitoring and control process influence the utilization of health information systems?

Justification of the Study

The aim of this study is to identify reasons why information technology projects in Nairobi are not fully utilized and to show how this affects the quality of service delivery. The findings from this study can be used by the government and other interested parties to formulate policies on how to improve efficiency through the adoption of new and existing technologies in healthcare centers.

By conducting this study, health institutions will learn that through the use of health information systems, not only do they add value to the organization but also give an institution a competitive advantage.

The study will benefit the government and other implementing partners in learning what is ailing the successful utilization of health information systems. The information gained can in turn be used to improve on those areas so as to improve the overall quality of health.

The findings will be used to add to the body of knowledge on the importance of health information systems to the health sector.

Scope of the Study

The study was conducted on health facilities within Nairobi County. This is because Kenya was the first country in Sub-Saharan Africa to deploy a completely online national Health Information System (HIS) in September 2011 and Nairobi County was among those that benefited from the online HIS with all districts and selected health facilities connecting to the DHIS 2 national server using mobile internet (USB modems) on their computers. (dhis2.org).

In addition, Nairobi been the capital city of Kenya accounts for the largest number of health facilities (Wamai, 2009). Thus, by investigating on the factors affecting the utilization of health information technology projects, the study would assist in developing strategies aimed at promoting the utilization of health information systems not only in Nairobi but in other counties as well. This will lead to solving the problem of underutilization of health systems.

Nairobi been the capital city of Kenya was founded in 1899. It has a population of 3,039 million (2008) and an area of 696km2. The city and its surrounding area form the Nairobi County which is made up of seventeen constituencies (Dagoretti North, Dagoretti South, Embakasi East, Embakasi West, Embakasi Central, Embakasi South, Embakasi North, Kasarani, Kibra, Mathare, Starehe, Langata, Roysambu, Kamukunji, Makadara, ruaraka and Westlands).

According to the Ministry of Health, Master facility list on e-health Kenya, Nairobi has a total of 857 facilities which are owned by the government, private institutions and faith based organizations. However, out of 857 facilities, the study was conducted around 97 health facilities which include National referral hospitals, district hospitals and health center's which are owned by the government, private institutions and faith based organizations.

Limitation of the Study

The study was limited in the following ways:

The researcher found it difficult to convince the health workers to participate in the study who doubted the intention of the study. This was mitigated by explaining to the respondents that the study was meant for academic purposes and a letter from the institution was shown to the respondents.

The researcher also encountered a problem in getting the key respondents to participate in the study due to their busy schedules. This was mitigated by constant follow ups and scheduling meetings at the respondents' convenience.

Another limitation that the researcher experienced was poor infrastructure due to poor roads. This was mitigated by hiring boda boda's and conducting a feasibility study to familiarize oneself with the area before conducting the study.

LITERATURE REVIEW

Introduction

Literature review refers to surveying scholarly articles, books and other sources relevant to a particular issue, area of research, or theory and by so doing, providing a description, summary and critical evaluation of these works. In addition, it provides an overview of the sources the researcher explored while researching on the topic so as to help us know the findings from previous researchers, identify gaps and come up with a study to improve on their findings.

The chapter dealt with the theoretical and empirical literature of the independent variables related to the study.

Theoretical Review

Diffusion of Technological Innovation Theory

According to Rogers and Shoemaker's (1973), they explain why some users adopt to technological innovations early while others adopt late or never adopt all. They state that there are five stages through which adoption to new technologies takes place i.e. knowledge, persuasion, decision, implementation and confirmation. They also urge that users decide to adopt a given technology if they know how to use it and if they know the technology's relative advantage or the benefits that a new technology offers to them through persuasion. Thus, they categorized users into two; those that adopt early (early adopters) and those who adopt late (late adopters). Early and late adopters enhance sustainability of such new technologies. However, even when they know how

to use a given technology and its benefits, some users still do not adapt thus they classified the process as rejection.

According to Davis *et al.* (1989), he states that knowledge increases perceived ease of use of a technology, thereby changing people's attitudes towards the technology and hence actual usage or adoption.

Technological Acceptance Model (TAM)

Davis (1989) aimed at explaining ICT usage behavior that is; what causes potential adopters to accept or reject the use of information technology. According to him, perceived usefulness and perceived ease of use are fundamental determinants of system use and predict attitude toward the use of the system that is the User's willingness to use the system. He defines perceived usefulness as the degree to which a person believes that using a particular system would enhance his or her job performance while perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort.

Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) developed the unified model by reviewing eight models which focus on ICT usage namely the Theory of Reasoned Actions (TRA), Theory of planned behavior (TPB), Technology Acceptance Model (TAM), motivational model, a model combining the TAM and TPB, the model of PC utilization, Diffusion of Innovations (DOI) and the social cognitive theory. The model explains the user's intention to use ICT and the subsequent user behavior. The model considers performance expectancy, effort expectancy, social influence and facilitating conditions as factors that influence user acceptance and user behavior. In addition, the model considers age, gender, experience and voluntariness of use as moderating variables that influence the use of technology.

Venkatesh (2003) defines Performance expectancy as the degree to which an individual believes that using the system will help him or her to attain gains in his performance. Effort expectancy as the degree of ease associated with the use of the system. Social influence as the degree to which an individual perceives that others believe that he or she should use the new system. While facilitating conditions is the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system.

According to Vankatesh (2003), gender plays a moderating role to performance expectancy. According to Minton and Schneider (1980) on gender differences, men tend to be highly task-oriented and hence performance expectancies that focus on task accomplishment are likely to be significant on men. In addition, age, gender and experience have an effect on effort expectancy, in that, younger women particularly those in their early stages of their career have an ease in using the system. Lastly, the theory suggests that women tend to be more sensitive to other's opinions and hence find social influence to be more salient when making a decision on whether to use the new technology (Miller 1976; Venkatesh et al.2000) while the effect declines with the level of experience (Venkatesh and Morris, 2000).

Motivation Theory

Motivation in a project set up refers to performance. This view is supported by a number of theories that present motivation as a function of individual effort and performance. This theories include (McClelland, 1961; Locke, 1968; Vroom, 1964; Adams, 1963; Klein, 1989).Motivation can also be defined as a force that energizes behavior and which is goal directed (Armstrong, 2003). This behavior stems from unsatisfied wants and needs of the individuals leading to the establishment of goals by the individuals (Hull, 1951).

McClelland theory of needs (1961) states that individual's motivation is expressed as their drive to

excel in relation to a set of standards. In relation to a project setting, Garies (2005) presents the concept of 'performance motives' where the individuals are motivated to achieve the performance objectives they set for themselves. This is also supported by Harrison (1994) who observes that individuals working in a project setting are ambitious and are driven by their goals. Locke (1968) in his Goal-Setting theory it shows that individuals having specific goals produces a higher level of output. Thus, when coupled with feedback on performance, motivates the person as this would help a person know how well he has achieved his targets.

Harrison (1994) emphasizes on the role of 'people system' to achieve project performance. He suggests that performance is dependent on how the ability of the people and motivation impacts people's ability and performance, either positively or negatively. Miner (1980) in his study on the relationship between the characteristics of the people involved and motivation, he states that individuals vary in their response to autonomy, extrinsic rewards (pay and promotion), consideration, and achievement opportunities. These observations are upheld by Harrison (1994) who suggests that goal setting, extrinsic rewards, and job enrichment motivate people.

2.3 Conceptual Framework

The conceptual framework is a system of concepts, assumptions, expectations, beliefs and theories that supports and informs your research (Miles & Huberman, 1994; Robson, 2011). In addition, it is a visual or written product that explains, either graphically or in narrative form, the main things to be studied, the key factors, concepts, variables and the presumed relationships among them (Miles & Huberman, 1994).

A variable is a concept that can take on different quantitative values. A dependent variable depends upon or is a consequence of the other variable. While an independent variable is a variable that is antecedent to the other variable (Kothari, 2004).

In this study, the researcher focused on the following independent variables, project identification, project planning, project implementation, project monitoring and control as factors that relate to the utilization of HIS. The study further came up with various recommendations that can be used to improve on the utilization of health information systems in Nairobi County.

Conceptual Framework

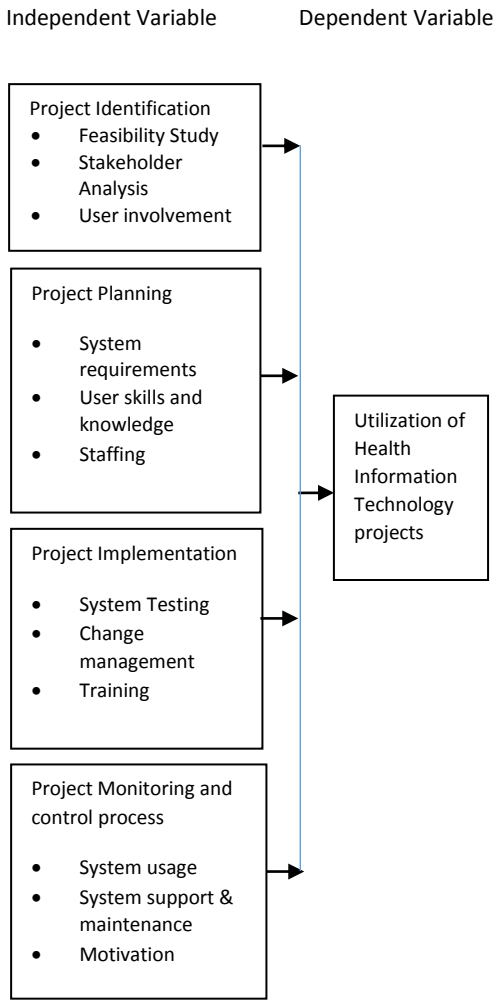

Figure 2.1 Conceptual Framework

Project Identification

Project identification refers to identification of the business problem, need or opportunity. It is after

the identification of the problem, need or opportunity that a business case is defined. According to (Buckhout et al, 1999), a clear business plan and vision is essential to steer the direction of the project. It outlines the proposed strategic and tangible benefits, resources, costs, risks and the timeline (Wee, 2000). A feasibility study is then conducted to investigate whether each option addresses the business problem and a final recommended solution is then put forward (Westland, 2006).

A study by Thorn and Hwang (1999) States that user participation in system development is beneficial to the success of the system. This is because by engaging the users in the actual development of the system, the users are able to give more input on their expectations from the system. This will then translate to a high quality system resulting to frequent use and user satisfaction. According to the CHAOS report (2008), failure to involve users causes a major project failure even when the project is delivered on time and on budget. Manley (1975) states that the degree to which users are involved in the implementation of the project will have a great variation in their support towards the project. In addition, Lucas (1978) emphasizes on the importance of involving users in system development as it improves their likelihood of accepting the system.

One of most important people in the project right from project initiation through project closure are the top management as they assist in steering the project in accordance to the organizational objectives. This is supported by (Bingi et al, 1999) who say that top level management must approve the project and align in accordance to the strategic business goals. According to (Wee, 2000), top level management need to publicly and explicitly identify the project as top priority. Senior management must be committed and willing to allocate resources to the implementation of the project (Holland et al, 1999). This involves providing the needed people for the implementation and allocating appropriate time to get the job done (Roberts and Barrar, 1992).

Project Planning

Project planning involves the creation of a project plan outlining the activities, tasks and timeframes, the creation of a resource plan listing the labor requirements and materials used, financial plan identifying the cost of the labor requirements and material costs, risk plan outlining the potential risks, procurement plan communication plan (Westland,2006).

According to Wekesa (2014), computer literacy a health care provider's attitude towards the system, level of education and age influence the level of utilization of an electronic system which as a result has an impact on the services been delivered. A study on knowledge and utilization of information technology among health care providers and students in Ile-Ife Nigeria found that computer possession and utilization was low. This is because there was lack of a structured training and utilization patterns (Ogunyade *et al*, 2003).

Shortage of staff is a pressing issue in health care. In understaffed hospitals, medical personnel are overworked. Stress, sleeplessness, and fatigue impair thinking and cause lapses in performance. Many hospitals and nursing homes in the U.S. require nurses to work more than 12 Hours a day (IOM, 2004). A U.S. national survey of residents' work hours revealed that 50 per cent of first-year residents and 30 per cent of second-year residents work 30 hours per shift and over 80 hours per week (Baldwin et al., 2003). Undoubtedly, this affects their performance and the quality of health care.

Evidence suggests that shortage of nurses is detrimental not only to quality of patient care, but also to staff morale, which in turn affects staff retention (Wilson, 2006). Patients' mortality rates are higher where standards are weaker, nurse turn over and understaffing is persistent (Aiken et al, 2002). High patient-to-nurse ratios have been

shown to lead to frustration and job burnout, which is linked to higher turnover (Vahey et al, 2004). Significant relationships among workplace incivility, stress, burnout, turnover intentions, total years of nursing experience, and RN education levels have also been reported in studies (Oyeleye et al, 2013).

According to a report from the Ministry of Health (2005) most health facilities in Kenya are understaffed. For example, dispensaries, which make up over three-fourths of the facilities, are mostly run by one or two nurses.

A study which was conducted by Dr. Gatero in 2010 to investigate the availability and utilization of information and communication technology by medical health technologies revealed that medical practitioners need medical information regularly in the course of their clinical work in order to take care of their patients and professional updating on the current medical practices. It emerged that when they needed information they turned to their colleagues. Another frequently used source of information was text books and journals. The use of e-journals and internet was limited. There was lack of library and information services, inadequate use and access of electronic information resources and inadequate ICT skills among health professionals.

Dr Gatero proposes that there should be improved use of ICT to access information in order to enhance service delivery through access and sharing of information among health professionals. Establishment of hospital libraries and information services, appointment of information professionals with skills and capabilities to conduct online information searches to assist in clinical-information decision making, capital investment in the form of internet and supporting infrastructure, and finally to allocate adequate financial resources for improved access to health information by the medical professionals. These ideas could be of much help not only in Nairobi but also to the entire country. Lack of adequate health information is associated with variations in healthcare utilization at various healthcare facilities, especially between rural and urban centers (Thompson, 2003).

Project Implementation

According to PMBOK, a project can be said to have been successfully implemented if it completed within the set timeframe, within the set budget, if it meets the objectives for which is was set for and if it is accepted by the clients for whom it was meant for. Software development, testing and troubleshooting is essential during the implementation of the system (Wee, 2000). In addition, it is imperative to troubleshoot system to ensure proper functioning of the system (Holland *et al,* 1999).

According to Wekesa (2008), on a study on Utilization of the Health Information Management System by community health workers in the Amref facility in Kibera, states that inadequate refresher training has contributed to inadequate use of the health management system. Employees need to be trained to understand how the system will change the business process. In addition, extra training and on-site support for staff as well as managers needs to be conducted during implementation (Wee (2000).

Project Monitoring and Control

Project monitoring is important in keeping track of the project progress. This can be achieved by measuring each milestone achieved against set targets. A study on the factors influencing the acceptance of electronic health records highlighted that perceived ease of use, age and level of education may cause end users to embrace or reject information technology (Glandon et al, 2008). According to the Technology Acceptance Model (TAM), perceived ease of use refers to how difficult a person believes the proposed system would be to use. Age has an influence on the acceptance and utilization of the system in that, younger people embrace technology more openly as compared to older people (Heeks, 2006).

Lack of technical assistance for office staff and physicians have been found to have a negative impact on the adoption of health information systems (Ammenwerth *et al*, 2006). In addition, the inability of electronic health records (EHR) and HIS to communicate with each other (interoperability) has been seen as one of the factors affecting the utilization of HIS.

Manley (1975) states that top management support refers to the nature and support that the project manager can expect from management both for himself and for the project. It may involve allocations of various aspects such as allocation of various resources (financial, manpower and time). He further states top management support influences the client's decision towards acceptance or resistance towards the project. According to Schultz and Selvin (1975) top management support is imperative for the success of the project. According to Beck (1983) project management not only depends on top management for authority, direction and support but also, for the ultimate implementation of the top management's plans or goals for the organization.

Motivation is defined as the individual's internal process that energizes, directs and sustains behavior. In the work context, motivation can be defined as an individual's degree of willingness to exert and maintain an effort towards organizational goals (Nzuve, 1999). At an individual level, factors such as a person's job expectations, his/ her self-esteem to be able to do a certain job and his or her own goals compared to the goals of the organization (Franco et al, 2002).

Motivation improves the worker's morale, reduces tension between the workers and the management thus leading to organizational productivity. However, little is known about the motivational factors that are important for health workers in developing countries (Franco et al, 2002).

According to WHO (1993) improved implementation of performance management activities contribute to the motivation of health staff to work effectively - When non-financial incentives are considered, managers should have the capacity to implement selected performance management activities. Examples of performance management activities that were considered important in the study were supportive supervision, better use of performance appraisal and clearer access to training. These activities can be improved through training (and supervision) of managers and providing tools and guidelines.

In Kenya, the performance of health systems can be improved by training adequate numbers of policy – making and management personnel including public health specialists, policy analysts, hospital managers and drug management specialists (Mutizwa – Mangiza, 1998).

According to McClelland (1976), Human behaviour on the job is influenced by many needs. People acquire or learn certain needs from their culture. When a need is strong enough, it prompts a person to engage in work activities to satisfy that need.

A study by (Schmid and Adams, 2008) on the project manager's perspective on team motivation in project management established that, project managers strongly influence team motivation especially during the early stages of the project. This is because project managers have the ability to create subcultures within the overarching organization in which team dynamics can lead higher level of motivation than the primary organization.

The study further established that to ensure majority of the members involved in the project are motivated about it, project managers have to be sensitive during the early stages of the project. In addition, they must ensure that they communicate clearly during the beginning of the project, strive for top management support and establish clear scope requirements with the client and or sponsor. Lastly, the project manager must involve the team members as early as possible to ensure they buy in

the project from the most important stakeholders in the project.

2.4 Summary

Studies have been done in relation to the utilization of information technology projects. A study conducted by Heeks, Mundy and Salazar (1999) explored on the factors affecting utilization of information system. The study concluded that individual factors such as computer literacy, regular training and refresher courses and attitude towards change were some of the factors that influenced health workers to use HIS.

In a study by Moazzama and Horikoshi (2002) on the utilization of health information systems, the study found that low income and poor working conditions were the main reason why the workers were less interested in utilization of health information system. This negatively affected the performance of healthcare facility resulting to low turnover of patients due to inefficiencies of using the manual systems.

A study conducted by Lippeveld and Limprecht (2001) in Pakistan examined the extent of utilization of health information system management. The findings from this study established that most of the health workers were not trained and did not have the skills to manage data at the health unit for instance drawing graphs and interpreting them. This led to underutilization of HIMS, use of manual systems which led to delays, increased costs and poor quality services. This created a bad image for the facility that resulted to a decline in sales turnover.

Heeks (2006) explored on the benefits of health information management systems in private hospitals. The study found that a computerized HIMS comes with easy and timely accessibility to updated information that provides regular statistics to support reports. This helps to provide feedback which improves reporting and data quality on information systems and developing countries.

Research Gaps

Although extant research has shown that health information system contributes to improved efficiency of services in the health care facilities and customer satisfaction. Some studies contradict with these findings and hence knowledge gaps. A study by Talisuna (2000) investigated on the management and utilization of health management information system in Uganda, Kampala. The study revealed 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 challenge was found to be lack of functional centralized system for routine health data and use of individual patient tick-sheets for scanning. Lastly, most of the studies done do not reflect a project management angle towards as one of the factors that influence utilization of HIS and thus, the study seeks to show how project management influence the utilization of HMIS.

REASEARCH METHODOLOGY

Introduction

This chapter outlines how the research was conducted through the research design, target population, sampling frame, sample size and sample technique, instruments that were used for data collection, data analysis and mode of data presentation.

Research Design

A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. It is the conceptual structure within which research is conducted; it constitutes the blueprint for the collection, measurement and analysis of data (Kothari, 2004). A research design can also be defined as a procedural plan that is adopted by the researcher to answer questions validly, objectively, accurately and economically (Kumar, 2011).

The researcher adopted the descriptive research design to conduct the study. Descriptive research is concerned with describing the characteristics of a particular individual, or of a group. Descriptive research provides an accurate description or picture of the status or characteristics of a situation or phenomenon by describing the variables that exist in a given situation and sometimes, it describes the relationship that exists among variables (Christensen and Johnson, 2012). The researcher adopted this kind of research design because it provided a clear image of the current situation at the health facilities following the implementation of health information systems. Through this research design, the researcher was able to unearth the factors affecting the utilization of health information systems.

Target Population

A population refers to the entire group of people, events or things of interest that the researcher wishes to investigate (Bougie and Sekaran, 2010). A target population is the collection of objects which possess the information required by the researcher and about which an inference is to be made (Bajpai N, 2011).

The research revolved around health facilities within Nairobi that have implemented health information systems. According to the Ministry of Health, Master facility list on e-health Kenya (2014), Nairobi has a total of 857 facilities owned by the government, private entities and faith based organizations. The facilities consist of National referral hospitals, district and sub district hospitals, health Centre's, dispensaries, clinics and so much more.

The study focused on 39 facilities (National, district, sub-district and health Centre's owned by the government, 48 private facilities and 10 faith based facilities constituting total of 97 facilities. The target population below was selected by the researcher because it contained information that the researcher was interested in.

Table 3.1: Target Population

Respondents	**Target Population**
Government owned health facilities	39
Private health facilities	48
Faith Based Organizations health facilities	10
Total	**97**

Sampling

Sampling is the process of inferring something about a large group of elements by studying only a part of it while a sample refers to the selected part which is used to ascertain the characteristics of the large group or population (Pathak P. R, 2008). The researcher adopted stratified sampling technique since it groups government owned facilities, private facilities and faith based facilities into homogenous subgroups that are distinct hence giving precise information on the whole population if the strata were to be grouped together.

Sample Size

The sample size was drawn from three groups: Health facilities owned by the government, health facilities owned by private institutions and health facilities owned by faith based organizations. The sample size constituted 30% of the target population as recommended by (Mugenda & Mugenda, 2003) who recommends at least 30% of the target population to be used for purposes of research.

Table 3.2: Sample Size

Respondents	**Target Population**	**Sample Size**
Government Owned health Facilities	39	12
Private health facilities	48	14
Faith based health facilities	10	3
Total	**97**	**29**

Data Collection Instruments

Data collection involves gathering evidences for either verifying new hypothesis or for checking current conclusions from documentary sources or field sources (Pathak P. R, 2008). In this study, both primary and secondary methods were used.

Primary methods

This is the process of collecting raw data. It consists of information that has never been collected or recorded before thus never been documented. In this method the researcher comes face to face with the respondent and mainly involves the use semi-structured and fully structured questionnaires (Bernard, 2000). The widely used primary data collection methods include: Questionnaires, observation, interviewing and experimentation. The researcher used a questionnaire to collect data.

Questionnaire

A questionnaire is a data collection instrument that is used to collect data for the purposes of research. The questions are structured to address the objectives of the research and are to be completed by the respondent. In addition, the questions could either be open or closed ended questions.

The researcher used a semi- structured questionnaire to collect data. The questions were both closed and open in order to give the respondent a chance to respond to that which had not been captured in the questionnaire. The reason for choosing the questionnaire is because, as Kiess and Bloomquist (1985) observe, it offers considerable advantage in the administration: it presents an even stimulus potential to large numbers of people simultaneously and provides the investigations with an easy accumulation of data. Gay (1992) maintains that questionnaires give respondents freedom to express their view or opinion and also to make suggestions. In addition, it is cheap and easy to administer, data that was obtained by use of questionnaires was easy to arrange and analyze and, the researcher did not need to be physically present when the respondents are filling the questionnaires hence providing the respondents with a free conducive atmosphere to fill the questionnaires. Lastly, questionnaires can elicit information from respondents.

Secondary Methods

This involves the collection of data from journals, magazines, government publications, annual reports of companies etc. (Panneerselvam, 2004). The researcher used secondary data from journals, government publications as a reference point during the study.

Pilot Test

Mugenda and Mugeneda (1999) define reliability as a measure of the degree to which a research yields consistent results or data after repeated trial. The researcher administered five questionnaires randomly to nurses in charge of the health workers within Nairobi County before the actual data collection to enable her test the reliability of the data collection instrument. Through the pilot test, the researcher was able to understand questions or items within the questionnaire that were unclear to the respondent and amended them accordingly. In addition, it provided the researcher and her team with an opportunity to familiarize themselves with the tool.

Validity can be defined as the accuracy and meaningfulness of the inferences which are based on the research results (Mugenda and Mugenda, 1999). This therefore means that validity can be obtained if the analysis of the data represents the area under study. In addition, according to Gay (1992) validity is established by expert judgment. Thus, the questionnaire was constructed under close supervision with the University Supervisor.

Data Analysis and Presentation

This is a process that is done to derive the meaning of the data collected through statistical tools such as statistical package for social sciences (SPSS). The data is analyzed and interpreted to arrive at a logical conclusion and form recommendations based on the findings. The researcher used

Statistical package for Social Sciences version 22.0 to analyze the data and provide findings and recommendation for the same.

The data was organized, presented, analyzed and interpreted using descriptive statistics. Through descriptive statistics, frequency tables, percentages, and charts were used to present the data. In addition, a narrative was also be used to present the qualitative data.

RESEARCH FINDINGS AND DISCUSSIONS

Introduction

This chapter represents the findings of the study as guided by the research objectives. The broad objective of the study was to assess the factors affecting the utilization of health information technology projects in Nairobi County while the specific objectives were to assess how project identification, project planning, project implementation and project monitoring and control process affect the utilization of HIS. The researcher used descriptive analysis to analyze the data collected and presented it in form of tables and charts. Three categories of respondents were the target population; facilities owned by the government, facilities owned by the private institutions and facilities owned by faith based organizations. A semi-structured questionnaire was distributed to nurses, doctors and nurses in charge to help answer the research objectives.

Response Rate

29 questionnaires were distributed to three categories of health facilities; those owned by the government, private institutions and faith based organization. Out of the 29 questionnaires, 25 were returned to the researcher. This represents a response rate of 86% which was considered a sufficient presentation of the population for this study. The 24% of the respondents who never returned the questionnaires cited busy schedules. This response rate was above the 10% recommended by (Mugenda and Mugenda, 2003). These findings are based on the response rate from the respondents.

Reliability Analysis

To successfully conduct the data collection exercise the participants were briefed in advance on the importance of the study by the researcher. Permission was sought for participation in order to have adequate support. Guidance on how to answer the questionnaire was given by the researcher to enhance completion rate and improved accuracy of data collected. Kothari (2004) puts forth that the procedure for assessing the content validity of a measure is to use an expert in a particular field.

Background of the Respondents

Background data was sought on the respondent's gender, age, level of education and marital status. The researcher requested the respondents to indicate their gender. Table 4.1 shows that 60% of the respondents were male while 40% were female.

Table 4.1 Gender

Gender	Frequency	Percent
Male	15	60
Female	10	40
Total	25	100

Respondents were asked to indicate their age. The results in table 4.2, showed that most of the respondents were aged between 31- 40 years at 40%, followed by 32% who were between the ages of 41-50 years. 24% were between the ages of 21-30 years while 4% were the age of 51 years and above (table 4.2) .It can be concluded that most health workers in the health facilities were between the ages of 31-40 years and 41-50 years.

Table 4.2 Age

Age	Frequency	Percent
21 - 30	6	24
31 – 40	10	40
41 -50	8	32
51 and above	1	8
Total	25	100

Respondents were asked to indicate their highest level of education. Table 4.3 shows that, 48% of the respondents were degree holders, 36% of the respondents were certificates and diplomas holders and 16% of the respondents had attained post graduate level of education.

Table 4.3 Level of Education

Level of Education	Frequency	Percent
Certificate / Diploma	9	36
Graduate	12	48
Post Graduate	4	16
Total	25	100

Lastly, respondents were asked to comment on their marital status. Table 4.4 shows that 48% of the respondents were married, 28% were divorced, 16% of the respondents were windowed and 8% were single. This implied that most of the respondents were married.

Table 4.4 Marital Status

Marital Status	Frequency	Percent
Single	2	8
Married	12	48
Divorced	7	28
Widowed	4	16
Total	25	100

The study showed that 60% of the respondents were male while 40% were female. 40% of the health workers are between the ages of 31-40 while 32% were between the ages of 41 – 50 years. During the study, most of the health workers between the ages of 41 – 50 years stated that they faced some difficulty in using the system. They cited reasons like the system not been user friendly while their colleagues between the ages of 31 – 40 years and 21 – 30 years said they didn't face any difficulty on using the system. According to a study by Heeks (2006), 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 study further revealed that 48% of the health workers were graduates, 36% had acquired their certificates and diplomas while 16% had acquired a post graduate level of education. Lastly, 48% of the health workers were married.

Role of Project Identification on the Utilization of HIS

The researcher was interested in finding out the role of project identification on the utilization of health information systems. The respondents were asked to indicate whether they had participated in the feasibility study in order to establish the effect of project identification on the utilization of health information systems. It emerged that most of the respondents had been involved in the feasibility study. Table 4.5 shows that 60% had been involved while 40% had not been involved.

Table 4.5 Participation in the Feasibility Study

Feasibility Study	Yes	No	Cumulative Percent
	60%	40%	100

The respondents were asked to indicate the involvement of the project sponsors and stakeholders in the project planning and implementation process. From the findings in table 4.6, it is evident that 88% of the respondents

confirmed that project sponsors and stakeholders were actively involved in the project identification process while only 12% of the respondents were of the opinion that project sponsors and stakeholders were not actively involved.

Table 4.6 Sponsors and Stakeholders participation

Sponsors and Stakeholders participation	Yes	No	Cumulative Percent
	88%	12%	100

Questions were further posed to respondents to help understand if the users were involved in defining the system needs. This was intended to find out if the users were part of the team that was involved in designing the system. From the findings in table 4.7, most of the users were not involved in defining the system needs. 65% of the respondents pointed out that they weren't involved in defining the system's needs while only 35% of the respondents were involved in defining the system's needs. Some of them explained that though their managers were part of the stakeholders, they were hardly involved in defining their needs and only got to hear some of it from staff meetings.

Table 4.7 User Involvement

User Involvement	Yes	No	Cumulative Percent
	35%	65%	100

Role of Project Planning on the Utilization of HIS

The respondents were requested to indicate the expected system requirements that were as documented in the project plan. Table 4.8 shows that 48% of the respondents expected that through the system drugs could be ordered electronically, 32% of the respondents expected that through the system patient records could be stored and retrieved electronically, 12% of the respondents expected that they would share patient's records with the clinician while 8% of the respondents expected that pharmacists would be allowed to dispense drugs electronically.

Table 4.8 System Requirements

System requirements	Frequency	Percent
Store and Retrieve Patient records	8	32
Sharing Patient Records	3	12
Order Drugs	12	48
Allow Pharmacists to dispense Drugs	2	8
Total	25	100.0

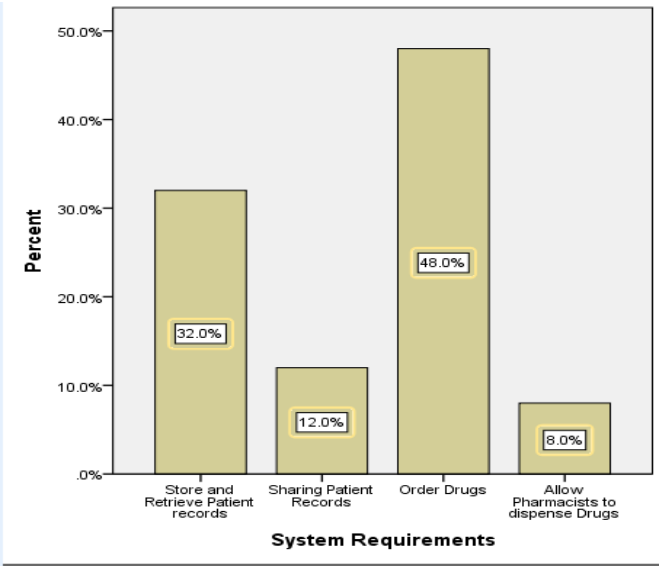

Figure. 4.1 System Requirements

Respondents were further asked to indicate whether they understood how to use information system within the health facility. Table 4.9 shows that 55.57% of the respondents were not knowledgeable on the use of HIS while 44.43% of the respondents were knowledgeable on the use information system within the health facility. This shows that although a huge investment has been done on the HIS, the uptake was low. It was further discovered that most of the respondents who knew how to use the system had acquired the knowledge

from on the job training. The training was done practically while working.

Table 4.9 Knowledge on the use of HIS

Knowledge on the use of HIS	Yes	No	Cumulative Percent
	44.43 %	55.57%	100

The researcher sought to find out if understaffing existed and if it had an effect on the utilization of HIS. Respondents were requested to indicate the number of staff and the number of patients served in a day.

Table 4.10 Number of staff against number of patients Served in Day

	Number Staff		Number of Patients	
Category		Frequency		Frequency
Government	1 - 10	8	1 - 20	2
	11 - 20	7	21 - 40	5
	21 - 30	5	41 - 60	8
	31 +	5	61 +	10
Private	1 - 10	3	1 - 20	10
	11 - 20	6	21 - 40	7
	21 - 30	8	41 - 60	5
	31 +	6	61 +	3
FBO	1 - 10	4	1 - 20	6
	11 - 20	7	21 - 40	8
	21 - 30	8	41 - 60	7
	31 +	6	61 +	4

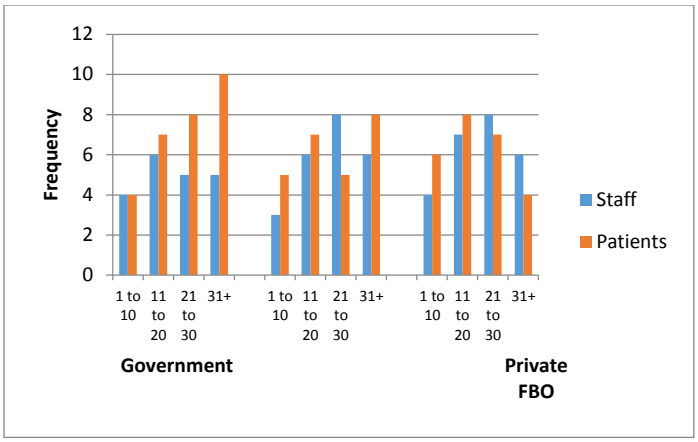

Figure 4.2: Number of staff against number of patients served

From Figure 4.2, the government based facilities appear to have the highest staff to patient ratio. On average, the government facilities appear to be understaffed because the discrepancy between the patients and staff increases as the facility increases it holding capacity. Big hospitals that have more than 31 members of staff appear to be overwhelmed by the workload since the number of patients increases simultaneously. The staff to patient ratio is low in private hospital hence the workload appears less in all levels and this may be the major motivator of using the system. However, the FBO had the lowest number of staff and patients recording a simultaneously.

The system project plan revealed that through the HIS, drugs could be ordered electronically as recommended by KEMSA so as ensure that facilities had the required drugs, ensure efficiency and avoid stock outs. In addition, the system was meant to allow users to store and retrieve patient records, share patient records with the clinicians and allow pharmacists to dispense drugs.

Effect of Project Implementation on the Utilization of HIS

Questions were posed to verify if the system met the user's needs. Respondents were asked to indicate whether they were involved in testing the

system before it was deployed to a certain if the system had been developed as per the user needs documented in the project plan. From the findings, most of the respondents cited been involved in testing the system. Table 4.11 shows that 60% of the respondents were involved in testing the system while only 40% of the respondents were not involved.

Table 4.11 System Testing

System Testing	Yes	No	Cumulative Percent
	60%	40%	100

Respondents were further asked to indicate if the changes identified during the testing phase were implemented accordingly. From the findings, 62% of the respondents cited that the changes were not implemented while 38% of respondents indicated that the changes suggested were implemented (Table 4.12). It can therefore be concluded that lack of implementing the suggested changes affected effectiveness of the HIS.

Table 4.12 Change Implementation

Change Implementation	Yes	No	Cumulative Percent
	38%	62%	100

The researcher sought to find out if the respondents were trained on how to use the system as well as find out how often refresher trainings on the use of HIS were conducted. Most of the respondents, 48% indicated that they underwent refresher training after a period of 1- 2 years. 24% of the respondents indicated that they undertook a refresher training course after a period of 9-12 months, 16% underwent a refresher training after a period of 5- 8 months while only 12% of the respondents indicated that they undertook training after 1-4months. The study can therefore conclude that most employees in the health care departments underwent a refresher training course after a period of 1- 2 years to keep updated on the current trends regarding the HIS.

Table 4.13 Refresher Training

Refresher Training	Frequency	Percent
1-4 Months	3	12
5-8 Months	4	16
9-12 Months	6	24
1-2 Years	12	48
Total	25	100.0

Effect of Project Monitoring and Control Process on the utilization of HIS

Questions were posed to help understand how the users were using the system. From the findings on table 4.14, only 33.3% of the respondents agreed that they store and retrieve patient records using electronic means while 66.7% used manual systems. 74.7% of the respondents indicated that they order drugs electronically while 25.3% of the respondents indicated they ordered drugs the manual way. It was further revealed that sharing of information with the clinician and dispensing of drugs to patients was done manually. These statements were supported by 73.7% and 68.6% of the respondents respectively.

During fieldwork, it was revealed that the 74.7% of the respondents who mentioned they ordered drugs electronically were from facilities owned by the government and hence, it was a requirement from KEMSA to order drugs electronically. In addition, some respondents mentioned to using both the electronic and manual way in performing different tasks. They said they preferred the manual way since in some cases, the systems hanged thus making them too slow to execute any operation from the users. They also said that sometimes the systems broken down and it took long to be repaired when a malfunction occurred thus resulting them to using the manual way.

Table 4.14 System Usage

System Usage	Electronic	Manual
Storage and retrieval patient records	33.3%	66.7%
Ordering of drugs	74.7%	25.3%
Sharing patient information with the clinician	26.3%	73.7%
Dispensing drugs to patients	31.4%	68.6%
Average	41.4%	58.6%

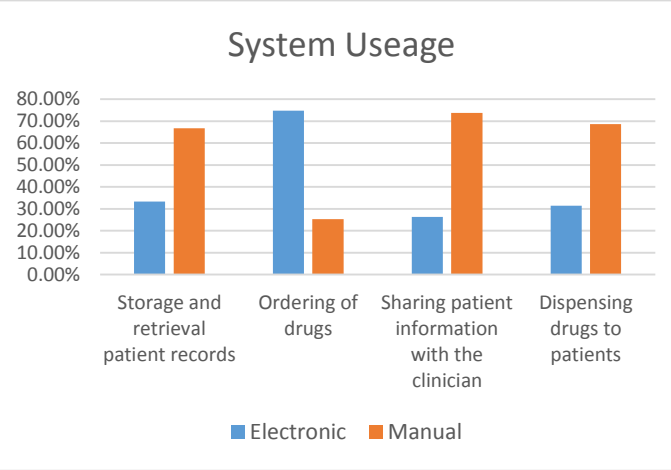

Figure 4.3 System Usage

Respondents were requested to indicate the time it took to repair the system in case of a breakdown. This was intended to find out if it had an effect on the utilization of the system. 60% of the respondents indicated that it took more than a week to repair the HIS. 28% of the respondents indicated that it took a day for the IT department to repair the health care system. 8% indicated it took a month, while only 4% of the respondents indicated that it took over one month to repair the HIS (table 4.15). This shows that most health facilities took a week to repair their HIS.

Table 4.15 Duration of system repair

Length of Time to Repair	Frequency	Percent
1 Day	7	28
More than a week	15	60
A Month	2	8
Over a Month	1	4
Total	25	100.0

Questions were posed to help understand the stakeholder's participation towards providing system support so as to ensure sustainability of the system. Respondents were requested to indicate if the project sponsors provided them with system support after the implementation of the HIS. From the findings, 55% of the respondents indicated system support was not provided by the project sponsors while 45% indicated that the project sponsors provided them with support (Table 4.16). Most of those who noted that the project sponsors didn't offer them any form of support, mentioned that the IT staff in the facility provided them with system support such as training them on how to use the systems.

Table 4.15 System Support

System Support	Yes	No	Cumulative Percent
	45%	55%	100

The researcher asked the respondents to rate their level of motivation on the satisfaction of various needs.

Motivation by the rate of salary increment offered

From Figure 4.4, only 15% percent of the employees working in government institution were motivated by the salary increment. The rate of motivation in private sector was the highest at 48% based on salary increment while the level of motivation

	Government		Private		FBO	
Satisfaction of needs	Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
Rate of salary increments offered	4	15%	12	48%	8	32%
Assurance on job security	15	60%	7	28%	8	32%
Safety of working conditions	6	25%	6	24%	9	36%
	25	100	25	100	25	100

based on salary in FBO organization at 32%. This indicates that the private hospitals provided better remunerations and allowances that inspire their workforce.

Motivation by the Assurance of Job security

From the illustration in Figure 4.4, Job security appears to be the highest motivator to government employees with 60%. However, in private sector, lack guaranteed job security is a major factor that made 28% of the respondents felt motivated. Nonetheless, 32% of the respondents in Faith Based Organizations were motivated by the assurance of job security.

Motivation by the rate of working conditions available

From the presentation in the figure 4.4, government and private sector employees appeared to be the least motivated due to provision of safe working conditions with 32% response rate. The motivation of employees in FBO hospitals is also high at 36%. This shows that despite the increased promises to better pays in the public and private sector, the FBO institutions still maintains the trust of their employees.

Table 4.16 Level of motivation on the satisfaction of needs

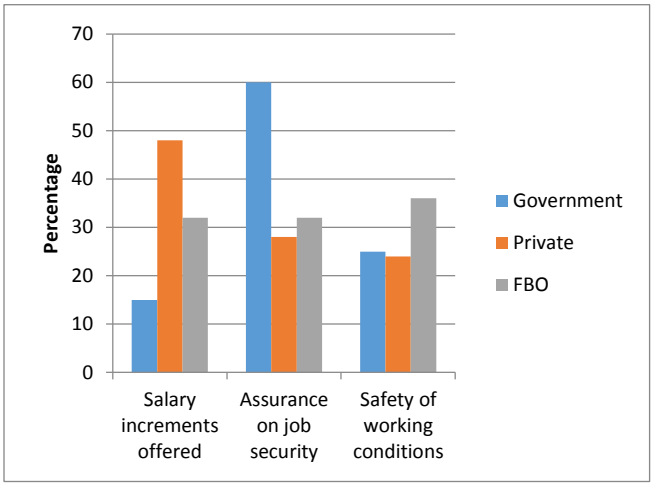

Figure 4.4: Level of motivation of on the satisfaction of needs

Respondents were requested to state ways that could be used to improve utilization of the health information systems. Some mentioned that upgrading the systems to accommodate new programs would make the systems flexible and up to date. In addition, they mentioned that proper maintenance of the HIS will not only make the system more efficient and effective in its work, but also, improve on the quality of health care services offered by the health care facilities.

The findings further revealed that the systems have eased the work load since it is able to execute a lot of work with improved accuracy and reliability. This in turn helps the health facility to deliver quality services leading to improved customer confidence and satisfaction.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter provides a summary of the findings from the research, conclusions drawn from the area study and recommendations made. It also highlights the areas of further research.

Summary of findings

The broad objective of this study was to assess the factors affecting the utilization of health information technology projects in Nairobi County. Out of the questionnaires that were send out, a large majority of these were returned to the researcher. 25 out of 97 health facilities in Nairobi County were sampled to participate in the study.

Effect of Project Identification on the utilization of HIS.

Under this objective, the researcher was interested in finding out the role of project identification on the utilization of health information systems. The study revealed that 60% of the respondents were involved in the feasibility study while 40% indicated that they were not involved. It was concluded that most of the respondents participated in the feasibility study. This is consistent with a study that was conducted by Mitchell (1997) who emphasized on the importance of participation in the feasibility study during implementation of information technology health projects. He argues that it improves effectiveness of the project since project implementers can be able to design the project in a manner that suites the customer needs.

From the findings, 88% of the respondents confirmed that the sponsors and relevant stakeholders were actively involved during project identification while 12% cited lack of participation from the project sponsors and relevant stakeholders. It was further established from the respondents who cited lack of participation from the sponsors and stakeholders that in some cases, the stakeholders and project sponsors failed to attend crucial project meetings that needed their input with regards to decision making and hence the project had to be delayed awaiting their input. The findings are in line with the CHAOS report (2008) which emphasizes on the importance of executive support as it influences the process and progress of a project and it also states that lack of executive input can affect a project severely.

It was further established that 65% of the respondents who were users of the system were not involved in defining the system's need while only 35% of the users participated in defining the system's needs. This observation relates to a study by Talisuna et al (2009) in Uganda on the designing, tailoring and monitoring the Health sector Strategic plan. It was concluded that for a system to effectively suite the needs of the customers, the firm has to understand the system needs.

Effect on Project Planning on the utilization of HIS

From the findings, project planning has a great influence on the utilization of HMIS. It was established that 55.57% of the respondents were not knowledgeable on the use of HIS while 44.43% were knowledgeable on the use of the HIS. Those who knew how use the system had received on the job training while others had acquired the knowledge from school.

Most of the facilities were found to be understaffed as compared to the number of patients they attend to. This in return had an effect on the utilization of the HIS since most of the respondents mentioned that they at times opt for the manual method to offer various services in the health facility. This usually happened when queues got long and one had to use the manual methods since according to them, it was easier and helped to save time while serving patients.

Effect of Project Implementation on the Utilization of HIS

This objective aimed at assessing the influence of project implementation on the utilization of HMIS. The study established that the system was tested

before it was deployed. This is supported by 60% of the respondents were involved in the testing of the system while 40% of the respondents were not involved. This is consistent with a report by PATH (2013), which states that for an information system to be successfully implemented, it is imperative to conduct three types of tests to the system. User acceptance test, is a test in which the key users test if the system has lived up to their requirement. It takes place in a controlled central setting with test data. A pilot test is then conducted in a real life setting in which a limited number of real users work with the system entering real data while ensuring they maintain the normal process as much as possible. Finally, a volume (stress) test is conducted. It involves a large number of users entering a large number of transactions to ensure the system is scalable. This shows that most of the respondents were involved during the system testing before it was deployed thus enabling the users to verify if the system met the needs defined.

Upon testing the system, users noted that some changes had to be made to ensure the system met the user needs. Unfortunately, as noted in the research findings, 62% of the respondents indicated that changes noted were not implemented while 32% cited that the change were implemented. It can therefore be concluded that lack of implementation of system changes had an effect on the utilization of the health information system. This finding is coherent with the explanations given by World Health Organization in 1994 which put more emphasis on the need to incorporate suggested changes in health projects implementation. The report insists on the need to make changes pointed out during implementation to ensure that the health projects meet the needs of its customers.

The study further established that health workers undertook refresher trainings after a period of 1 -2 years. This hinders them from improving their skills and expertise in utilization of health information systems. The findings are in line with a study conducted by Stansfield (2005) who insists on the importance of training and capacity development programs to employees. According to the study findings, it is necessary for the employees to update and improve their skills based on their areas of specialty since it gives them confidence and motivation to work. In addition, it enables them to tackle challenges in their work.

Effects of project Monitoring and Control process on the utilization of HIS

This objective aimed at assessing the influence of project monitoring and control on the utilization of HMIS. With regard to the influence of motivation on the level of satisfaction, the findings revealed that most of the health workers working for the private sector were highly motivated by most aspects of their job. This explains why there is high utilization of HIS compared to the public sector. These findings are in tandem with the Vujicic et al. (2004) who insisted on the importance of motivating employees for improved performance. He pointed out that remuneration and working conditions influence motivation levels and satisfaction among employees. Demotivated employees exhibit poor performance in contrast with motivated employees.

It was also observed that the duration taken to repair the HIS is also a contributor to underutilization of HIS. This is evidenced by 60% of the respondents who indicated that it took more than a week for the system to be repaired while 28% of the respondents indicated that it took a day for the IT department to repair the health care system. 8% indicated it took a month, while only 4% of the respondents indicated that it took over one month to repair the HIS. This is supported by a study conducted by Moazzam and Horikoshi (2002) which investigated the causes of underutilization of information systems in the health facility in Pakistan. It was concluded that the one of the main

causes of underutilization was inefficiency in repairing the HIS in cases of breakdown.

Conclusion

Based on the above findings, the researcher deduced the following:

Age has an effect on the utilization of health information systems as most of the respondents aged between 41 – 50 years found difficulty in the use of the system while those aged between 31 – 40 years and 21 – 30 years had no problem in using the system.

User involvement plays a key role in the success of the utilization of an information system. This is because the users are able to air their views with regards to the project and hence lead to the sustainability of the project since they will have owned the project. In addition, user involvement leads to motivated users due to the fact that they are involved in decision making of the project.

The number of staff in a health facility has a great influence on the utilization of the HMIS. From the above findings, most of the health facilities are understaffed and hence don't utilize HMIS appropriately. This is because according to them, using the manual method is easier. This can be explained by the fact most of the health facilities run parallel HMIS which are not integrated to communicate with each other thus giving the health workers more work with regards to filling information in the systems.

Change implementation has a great influence on the utilization of the HMIS projects. This is because, despite the users having been involved in testing the system during development, the changes noted were not implemented. According to project management change management is important for the success of the project and hence the project manager should ensure that change is managed adequately.

Lack of adequate refresher trainings has also influenced the utilization of the HMIS greatly. Delay in the repair the HMIS has also resulted in the users using the manual methods. This is evidenced in the usage of the HMIS whereby delay has been cited as one of factors that has resulted users to using the manual methods.

Recommendations

Based on the findings, the researcher recommends the following:

During project identification of any system development project, users should be involved in defining their needs. This is important since it ensures that the users identify their needs which should be taken into consideration during system design. In the end, it results to the utilization of the system since the users have a sense of ownership.

The government needs to increase the number of staff in facilities to ensure proper service delivery within the facilities. This will in turn result to utilization of HIS. Regular training to the healthcare workers. This will be helpful in sharpening their skills and increasing their knowledge in computer and information communication technology for sustainability of the program.

HIS systems should be repaired promptly to ensure they are utilized adequately. In addition, system change should be incorporated to ensure the system operates in the planned manner.

The management should support proper project planning. This can be achieved through proper designing and implementation of health information technology projects. This involves involvement of health workers in the process of implementation to ensure that they understand the system which in return will result to utilization of health information technology and thus improved performance.

Health facilities need to ensure regular refresher training to ensure that health is updated on the use

of the HIS as well as on new systems. In addition, health facilities should ensure employees are well motivated with regards to the salary paid for the work done and improve the working conditions.

Areas for further Research

Future researcher should be conducted in the private sector among other sectors that are similar in terms of size and areas of intervention. Findings can be drawn to determine the factors affecting utilization of health information technology projects in Nairobi County. Conclusion can then be drawn to determine if there areas of commonalities or unique factors.

Although the research compared a few aspects of HIS utilization in the government and private facilities, further research needs to done on the utilization in private health facilities. In addition, Future research can be done to establish the best practices to adopt in order to achieve improved utilization of health information technology and how to achieve a competitive advantage from the benefits derived.

Lastly, a comparative study can be carried out to assess the factors affecting utilization of health information technology projects in Hospitals within Nairobi. Laying more focus on the challenges of adoption and implementation of information technology and ways of resolving these challenges. This will provide more insights on the best practices to adopt in utilization of health information technology systems for improved efficiency and quality services.

REFERENCES

Aiken, L.H., Clarke, S.P., Sloane, D.M., et al. (2002) Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction. JAMA, **288**, 1987-1993.

Armstrong, M. 2003. *A Handbook of Human Resource Management Practice*. London: Kogan Page

Baldwin, D.C., Daugherty, S.R., et al. (2003). "A national survey of residents' self-reported work hours: Thinking beyond specialty." Academic Medicine. 78(11): 1154-1163

Bajpai Naval (2011), Business Research Methods, Dorling Kindersley (India) Pvt Ltd, Pearson Education, South Asia.

Beck, D. R. "Implementing Top Management Plans Through Project Management," in *Project Management Handbook,* ed. Cleland, *D.* I. and King, W. R. (Van Nostrand Reinhold. New York, 1983), pp. 166-184.

Bingi, P., Sharma, M.K. and Godla, J. (1999), ``Critical issues affecting an ERP implementation'', *Information Systems Management*, pp. 7-14.

Bougie Rodger and Sekaran Uma (2010), Research Methods: A skill Building Approach, John Wiley & Sons 2010.

Christensen Larry, Johnson Burke (2012), Educational Research: Quantitative, Qualitative and Mixed Approaches, SAGE Publication, United States of America.

Charles P. Friedman, Jeremy Wyatt (1997), EVALUATION METHODS IN MEDICAL INFORMATICS. Newyork, Springer London.

David A Powner, Linda D.Kooontz (2005) Health Information Technology: HHS is Taking Steps to Develop a National Strategy, Diane Publishing.

Davis, F. D., Bargozzi, R.P., & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. Management Science, 35, 982-1003.

Elske et al (2003) Evaluation of health information systems-problems and challenges. International Journal of Medical Informatics, volume 71, issues2-3, pages 125-135. Retrieved from http://www.sciencedirect.com/science/article/pii/S138650560300131X on 2nd October 2013.

Franco L.M., Bennett S., Kanfer R. (2002): Health Sector Reforms and Public Sector Health Worker Motivation: A Conceptual Frame Work. Social Science and Medicine 2002, 54: 1255 -66.

Gay, L. R; (1992). Educational Research, Competences for Analysis and Application, Ohio: Charles E. Merill Publishing.

Harrison, L. 1994. Motivation in the Project Setting. In D. Lock (ed.) ***Gower Handbook Of Project Management***: 531-549. England: Gower Publishing

Health Metrics Network. 2009. Guidance for the Health Information System Strategic Planning Process: Steps, Tools and Templates for HIS Systems Design and Strategic Planning. Geneva.

Heeks, R. (2006). Health Information Systems: benefits failure, success and improvisation, International Journal of Medical Informatics, 75(2), 125-137.

Heeks, R.B, Mundy, D. & Salazar, A. (1999). Factors affecting utilization of information system succeed or fail, working paper series No: 9, University of Manchester, Manchester.

Holland, P., Light, B. and Gibson, N. (1999), ``A critical success factors model for enterprise resource planning implementation'', *Proceedings of the 7th European Conference on Information Systems*, Vol 1, pp. 273-97.

Hwang, M. I., & Thorn, R. G. (1999). The effect of user engagement on system success: a meta-analytical integration of research findings. Information & Management, 35(4), 229-236.

Institute of Medicine. Committee on Quality of Health Care in America (IOM): Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: National Academy Press; 2001.

Joy p.k (1994) Total project management, The Indian context, Bombay, publisher.

Kenya National eHealth Strategy: 2011-2017. Ministry of Medical Services and Ministry of Public Health and Sanitation. http://svn.who-mahler.net/hci-content/ethiopia/lib/exe/fetch.php?media=workshops:ethiopia:kenya_final_national_ehealth_s trategy_2011-2017_.pdf

Kothari C. (2004) Research Methodology: Methods and Techniques, New Age International.

Kohari C.R (2004): Research Methodology: Methods and Techniques (Second Revised Edition). New Age International Publishers, New Delhi.

KIT (2001). A study of motivation of health staff in northern Viet Nam Amsterdam: Royal Tropical Institute.

Kumar R. (2010), Research Methodology: a step by step guide for beginners, SAGE Publications Ltd,1 Oliver's Yard,55 City Road, London ECIY ISP.

Lau F et al. (2006).*A review of the predictors, linkages, and biases in IT innovation adoption research,* Journal of Information Technology, 21 1–23.

Leon Alexi (1999). Enterprise Resource Planning. Tata McGraw-Hill Publishing Company Limited, 7 West Patel Nagar, New Delhi.

Locke,E.A 1968. Toward a Theory of Task Motivation and Incentives. ***Organizational Behavior and Human Performance***, 3: 157-89.

Lorenzi NM, Riley RT, Blyth AJ, Southon G, Dixon BJ. (1997).*Antecedents of the people and organizational aspects of medical informatics: review of the literature*. J Am Med Inform Assoc; 4:79-93.

Lippeveld, T. Gul, Z, Limprecht, N. (2001). Assessment Study on Health Information Systems in Pakistan: Pakistan Child Survival Project, Ministry of Health, National Basic Health, Services Cell, Islamabad

Lucas H. C. Jr. "The Implementation of an Operations Research Model in the Brokerage Industry," in *The Implementation of Management Science,* ed. Doktor, *R.,* Schultz, R, L. and Slevin, D. P. (North-Holland. New York, 1979), pp. 139-154.

Manley. J. H. "Implementation Attitudes: A Model and a Measurement Methodology."

in *Implementing Operating Research and Management Science,* ed. Schultz. *R.* L. and Slevin, D. P. (Elsevier. New York, 1975), pp. 183-202.

McClure David P., (2007) e-Health and America's Broadband Networks An Examination of How Broadband Services Enhance Health Care In America, A publication of US Internet Industry Association, August 14, 2007

McClelland, C.1961.*The Achieving Society*. Princeton, NJ: D Vannostrand Co

McManus J. and Wood-Harper T. (2003). Information Systems Project Management: Methods, Tools and Techniques. Harlow, England: Pearson Education Limited.

Miles, M. B., & Huberman, A.M. (1994): "Qualitative Data Analysis: An Expanded Sourcebook" (2nd edition). Beverley Hills, Sage.

Miller, J.B (1976): *Toward a New Psychology of Women*, Beacon Press, Boston.

Multi-donor Support Unit (MSU) (2001).*An overview of the health sector: The way forward. In: Health sector in Pakistan*: Ministry of Health, Government of Pakistan: 34-6.

Mutizwa-Mangiza, D. (1998). Impact of Health Reform on Health Worker Motivation. Abt Associates, Inc. Bethesda.

Ministry of Medical Services and Ministry of Public Health and Sanitation: Nairobi.

Ministry of Health Kenya (2005) The 2005 Kenya Health Workers Survey.

Miner, J.B. 1980. ***Theories of Organizational Behavior***. San Diego: The Dryden Press

Minton, H. L, and Schneider, F.W (1980) *Differential Psychology*, Waveland Press, Prospect Heights.

Moazzam, A, Horikoshi, Y. (2002).Situation analysis of health management information system in Pakistan. Pakistan J. Med. Res; 41:64-9.

McClelland, D. C. (1976). The Inner experience, New York, Prentice-Hall

Nzuve, A.N. (1999): Elements of Organizational Behaviour, Nairobi University Press, Nairobi.

Nursing and Midwifery Council of Nigeria, Statistics of Nurses, 2012.

Oyeleye, O., Hanson, P., O'Connor, N. and Dunn. D. (2013) Relationship of Work Incivility, Stress, and Burnout on Nurses' Turnover Intentions and Psychological Empowerment. Journal of Nursing Administration, **43**, 536-542.

Pathak P.R (2008), Methodology of Educational Research, Atlantic Publishers & Distributors Ltd, New Delhi.

Rajaraman V. (2006). Introduction to Information Technology. Asoke K. Ghosh, Prentice-Hall of India Private Limited.

Roberts, H.J. and Barrar, P.R.N. (1992), ``MRPII implementation: key factors for success'', *Computer Integrated Manufacturing Systems*, Vol. 5 No. 1, pp. 31-8.

Schmid, B., & Adams, J. (2008). Motivation in project management: The project manager's perspective. *Project Management Journal*, *39*(2), 60-71.

Schultz, R. L. and Slevin, D. P. "Implementation and Management Innovation," in

Implementing Operations Research and Management Science, ed. Schultz, R. L. and Slevin, D. P. (Elsevier. New York, 1975), pp. 3-22.

Stansfield S. (2005). "*Structuring information and incentives to improve health*". Bulletin of the World Health Organization, 83(8):562.

Stilwell, B. (2001): Health Worker Motivation in Zimbabwe; Geneva: World Health Organization.

Sergon, Kibet. 2009. Presentation to the DPHK: Highlights on Health Information System (HIS).

Talisuna, A. O. (2000). HMIS: Is it tailored to monitoring the Health Sector Strategic Plan, Uganda Health Bulletin, 7(2), 1-2

Vahey, D.C., Aiken, L.H., Sloane, D.M., et al. (2004) Nurse Burnout and Patient Satisfaction. Medical Care, **42**.

Valdes I, Kibbe DC, Tolleson G, Kunik ME, Petersen LA**.** Barriers to proliferation of electronic medical records. Inform Prim Care. 2004; 12:3-9. [PMID: 15140347]

Venkatesh, V. Morris, M.G and Ackerman P.L "A Longitudinal Field Investigation of Gender Diffrences in Individual Technology Adoption Decision Making Processes," *Organizational Behavior and Human Decision Processes (83:1), 2000, pp.33-60.*

Wanjala, Pepela & E.A. Ogara. 2010. Presentation: Health Information System and Use of ICT in the Health Sector.

Westland Jason (2006): Project Management Life Cycle; A step by step methodology for initiating, planning, executing and closing a project successfully. Great Britain by Cambridge University Press.

Wee, S. (2000), ``Juggling toward ERP success: keep key success factors high'', *ERP News*, February, available http://www.erpnews.com/erpnews/erp904/02get.html.

Wilson, C. (2006) Why Stay in Nursing? Nursing Management, **12**, 31.

WHO (1993). Training manual on management of human resources for health, Section 1, part A, Geneva.

WHO (2011).*Analyzing disrupted health systems in countries in crisis training course*.

WHO Regional Office for the Western Pacific (WHO-WPRO).(2003).*Practical principles on building and improving health management information systems.*

Willcocks L, Lester S.Evaluating the feasibility of information technology Research discussion paper DDP93/1. Oxford: Oxford Institute of Information Management,1993. (Confirm the second names of the authors)

http://www.ehealth.or.ke/facilities/districts.aspx?mst=prv&prvid=40

http://www.pmi.org/About-Us/About-Us-What-is-Project-Management.aspx

2009f. Health Sector Strategic Plan for Health Information System 2009-2014. Nairobi.

2008a. Health Information System Policy 2009-2014. Ministry of Health: Nairobi.

2009e. Health Management Information System (HMIS): Review of Software's in the Health Sector.