

**DETERMINANTS OF EFFECTIVE UTILIZATION OF ROUTINE HEALTH
INFORMATION WITHIN PRIVATE HEALTH FACILITIES IN
KAMPALA-UGANDA**

BY

Abias Katesigwa Asiimwe

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Department: School of Business and Management

Supervisor

Professor Benon Basheka

UTAMU

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LIST OF ABBREVIATIONS

| | | |
|-------|---|--|
| GAVI | : | Global Alliance on Vaccines and Immunization |
| GFTAM | : | Global Fund to Fight AIDS, TB, and Malaria |
| HIS | : | Health Information System |
| HMIS | : | Health Management Information System |
| HMN | : | Health Metrics Network |
| MOH | : | Ministry of Health |
| PPP | : | Public Private Partnership |
| PRISM | : | Performance of Routine Information System Management |
| RHI | : | Routine Health Information |
| RHIM | : | Routine Health Information Management |
| RHINO | : | Routine Health Information Network |
| WHO | : | World Health Organization |

CHAPTER ONE

INTRODUCTION

1.1 Introduction

The study intends to examine the determinants of effective utilization of routine health information in the private health facilities within Kampala. World Health Organization (WHO, 2003) regards routine health information system an integral component of any health care system as it provides the context with which effective data collection, analysis and reporting of health information. Utilization of routine health information has potential to facilitate the development of the private health care facilities' indicators such as decision making, planning and monitoring and evaluation. Routine health information is likely to allow private health facility managers and service providers to document, analyze and use information to improve coverage, continuity and quality of health care services at all levels by better planning, monitoring and evaluating of private health facility services.

The study will consider, effective utilization of routine health information as the dependent variable (DV) while determinants of effective utilization of routine health information as the independent variable (IV). This chapter will also look at the background of the study, the statement of the problem, the purpose of the study, the objective of the study, the research questions, the hypothesis, the scope of the study, the significance, the justification and operational definition of terms and concepts.

1.1 Background of the Study

1.1.1 Historical Perspective

Since the 18th century, accurate and complete data was delivered to users as information which played an important role in the health planning, management and decision making (Schaufeli,

2007). Evidence-based plans and decisions were of great necessity and were based on accurate, complete and timely data. Good planning and management depended on the availability of reliable, accurate and timely information. Most often, decisions on whether or not to use routine collected data for planning and decision making were made subjectively.

Snow (1936) demonstrates how the appreciation towards the originality of use of health information relates to the cholera epidemic that ravaged London in the mid-1800s and how officials used local registers of birth and deaths to provide information on mapping the number of deaths in relation to the sitting water pumps. This helped in controlling the epidemic as a public health concern in the community.

This later evidenced the foundation of American Health Information Management Association (AHIMA), in 1928 "when the American College of Surgeons established the Association of Record Librarians of North America (ARLNA) to 'elevate the standards of clinical records in hospitals and other medical institutions such that effective health information records are put in place to ensure health practitioners easily tracked the prevalence of diseases as well as knowing how treatable they can be (Sauerborn, 2000).

Thereafter emerged the establishment of HIMSS establishment in 1961 to increased health information knowledge. The Healthcare Information and Management Systems Society (HIMSS) was organized in 1961 as the Hospital Management Systems Society (HMSS), an independent, unincorporated, nonprofit, voluntary association of individuals. It was preceded by increasing amounts of management engineering activity in healthcare during the 1950s, when teachings of Frederick Winslow Taylor and Frank Bunker Gilbreth began to attract the attention of health leaders. The HIMMS grew to include chapters, membership categories, publications,

conventions, and continues to grow in different parts of the world via its Europe, Asia Pacific, and Middle Eastern branches. Health information managers are charged with the protection of patient privacy and are responsible for training their employees in the proper handling and usage of the confidential information entrusted to them. With the rise of technology's importance in healthcare, health information managers must remain competent with the use of information databases that generate crucial reports for administrators and physicians (Sauerborn, 2000).

The Declaration of Alma – Ata in 1978, led most developing countries to implement health sector reforms among which the utilization of routine health information became very important for reference and evidence (WHO, 1978). A central feature of the reform strategy has been a process of structural decentralization, the aim being to vest greater decision making responsibility in the district health systems. The underpinning primary level health management units in the delivery of health services were taken as the core providers of health services to the people especially in rural areas which meant that they also carried the responsibility of managing health related information (WHO, 1978).

Globally, all countries in the world have adopted the system of Health Information System which first led to output of high quality and timely data which are the foundation of the functionality of the health system and inform decision making in each other five building blocks of health care system that finally affect quality health service delivery and health outcomes (Mills, 1990). Although the geo-politics vary from country to country, the district tends to be the last format unit of local government and administration (Mills, 1990). Across the variations of decentralization of developing health systems, the success of decentralization has predominantly been considered to rely significantly on the capability of the district health system to effectively exercise its assigned authority and play its role in the reformed health structure. Thus, there has

been a deliberate movement to strengthen the management capacity of district health system (Boone, et. al., 2013).

In the United Kingdom, the government and Non-Governmental Organizations considered the improvement of the use of health information in all health related entities to be integral in scaling up the delivery of quality health care services. This is because improved health information use requires improved quality of data and of information products which in turn requires improved health information systems (HIS) (Boone, et. al., (2013).

On the African continent, most countries particularly Sub-Saharan countries such as Nigeria have witnessed a growing private sector engagement and interest in the role of private for – profit sector in health service provision. This is also a similar case to most countries of the world of low and middle income countries. Many countries have a vibrant and growing private health sector which is perceived by some to respond to public health failures. Private health providers are argued to deliver services that are more accessible, affordable and responsive to the needs and preferences of users (Aqil A, et. al., 2009:496).

In 1970s, driven by the international health agenda that supports the United Nations Millennium Development Goals, efforts were underway across Africa to improve the health care and reduce barriers to service uptake (Murray, 2004). In the early 1970's, Kenya's Ministry of Health (MOH) recognized the need to establish the health information systems(HIS) which is a system for the collection and processing of data in various sources. The HIS was made of several data sources. Data collected focused on Ministry of Health headquarters needs. The information generated was expected to assist in the formulation of health policies, setting of priorities and evaluation of health care programs. In the HIS, the Health Management Information System

(HMIS) was created followed by subsequent units of Vital Health Statistics Unit and Evaluation and Research Unit (Jutand, 2000).

In the Uganda context, health information dates back to 1985, at a time when it was a central health information system (HIS) focused on morbidity and mortality (Schaufeli, et. al., 2006). Based on the need for more information with an impact on management aspects, the system was reviewed in 1992, 2000 and 2004 with culmination into the current human management information system. Among the aims of the new system was to improve the capacity of health related decision making at the district level in light of the decentralization policy that was being implemented in the country.

With the new system was in place, improvements in the aspects of timeliness and completeness of reports were progressively registered. In terms of content, the system is paper based at the health unit level where the information is collected using various HMIS forms and registers and computerization takes place at the higher levels i.e. the district headquarters and at the national level. The system collects information regarding resource management, logistics and commodities management, individual client activities and preventive for MCH among others (Boone, et. al., 2013).

1.1.2 Theoretical Perspective

The study will use an Evidence Based Health Information System Theory by Carbone (2008). The theory holds that there is a need for evidence based information regarding the organization daily routine information to make planning and policy formulation for any developmental organization. Carbone (2008) defends the need to know the importance of having information system theories that will be conducive to the adoption of new technologies in health settings

cannot be underestimated. According to Carbone, (2008), the concept of evidence is not new to health settings; however in health the use is normally reserved for medico-clinical endeavors only. The findings from this examination and the relevant authoritative literature suggest evidence to be the key conduit or foundation pathways where information system implementation are quickly accepted and sustainably adopted. The arguments are drawn on the following premises and conclusions.

The theorist further argued that health settings are owned and run by health workers who at the same time key personnel for decision making (Carbone, (2008). Clinicians are trained in scientific thought (empirical rational methods). Empirical rational change management strategies exist. Empirical rational methods influence clinical practice behavioral change / motivation device). Evidence of care deficit in clinical practice is found in the local (electronic) health records. Empirical rational change management strategies using local data (evidence) affects behavioral change positively. Sustainability of change and further change depends on the evidence success (Carbone, 2008).

Where the evidence based system construct represents the core business of health (patient core). Identifiable by its twin concerns: input task (drivers) and output task (outcomes). It can be thought of clinical task (business) that needs to be performed or improved (though the adoption of information system) like the management, prevention or treatment of clinical problem of any health setting. As much it sub-sums all other concerns in this theory. The bottom line, to borrow a business term is ‘the clinical improvement of patient care.’ The catalyst, as with an operating system is the enabler of that overall “clinical care’ task. However, along the way (from input to output) the catalyst, like an operating system, must make sure that a set of circumstances or optimization occurs to allow the clinical (input) task – driven by the expectation of improving

the health of an individual or population is satisfactorily carried out (output) known in the health field as a clinical outcome (Jutand, 2000).

The tasks carried out by the catalyst (operating system) to enable evidence-based system to succeed are multiple; for example, just to name a few of the potential sub-systems in health settings, it must allow members of the clinical team (Doctors, Nurses, Staff etc) to communicate with each other, it must make sure that risk management system exist to follow up on patients that might miss out on clinical care; it must ensure that there is a sound financial systems underpinning the work being carried out. Another principal role is to measure the success in achieving that original task (improvement in health outcomes) (Aqil A, et. al., 2009).

A key aspect of this theory is the relationship between catalyst and the human / workforce sub-system. This relationship needs to be built around principles of mutual trust and purposeful action between individuals that appear to share a common 'end' goal (health outcomes improvements). This connection between the catalyst and health setting is not always evident as sometimes 'individual's short term goals' might not be the same; for example the Information System (IS) practitioner (catalyst) might be more compelled to be financially and workforce savvy; each sharing their expertise to create a contextually customized and optimized health information system. This explanation is by no means comprehensive, but begins to discuss the basic assumptions behind the construct' relationship (Jutand, 2000).

1.1.3 Conceptual Perspective

Information which is a key concept of the study is defined by Bailey and Pang (2004), as data which is accurate and timely, specific and organized for a purpose, presented within a context

that gives it meaning and relevant and can lead to an increase in understanding and decrease in uncertainty.

Health information on the other hand refers to the demographic information, medical history, test and laboratory results, insurance information and other data that is collected by a health care professional to identify an individual and determine what type of care that individual should receive or to determine appropriate care (Thompson, 2004). He shortens it as any information about health status, provision of health care, or payment for health care that can be linked to a specific individual.

According to Kruse, (2003), there must be full utilization of information routinely collected by private health facilities in the facilities' decision making and planning in order to influence the facility's development and performance. Ideally, local data should be collected, analyzed and used in order to support local health management and local health service delivery in order to foster decision making process.

Routine health information which is one of the key concepts of the study has been used to mean "information that is derived at regular intervals of a year or less through mechanisms designed to meet predictable information needs" (Rhino, 2001). Example of routine health information are information generated from data collected by health workers on various programmes, Maternal and Child Health, communicable diseases, tuberculosis and drug programmes. Routine data can also be collected from the community. According to Aqil et. al., (2009:488), routine health information has much been disregarded especially by private health facility in the decision making process and policy formulation and thus failure of health facilities to consider routine

health information for decision making and planning has been a result of several determinants which forms a motivation for carrying out this study.

The determinants to the routine utilization of routine health information are categorized into; technical factors, organizational factors and behavioral factors (Deming, 1993) and this will be a basis for the formulation of the objectives of the study that will guide the whole research process. In this study, these categories of determinants are reported to have an influence to the proper utilization of routine health information for better private health facility management (Boone, et. al., 2013).

The term ‘utilization’ of data (routine health information) which in this study has been used as a concept of the dependent variable means the analysis, synthesis, interpretation and review of data as part of a decision-making processes, regardless of the source of data. The study focuses on the demand for and use of data as captured in various data sources such as surveys and facility recordings. (Khunga, et. al., 2005) asserts that effective utilization of information collected by health facility is key factors for proper formulation of key principles, policies and regulation on which a good operating health facility can continue to succeed. ‘Data informed decision making’, then, refers to the proactive and interactive processes that consider data during program monitoring, review, planning and improvement; advocacy; and policy development and review (Khunga, et. al., 2005). Similarly, Aqil, et. al., (2009) argues that the failure of some private health facilities to utilize routine health information need to be blamed on the lack of technical team within a private health facility to properly utilize data to good end results.

Khunga, et. al. (2005), defines information system as a common name for an organization within an enterprise that is responsible for its data processing and information system or systems.

Khunga. et. al., (2005), argues that health institutions should have organizations for maintaining and organizing information for the health systems. Information is used at various levels of the health system for health service and system management planning, advocacy and policy development. Therefore, support to planning and decision making and improved quality of and access to health care were key among others the benefits of the health information systems reported by the nurses and doctors during an evaluation of the health management information system in Uganda Catholic Medical Bureau (Boone, 2013).

1.1.4 Contextual Perspective

In the Ugandan perspective, a health information system (HIS) was designed in 1985 to capture and analyze morbidity data for selected communicable and non-communicable diseases and other services like immunization and family planning (MOH, 1985). Information was collected in the health facilities, summarized at the district level and later forwarded to the Ministry of Health at the Centre where data analysis would be done. After 7 days of implementation, it was felt that the system was leaving out vital management information such as staffing levels, infrastructure, health facility management, medical equipment availability, financial information and drug management. A review was therefore commission in 1992 with the aim of determining possibilities of collecting management information using the same channel.

Until 1993, Uganda had a central Health Information System (HIS) focusing on mortality and morbidity reporting with data flow from one individual health unit to the district and national level. With government policy of decentralization and public private partnership (PPP) of service delivery where health management information system harmonized integration of data information from both public and private sector health facilities.

Kampala district is the capital city of Uganda with 5 administrative divisions, namely; Kampala Central Division, Nakawa Division, Kawempe Division, Lubaga and Makindye. All these 5 division accommodate a very big population which means a representation of a number of private health facilities to serve the demand of health services to the people. It is however important to note that all these health facilities are mainly private continuously receiving patients and therefore making routine recording of patients information concerning disease, and treatments. Important to understand, is whether the continuously recorded data are regarded by these private health facilities to make decision making for quality service delivery and contributing to national policy formulation. The major intention of this STUDY therefore is to document whether private health facilities in Kampala district base on their routine collected information to make their organization decision making process.

1.2 Statement of the Problem

The private health sector is considered an important and relevant sector and since is it a private profit – oriented business sector, much emphasis should be placed to monitor its operation and progress if not that private health facilities may do their things out of line with the district health system and the standards of the ministry of health (Chaled, et. al., 2013).

Private health facilities are supposed to provide routine relevant health information to the ministry of health and relevant authorities on the statistics concerning the health state of the people who seek medical attention from them and way forward to either improve or to keep the standard of the health system but it is surprising that this is rarely or not done at (Gnassou , 2008). More so, private health facilities are meant to employ health workers who routinely record and document data on a daily, weekly monthly and mainly basis but such records are either not complete or nonexistent meaning that they cannot effectively be used a yard stick for

decision making and policy formulation. It is therefore not clear as to why these health facilities have continuously put a widening gap in managing their routine health information a gap this study intends to fill.

It is however, sad to note that the information recorded is only used by private health facility not as a basis of decision making process and policy formulation but as a basis of analyzing cost and profit stand of these health facilities which is not bad but looking at the side of decision making data can help them for improved service delivery (Uganda Demographic and Health Survey, 2011). The detrimental part of this is that, private health facilities might fail to realize growth in terms of effective service delivery which counts on the positive outcome of tasks completed in time with the satisfaction of their clients and if this continues private health facility success might become a nightmare. This study is therefore an attempt to examine the determinants of effective utilization of routine health information by private health facilities for decision making, planning and evaluations.

1.3 Objectives of the Study

1.3.1 General Objective

The major objective of the study is to examine the determinants of effective utilization of routine health information by the private health facilities towards decision making, planning and evaluation of performances.

1.3.2 Specific Objective

1. To establish how technical factors influence utilization of routine health information in private health facilities in Kampala district.
2. To establish how organizational factors influence utilization of routine health information in private health facilities in Kampala district

3. To establish how behavioural factors influence utilization of routine health information in private health facilities in Kampala district.

1.4 Research Questions

1. How do technical factors influence effective utilization of routine health information in private health facilities in Kampala district?
2. How do organizational factors influence effective utilization of routine health information in private health facilities in Kampala district?
3. How behavioral factors influence effective utilization of routine health information in private health facilities in Kampala district?

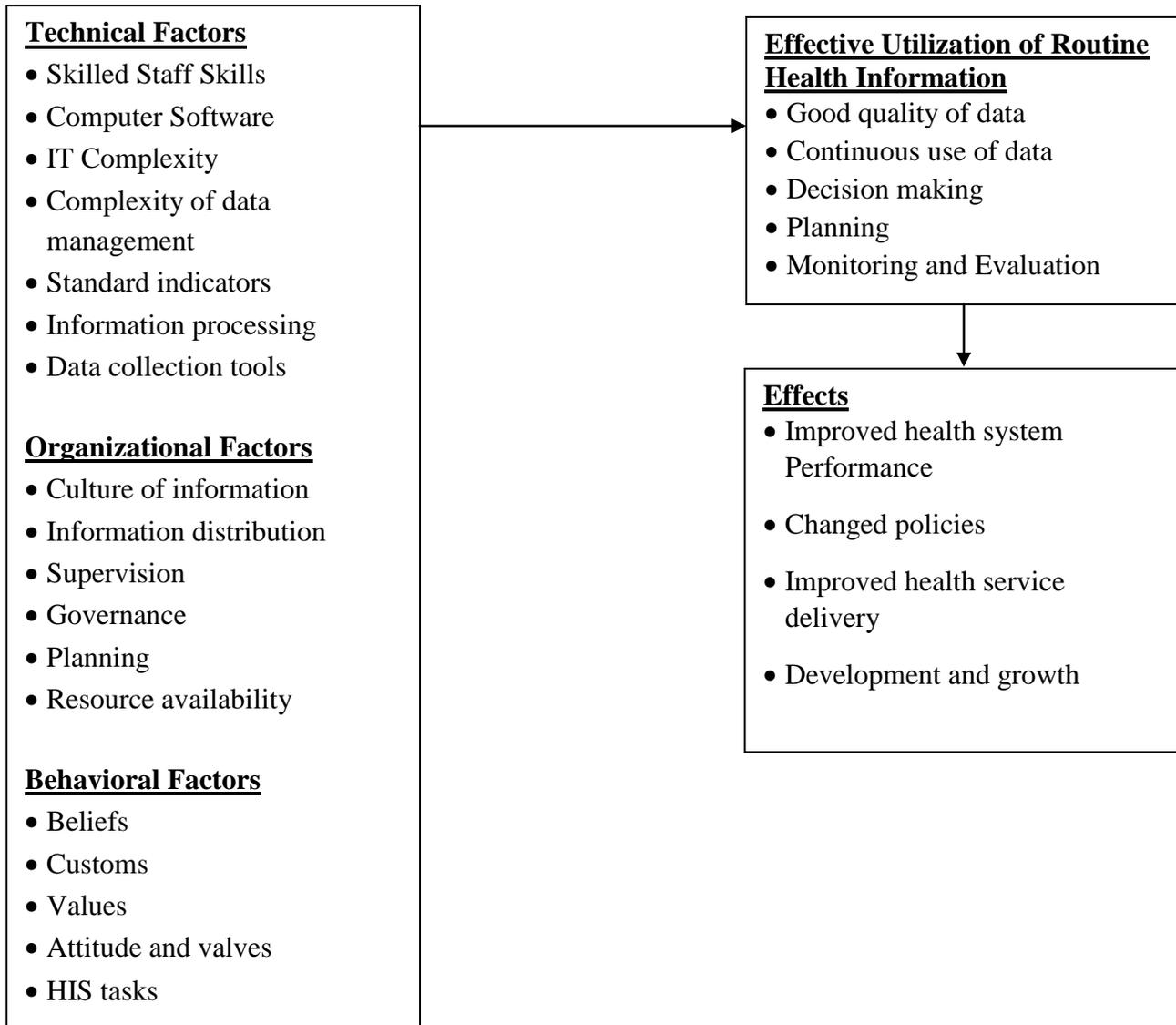
1.5 Hypothesis

1. Technical factors significantly influence the effective utilization of routine health information in private health facilities.
2. Organizational factors significantly influence to the utilization of routine health information in private health facilities.
3. Behavioral factors significantly influence effective utilization of routine health information in private health facilities.

1.7 Conceptual Framework

Independent Variables

Dependent Variables



Source: Deming (1993)PRISM (Performance of Routine Information System Management) framework

The framework above depicts an effect that in order to effectively utilize routine health information by private clinics, several factors must be considered. These are technical, organizational as well as behavioral as far as this study is concerned. Technically, the skills by

the health facility staff, data management tools among others affect the utilization of routine health information system. More so, several organizational factors like information distribution, supervision as well as resource availability have an effect on the effective utilization of routine health information among private clinics. Lastly but not least, behavioral factors like ones belief, values and attitudes towards health information also affect its effective utilization among private health clinics.

1.8 Justification of the Study

The good completion of the earlier scientific works like the Work of John Snow in cholera epidemics were made possible by using registers (data) of births, deaths and address maintained in 1800s (Doyle, 2002). Kaen, (2006) points out that where resources are scarce, it's more important that evidence informs decisions for wise use of limited resources. Keeping information and referring to information for national and international findings is a key component of all big sectors be it, agricultural, fishing and transport and therefore to health recording keeping is too crucial and be emphasized for better and improved service delivery. Particularly in the private sector where the major intention of the owners is profit making, it is possible to disregard information for decision making and reporting information daily to managers. In local areas where record keeping in private health facilities is not strictly emphasized, increased deaths seem to be much and the blamed for this cannot be taken away from the exemption of daily routine information for decision making and policing. Realizing this, means an urgent needs to transform the ongoing problem hence the need for this current study.

1.6 Significance of the Study

The study will act as an eye opener for the private health facilities on the relevance of routine health information for the purposes of decision making, planning and evaluations. The study will unveil the different determinants for effective utilization of routine health information as available in the private health facilities.

The study will be useful for private health facilities to know the relevancy of installing health information systems relevant for better information management. The study will change the intention of private health facilities from the behaviour of profit aiming to better and improved service delivery in maximizing profits.

The study will act as a source of literature for scholars who wish to do further studies about health information utilization or in other fields related to the factors that affect the effective utilization routine health information both in private and public health facilities.

The study may be an eye opener for the Ministry of Health and other relevant health authorities in finding ways of ensuring that private health facilities and clinics effectively utilize routine health information using the recommendations that will be put forward after the study.

1.9 Scope of the Study

1.9.1 Content Scope

The study will specifically focus at investigating the determinants of effective utilization of routine health information by private health facilities in Kampala district. The independent variable to be determinants whereas the dependent variable effective utilization of routine health information.

1.9.2 Geographical Scope

The study will be carried out among randomly 20 selected private health facilities offering comprehensive health care services in the five divisions of Kampala district that is central division, Makindye, Lubaga, Kawempe and Nakawa. It is expected that health facility managers, health workers and district division health officers and health information officers will act as respondents for providing information necessary for the study.

1.9.3 Time Scope

The literature considered relevant for this study will be ranging from 2000 to 2014 and statistical information ranging from 2004 to 2014 will be used for the study. The field study activity will be conducted between the months of May and July 2015 and therefore private health facilities that will be offering comprehensive health care package at the time of the study will be among the sample population of the study.

1.10 Operational Definitions

Comprehensive health care package: A facility offering the minimum health care services including HIV/AIDS care and SMC services

Data: Unprocessed raw data or facts

Determinants: The elements guiding and limiting use of routine health data and information

Information: In this study, information refers to collected and effective data for use.

Health Information System: A set of component and procedures organized with the objective of generating information which will improve health care management decisions at all levels of the health system. Health information System integrates data collection, processing, reporting, and use of the information necessary for improving health services effectiveness and efficiently through better management at all levels of health services

Health Information Management System: A system designed to produce information to be presented to the management to assist in decision-making and to enable it to ascertain the progress made by the health facility in the achievement of its major objectives

Routine Health Information system: Ongoing data collection on health status, health interventions and resources

Private Health Facilities: Non-government health providing units that include ONLY private for profit (PFP)

Utilization: The ability to manually or computer, analyze and interpreter data for decision making

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature reviewed in this chapter is related to the guiding objectives of the study which are; To establish what technical factors influence utilization of routine health information in private health facilities, To establish the organizational factors influencing utilization of routine health information in private health facilities and To establish what behavioral factors influence utilization of routine health information in private health facilities Literature used in this study is obtained from textbooks, libraries, documentaries, internet and journals to fit the notes of the topic under study.

2.2 Theoretical Review

The study will use an Evidence Based Health Information System Theory by Carbone (2008) and theoretical review looks at the different scholars who used the Evidence Based Health Information System Theory in their own studies.

In a study by Lorenzi, (2011) in Melbourne, Australia, he utilized the Evidence Based Health Information System Theory. The study was to bridge the gap between the Information systems theory and health service delivery in health. He argued that neither the information systems literature nor the health sector have been able to provide any satisfactory pathway to facilitate the adoption of information systems in health settings. He however acknowledged how the Evidence Based Health Information System Theory is helpful in this respect by saying that there was need for evidence based information to effectively have any information system functional. He further continued by reviewing the common pathway to develop information systems theory and the knowledge foundations used in the process, and then proceeds to highlight how it is only the

existing evidence of information or collected health information that can improve information availability for any form of technology to be supplied with the relevant data for routine utilization.

Little (2003) noted that for any health information to be useful to the final decision or policy makers there must be concrete evidence that it was collected and processed very well to suit the final user. In this, he referred to the Evidence Based Health Information System Theory saying that they evidence is needed for the information to be available or availed by the health workers, also there must be evidence that the information is credible for use in health related functions. In the same study, he noted that clinicians need to be trained in scientific enquiry such that the health information they gather is highly regarded with enough evidence that it is worthy to be used by decision making entities. He also used the Health Information System Theory to give explanation regarding the effect that health information has on its usage and usage health facilities level.

In a study by Bates, (2009), he argued that quality data must be place to reduce clinical and medical errors. He also used the Evidence Based Health Information System Theory as he clearly stated that the evidence based systems construct the core business in extension of health care to patients. Using information technology, health practitioners can reduce rates of medication errors in hospitals but evidence of reliable health information must be acquired from the clinicians as well as other personnel responsible for information gathering in health facilities.

A study by Gnassou, (2008) also talked about how evidence is critical in health information in hospitals. He argued that the tasks carried out by the catalyst (operating system) to enable evidence-based system to succeed are multiple; for example, it must allow members of the

clinical team (Doctors, Nurses, Staff etc) to communicate with each other, it must make sure that risk management system exist to follow up on patients that might miss out on clinical care; it must ensure that there is a sound financial systems underpinning the work being carried out, hence, the Evidence Based Health Information System Theory.

2.3 Conceptual Review

The study referred to the conceptual model called the PRISM framework, an innovative approach to design, strengthen and evaluate routine health information systems (RHIS), emphasizes RHIS performance and incorporates organizational, technical and behavioural determinants of performance.

According to the authors such as Aqil, Hotchkiss, Lippeveld, Mukooyo, Asiimwe. (2008), in recent times of resource constraints, good governance, transparency and accountability have become the mantra of development, and consequently more attention is given to strengthening evidence-based decision-making and information systems. Also, the emphasis on tracking Millennium Development Goals (Schaufeli, 2006), and the practice of performance-based release of funding requested by international funding agencies, such as the Global Alliance on Vaccines and Immunization (GAVI) and the Global Fund to Fight AIDS, TB, and Malaria (GFTAM), require increasing amounts of quality information. This trend is reinforced in the health sector by emerging infectious diseases and environmental disasters, which need timely information for action.

Recently the Health Metrics Network (HMN) was established as an international network to increase the availability and use of timely and accurate health information from a variety of data sources (HMN Secretariat 2006). Debates abound at different forums regarding which data

source is preferable for developing and tracking health system targets, documenting best practices or effectiveness of interventions, and identifying gaps in performance. Health system managers have no substitute for routine information in terms of monitoring progress towards achieving service coverage objectives and managing associated support services (e.g. logistics, human resources, finance) for their local target populations. Thus, the focus of debate should shift from abandoning RHIS over other sources of data to showing how to improve RHIS. In response to this need, and based on empirical work by Boone , (2013), presented a draft Prism framework at an international workshop on district HIS in South Africa (Rhino, 2003). In the absence of an ‘operational’ definition of RHIS performance in the literature, RHIS performance was defined as ‘improved data quality and continuous use of information’. It was stated that RHIS performance is affected by three categories of determinants: technical, behavioural and environmental/organizational (Boone., 2013). The RHIS performance occurs within an environment/organizational setting. Organizational members need motivation, knowledge and skills (behavioural factors) to perform RHIS tasks, and specialized technical know-how/technology (technical) is required for timely analysis and reporting.

The PRISM framework brings a paradigm shift in RHIS design and evaluation by considering RHIS to be a system with a defined performance (Deming 1993), and by describing the organizational, technical and behavioural determinants and processes that influence its performance. The PRISM framework states that RHIS performance is affected by RHIS processes, which in turn are affected by technical, behavioural and organizational determinants. It shows that behavioural determinants have a direct influence on RHIS processes and performance. Technical and organizational determinants can affect RHIS processes and performance directly or indirectly through behavioural determinants. For example, the

complexity of data collection forms (technical) could affect performance directly or indirectly by lowering motivation. Thus, the PRISM framework delineates the direct and indirect relationships of the determinants on RHIS utilization and measures their relative importance. The PRISM framework also opens opportunities for assessing the relationships among RHIS utilization, health system performance, and health status.

2.3.1 RHIS performance / Utilization

According to Lippeveld, (2009), RHIS utilization is defined as improved data quality and continuous use of information. Data quality is further described in four dimensions: relevance, completeness, timeliness and accuracy. Relevance is assessed by comparing data collected against management information needs. Completeness is measured not only as filling in all data elements in the facility report form, but also as the proportion of facilities reporting in an administrative area (e.g. province or district). However, without assessing use of information, it is difficult to know whether a RHIS is meeting its intended objectives, improving evidence-based decision-making, and consequently leading to better health system performance. Therefore, efforts were made to operationalize use of information for measurement (HISP 2005; MEASURE Evaluation2005). The PRISM framework defines use of information employing criteria such as use of information for identifying problems, for considering or making decisions among alternatives, and for advocacy.

2.3.2 Technical Factors affecting utilization of health information

Boone, (2013), defined technical determinants as all the factors that are related to the specialized know-how and technology to develop, manage and improve RHIS processes and performance.

These factors refer to development of indicators; designing data collection forms and preparing procedural manuals; types of information technology; and software development for data processing and analysis. Thus, it is necessary that RHIS users have good knowledge and information technology skills to effectively use and sustain it. However, in low technology settings, well-designed, paper-based RHIS can still achieve acceptable levels of performance.

According to the findings made by Sauerborn(2000), the complexity of the system design used in entry and recording of data is the most important technical factor affecting utilization of routine health information by private health facilities. Particularly in health facilities where external data systems consultants are hired for only designing and framing the system of data entry, it becomes difficult for the health workers who are responsible for daily routine entry to use and manage the system. Most of the consultant personnel for designing these systems have tendency of selling the new versions and editions of data entry system such as sun systems and e-views. These systems require again employment of a special person for entry of data and management the system as it also requires renovation and update. In relation to the above, Boone, (2013), also argues that the complexity of these systems makes it hard for health workers to utilize the system and end up using manual paper files recording which makes information spoilt and poorly managed.

In addition to the discussion of the technical factors limiting utilization of routine health information, Rhoda(2010), discovered that some of the software for running the system of data entry and computation are also scarce, expensive and complex. The complexity of the softwares also is a scary matter of private health facilities to invest a lot of money in such complex

softwares which is only done for modernizing the health facility not for motivating workers in the system.

In the course to argue the technical factors determining utilization of the routine health information, the arguments made by Jutand, (2000), in commenting the influence of IT complexity cannot be ignored. Gopalan (2013), argues that IT use and applications are a new concept in modern institutions in developing countries particularly those in Africa. African institutions right from the top district level are fond of using manual systems of data recording; that is through writing on papers and keeping in cupboards. The use of digital systems alone means firing the existing working team and employing new working team which has knowledge in IT use and application. Again, leaving the existing old team without knowledge of IT use requires further training. To make matters worse, the existing old working teams have a lot of experience and knowledge towards the history of the health facilities making them hard to fire. It is therefore the advancement of technology that requires use of digital IT – based systems that makes utilization of routine health information hard and difficult.

According to Adeya, et..al., (2006), in United States of America, a step in strengthening health information systems is important to link information production to use has been emphasized. Users of health information include those delivering care and those responsible for managing and planning health programmes both within countries (health and finance ministries) and outside (donors, development banks and technical support agencies). At the same time, decision-making around country health priorities necessarily involves the wider community, including civil society. A good health information system should therefore present and disseminate data in appropriate formats for all audiences and this mainly depends on the competence of the working team.

The process of conveying technical information effectively also influences routine health information utilization among private health facilities. Dumont, et. al., (2012), noted that, there are difficulties in conveying technical information effectively which include low numeracy skills limit the extent to which percentages, rates, and ratios can be used; low literacy levels may limit acceptance, understanding, and use of information; messages are misunderstood if they are not adapted to appropriate culture and language; they are ineffective if they stop short of suggesting an action; it is difficult to craft compelling messages on routine, “boring” subjects.

Complexities in sharing information with the media and the public are also opined by Dumont, et. al., (2012), as one of the technical determinants of effective utilization of routine health information. Fear of the misuse of information may impede its being communicated at all or may require that a spokesperson communicates only distilled information to the media; journalists may be “bloodhounds” who search for bad or sensational news; information is powerful and may be deliberately misused by the media to send the wrong message (e.g., cholera epidemic used as a weapon to criticize entire department of health).

Systemically, all stakeholders’ involvement in indicator development of data use is a strong factor in determining the level of utilization of routine health information in private health facilities especially in sub-Saharan countries such Nigeria. This issue also falls under the behavioral category. Lack of coordination and poor system design can lead to inefficiencies or non-use of information. Donors may have different agendas or needs that work against program needs and an efficient RHIS. Donor needs often result in special studies that bypass RHIS and further burden the health system. Including the private sector may be challenging, but in some countries it is necessary because the private sector plays a major role and RHIS and indicator selection require adequate budgetary resources.

The competence of health information system operators to manage data quality also influences the effective utilization of routine health information. For consistent data use to occur, data need to be of high quality so that data users are confident that the data they are consulting are accurate, complete, and timely. Without quality data, data-informed decision making will not occur and program efficiency and effectiveness will suffer (Mavimbe, Braa, & Bjune, 2005). Data quality protocols need to be developed, communicated, and implemented, as well as training and retraining of health professionals on data quality techniques and approaches.

In South Africa, changes have been made to identify information needs by the technical team of the health information management system has an impact on the level of utilization of routine health information. Information systems are developed to meet the needs of multiple data users throughout a health system. Because of the many types of data users that access information systems and their diverse needs, the resulting data may not necessarily respond to the specific information needs of all data users (Davies et al., 2011). Moreover, the vast amount of information may be overwhelming to the potential users who are ill equipped to navigate the data resources available to them. To facilitate data use, a focus needs to be placed on what stakeholders need to know to effectively run health programs instead of what data are available to them (Schaufeli, et. al., 2006).

Among private health facilities in Uganda, the level of data availability in form of synthesis, communication and access has influence on the level of utilization of routine health information in private health facilities. Ensuring that data are understood by potential users requires that data be synthesized and disseminated in formats that are targeted to the individual and organizational contexts in which they are intended to be used. Data users have different information needs, need information at different levels of detail and complexity, have different intensities of interest, and

have different roles in the decision-making process (Davies, Hodge, Aumua, Malik, & Lee, 2011). All of these factors need to be taken into account when data are synthesized and communicated into information products for stakeholders at the different levels of the health system. Making data available through the development of targeted information products that respond to specific data users' information needs is important (Aqil et al., 2009). The consideration of data synthesis, communication, and access all need to be improved to support the use of the information in decision making (Aqil et al., 2009).

2.3.3 Behavioural Factors affecting utilization of health information

RHIS users' demand, confidence, motivation and competence to perform RHIS tasks affect RHIS processes and performance directly. How an individual feels about the utility or outcomes of a task Chaled, (2013), as well as the complexity of the task (Jutand , 2000), all affect the likelihood of that task being performed. Limited knowledge of the usefulness of RHIS data is found to be a major factor in low data quality and information use (Rotich et al. 2003). The blind spot Sauerborn (2000) shows that people are unaware of a gap between their perceived and actual competence in performing a task. It is possible to use this gap for learning to change and meet expected behaviours (Sauerborn, 2000). The PRISM framework postulates that organizational and technical determinants also affect behavioural determinants.

The confidence level of health information management team has also a potential in influencing the level of utilization of routine health information by the private health facilities. Half the health facility management members are confident to undertake HIS tasks. They feel less confident in interpreting data and using information, and more confident in checking data quality (Chaled, et. al., 2013).

The competence of working staff of the management and technical teams for the supervision of the private health facilities and the utilization of routine health information also has an influence data use. Health facility managers are able to accomplish only one third of the given HIS tasks. Further, they are collecting data without understanding completely why they are collecting that data and its utility has not been explored and thus probably create little appreciation for collecting it (Dumont, et. al., 2012).

Among private health facilities in developing countries of Africa, capacity building in Monitoring & Evaluation (M&E) team have been implemented at all levels to promote full utilization of routine health information in private health facilities. Indicators contribute to an overall M&E strategy. In many countries, the overall M&E plan and strategy are not clear (e.g., objectives are not SMART), so indicators are not well designed and do not serve clear purpose and limiting utilization of routine health information. Sometimes M&E is not effectively linked to the RHIS. For example, indicators may be adequate, but the data sources are not defined, or the information system collects the indicator in a format that is not readily useful to managers. The last point can be considered a systemic issue as well, as it may reflect a lack of communication among HIS, M&E, and management functions (Dumont, et. al., 2012).

Arguments according to Gopalan., (2013), policies and guidelines needed on indicators for selection, collection, analysis, and use, including: criteria for selecting indicators and the need to relate indicators to problems, objectives, priorities, and goals are crucial for boosting effective utilization of routine health information. Every country requires good indicators that meet multiple needs, but should maintain a manageable number. It is also noted that the frustration of working with dysfunctional systems with too many indicators to manage. Multiple country

examples given include where managers want hundreds of indicators, and “success” is cited as reducing the number of indicators to a manageable level. The benefit of establishing a “minimum” list of essential indicators is noted (information that is “nice to have” versus information that one “needs to know”).

According to Boone,(2013), coordination in partnerships and organizational performance by the management and working team in the health management system has an impact towards the utilization of routine health information in private health facilities.Coordination involves bringing together the different elements and parts of an organization and its strategic fit in the internal and external environment. This tally with the open systems approach that look at organizations as interrelated units and a sum of its parts (Katz and Khan, 1978). It requires functional feedback system and communication cycle that allows for sharing of information and managing complexities that come with bringing systems together and may hinder mutually beneficial relationships (Ashman, 2001). While there are diverse views that exist on partnerships, Fowler (2002), Esra (2008), Susan, (2009) concur with the need for mutually enabling inter-dependent interactions that are built on trust and shared vision for sustainable NGO partnerships. Absence of mutual interactions will result into lack of focus on the purpose of partnerships and failure to meet the expectations of the different stakeholders in an efficient and effective way.

In addition, networks among the stakeholders involved in the management of health information help in the utilization of routine health information by the private health facilities. Holmen (2002) recognized that networks are particularly suitable for NGOs to improve performance as a cost effective means to share information. Prakash (2008) describes CSO alliances as a step-wise

progression where partners develop shared understanding and build towards a more lasting relationship as is the case of Food Rights and Uganda Land Alliance in Uganda. The analysis made on the NGO sustainability index (2008), indicate that sustainability will require a critical mass of NGOs that can efficiently provide services that consistently meet the needs, priorities and expectations of their constituents thus, organizational performance. The underlying assumptions include ability of NGOs to provide services in a variety of fields, provision of goods and services that reflect the needs and demands for the pro-poor (Action Aid Country Strategic Paper III). Similar experiences exist with other national and international organizations like the World Vision, Uganda Red cross Society and CARE Uganda. Reviewing its partnerships with local civil society organizations (2004), CARE International Uganda explored reasons for the formation of partnerships and how partnerships should be managed and explains differences in working with and through partners.

Shared values related to information systems are alluded to as a pre-existing culture of data collection (Kamadjeu et al. 2005) or ‘culture of information’ (RHINO 2001; Hotchkiss et al. 2006) without specifying how these values originate and sustain themselves. Sauerborn (2000) also showed the positive influence of values on organizational members’ behaviour. Therefore, understanding collective values related to RHIS processes and tasks could open up opportunities for promoting values conducive to RHIS tasks and lead to better performance.

2.3.4 Organizational Factors affecting utilization of health information

RHIS users work in an organizational context, which influences them through organizational rules, values and practices. This organizational context is the health services system and can be

managed by the public or the private sector. Organizational factors such as inadequacies in human and financial resources, low management support, lack of supervision and leadership affecting RHIS performance are described in the information system literature (Nsubuga et al. 2002; Rotich et al. 2003; Kamadjeu et al. 2005; Odhiambo-Otieno 2005b). The PRISM framework considers organizational determinants crucial for affecting performance and defines this category as all those factors that are related to organizational structure, resources, procedures, support services, and culture to develop, manage and improve RHIS processes and performance. In other words, people do not always act on what they are told to do but act on sharing what is important and valued in an organization.

On international standards, all countries have placed the need for the management of private health facilities to have improvement towards data storage and management in order to influence the effective utilization of routine health information by the private health facilities (Gopalan, 2013). Routine paper data recorded and collected through registers, cards, aggregation or reporting forms are likely to remain the dominant format for the foreseeable future in less-developed countries (Gopalan, 2013). Ensuring the proper storage and accessibility of such data over the medium to long term will facilitate its validation (accuracy, timeliness, completeness and reliability); analysis of disease trends; assessment of quality of care; comparison of different service performance; and ultimately the equitable distribution of resources (Gopalan, 2013).

Data registers and reporting forms should be filled and stored properly at each administrative level and classified according to date, geographical location, title and/or national code. In advanced countries such as United Kingdom, the unified storage of different forms in a single

setting facilitates retrospective investigations and studies, and supervisory activities has enabled effective utilization of routine information system among private health facilities (Rhoda., 2010).

Various periodical or ad hoc reports derived from surveys, statistical summaries, epidemiological bulletins, special research studies and evaluation reports should also be carefully stored in a dedicated library or other resource centre (Jutand, 2000). These documents and publications frequently represent the major reference source for programme and intervention evaluation. A uniform system (for example, universal library codes) should be used to classify such documents at all levels – from Ministry of Health headquarters to the most peripheral district office. At the same time, the evolution and dissemination of ICT devices in less-developed countries has been rapid and an increasing number of hospital and peripheral health facilities now have at their disposal well-maintained hardware and basic IT skilled staff (Jutand,2000).

Sauerborn(2000) argues that capacity building for health management teams from the district management to lower private health facilities supervision leads to effective utilization of routine health information by private institutions. At the district, sub-county and county health authorities there is facilitation to offer systematic supportive supervision to the ‘One-Stop Primary Level Centres’ to ensure that guidelines are adhered to, skills are reinforced and ultimately high quality services are offered(Boone,2013). Some members of the health management teams have been supported to receive training on supervision, leadership and management to enhance their capacity to effectively manage health services in the districts under which the two slums fall.

According to Chaled, et. al., (2013), the availability and access to timely reporting and feedback has potential to determine the level of utilization of routine health information by private health facilities. The process of transmitting, compiling, analyzing, and presenting the data is usually so tedious that by the time a report is prepared, the data are frequently obsolete and decisions are often made without any information input. Planners and managers face deadlines and time constraints in their daily decision making. Outdated information, even if of high quality, is of low value to them. Delays in data transmission and lack of feedback at the district level are often caused by the presence of strong vertical programmes. Health facilities report data directly to national programme managers, and line managers at the district level receive outdated feedback reports, if any.

The level of supervision quality of the district health inspection has a great influence on the effective utilization of routine health information by the private health facilities. A big percentage of the facilities receive one or more supervisory visit in three months. Of those facilities reporting one or more supervisory visit in the last three months, all reported that the supervisor checked data quality and helped them make a decision. None of the supervisors discussed facility performance using HIS information, nor gave feedback from their supervisory visit (Sauerborn., 2000).

The level of culture of information use of a health facility also influences the utilization of health information by the private health facility(Jutand, 2000).People working within an organization perform tasks and behaviours which they believe are valued and promoted by the organization. In other words, organizations create a culture for promoting and sustaining certain values around organizational functions to be performed at optimal levels. When these values are about the way

the information systems function, we say that the organization is promoting a culture of information.

Jutand (2000), further asserts that health information system information policies also has an influence towards the utilization of routine health information by the private health facilities. The legal and regulatory contexts in which health information is generated and used are important as they enable mechanisms to be established to ensure data availability, exchange, quality and sharing. The health information policy framework should identify the main actors and coordinating mechanisms, ensure links to programme monitoring, and identify accountability mechanisms.

Gopalan, (2013) argues that health information system financial and human resources also has an influence on the utilization of routine health information by the private health facilities. At national level, skilled epidemiologists, statisticians and demographers are needed to oversee data quality and standards for collection, and to ensure the appropriate analysis and utilization of information. At peripheral levels, health information staff should be accountable for data collection, reporting and analysis. Too often, such tasks are given to overburdened care providers who see this as an unwelcome additional task that detracts from their primary role.

The state of health information system infrastructure also determines the degree of utilization of routine health information by the private health facilities. The infrastructural needs of the health information system can be as simple as pencils and paper or as complex as fully integrated, web-connected, ICT. At the level of the most basic record keeping, the health information system needs the ability to store, file, abstract and retrieve records. Many countries describe overflowing storerooms filed with moldering patient records, facility logbooks and paperwork that is never

sorted or analyzed. Emerging technologies can help countries to dramatically increase their storage and performance capacities and accelerate the processing timeframes previously required. As a result, the availability, quality, dissemination and use of health-related data can be radically improved by ICT. Coherent capacity building in electronic and human resources throughout the health system is a far more effective and cost-efficient approach (Chaled, et. al., 2013).

2.7. Identified Gaps

Much has been written and documented by earlier authors and scholars relating to determinants of effective utilization of routine health information but the following gaps were found existing within the above literature. A great deal of the reviewed literature has been done in public health facilities and little has been done in the area of private sector and how data has been effectively utilized and this remains a big concern of this study. This research therefore will act as source of future reference to all studies related to determinants of effective utilization of routine health information among private health facilities.

Since models regarding data utilization in health institutions has been compiled for a couple of years, there is need for a model that works in relation to the current ICT model system that regards current data compilation and usage using modern information technologies. Literature reviewed in earlier studies do not relate the impact of effective utilization of routine health information towards the development of a health sector be it public or private. This gap remains a big challenge since most of the health facilities will not be motivated to understand the reasons

for routine health information compilation and utilization and if this is particularly encouraged then its adoption in the private sector will not be a problem.

Literature reviewed in earlier studies negatively relates the earlier intervention or current government and health institutions' intervention towards data utilization by lower health facilities. Literature and documentation is needed to emphasize the necessary policies towards the improvement of data recording and information utilization in all health care facilities particularly those in the private sector. Literature reviewed by earlier authors and studies does not make use of understanding how effective utilization does not only help in decision making but also how it is importance to other development variables such as training and human resource management area. This study will also make use of the existing finding to relate to the importance of information utilization towards other development factors such as effective human resource recruitment and training.

A lot of literature has been published on determinants of routine utilization of health information as cited above. This ranges from the historical perception of routine utilization of health information. The above literature also provides a valuable input to the researcher especially in bringing out variables such as determinants of routine utilization and it will also help the researcher in designing the instruments to use in data collection. However, the reviewed literature does not explain the extent to which determinants of utilization actually influences routine utilization of health information.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

This chapter describes the research design that will be used, the study population, the sample size, the sampling techniques and procedures, data collection methods, data collection instruments, the pre-test (validity and reliability), data collection procedures, data analysis and measurement of variables.

3.2. Research Design

This study will be a cross sectional research design which will be both quantitative and qualitative research in nature. Qualitative techniques will help the researcher to come up with conclusions on variables that will not be measured quantitatively while quantitative techniques will facilitate establishing values attached to numerical variables. The combination of two techniques otherwise known as triangulation increase the quality of research because results from each technique reinforce each other for consistency (Barifaijo, Basheka and Oonyu, 2010). More so cross sectional research design is relatively inexpensive and can estimate prevalence of outcome of interest because sample is usually taken from the whole population (Saunders et al, 2000).

3.3. Study Population

The target population for this study will be the district division health officers, district health information officers (Biostatistician), private health facility managers and health workers within private health facilities in the five divisions of Kampala district, Uganda. Kampala district has over 200 private health facilities each facility employing a minimum of ten (10) health workers. However, due to time constraints, the researcher will consider only 20 health facilities offering

comprehensive health care package including specialized services like HIV/AIDS and EMTCT-EID services. Four (4) health facilities from the five administrative divisions of Kampala district, including, Kampala Central Division, Kawempe Division, Nakawa Division, Makindye Division and Lubaga Division. Out of each health facility, only 6 respondents will be chosen to participate in the study; including the facility manager / owner, 5 frontline health workers. Key informative interviews will also be conducted to five (5) division health officers, (1) district health officer, (1) district biostatistician and five (5) health information officers in the respective five divisions.

3.4. Sample Size determination

Based on the study population of health facilities workers of 4,000 people according to (2007) statistics and using the Krejcie and Morgan (1970) sampling frame, the sample size of 122 respondents will be considered.

Category of respondents

| Category | Population | Sample | Sampling strategy |
|---|-------------------|---------------|--------------------------|
| District division health officers | 5 | 5 | Purposive sampling |
| District Biostatistician-KCCA | 1 | 1 | Purposive sampling |
| Division Health information officer (Biostatistician) | 5 | 5 | Purposive sampling |
| Private health facility managers | 20 | 19 | Purposive sampling |
| Health workers within private health facilities | 120 | 92 | Simple random sampling |
| Total | 151 | 122 | |

3.5. Sampling Techniques/Procedures

3.5.1 Purposive sampling

This sampling technique will help the research to access respondents with knowledge about the topic being investigated as argued by (Castillo, 2009). In this method, the researcher targets a specific group of health workers in the selected private health facilities in the respective divisions

especially those who have been involved in the implementation of health related information because they are believed to be reliable and knowledgeable about the topic (utilization of routine health information) and so they are in position to give dependable and detailed information about the study.

3.5.2 Simple random sampling

After selecting the respondents with the knowledge of health information using purposive sampling, the researcher will apply simple random sampling technique to all the health workers who have been chosen in order to have a manageable sample for the study. A list of private health facilities Private For Profit (PFP) offering comprehensive health care package will be generated in collaboration with district health offices, divisions' health offices, DHIS11 database, and Private Health Support Program an implementing partner mandated to support private health facilities in offering health care services in the country. Paper list of each facility will be generated and randomly mixed up in a box for each division and simple random picking without replacing will be done until four sites are selected.

Professional health workers from each health facility will be determined based on the targeted sample size. Identified health workers will be made to pick papers from the basket with numbers written on 1 to 150 and every who picks an odd numbers will be part of the sample until the targeted number of respondents is reached in each unit. According to Amin (2005), simple random sampling is advantageous because it is free of classification error, and it requires minimum advance knowledge of the population other than the frame. For these reasons, simple random sampling best suits situations where not much information is available about the population and data collection can be efficiently conducted on randomly distributed items, or

where the cost of sampling is small enough to make efficiency less important than simplicity (Castillo, 2009).

3.6 Data Collection methods

Questioning, interviewing and document review are the data collection methods that will be used in this study. As it is argued by Saunders et al, (2003), interviewing is the strongest tool which focuses on purposeful discussion between two or more people; it is helpful to get reliable and valid data which is relevant to research questions and objectives. The researcher will use face to face interview with the frontline health workers and health facility managers/directors, key informant interview with division informants and, KCCA director of health services and biostatistician. Observation and document review will be used to ascertain data collection, reporting and health information utilization at the health facilities.

3.7 Data collection Instruments

3.7.1 Questionnaires

The researcher will distribute questionnaires among the randomly selected respondents from different background health workers. Pre-determined semi-structured questionnaires will be administered by trained interviewers to frontline health workers and other respondents. This will facilitate uniformity and flow of questions to the respondents. This instrument will be intended to answer as many of the research questions as possible. The researcher will keep the questionnaire simple and straight forward so as to solicit for as much information as possible while taking the shortest time of the respondents as possible.

Questionnaires will also be the most appropriate instruments in collecting data because of the big number of respondents. The questionnaires may also make it easy for the respondent who might respond to the questionnaire at their own convenience and total freedom to the respondents to

express their genuine views without fear of revealing their identity. Responses from health workers will be obtained by use of both closed and open-ended self-administered questionnaires. Self-administered questionnaires will be used because they standardize responses and save time to make it easier to present information by way of categorizing and tabulating (Redman, 2001).

3.7.2 Interview guide (Key Informant Interview)

An interview guide will be used where a set of guiding questions will be developed. This will be appropriate because the method collects data from an informed respondent such as health facility administrators/managers, private health facility in-charges, district/division health officers and health information officers. Interviews will be open ended and administered with the researcher after fixing appointments with the various key informants. According to Mugenda (1999:46), interview guides are advantageous because they give in-depth information on the subject matter by the respondent. It also saves time in analyzing the data collected. The method further limits irrelevant responses as the questions target specific responses.

The interview guide will help the researcher to gather some vital data that is not provided for in the questionnaire. This method also gives immediate feedback from respondents and generating a wide of relevant themes it helps to show the reactions of respondents to various topics thus going deep into study.

3.7.3 Observation and document review Checklist

Observation and document review checklists will also be used where a set of observation guiding tasks will be developed. This will require the researcher to observe whether the health facility offices have data collection tools, data processing and transmission equipment, displayed information and performance review graphs & reports, administrative meeting minutes and action point plan. The researcher will also take note of the presence of data collection forms and also

observe whether the forms can simply be understood by the health workers. The researcher will also take observation on whether health workers are aware and able to manipulate data in the context of utilization of routine health information for decision making.

3.8. The Validity and Reliability

3.8.1 Validity

For this study, Quality control measures will be ensured throughout, from the process of designing the tools, data collection, analysis and presentation of the research findings. The researcher will determine the validity using the content validity. After soliciting the opinions from four groups of people to be interviewed and relevance of the instrument to the objectives of the study. After the judgment and assessment, amendments will be done accordingly and they will re-examine the instrument in order to establish its validity. According to Williamson (2002), the validity index below can be used to determine the validity of research instruments and any result above 0.6 makes the instrument valid.

The following formula is used to test validity index.

$$\text{CVI} = \frac{\text{Number of items regarded relevant}}{\text{Total number of items}}$$

3.8.2 Reliability

For the reliability of the instrument, a pilot study is done together with pre-testing the questionnaire and interview guide, to a few respondents other than the target respondents, normally around 10%. These few questionnaires will be entered in SPSS and a reliability test done there and then and a value above 0.5 depicts a reliable instrument and one which is less than 0.5 calls for adjustments to be done until it produces a better reliability value over several

numbers of presentations. Either way, reliability of the instruments can be tested using CRONBACH Alpha Coefficient.

3.8 Data collection Procedure

Once the data collection tools are pre-tested, reviewed and research assistant oriented to understand the study unit and data collection tools. The targeted private health facilities and KIs will be informed in two weeks advance so that targeted staffs are found at the facility and appointment fixed for the KIs. Three research assistant will be allocated to each division with an objective of each interviewer to interact with two health workers per day and one health facility covered in a day by the team. The principal researcher will be part of team to interview key informants and review of key documents relating to the objectives of the study. Meetings with research assistants will be held at every end of the day to discuss challenges and crosschecking for data completeness and accuracy. Where some identified data may be missing, site revisit will be planned accordingly. Completed data collection forms will be compiled and data cleaning follows.

3.9 Data Processing and Analysis

Data collected will be edited for completeness and accuracy after which it will be reduced into frequencies and simple tables. Basing on the objectives of the study, the data will be analyzed using Statistical Package for Social Scientists (SPSS Version 12) computer programme through which correlations and multiple regressions will be used to determine the relationship as well as the effect the determinants have on the routine utilization of health information in private health facilities. The study will use regression analysis to establish the extent to which the determinants influence routine utilization of health information thereby adopting the hypothetical regression model that guided this study which is in the multiple regression equation form of:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n$$

Where: Y is the dependent variable (Routine Utilization of Health Information), “ α ” is a regression constant; β_1 , β_2 , β_3 and β_n are the beta coefficients; and X_1 , X_2 , X_3 , and X_n are the independent (predicator) variables, and in this study, they are determinants.

Furthermore, the data from questionnaires will be presented in form of frequency tables, pie charts and bar graphs to give meaningful interpretation of the study. In qualitative analysis, content analysis will be used to edit the data from interviews and reorganize it into meaningful shorter sentences. These then will be presented to supplement the quantitative data in order to have a clear interpretation of the results. They will be presented in form of direct quotations as stated by the respondents.

3.9. Measurement of Variables

The research will consider measurement of variables to understand which of the independent variables has a great influence on the dependent variable. Therefore the study will test the influence of technical factors, organizational factors and behavioral factors and their level of influence on utilization of routine health information by the private health facilities. Among the three (3) factors of the independent variables, the one which will be tested with a lower p- value that is less than 0.05 significance level will be considered to have a great influence towards performance and utilization of routine health information. The factor (s) which will be found to have a great influence in our findings and will be based on in making final conclusions of the study.

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APPENDIX I: QUESTIONNAIRE

QUESTIONNAIRE FOR HEALTH WORKERS, DISTRICT HEALTH OFFICERS, DIVISION HEALTH OFFICERS, BIOSTATICIANS AND INCHARGE (MANAGERS) OF PRIVATE HEALTH FACILITIES

Dear Sir / Madam,

Abias Asimwe a student of Uganda Technology and Management University (UTAMU) working on his dissertation for an award of Masters of Project Monitoring and Evaluation

This study is about the Determinants of Effective Routine Utilization of health information in Private Health Facilities in Kampala district. The information you will give is purely for academic purposes and will be treated with confidentiality.

Your participation is purely voluntarily and has no monetary value

The report produced will be intended mainly for academic purposes shared with the University and Kampala district health office to understand the constraints in data-information use for decision making to support the design for appropriate interventions.

Thanks for taking 20 Minutes and answering the questionnaire

Are you willing to participate? Yes No

SECTION A: BACKGROUND INFORMATION

The section below you to tick the most appropriate option that best describes you for faster compilation in this inquiry.

1. Age of the respondent

- a) 18-25
- b) 26-40
- c) Above 40

2. Gender of respondent

- (a).Male (b).Female

3. Religion of respondent

- a).Islam
- b).Catholic
- c).Protestant
- d).Seventh day
- e) Others specify.....

4. Department/Division of affiliation

- a) Clinical department
- b) Dispensary
- c) Maternity
- d)Administration

5. Level of education

- Diploma
- Degree
- Post graduate
- Masters and above

6. What is your Job Title?

- Nurse
- Doctor
- Biostatistician
- Administrator/In-charge
- Laboratory technician

7. For how long have you been at the this facility

- Less than 1 year
- 1-5 years
- 6-10 years
- 11+

SECTION B: INDIPENDENT VARIABLES

I would like to know your opinion how you agree with statements. There is no right or wrong answer only express your opinion using the Likert scale; *1-Strongly Disagree, 2 Disagree, 3-Neither Agree or Disagree, 4-Agree 5-Strongly agree.*

Please be open and frank to choose the answer honestly

(i) TECHNICAL FACTORS

| 8. Indicate your level of agreement on the following statements regarding how technical factors influence the utilization of Routine health information in the private health facilities. | | | | | |
|--|------------|------------|------------|------------|------------|
| Statement | (1) | (2) | (3) | (4) | (5) |
| Health information users have good knowledge to effectively useroutine health data-information | 1 | 2 | 3 | 4 | 5 |
| Health information users have good information technology skills to effectively use data –information in in decision making | 1 | 2 | 3 | 4 | 5 |
| The system design used in data management is user friendly | 1 | 2 | 3 | 4 | 5 |
| Information systems of data entry are designed by external consultants hence difficult for the health workers who are responsible for daily routine entry | 1 | 2 | 3 | 4 | 5 |
| Most health information systems require employment of special personnel for entry of data special skills | 1 | 2 | 3 | 4 | 5 |
| The complexity of RHI systems makes it hard for health workers to utilize the system | 1 | 2 | 3 | 4 | 5 |
| Use of manual paper files recording makes information spoilt hence poorly managed for use | 1 | 2 | 3 | 4 | 5 |
| Some of the software for running the system of data management are also scarce, expensive and complex. | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|--|---|---|---|---|---|
| Lack of coordination with poor system design | 1 | 2 | 3 | 4 | 5 |
| The competence of health information system operators to manage data quality | 1 | 2 | 3 | 4 | 5 |
| The needed health information data is not readily available for the targeted information products that respond to specific data users' | 1 | 2 | 3 | 4 | 5 |
| Incomplete data | 1 | 2 | 3 | 4 | 5 |
| Poor quality data | 1 | 2 | 3 | 4 | 5 |
| Late data presented | 1 | 2 | 3 | 4 | 5 |
| No data presented | 1 | 2 | 3 | 3 | 5 |
| Poorly data -information presented | 1 | 2 | 3 | 4 | 5 |
| Provision of feedback to health information/record management team | 1 | 2 | 3 | 4 | 5 |
| Provision of feedback to data collectors routinely done at all levels | 1 | 2 | 3 | 4 | 5 |
| Lack of skills among health workers in the following; | | | | | |
| 1) In data collection | 1 | 2 | 3 | 4 | 5 |
| 2) Data analysis | 1 | 2 | 3 | 4 | 5 |
| 3) Data presentation | 1 | 2 | 3 | 4 | 5 |
| 4) Data use | 1 | 2 | 3 | 4 | 5 |
| Many data collection registers to be filled by one health worker for one particular client visit | 1 | 2 | 3 | 4 | 5 |
| Staff not oriented through the use of data collection tools | 1 | 2 | 3 | 4 | 5 |
| Data collection tools hard to use due to inadequate space to write in all the information | 1 | 2 | 3 | 4 | 5 |
| Standard health indicators NOT well understood to the facility | 1 | 2 | 3 | 4 | 5 |
| Facility Indicators targets displayed accessible to all staff at the facility | 1 | 2 | 3 | 4 | 5 |
| Monthly indicator performance discussed to assess progress | 1 | 2 | 3 | 4 | 5 |

9. What other technical challenges do face in trying to utilization of Routine Health Information decision making in the facility?

.....
.....

(ii) ORGANIZATIONAL FACTORS

| 10. Indicate your level of agreement on the following statements regarding how organizational factors influence the effective utilization of Routine health information in private health facilities | | | | | |
|---|----------|----------|----------|----------|----------|
| Statement | | | | | |
| RHIS users work in an organizational context, which influences their information use through; | | | | | |
| 1) Organizational rules | 1 | 2 | 3 | 4 | 5 |
| 2) Organizational values | 1 | 2 | 3 | 4 | 5 |
| 3) Organizational practices | 1 | 2 | 3 | 4 | 5 |
| 4) Inadequate human resource | 1 | 2 | 3 | 4 | 5 |
| 5) Financials resources | 1 | 2 | 3 | 4 | 5 |
| 6) Low management support | 1 | 2 | 3 | 4 | 5 |
| 7) Lack of supervision | 1 | 2 | 3 | 4 | 5 |
| 8) Poor leadership | 1 | 2 | 3 | 4 | 5 |
| Routine health information compilation supervision | 1 | 2 | 3 | 4 | 5 |
| Access to timely reporting | 1 | 2 | 3 | 4 | 5 |
| Timely feedback on routine health information | 1 | 2 | 3 | 4 | 5 |
| Tedious expensive data management processes to reporting often result in decision making without information in put | 1 | 2 | 3 | 4 | 5 |
| The level of culture of information use of a health facility is very low to facility evidenced based decisions | 1 | 2 | 3 | 4 | 5 |
| Well streamlined Health information system policies | 1 | 2 | 3 | 4 | 5 |
| State of health information structures in information use | 1 | 2 | 3 | 4 | 5 |
| Regular staff meetings to review action planson decisions | 1 | 2 | 3 | 4 | 5 |
| Performance indicator information display to monitor progress in different forms | 1 | 2 | 3 | 4 | 5 |
| To what extend do you agree with following statements on influencing information use; using the scale 1-5 below. Decision making is based on; | | | | | |
| At organization level | | | | | |
| Seek feedback from staff | 1 | 2 | 3 | 4 | 5 |
| Emphasize data quality in regular reports | 1 | 2 | 3 | 4 | 5 |

| | | | | | |
|--|---|---|---|---|---|
| Promote culture of data use | 1 | 2 | 3 | 4 | 5 |
| Explain what they expect from staff | 1 | 2 | 3 | 4 | 5 |
| Share data with other stakeholders | 1 | 2 | 3 | 4 | 5 |
| Staff are aware of their responsibilities | 1 | 2 | 3 | 4 | 5 |
| Staff are trained in data management and use | 1 | 2 | 3 | 4 | 5 |
| Rely on data for planning, setting targets and monitoring | 1 | 2 | 3 | 4 | 5 |
| Discuss conflicts openly and resolve them | 1 | 2 | 3 | 4 | 5 |
| Check data quality at the facility regularly | 1 | 2 | 3 | 4 | 5 |
| Provide regular feedback to the staff through regular report on evidence | 1 | 2 | 3 | 4 | 5 |
| Report on data accuracy regularly | 1 | 2 | 3 | 4 | 5 |
| Staff are reward for their good work | 1 | 2 | 3 | 4 | 5 |
| Display data for monitoring their target performance | 1 | 2 | 3 | 4 | 5 |
| Use HMIS data for day to day management of the facility | 1 | 2 | 3 | 4 | 5 |
| Gather data to find route cause of the problem | 1 | 2 | 3 | 4 | 5 |
| Can develop appropriate criteria for solving the problem | 1 | 2 | 3 | 4 | 5 |
| Staff are empowered to make decisions | 1 | 2 | 3 | 4 | 5 |
| Staff admit mistakes and make corrective actions | 1 | 2 | 3 | 4 | 5 |
| Are able to say no superior, colleagues for demands and decisions | 1 | 2 | 3 | 4 | 5 |
| Are accountable for poor performance | 1 | 2 | 3 | 4 | 5 |
| Use HMIS data for education and community mobilization | 1 | 2 | 3 | 4 | 5 |
| Can develop particular targets for interventions | 1 | 2 | 3 | 4 | 5 |
| Can evaluate whether they have achieved their targets | 1 | 2 | 3 | 4 | 5 |

11. In your own opinion what other organizational factors influence the effective utilization of Routine health information use in this facility

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.....

.....

 12. How does your health facility support having the necessary information to make decisions?

.....

 13. How does your health facility support prioritization and use of information?

.....

 14. How does your facility support staff in training in the use of information for decision making?

(iii) BEHAVIORAL FACTORS

| 15. Indicate your level of agreement on the following statements regarding how behavioral factors influence the utilization of Routine health information. | | | | | |
|---|----------|----------|----------|----------|----------|
| Statement | | | | | |
| RHIS users demand for information | 1 | 2 | 3 | 4 | 5 |
| Confidence to use the generated information by HIS management team | 1 | 2 | 3 | 4 | 5 |
| Staff competence to perform their HIS tasks | 1 | 2 | 3 | 4 | 5 |
| Poor attitude toward data collection | 1 | 2 | 3 | 4 | 5 |
| Belief that RHIS data is useless | 1 | 2 | 3 | 4 | 5 |
| Lack motivating incentives to staff during data management team | 1 | 2 | 3 | 4 | 5 |
| Customized to patients treatment not collecting data | 1 | 2 | 3 | 4 | 5 |
| . Collecting information that adds no value irritates me | 1 | 2 | 3 | 4 | 5 |
| To what extend do you agree with following on influencing information use; using the scale 1-5 below. Decision making is based on | | | | | |
| Individual /personal level | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Personal Liking | 1 | 2 | 3 | 4 | 5 |
| Superior directive | 1 | 2 | 3 | 4 | 5 |
| Cost consideration | 1 | 2 | 3 | 4 | 5 |
| Comparing data with strategic objectives /indicators | 1 | 2 | 3 | 4 | 5 |
| Evidence /facts | 1 | 2 | 3 | 4 | 5 |
| Health needs | 1 | 2 | 3 | 4 | 5 |
| Data collection makes one bored | 1 | 2 | 3 | 4 | 5 |
| Data collection meaningful to me | 1 | 2 | 3 | 4 | 5 |
| Collecting data gives me feeling that it is for planning and monitoring performance | 1 | 2 | 3 | 4 | 5 |
| Document their activities and keep records | 1 | 2 | 3 | 4 | 5 |
| Feel committed in improving health status of the targeted community | 1 | 2 | 3 | 4 | 5 |
| Set appropriate targets do able of their performance | 1 | 2 | 3 | 4 | 5 |
| Feel guilty of not accomplishing their targets and performance | 1 | 2 | 3 | 4 | 5 |
| Collecting information not used for decision making is discouraging | 1 | 2 | 3 | 4 | 5 |
| Collecting information gives me feeling data is needed for monitoring facility performance | 1 | 2 | 3 | 4 | 5 |
| Collecting information gives a feeling that is forced on me | 1 | 2 | 3 | 4 | 5 |
| Collecting information is appreciated by the co-workers and supervisors | 1 | 2 | 3 | 4 | 5 |
| Understand and appreciate my roles and responsibilities regarding health information management | 1 | 2 | 3 | 4 | 5 |

16. Mention other behavioral factors and how you think influence the effective utilization of Routine health information?

.....

.....

.....

.....

17. Describe three reasons for collecting data on routine and monthly basis

.....
.....
.....

18. Which decisions have you made in the last three months using the routinely collected data – information?

.....
.....
.....
.....

SECTION C: DIPENDENT VARAIABLE

(i) ROUTINE UTILISATION OF HEALTH INFORMATION

| 19. Indicate your level of agreement on the following statements regarding the effective utilization of Routine health information in the private health facilities. | | | | | |
|---|---|---|---|---|---|
| Statements | | | | | |
| Good quality data for use : | | | | | |
| 1) Collected using standard tools | 1 | 2 | 3 | 4 | 5 |
| 2) Checked for completeness | 1 | 2 | 3 | 4 | 5 |
| 3) Checked for accuracy | 1 | 2 | 3 | 4 | 5 |
| 4) Timely available | 1 | 2 | 3 | 4 | 5 |
| There is continuous use of the data collected for the benefit of patients as well as the health facilities | 1 | 2 | 3 | 4 | 5 |
| Exist data processing system into information | 1 | 2 | 3 | 4 | 5 |
| Monthly reports compiled shared with stakeholders | 1 | 2 | 3 | 4 | 5 |
| Routinely use health facility data to monitor indicator performance | 1 | 2 | 3 | 4 | 5 |
| Health facility gets feedback on the monthly health information report submitted | 1 | 2 | 3 | 4 | 5 |
| Decision making regarding quality of health information data is collected timely for the stakeholders | 1 | 2 | 3 | 4 | 5 |
| Decisions made based on routine health information findings | 1 | 2 | 3 | 4 | 5 |
| 1) Patient utilization | 1 | 2 | 3 | 4 | 5 |
| 2) Disease data | 1 | 2 | 3 | 4 | 5 |
| 3) Drug stock out | 1 | 2 | 3 | 4 | 5 |
| 4) Quality gaps | 1 | 2 | 3 | 4 | 5 |

| 5) Data quality | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| The administrators of health facilities make a follow-up on the quality of data before submitting to respective authorities for review | 1 | 2 | 3 | 4 | 5 |
| Periodically evaluate facility target indicator performance | 1 | 2 | 3 | 4 | 5 |
| Health facility data routinely used to monitor health facility indicator performance | 1 | 2 | 3 | 4 | 5 |
| The information users seek feedback from the health facility staff regarding the data collected | 1 | 2 | 3 | 4 | 5 |
| The facility administrators share data with other stakeholders for proper health service delivery | 1 | 2 | 3 | 4 | 5 |
| Data –information based decision made at all levels of facility management | 1 | 2 | 3 | 4 | 5 |
| Existence of facility action plan showing decision based on routine health information | 1 | 2 | 3 | 4 | 5 |
| Review strategy by examining performance target and actual performance from month to month | 1 | 2 | 3 | 4 | 5 |
| Review facility personnel responsibilities by comparing performance service targets and actual performance month to month | 1 | 2 | 3 | 4 | 5 |
| Health facility priority allocation of resources based on the evidenced data based gaps | 1 | 2 | 3 | 4 | 5 |
| The stakeholders most especially the health facilities rely on data for planning their service delivery | 1 | 2 | 3 | 4 | 5 |
| Regular decisions review meetings about use of information | 1 | 2 | 3 | 4 | 5 |
| Decisions based on evidence improve services delivery | 1 | 2 | 3 | 4 | 5 |

20. Do you have any suggestions on how to improve routine health information use at the health facility?

21. Describe how the health facility uses the routine health information

Thanks for your time and cooperation

APPENDIX 11

Observation Checklist - Routine Health Information Utilization

| | | |
|--|--------------|------------|
| Health Facility: | | |
| Observer : | Date: | |
| ITEMS | NO | YES |
| Presence of RHIS mission displayed at appropriate position | | |
| Presence of updated DHMIS organizational chart showing functions related to RHIS/Health information | | |
| Presence of health facility RHIS targets displayed | | |
| Presence of health facility indicator performance charts, graphs and table displayed | | |
| Presence of staff meeting minutes reflecting reports, data and feedback from health facility or district discussed | | |
| Presence of action work plan relating identified data gaps and how they were addressed | | |
| Presence of performance improvement tools like flow charts, QI journals, charts and projects | | |
| Presence of RHIS standards at the facility | | |
| Presence of RHIS training manual and guide | | |
| Presence of RHIS supervisory checklist | | |
| Presence of RHIS supervisory report | | |
| Presence of data quality assurance checklist | | |
| Presence of updated database for monthly reports submitted to the district | | |
| Existence of functioning HIS software | | |

APPENDIX III

INTERVIEW GUIDE FOR FACILITY MANAGERS, DIVISION HEALTH OFFICERS, BIOSTATICIANS AND KCCA HEALTH OFFICER

- i. Briefly describe term health information and how routinely should it be utilized?
- ii. How often is health information gathered/collected?
- iii. If not so often, why isn't health information routinely gathered?
- iv. How does the health facility maintain health information?
- v. Does the health facility go through recommended procedures to process health related data?
- vi. If yes, what procedures does it go through to process data?
- vii. If No, why doesn't the health facility go through recommended process to process health related data?
- viii. Does the facility's culture promote data and information utilization of routine health information? How?
- ix. Does the facility has a set of demands that does not comply the effective utilization of routine health information?
- x. Does the facility manager report communicate with the district health leaders to know the district requirements of private health facilities?
- xi. Is the tradition of health workers attendance allow all information of patients to be routinely entered in the system?
- xii. Are the process related challenges hindering routine utilization? How?
- xiii. In your own view, which technical related factors influence the routine utilization of health information in health facilities?

- xiv. How can the technical factors be eliminated such that routine health information is utilized?
- xv. In your own view, which behavioral related factors influence the routine utilization of health information in health facilities?
- xvi. How can the behavioral factors be eliminated such that routine health information is utilized?
- xvii. Does management, district MOH give feedback on the facility performance?
- xviii. If yes ,can you describe the feedback given by the above
- xix. In your own view, which organizational related factors influence the routine utilization of health information in health facilities?
- xx. How can the organizational factors be eliminated such that routine health information is utilized?
- xxi. In your view, what can health facilities do to routinely utilize health related information?

Thank you

APPENDIX IIV:

BUDGET

| No | ITEM | QTY | EACH | AMOUNT |
|-----------|---|------------|---------------------|-------------------|
| 1 | Personnel Research Assistant / Guide | 01 | 50.000= for 15 days | 750.000= |
| 2 | Clipboard | 02 | 5.000= | 10.000= |
| | Umbrella | 02 | 9,000= | 18.000= |
| | Bags | 02 | 25.000= | 50.000= |
| 3 | Travel in the field | | | 750.000= |
| | Meals | | | 450,000= |
| | Accommodation | | | 1,800.000= |
| 4 | Acquisition of data packages | | | 400,000= |
| 6 | Stationery | | | |
| | Reams of ruled studys | 03 | 15.000= | 40.000= |
| | Notebooks | 2 | 5.000= | 10.000= |
| | Computer printing | 500pages | 200= | 100.000= |
| .7 | Photocopying | 1000 pages | 50= | 50.000= |
| | Binding | 04 | 40.000= | 160.000= |
| 8 | Miscellaneous | | | 3 00.000= |
| | Sub- Total | | | 100.000= |
| | Grand Total | | | 5,148,000= |

**APPENDIX V:
TIME FRAMEWORK**

| Topic: Determinants of effective Utilization of Routine Health Information in private health facilities in Kampala District | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|----------|---|---|---|-------|---|---|---|-------|---|---|---|-----|---|---|---|------|---|---|---|------|---|---|---|--------|---|---|---|--|
| Research Chapter | February | | | | March | | | | April | | | | May | | | | June | | | | July | | | | August | | | | |
| Chapter 1 | ■ | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | | | |
| Chapter 2 | | | | | ■ | ■ | ■ | | | | | | | | | | | | | | | | | | | | | | |
| Chapter 3 | | | | | | | | ■ | | | | | | | | | | | | | | | | | | | | | |
| Developing & reviewing data collection tools | | | | | | | | | ■ | ■ | ■ | ■ | | | | | | | | | | | | | | | | | |
| Data tool pre-test & Field data collection | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | | | | | | | |
| Data cleaning | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | | | | | | | | |
| Data analysis (Chapter 4) | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | | | | | | |
| Writing report | | | | | | | | | | | | | | | | | | | | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |

APPENDIX VI: SAMPLE SIZE TABLE

| <i>N</i> | <i>S</i> | <i>N</i> | <i>S</i> | <i>N</i> | <i>S</i> |
|----------|----------|----------|----------|----------|----------|
| 10 | 10 | 220 | 140 | 1200 | 291 |
| 15 | 14 | 230 | 144 | 1300 | 297 |
| 20 | 19 | 240 | 148 | 1400 | 302 |
| 25 | 24 | 250 | 152 | 1500 | 306 |
| 30 | 28 | 260 | 155 | 1600 | 310 |
| 35 | 32 | 270 | 159 | 1700 | 313 |
| 40 | 36 | 280 | 162 | 1800 | 317 |
| 45 | 40 | 290 | 165 | 1900 | 320 |
| 50 | 44 | 300 | 169 | 2000 | 322 |
| 55 | 48 | 320 | 175 | 2200 | 327 |
| 60 | 52 | 340 | 181 | 2400 | 331 |
| 65 | 56 | 360 | 186 | 2600 | 335 |
| 70 | 59 | 380 | 191 | 2800 | 338 |
| 75 | 63 | 400 | 196 | 3000 | 341 |
| 80 | 66 | 420 | 201 | 3500 | 346 |
| 85 | 70 | 440 | 205 | 4000 | 351 |
| 90 | 73 | 460 | 210 | 4500 | 354 |
| 95 | 76 | 480 | 214 | 5000 | 357 |
| 100 | 80 | 500 | 217 | 6000 | 361 |
| 110 | 86 | 550 | 226 | 7000 | 364 |
| 120 | 92 | 600 | 234 | 8000 | 367 |
| 130 | 97 | 650 | 242 | 9000 | 368 |
| 140 | 103 | 700 | 248 | 10000 | 370 |
| 150 | 108 | 750 | 254 | 15000 | 375 |
| 160 | 113 | 800 | 260 | 20000 | 377 |
| 170 | 118 | 850 | 265 | 30000 | 379 |
| 180 | 123 | 900 | 269 | 40000 | 380 |
| 190 | 127 | 950 | 274 | 50000 | 381 |
| 200 | 132 | 1000 | 278 | 75000 | 382 |
| 210 | 136 | 1100 | 285 | 100000 | 384 |

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970