

**IMPROVING CIVIL REGISTRATION THROUGH INTRODUCTION OF
INFORMATION AND COMMUNICATION TECHNOLOGY IN SIAYA DISTRICT**

BY

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DECLARATION

ABSTRACT

Civil registration is a fundamental step towards good governance because it makes it virtually possible to plan or implement effective development strategies. The process requires an efficient system for quick dissemination of information among stakeholders. This can be achieved through the use of ICT. Experience has indicated that manual registration leads to delays in registration process and issuance of births and death certificates. In Siaya civil registry, there is limited use of ICT. The main purpose of this study therefore was to explore how Information and Communication Technology could be used to improve civil registration in Siaya civil registry. The specific objectives were to explore how civil registration stakeholders could be linked through networking, to analyze how ICT could speed up the process of births and deaths registration and finally to examine how ICT could ensure safety of births and deaths records. The study was conducted in Karemo Division, Siaya District. The sample size was 384 from a population of 21,150 households. The study also included all the 30 health workers, 17 area assistant chiefs and 3 data clerks. Purposive sampling was used to collect data from the key informants who were the health workers, area assistant chiefs and the data clerks while simple random sampling was used to collect data from the households. Primary data was collected through questionnaires, observation and interviews. Quantitative data was analyzed using descriptive statistics at a significance level of 0.05 and presented in the form of charts, tables and graphs while qualitative data was summarized and presented in narrative form. The study established that manual registration is still common in all the civil registration offices because of inadequate ICT hardware and software. The study established that 72% of the civil registration stakeholders are not linked through ICT. The speed of data transmission is still very slow and causes delays in issuing out registration certificates. 67% of the civil registration stakeholders have difficulties in acquiring records from registration centers. The study further established that the use of ICT provides the best alternative for improving data security by creating backups or assigning password to stored data. 60% of the respondents noted that manual system has no adequate security of civil registration records. The study concluded that ICT is an important tool in improving linkages among civil registration stakeholders, speeding up registration process and ensuring safety of civil registration records. The study recommended that among other things; full implementation of ICT for improved efficiency of service provision; the government and other development partners should provide computers and internet connection to civil registration centers, training and awareness creation on how the use of ICT can help to revolutionize civil registration processes.

CHAPTER ONE: INTRODUCTION

1.1 Background

Civil registration is a fundamental step towards good governance and a vital element in the fostering of democratic processes. United Nations (1998) defines Civil Registration as the continuous, permanent, compulsory, and universal recording of the occurrence and characteristics of vital events (live births, deaths, fetal deaths, marriages, and divorces) and other civil status events pertaining to the population.

The applications of Information and Communication Technologies (ICTs) in civil registration play critical roles in strengthening civil registration. According to World Health Organization (2010) the use of ICT does have a number of advantages which include timeliness of different processes, including data production and management; data verification, validation and sharing of vital statistics data. On the contrary, paper based systems of civil registration presents numerous challenges such as overflowing storerooms filled with paperwork, and shortages of basic commodities such as paper, pens, and simple calculators or computers. These challenges make it difficult to obtain copies of birth or death certificates, which in turn can discredit the reputation of civil registration systems and make communities reluctant to comply with their requirements (WHO, 2013).

However, ICT in civil registration is widely practiced more by the developed countries of the North as opposed to the South. In the United States of America for example computerized systems and e-records are becoming the basis for registering births and deaths with a centralized database that helps to keep track of such records (UN, 1998; IRMT, 2004). Similarly in Malaysia automated civil registration is decentralized, with local police officers,

village headmen and midwives who are all legally required to notify the District Registrar of any births occurring in their respective areas. Registration data are entered in a centralized database that is accessible by authorized agencies through a web site (UNICEF, 2002).

In many developing countries, computers are not used at the local level where events are initially registered, and this can make the transfer of microdata to higher administrative levels cumbersome and subject to error (WHO, 2013). Many African countries are still struggling to establish complete CRVS systems (UN, 2013). Irons *et al* (1998) explain that manual system has led to lack of proper linkage among stakeholders in civil registration.

The government of Kenya is currently aiming at developing a computerized database of all registered births and deaths that have occurred in the country (Kenya, Republic of, 2008).

However, it is pointed out by UNICEF (2011) that there are still several challenges being encountered. The challenges include lack of a functional inter-agency coordination mechanism at national level, hard to find qualified and trained people to manage the system at each level of the structure, resistance of older social workers to make the shift from paper-based systems to the new electronic version and finally lack of institutional support.

The use of ICT is evident in the department of civil registration and as well health facilities such as Siaya District Hospital which has the Health Management Information Systems (HMIS) department (Kenya, Republic of, 2008). However, the linkages between the civil registration departments are not adequate despite the availability of computers. According to UNICEF (2011), If there are plans to expand the computerization of the data system in the near future, it is important to discuss the effect that further computerization is likely to have on the quality and timeliness of the statistics produced.

1.2 Problem statement

Manual system of civil registration has led increased inefficiency and therefore delays in data transmission among the stakeholders and the department s involved. WHO (2010) reiterates that paper based systems of civil registration presents numerous challenges which make it difficult to obtain copies of birth or death certificates. This may in turn discredit the reputation of civil registration systems and make communities reluctant to comply with their requirements. It has also been pointed out by UNICEF (2011) that the use of manual system is still common in Kenya due to resistance to make the shift from paper-based systems to the new electronic version and lack of computers.

The slow process of civil registration and difficulties in analyzing and assorting registration data is inevitable in Kenya. Difficulties in handling large volumes of files and frequent loss of manual data are also common in the civil registration department. Further, the use of computerized civil registration in Siaya is still low despite the existence of computers in health facilities and civil registration departments. The computers are few and lack local area networks thus making it difficult to transfer data between various departments.

The problem is more pronounced during the months of January and February when births certificates are required by the Kenya National Examination Council for registration of examination. Integration and implementation of ICT in this process is therefore expected to speed it up. According to World Health Organization (2010) the use of ICT advantages such as timeliness in data production and management data verification, validation and sharing of vital statistics data. This study therefore sets out to examine ways in which ICT can be used to improve such services and if indeed this is the manner in which the registry is implementing the use of ICT.

1.3 Objectives of the study

The main purpose of the study was to assess how the use of ICT can improve registration of births and deaths in Siaya District.

1.3.1 Specific objectives

1. To explore how Civil registration stakeholders can be linked through networking.
2. To analyze how ICT can speed up the process of births and deaths registration.
3. To examine how ICT can ensure safety of births and deaths records.

1.3.2 Research Questions

1. How can ICT be used to improve Civil Registration through networking?
2. How can ICT be used to speed up the process of births and deaths registration?
3. How can ICT be used to ensure safety of births and death records in Siaya District?

1.4 Justification

Although Kenya is one of the African countries that have a well developed area network for internet access (Wamukoya & Mutula, 2011), it is pointed out by UNICEF (2011) that the shift to the electronic registration system has been slow and most of the work is still done manually. But Irons *et al* (1998) explain that manual system has led to lack of proper linkage among stakeholders. The use of ICT therefore presents an opportunity that can be exploited to eradicate the challenges.

The findings of this study will expose the advantages of ICT in civil registration and will therefore be beneficial to the stakeholders in the civil registration in understanding how the various stakeholders involved in civil registration can be linked to through ICT to speed up the transmission of data. They will also learn how the system can help them to improve safety

of data and to reduce the use of manual systems of data storage. It is also expected that the findings and recommendation of the study will help policy makers to design appropriate policies on the application of computerized system for civil registration. Other researchers or scholars may also benefit from the study as a source of reference material

1.5 Scope of the study

The study will be conducted in Karemo Divion in Siaya district. The study will specifically focus on the use of ICT in the civil registration department. Accordingly, the study will explore how the use of ICT can be used to provide an effective linkage among the civil registration stakeholders in health facilities, village and registration centres at the district headquarter. The study will also cover the various ICT uses that can be used to ensure rapid dissemination of registration records. Finally, the study will explore security issues that are associated with the use of manual system and how ICT can be used to improve and ensure accuracy and privacy of data.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter provides an elaborate review of secondary materials on the use of ICT and its use in civil registration. The secondary materials under review include published books, journals, periodicals, conference papers, departmental reports and electronic medium such as internet. Literature has been conducted to provide a baseline for the study.

2.2 Linking civil registration stakeholders through networking

Civil registration and vital statistics systems are basic government functions for every country of the world as they are relevant to the administration of the country, to the national statistics system, to researchers, to the health information system, to each individual in the society, and so forth. Ahern and Martin, (2001) notes that civil registration has many uses and benefits for the individual citizen, society and the State in that it underpins the civil status of every person and establishes identity as individuals and as members of society; provides certificates requested by Government Departments and Agencies in support of applications for services.

When computerizing civil registration, different view point is taken. The civil registration system concept focuses on the individual as the main key to the civil events information linking all registrations to the individual. By establishing this linkage, the civil registration is from the very first version prepared for future changes and additions (UN, 1998). Ahern and Martin (2001) add that an essential element underpinning the integration of public services is the sharing of personal data between public service agencies.

Linkage of civil registration data has been achieved in Malaysia which has an automated civil registration decentralized, with local police officers, village headmen and midwives who are

all legally required to notify the District Registrar of any births occurring in their respective areas. At the national level, birth registration data are entered in a centralized database that is accessible by authorized agencies through a web site (UNICEF, 2002).

Registration of births and deaths came into effect in Kenya (Then the East African Protectorate) in 1904, when it was compulsory for Europeans and Americans to be registered only. In 1906 compulsory registration was extended to cover all deaths in townships and all deaths of Europeans, Americans, and Indians (Kenya Republic of, 2008). The system of registration is however still weak with inadequate linkages of various departmental records. It is suggested that at the office of civil registration, capacity needs to be strengthened and linkage to the MoH enhanced if complete mortality statistics have to be generated.

One of the key challenges in the Kenyan health sector identified in First Medium Term Plan of Vision 2030 document is weak health information systems. Various weaknesses identified in the existing information systems include lack of policy and guidelines, inadequate capacities of HIS staff, unskilled personnel handling data, lack of integration, many parallel data collection systems, and poor coordination, amongst others. The current HIS provides limited information for monitoring health goals and empowering communities and individuals with timely and understandable information on health (Kenya republic of, 2010).

Kenya's health information system (HIS) includes routine service data; census and vital statistics; surveys; surveillance; other population- and facility-based statistics and research; management statistics; and information and communication technologies (ICTs). However, across these components, integration and interoperability is limited. In addition, information

feedback loops and use of information for management and decision-making is variable across health system levels and across management units (Luoma *et al*, 2010).

Linkage through a well networked ICT system can provide an opportunity for close working relationship and partnerships with HIS to provide data on population- based statistics, vital events (births and deaths) and health related research data for comparative analysis and warehousing. Muzzi (2010) for instance observes that birth registration system can serve as the backbone of an electronic health administration system for improved monitoring, planning and service delivery, as well as enhanced monitoring of each individual child's health status. Ultimately, one basic database could be used for all services.

2.3 Information and Communication Technology in speeding up civil registration

Records of birth, death, marriage are an important bridge between customers and a range of public services. The sharing of, or the provision of access to registration data could be used to support efficient processing of applications for passports, child benefit entitlements etc (Ahern and Martin, 2001).

Computerization of civil registration data is the best strategy to speed up data management and transfer. Some developing countries have made significant progress going from a manual system to a paperless system in a relatively short time. For example, Albania started computerizing their paper-based system in 2003. By 2008 certificates were being issued directly from their central database (AusAID, 2011). In Guinea Bissau, computerization has enabled data from all children born between 2000 and December 2007 to be registered in the electronic database, including nearly half a million children (Muzzi, 2010).

A coordinated approach is needed that brings together all the key players for making change happen. According to AusAID (2012), a collaborative action by key players can bring about improvements in a short timeframe. For example, in South Africa, where major stakeholders joined forces and government has made a concerted effort to invest in improving vital registration, completeness of registration greatly improved in a relatively short time period.

In Kenya registration of births and deaths at the Department of Civil Registration is still manual. Data entry of records of births and deaths is being computerized on pilot basis (Kenya Republic of, 2009). However, the manual system has shortcomings such as difficulties in updating and correcting information because the records held in this form are complex and are not linked. According to Ahern and Martin (2001) it could save time at a death registration and improve the quality of the information if an informant was able to confirm a link to the deceased's birth record.

The use of ICT eliminate burdens such as the requirement to attend a specific civil registrar's office to register a birth, still-birth or death or to give notice of marriage, the requirement to produce drafts of particulars, restrictions on the way documents are produced (e.g. on paper), and requirements to register events in paper registers. UNICEF (2012) indicated that automated system improves the co-efficiency and accuracy of establishing a new person's identity at birth. It further indicates automated system ensures well organized and easy to retrieve data from the central database.

In the developed countries such as England and Wales it is purported that registration via the Internet will be interactive and will include the use of portals such as the government's United Kingdom Online gateway. Help and advice will be available in person from local service

providers, via telephone help-lines and through help databases on the Internet. It will be possible to access information about registration services 24 hours a day, 7 days a week and to use those services remotely for much of that time. This will provide quick transfer and exchange of information and speed up government or departmental decision or policy making.

USAID (2010) points out that Health Information Systems (HIS) components, integration and interoperability in Kenya is limited. The country's File Transfer Protocol (FTP) system to transmit routine service data from lower levels to the central level lacks adequate features to facilitate analysis and use of information for decision making. Information products are produced and disseminated by the division of HIS and other stakeholders, but deficiencies in quality, timeliness, and widespread availability hamper use and relevance and leads to into delays in transfer of information across relevant departments.

Overall, the need to develop automated system is to influence governments to make Civil Registration and Vital Statistics a priority and ensure that development partners recognise that these systems are key to development (Mahapatra *et al.*, 2007).

2.4 Using Information and Communication Technology to improve data security

A fully functional civil registration system should be compulsory, universal, permanent and continuous and should ensure the confidentiality of personal data. It should collect, transmit (and store data in an effective way and guarantee their quality and integrity (UNICEF, 2002).

If data confidentiality and personal privacy are not maintained, the civil registration system will not be trusted, and people will be reluctant to register. The civil registration law should protect the confidentiality of the personal information in the registration records and safeguard it from unlawful access. The introduction of computers in all aspects of civil

registration makes it all the more imperative to ensure that there are laws, policies, and mechanisms governing the release of individual data. Sharing of files with registration data with other agencies for statistical or administrative purposes should involve a formal agreement that outlines security procedures to be followed and specifically lists all restrictions on use of the data (AusAID, 2011).

In order to safeguard personal data and ensure security, some developing countries such as Albania are being assisted to develop a secure central framework which will become the access point for all public services and thus assist customers in their dealings with the Public Service (Ahern and Martin, 2001). While confidentiality provisions should not interfere with any legitimate administrative, public health, and social uses of the data, these uses should be consistent with confidentiality concerns and the improvement of services (UNAIDS, 2009).

Similarly, in Bangladesh, a web-based user interface was proposed to be developed for birth registration. An inherent advantage of this interface is that it is very simple and easy to use and will also reduce possible support requests that otherwise might arise from the non-functioning of such software. Data will be safe on the central server, and restoration time will be short even if the computer is damaged due to unforeseen reasons (Muzzi, 2010).

In Kenya, it has been proposed that there is urgent need to improve the use and application of modern ICT to capture, store and exchange health information at all levels through provision of equipment and developing capacity of staff. There is also need to have adequate storage place and data collected and information generated must be handled with confidentiality and security they deserve (Kenya Republic of, 2009). United Nations Statistical Commission (UNSC) demands that statistical data and health information be made liberal and readily accessible as a "Public good" and in a timely manner, and also promotes use of existing data.

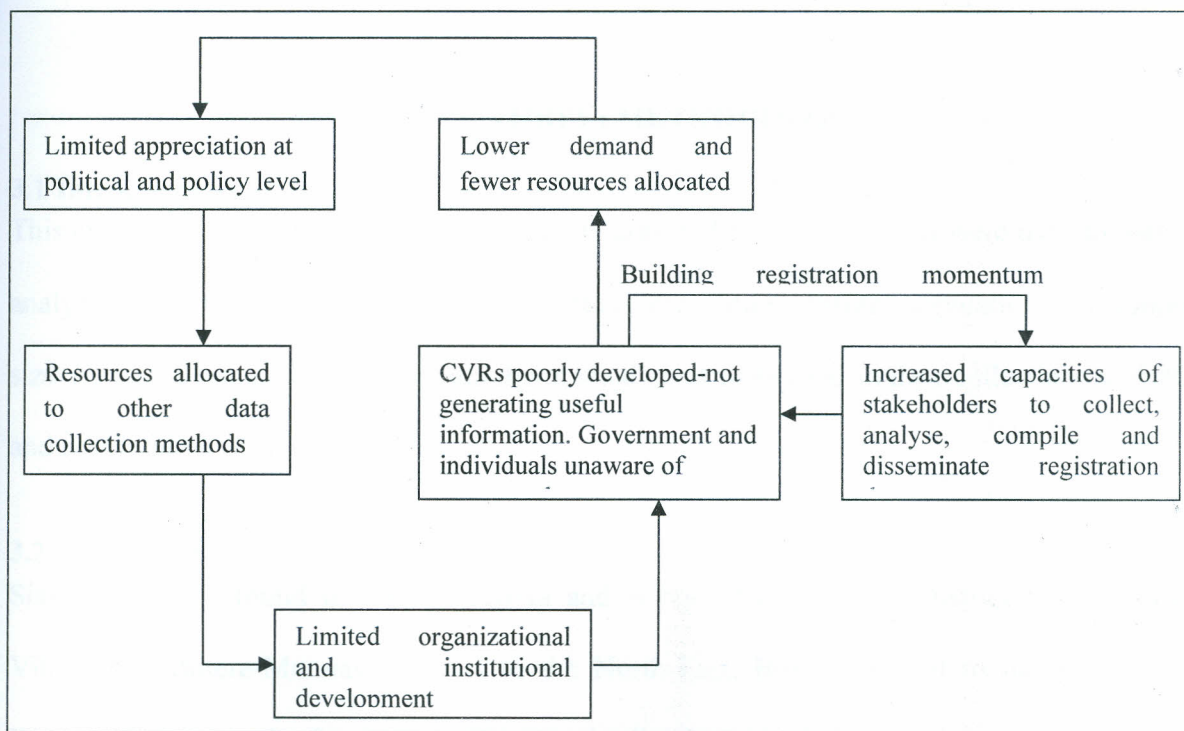
However, there are guiding principles which seeks to promote ethical considerations in matters concerning data security and information disclosure (Kenya Republic of, 2010).

2.5 The Conceptual Framework

It is essential to overcome the challenges associated with manual system of civil registration. According to AusAID (2012) of underinvestment in Civil Registration Vital Systems (CVRS) results into weak and dysfunctional CRSVS systems which are unable to generate vital statistics or provide legal documentation on vital events. As a result, there is little allocation of resources, with policy-makers failing to see the potential benefits of CRVS systems. The outcome is the allocation of resources to alternative data collection methods, without realizing that these have a number of limitations compared to functioning CRVS systems. This in turn results in weak institutional and organization development of CRVS.

Advocacy can bring about a changed perception that CRVS systems are “public goods” that every government should provide to their citizens as they benefit individuals and communities as well as generating reliable birth, death and cause-of-death data. This requires the building of registration momentum through a well-developed ICT system that will enable stakeholders to increase collection, analyses and to compile registration data. If the ICT system is not well developed it may equally result into non-useful or data that does not benefit the stakeholders.

Figure2- 1: Conceptual Framework



Source: Adopted and modified from Kiregyera (2005)

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter provides information on the study area and the methods that were used to gather analyse data and present the findings. The study area, study design, population and sample size are also explained. It also details the methods that were used in data collection, analysis and presentation of findings.

3.2 Study area

Siaya District is found in western Kenya and is bordered by Busia District to the North, Vihiga and Butere-Mumias Districts to the North-East, Bondo District to the South, and Kisumu District to the South-East. The District lies between latitude $0^{\circ} 26'$ to $0^{\circ} 18'N$ and longitude $33^{\circ} 58'E$ and $34^{\circ} 33'W$. The total area of the district is approximately 1520 km².

Figure3- 1: Siaya District in the National Context



Source: Redrawn from Kenya County map, 2011

Siaya District is divided into seven administrative divisions namely Yala, Wagai, Karemo, Ugunja, Boro, Uranga, and Ukwala. The largest division is Ukwala with an area of 319 km²,

followed by Karemo with an area of 235.1 km², while Boro is the smallest division with a total area of 180.1 km² (Siaya District Strategic Plan, 2005 – 2010). The study was conducted in Karemo division shown in the map below.

According to the 2009 National Population and Housing Census, Karemo division has a population of approximately 88,705 with a population density of 239/km². In terms of gender distribution, the division has 41,756 males while 46, 949 females (Kenya Republic of, 2009).

Map of Siaya District in the local context



Source: Redrawn from Siaya district development plan map, 2008.

3.3 Research Design

The study involved a survey design due to its advantages of providing the researcher with an opportunity to explore the whole study area or population. According to Kothari (2004) survey design enables the researcher to gather data from a relatively representative portion. Survey design therefore provided an opportunity to collect information from a representative portion of the study population.

The study was broken down into three phases in order to ensure systematic gathering of relevant information. The first phase involved identification of the study sites through preliminary surveys. It involved informal discussions with the residents, health workers, civil registration officers and the local administration.

The second phase involved preparation of for the real fieldwork and the final data collection exercise. It involved preparation of data collection tools and seeking for permission from the relevant authorities. The second phase also involved the determination of the survey areas in order to help the researcher to deal with a manageable population sample size. The third phase involved data cleaning and entry into a computer software in preparation for analysis and report preparation.

The study employed the use of the mixed approach method in which both qualitative and quantitative methods were used to acquire information. It is argued by Stake (1995) that qualitative and quantitative methods reinforce each other when planned carefully.

3.4 Study population

According to the 2009 National Population and Housing Census, Karemo division has a population of approximately 88,705 with a population density of 239km². In terms of gender distribution, the division has 41,756 males while 46, 949 females (Kenya Republic of, 2009).

Table3- 1: Population distribution in Karemo Division

Location	Formula	No. Households
Township	384(8043/21150)	146
S. Alego	384(5986/21150)	109
E. Alego	384(2381/21150)	43
S. E. Alego	384(4740/21150)	86
TOTAL		384

The study focused on various institutions that deal with civil registration and include health facilities, local administration (chief's office) and the department of Civil Registration in Siaya district under the Ministry of Immigration and Registration of persons.

3.5 Sample size

According to departmental records, Karemo Division has 17 assistant chiefs, 30 records officers/community health workers and 3 registry data clerks. The groups in the study area therefore form a total population of 50 respondents. Kothari (2004) points out that if many class-groups (groups and sub-groups) are to be formed, a large sample would be required because a small sample might not be able to give a reasonable number of items in each class-group. However, a total of 384 households were also selected from the total population of 21,150 using the formula below.

The population of assistant chiefs, community health workers and civil registration clerks was determined through total count while the household population was determined using the formula below:

$$n = (Z^2 pq) / d^2 \quad (\text{Mugenda and Mugenda, 1999})$$

Where: n = the desired sample size (if the target population is greater than 10,000)

z = the standard normal deviate at the required confidence level

p = the proportion in the target population estimated to have characteristics being measured

$$q = 1 - p$$

d = the level of statistical significance set.

Assumptions: since there was no estimate available for the proportion in the target population assumed to have the characteristics of interest, 50% was used as recommended by Fisher *et al.*

z -characteristic was taken as 1.96 at the accuracy level of 0.05, thus

$$n = 384.$$

Determination of locations and sub locations sample sizes was done through proportional allocation formula given by Kothari (2004)

$$i = n \cdot p_i$$

$$p_i = N_i / N$$

Where: i = stratum, N_i = sample size, N = population

For Karemo division: households = 21,150 (N), sample size (n) = 384 households

Township = 8,043(N₁), South Alego = 5,986(N₂), East Alego = 2,381(N₃), South East Alego = 4,740(N₃)

Proportional allocation for each location

Location	Formula (p _i .n)	No households
Township	384(8043/21150)	146
S. Alego	384(5986/21150)	109
E. Alego	384(2381/21150)	43
S. E. Alego	384(4740/21150)	86
TOTAL		384

No. of households: there are 21,150 households in Karemo Division (Kenya Republic of, 2009) and one parent was interviewed per household in the selected sample.

Sample size = is determined using stratified sampling.

Proportional allocation for each sub location was:

Sub location	Formula ($p_i \cdot n$)	No of households
Nyandiwa	146(2028/8043)	37
Mulaha:	146(2220/8043)	40
Karapul	146(3795/8043)	68
Barding	109(801/5986)	15
Bar Osimbo	109 (502/5986)	9
Nyajuok	109(1333/5986)	24
Randago	109(815/5986)	15
Bar Olengo	109(682/5986)	12
Mur Malanga	109(815/5986)	15
Pap Oriang	109(1038/5986)	19
Olwa	43(835/2381)	15
Ulafu	43(735/2381)	13
Umala	43(811/2381)	15
Masumbi	86(1259/4740)	23
Bar Agulu	86(1249/4740)	23
Mur Ng'iya	86(1187/4740)	22
Nyangoma	86(1045/4740)	19
Total		384

3.6 Sampling procedures

Sampling procedure in this study is defined as the process of selecting the individuals to participate in the study. The research was based in two levels:

The composition of the sample included the entire 17 Assistant chiefs, all the 30 Community health workers and the only 3 civil registration clerks in the district. Each

community health worker, assistant chiefs and the only three clerks in the district was interviewed.

The total sample of household was 384. Each individual parent in population sample had a specifiable probability of selection and sampling occurred on a random process but based on the probabilities. Random process was used to produce a given outcome (unpredictable) out of a set of possible outcomes. This sampling procedure was used for the case of households due to their large number.

Key informants were used in the study since it was assumed that they had a better knowledge on the use of ICT and the experience they had with the use of manual system. Parents on the other hand were included in the survey so as to ascertain the need for the use of ICT to avert the difficulties they experience with manual registration.

3.7 Sampling Techniques

The study included health workers, registration clerks, area chiefs and households. Both purposive and simple random sampling techniques were used to carry out the study. Community health workers, area chiefs/assistant chiefs and registration clerks will be selected purposively. According to Singh, (2006) purposive sampling is advantageous due to homogeneity of subjects used in the sample and the use of the best available knowledge concerning the sample subjects.

Simple random sampling was however used to select the households due to their large size which cannot be sample effectively through other techniques. Simple random sampling is advantageous because each member of the population has an equal probability of being

selected to participate in the study (Kazdin, 1992). The population sample is not selected following any order to avoid biasness.

3.8 Data collection methods

3.8.1 Secondary data

The study involved collection of primary and secondary data. Secondary were obtained through literature review of books, research reports and administrative records, journals, periodicals and internet. The main purpose of secondary data was to establish the existing knowledge base with respect to research issues at hand, and to supplement primary data.

3.8.2 Primary Data

These included information collected from the field through the respondents and observation techniques. Primary data collection therefore involved multiple data collection techniques of both qualitative and quantitative nature. Detailed discussions of the primary methods of data collection are discussed below.

3.8.2.1 Key Informant Interviews

Key informant interviews (KII) were conducted with the head of civil registration department and officials from the Ministry of Immigration. KII is based on the understanding that the officials had rich information on the use of manual registration system and the adoption of ICT. KII were relevant in gathering information on the opinion and experience of the civil registration officers with regard to working mechanisms of ICT and how it can revolutionize the civil registration process. According to Stake (1995) in-depth interviews with key informants are particularly useful where it is advantageous to keep respondents apart so that there is no contamination from hearing the response of others, as happens in focus groups.

3.8.2.2 Observation

Noor (2006) explains that observation is where the researcher observes a phenomenon of interest in the environment studied to draw information which is not obtainable from other methods. Observation was used in this research to ascertain the existence of computerized hardware and whether they are linked to various civil registration departments. It also enabled the researcher to observe physical environment in relation to manual data storage system and the available office space.

3.8.2.3 Questionnaires

Questionnaires are important in extracting information that cannot be obtained through other means such as observation. Questionnaires in this case were used to answer questions regarding safety of data, use of manual system and its implications and how ICT can be used to improve civil registration. Noor (2006) posits that the major advantages of questionnaire are that it permits wide coverage at a minimum expense of both money and effort and also promotes validity in the results through the selection of a large and more representative sample. A semi-structured questionnaire was used targeting the parents of the school going students' as part of the sample population. In either cases, the correspondents per given tool was numbered to conceal their identities and to fasten the aim of the activity as strictly research.

3.9 Data Processing, Analysis and Interpretations

The study generated large volumes of qualitative and quantitative data which required summarizing and coding. Data cleaning was undertaken in the summary and coding process and irrelevant data were discarded. Quantitative data was entered into the computer software for final analysis using SPSS. Analysis involves of systematically breaking down something

into its constituent parts and describing how they relate to each other; it is not random dissection but methodological examination (Kvale, 1996).

Quantitative data was useful in quantifying the degree of truth of certain claims of the variables in this study. According to Mugenda & Mugenda (2003) quantitative analyses are useful for assessment of the dimensions of characteristics of variables under investigation. Qualitative were analysed relying on the approaches outlined by categorization, condensation, structuring of meaning through narratives and interpretation of meaning.

3.10 Validity and Reliability of Instruments

Validity refers to the extent to which the interpretations of the results of a test are warranted based on the test's intended use (Oso & Onen, 2008). Reliability is the degree to which a measurement technique can be depended upon to secure consistent results upon repeated application (Winer, 1962).

In order to ensure data validity, the tests of the research were done at a significance level of 0.05 (5%). This implies that the researcher was 95% sure that the results of the study were true and not biased. However, reliability of the research results was achieved by carrying out cross-analyses of secondary and primary data. The researcher went beyond the use of only one method by conducting triangulation to ensure that the initial claims are either supported or rejected through other methods.

3.11 Limitations of the Study

The study had got various challenges which had to be averted in order to achieve the objectives of the research. Karemo division is expansive, has poor accessibility and the villages are sparsely located. This made it difficult to meet the target respondents especially

the households. This led to hiring of motorcycles to aid in the movement of the research assistants thus increasing the cost of conducting the research. The other challenge involved the difficulty to meet some respondents especially the local administration and the health workers due to their work schedule. However, the researcher had to get alternative respondents within the same institutions to provide the information.

CHAPTER FOUR: FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter provides detailed and systematic analysis of the study findings in relation to the objectives. It examines the views of respondents on the use of ICT in improving civil registration. The chapter has been organized in accordance to the set objectives.

4.2 Linking Civil Registration Stakeholders through Information and Communication Technology

This section addresses the first specific objective which is *“to explore how Civil registration stakeholders can be linked through networking”*.

It is evident from literature review that manual registration of births and deaths makes it difficult to share data among the registration stakeholders who are parents, health workers, assistant chiefs and civil registration staff. Parents are the informants while assistant chiefs and health workers are the registration agents. Civil registration clerks are the custodians of the data. This study explored the use of ICT and how it is used to share registration data among the stakeholders. It was therefore necessary to examine the presence of electronic media within the study settings. According to the study findings 55% of the respondents pointed out the use of computers while 40% did not have any electronic media for registration purposes. However, 2% of the respondents reported the use of mobile phones to facilitate the registration process.

An in-depth interview on how electronic media is used was conducted in order to understand the application of such media in civil registration. It was established that mobile phones are basically used by the residents to inform the local administration of any births or deaths in their locality before going to obtain the valid documentation. However, at the local administration offices, recording is carried out manually. According to findings in table 4-1

below, 100% of the respondents noted that the process at the local administration is purely manual. An observation conducted also revealed that all the local administration offices did not have computers. The study revealed that 55.6% of the civil registration clerks apply the use of computers in carrying out registration while 44.4% use manual system. Contrary to the study expectations, it was revealed through observation that most of the records received are first recorded manually before being entered into the computer system. The table below shows a cross-tabulation of civil registration officers and the mode of civil registration.

Table4- 1: Mode of Civil Registration

		Mode of Civil Registration		Total
		Manual	Electronic	
Person who conducted registration	Chief/Assistant chief % within Person who conducted registration	100.0%	.0%	100.0%
	Health workers % within Person who conducted registration	44.4%	55.6%	100.0%
	Civil registrar/clerks % within Person who conducted registration	14.3%	85.7%	100.0%
Total % within Person who conducted registration		42.5%	57.5%	100.0%

It was established through literature review that one of the key challenges in the Kenyan health sector is weak health information systems which include, among other things, lack of

policy and guidelines, inadequate capacities of HIS staff, unskilled personnel handling data, lack of integration, many parallel data collection systems, and poor coordination.

Having established the modes of civil registration, the study investigated whether there are electronic data linkages between the stakeholders. According to the findings only 27.5% of the respondents said that they are linked through electronic system through the Local Area Networks (LAN). However, 72% of the study stakeholders are not connected and this reveals how the use of ICT in data transmission is still dismal in civil registration processes.

Transmission of civil registration data from other stakeholders to the civil registrar’s office is manually done as revealed by this study. From the study findings, there was no electronic means of data transmission. As revealed by the study, 62.5% of the respondents indicated that the records are transmitted by the clients from one station to another while 37.5% said that the records are sometimes picked by the civil registration officers. Table4-2 below shows a summary of the findings.

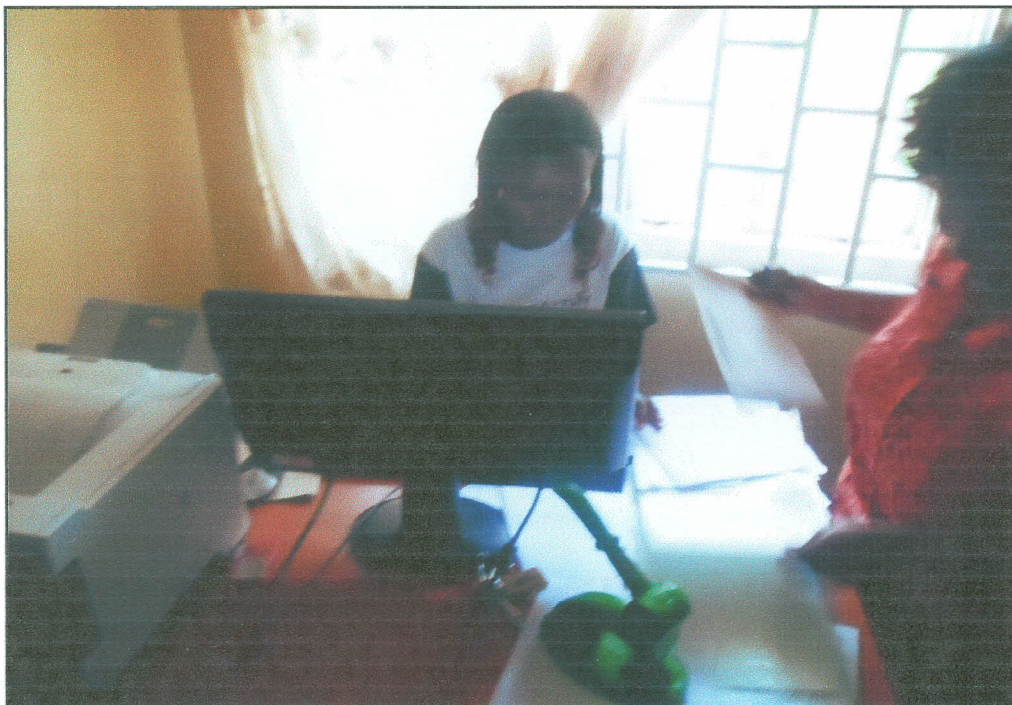
Table4- 2: Modes of transmitting Civil Registration Data

		Percent
Mode of data transmission	Picked by civil registration officers	37.5%
	Submitted by clients	62.5%
	Total	100.0%

It is this mode of manual transmission that causes delay in the registration process and difficulties in handling and sharing data. However, UNICEF (2011) notes that the use of manual system is still common especially in Kenya due to resistance to make the shift from paper-based systems to the new electronic version and lack of computers. An in-depth interview with the registrar pointed out that the cost of implementing and maintaining ICT is high and is one of the reasons why they haven’t implemented the system.

Personal observation made during the study indicated existence of computers in the civil registration offices but were devoid of local networking. It was also observed that most of the registration officers had personal modems for their own, a condition which limited communication between the stakeholders due to high cost.

Figure4- 1: Civil registration clerk using a computer

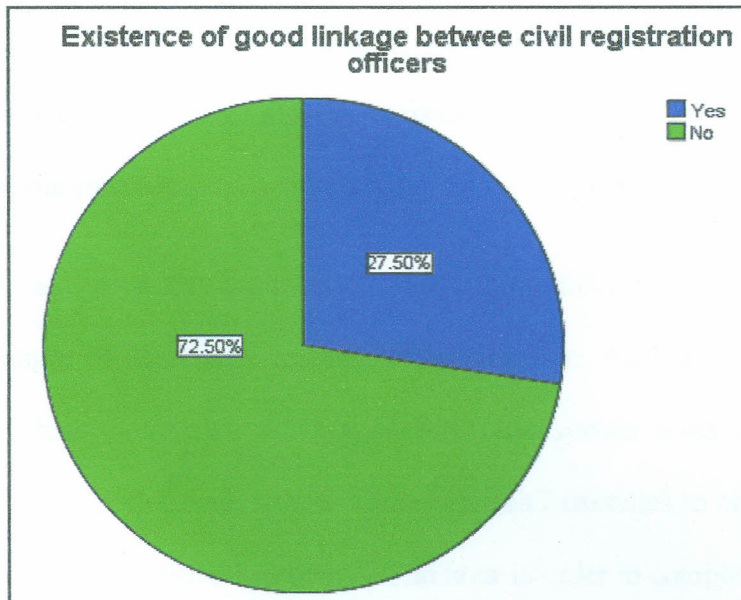


Source: Field photograph

According to initial findings 55.6% of health workers and 85.7% of the registration clerks use electronic system. However, personal interviews with the health workers and the civil registration clerks showed that though the electronic media exist in some of the offices, all the transmission of data is entirely through the manual system due to lack of electronic linkages. Personal observation revealed how parents and officials move from one office to another in order to complete filling in the registration form before final submission for registration. Figure 4-1 below shows the respondents opinions on whether there are good linkages between

the stakeholders. About 72% of the respondents noted lack of linkage in civil registration departments.

Figure4- 2: Respondents feelings on linkage among civil registration stakeholders



Generally, the study established that there is poor electronic linkage between the civil registration stakeholders. According to the AusAID (2012) underinvestment in Civil Registration Vital Systems (CVRS) may results into weak and dysfunctional CRV systems which are unable to generate vital statistics or provide legal documentation on vital events.

4.3 Using Information and Communication Technology to Speed up Civil Registration Process

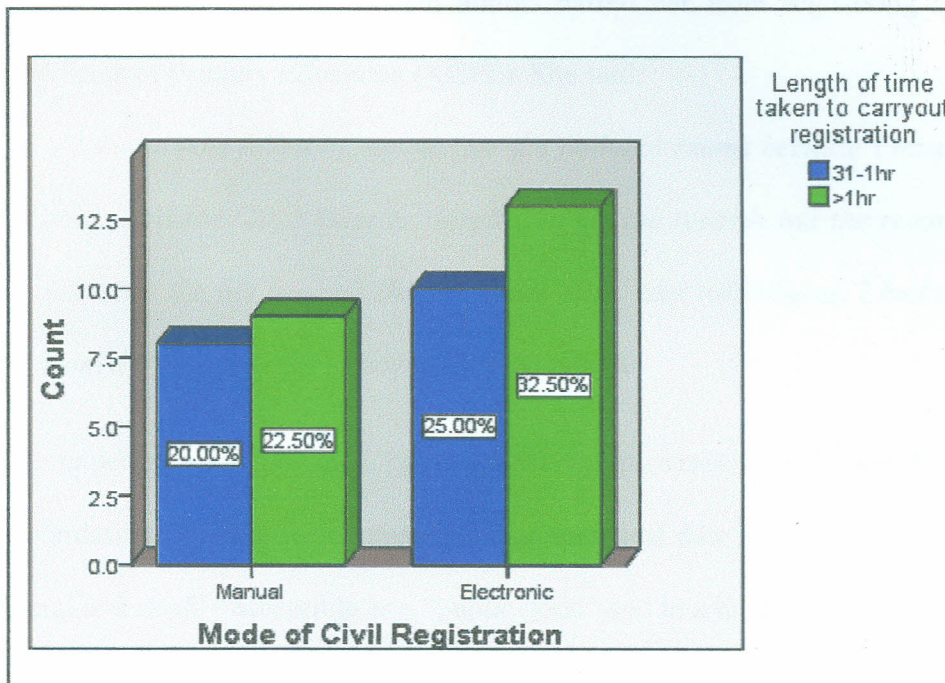
This section addresses the second objective which is “*To analyze how ICT can speed up the process of births and deaths registration*”.The use of ICT according to literature findings can improve the speed of civil registration method. This study examined the length of time taken between the time of application and the issuance of civil registration certificates.A cross-analysis from the registration departments showed that registration process take longer hours due to

manual system which require the clients or registration officers to move from one office to another in order to acquire relevant registration requirements.

During interviews, 90% of the respondents said that manual system is difficult to use while a dismal 10% favoured manual system. However, the respondents were asked about their opinions on the use of electronic system in speeding up the registration process and 100% agreed that electronic can reduce time for carrying out civil registration.

Cross-tabulation was conducted to find out the difference between the mode of registration and the length of time taken to complete registration. According to the study results, 32% of the respondents noted that the use of electronic system takes more than one hour while 25% observed that electronic system takes between 31minutes to one hour. It was noted that there is no mode that recorded less than half an hour in order to complete registration process. Figure 4-2 below shows a summary of the findings.

Figure4- 3: Length of time taken to complete Civil Registration applications



An in-depth interview with the key informants was carried out to explain why electronic system takes longer duration contrary to the prior findings from literature. One of the clerks at the civil registration said;

Electronic system provides the easiest mode for carrying out civil registration but we have very few or lack computers in the departments. We are often forced to collect registration details from our clients before feeding them in the computers. Some of our clerks are not very good at using the computers and this slows down the speed of capturing the registration details (Personal interviews with the registration clerk).

It was also revealed through the interviews that processing of the certificates take three weeks or even two months. It was explained by some of the parents that the manual system is cumbersome due to requirements such as copies of parents' national identification card, authorization from the local administration and even health records. A 35 year old parent observed how the manual system almost barred her from registering her son for Kenya Certificate of Primary Education (KCPE). She said;

My son almost failed to register for the national exams because I misplaced the clinic card. I visited Siaya District Hospital to get the records but the record officers could not trace the file because the files were many and voluminous. I had to get assistance from a friend in order to acquire the certificate.

The experience by the lady goes against the provisions of United Nations Statistical Commission (UNSC) which demands that statistical data and health information be made liberal and readily accessible as a "public good" and in a timely manner., and also promotes use of existing data (Kenya Republic of, 2010).

According to the table below, 67% of the respondents explained that they have difficulties in acquiring records from the civil registration centers. In-depth inquiries revealed that going through the files is often cumbersome in order to retrieve the needed information. Only 32% of the respondent noted that acquiring data from the manual files is not difficult.

Table4- 3: Respondents perceptions on ease of acquiring data by clients

	Percent
Ease of acquiring data by Yes	32.5
clients No	67.5
Total	100.0

Health workers and civil registration clerks explained that civil registration can be speeded up if internet connections are made available with relevant software linking each department. They also noted that using mobile phones may provide an alternative electronic medium through which civil registration reports can be conveyed.

Figure4- 4: Registration clerk retrieving data from manual files



Source: Field photograph

The Ahern and Martin (2001) for example point out that it could save time at a death registration and improve the quality of the information if an informant was able to confirm a link to the deceased's birth record.

4.4 Using Information and Communication Technology to Improve Security of Civil Registration Records

This section addresses the third specific objective which is *"To examine how ICT can ensure safety of births and deaths records"*. The use of manual system in carrying out civil registration shows that it has several shortcomings. Interviews conducted with the key informants showed that loss of manual data files is common while retrieving records become difficult without having detailed information about the records. The use of manual system is still dominant in civil registration offices. However, security of such data is often compromised due to difficulties in keeping large volumes of paper records and lack of security controls like pass words.

In order to examine how ICT can be applied in improving the security of data the study examined the respondents' feeling on the safety of each mode of registration and data transmission. According to the findings 60% of the respondents concurred that the manual system has no adequate security while 40% noted that manual system has no safety threats.

Table4- 4: Respondents perceptions on the security of manual data storage

	Percent
Yes	40.0%
No	60.0%
Total	100.0%

However, the study relied on key informants to investigate how ICT enhances security of civil registration records. The study started by examining how security of manuals data is ensured

in the civil registration offices. It was established that the data files are often kept in restricted offices or cabinets and are only accessed by the relevant officers. Observation was used to witness manual storage of data in registration offices. In Siaya District registration office it was observed that the records are kept in separate store strictly accessed by the clerks only.

Siaya civil registry Manual files in the shelves



Field photograph

Similarly, Siaya District Hospital has got offices for such records and is only limited to health record officers.

However, insecurity of manual data is compromised by storage furniture. Observation conducted within the offices of the local administrators (Chiefs/assistant chiefs) showed that they had small office spaces and furniture that created problems in storing large volumes of paper records. The filing system did not have a common order and the assistant chief of Masumbi sub-location admitted that they often face difficulties in retrieving past records and to account for any lost records.

According to table 4-5 80% of the respondents noted that insecurity of manual data files are high in local administration offices as compared to district civil registration and health offices. Insecurity of data is also relatively high in among health workers as reported by 77.8% of the respondents.

Table4- 5: Data security in civil registration offices

		Security of files in manual registration		Total
		Yes	No	
Person who conducted registration	Chief/Assistant chief % within person who conducted registration	20.0%	80.0%	100.0%
	Health worker % within person who conducted registration	22.2%	77.8%	100.0%
	Civil registrar % within Person who conducted registration	61.9%	38.1%	100.0%
Total	Count	17	23	40
	% within Person who conducted registration	42.5%	57.5%	100.0%

The key informants note two main approaches of ensuring electronic data security namely; creating data backups and passwords

4.4.1 Creating Data Backups

The respondents noted that electronic system provides the best alternative for ensuring data security. According to the civil registration clerks who embrace computerized data recording, computers provide the efficient means of creating backups for data safety. However, observation results showed that there are no elaborate data backups hence safety of data is not

guaranteed in the department. He pointed out that creating electronic data backups provide better security because several storage devices can be easily carried and kept away from the offices. An important observation was that none of the departments have got a central point for storing data. The findings on lack of central data storage point or backup in the civil registration offices fall short of the findings by Muzzi (2010) who reiterates that data will be safe on the central server, and restoration time will be short even if the computer is damaged due to unforeseen reasons.

4.4.2 Assigning password to registration data

The key informants also observed that electronic data security can be ensured by assigning password to individual records. The district civil registrar for instance explained that password has enabled him to provide adequate security to his personal and departmental data as opposed to the manual system which can be accessed by anybody at any time. He explained;

I have never experienced any problem with my personal data because all my data have been secured through password and any person intending to use my computer must seek for permission. The computer cannot be accessed in my absence and am assured of my data security even when am out of the office (Interview with the District Civil Registrar, 29/08/2013)

However, such security measures may be detrimental if there is urgent data need and the password is kept confidential by the absent officers. UNAIDS, (2009) therefore explains that while confidentiality provisions should not interfere with any legitimate administrative, and social uses of the data, these uses should be consistent with confidentiality concerns and the improvement of services.

CHAPTER FIVE: SUMMARY CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides an overview of the study findings and the conclusions that can be drawn from the results. Recommendations are also provided with an aim to ensure that the study findings benefit the target beneficiaries. Finally, areas for further study have been proposed to help bridge the study gaps which still exist in the use of ICT in civil registration.

5.2 Summary

Linking Civil Registration Stakeholders through Information and Communication Technology

The first objective of this study was to examine the linkage of civil registration stakeholder through ICT. The study therefore examined if the civil registration departments use ICT to carryout registration and whether there is electronic linkage to enhance sharing of registration data among the stakeholders. The study found that 55% of the respondents confirmed the use of while 40% noted absence of electronic media for registration purposes.

An observation conducted also revealed that all the local administration offices are entirely manual due to lack of computers. Even where computers are available the records received are first recorded manually before being entered into the computer system. The findings on electronic linkages among stakeholders showed that there is weak linkage as pointed out by 72% of the respondent. Transmission of civil registration data from other stakeholders to the civil registrar's office is manually from one station to another either by the clients or civil registration officers.

Using Information and Communication Technology to Speed up Civil Registration Process

The use of ICT as established through this study can help to speed up civil registration. Analysis from the registration departments showed that registration processes currently take longer hours due to manual system. According to the study results, 32% of the respondents noted that the use of electronic system takes more than one hour while 25% observed that electronic system takes between 31minutes to one hour. It was also revealed through the interviews that processing of the certificates take three weeks or even two months.

It was explained by some of the parents that manual system is cumbersome due to many requirements which must be presented in hard copies and some must be approved or signed by the local administration. Inadequate availability of electronic media such as computers, internet connections and inadequate computer literate personnel were also found as some of the factors which promotes the use of manual system in civil registration.

The health workers and civil registration clerks explained that civil registration can be speeded up through internet connections which enhance online communication between the stakeholders. Findings from literature points out that linking stakeholder through ICT could save time at registration and improve the quality of the information.

Using Information and Communication Technology to Improve Security of Civil Registration Records

The third objective of the study involved a study on how ICT can be used to enhance security of civil registration data. Interview results indicate loss of manual data files due to difficulties in keeping large volumes of paper records. About 60% of the respondents noted that manual system has no security as opposed to 40% who said it has no security threats.

Insecurity of manual data is compromised by challenges of storing data which include lack of adequate space and poor filing systems. The respondents pointed out that data security can be enhanced through creation of data backups which can then be stored away from the offices. Backups can also be created by saving registration records in various linked computers to enhance retrieval in the event of computer failure at the data source. Creation of passwords also provides data security by preventing unauthorized access.

5.3 Conclusion

Application of ICT in civil registration provides the best opportunity for enhancing quick transmission of registration data among the stakeholder. However, the use of ICT in civil registration is still limited and most of the records are taken and transmitted manually. Local administrators rely entirely on manual registration while civil registration offices and health facilities have computers but no internet connections or LAN. The study concludes that the use of ICT in civil registration is still very weak and compromises data quality and sharing among the data users.

The speed of data transmission is greatly hindered by the manual system which is slow and cumbersome. Clients spend a lot of time to complete applications or retrieve information from the records while registration officers find it difficult disseminate registration information to the clients or other departments. This leads delay in processing applications and issuing out civil registration certificates. The study concludes that manual system of civil registration has got several challenges which can be averted by adopting the use of ICT through the establishment of a local area network.

Civil registration records should be easily accessible to the stakeholders and should therefore be made available whenever need arises. However, security of data is pivotal and data should

be kept in areas or modes which cannot allow any unauthorized person to have access. Data should also be in a form that can be replicated and stored in other areas to avoid loss or damage from the data source. It is concluded from the findings of this study that the use of ICT provides the best alternative for improving data security. ICT favours the creation several backups which can be easily stored in other areas away from the data source. Further, ICT enables data users to assign passwords and therefore prevent any unauthorized access.

5.4 Recommendations

The study has established that there is poor linkage of civil registration stakeholders through ICT and the use of manual system is still widely practiced in carrying out civil registration processes. It is evident from the findings of this study that the manual system leads to delay in processing applications and dissemination information to relevant departments or stakeholders. The study therefore recommends that the civil registration department should adopt the use of ICT for improved efficiency of service provision.

The study has established that the use of ICT is hindered by lack of relevant hardware and software such as computers and internet connections. Recording and transmission of data across the departments is still carried out manually even in offices where the computers are available. Loss of data, poor storage and handling of bulky files are some of the disadvantages caused by the inability to implement the use of ICT in civil registration. It is recommended that the government and other development partners should provide computers and internet connection to civil registration centres.

The use of ICT is also hindered by inadequate trained personnel. It was discovered during the study that some of the civil registration officers have no adequate knowledge on how to use computers. The study recommends that civil registration officers should be trained on the use

of ICT. Awareness should also be created among the registration officers in order to demonstrate how the use of ICT can help to revolutionize civil registration processes.

5.5 Areas for further research

1. Causes of slow implementation of ICT in Civil Registration
2. Using mobile phones to facilitate civil registration process

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