QUALITY OF DATA COLLECTION PROCESSES IN IFAKARA HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM:

A CASE OF MALARIA DEATHS DATA COLLECTION
QUALITY OF DATA COLLECTION PROCESSES IN IFAKARA HEALTH AND DEMOGRAPHIC SURVEILLANCE SYSTEM:
A CASE OF MALARIA DEATHS DATA COLLECTION

By
Mwajabu Mohamed Hamis,

An Evaluation Dissertation Submitted in Partial Fulfilment of the Requirement for Award of Master Degree of Science in Health Monitoring and Evaluation of Mzumbe University
2015
CERTIFICATION

We, the undersigned, certify that we have read and hereby recommend for acceptance by Mzumbe University, a dissertation entitled “Quality of Data Collection Processes in Ifakara Health and Demographic Surveillance System: A Case of Malaria Deaths Data Collection” in fulfilment of the requirements for the award of the degree of Master of Science in Health Monitoring and Evaluation (Msc. HME) of Mzumbe University.

..............................................................
Name & Signature: Major Examiner

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Name & Signature: Internal Examiner

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Name & Signature: External Examiner

Accepted for the Board of school of Public Administration and Management

Signature…………………………………………………………………………………

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I, Mwajabu Mohamed Hamis, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

Signature...........................................................................................

Date.................................................................................................

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ACKNOWLEDGEMENT

First and foremost I thank the Almighty God for giving me breath, determination and guidance to study MSc. in Health Monitoring and Evaluation and be able to conduct this evaluation study, despite of certain challenges.

I am grateful to a number of people without whom this work would not have been possible. I am very much indebted to my supervisors: Gustav Elias Antony Kunkuta (PhD) and Fredros Oketch Okumu (PhD) for their technical mentoring and supervision of this work from inception to the final write up. I am also thankful to the Ifakara Health Institute, particularly the Outdoor Mosquito Control (OMC) Group and US Centre for Disease Control and Prevention (CDC) for funding the tuition fees and stipends for my studies.

I sincerely thank Mr. Amri Shamte, the coordinator of the Ifakara Health and Demographic Surveillance System (HDSS) for his constructive ideas and comments that promoted my understanding of IHDSS programme, and ensured achievement of my evaluation objectives. I also wish to thank all IHDSS members including Jumanne Kisweka, Michael Abdon, Rafael Msabana and Dr. Richard Amaro for their participation in my data collection activities.

A word of recognition goes to all the lecturers at Mzumbe University from whom I acquired the knowledge to do this work and who in one way or another participated in making this work a success. I sincerely thank Mr. Hashim Mohamed (PhD) and Joseph Matemu who took their time to proof read my thesis document.

Finally, I wish to show my gratitude to my classmates, specifically Mr. Abass Makame, friends and my dear mother Mrs. Tunu Jafary for their encouragement, social and moral support, through my whole M&E academic path.
DEDICATION

I strongly dedicate this evaluation to my uncle, Mwamba Jafary and my lovely mum Mrs. Tunu Jafary, sister Asia Mohamed and brother Hamis Mohamed for their unconditional support to my master degree and this evaluation study. I am really grateful for giving myself an opportunity to prove and improve my skills. May God give you the same wonderful heart and soul. I love you all.
# ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHIMA</td>
<td>American Health Information Management Association</td>
</tr>
<tr>
<td>AIDS</td>
<td>Acquired Immune Deficiency Syndrome</td>
</tr>
<tr>
<td>CR</td>
<td>Civil Registration</td>
</tr>
<tr>
<td>CSPro</td>
<td>Census and Survey Software Programme</td>
</tr>
<tr>
<td>DHS</td>
<td>Demographic and Health Surveillance</td>
</tr>
<tr>
<td>DQO</td>
<td>Data Quality Objectives</td>
</tr>
<tr>
<td>DQS</td>
<td>Data Quality Software</td>
</tr>
<tr>
<td>DSA</td>
<td>Demographic Surveillance Area</td>
</tr>
<tr>
<td>DSS</td>
<td>Demographic Surveillance System</td>
</tr>
<tr>
<td>HDSS</td>
<td>Health and Demographic Surveillance System</td>
</tr>
<tr>
<td>HIV</td>
<td>Human Immune Deficiency Virus</td>
</tr>
<tr>
<td>HRBs</td>
<td>Household Registration Books</td>
</tr>
<tr>
<td>HRS</td>
<td>Household Registration Systems</td>
</tr>
<tr>
<td>IHDSS</td>
<td>Ifakara Health and Demographic Surveillance System</td>
</tr>
<tr>
<td>IHI</td>
<td>Ifakara Health Institute</td>
</tr>
<tr>
<td>INDEPTH</td>
<td>International Network of Field Sites with Continuous Demographic Evaluation of Populations and their Health</td>
</tr>
<tr>
<td>ITNs</td>
<td>Insecticide Treated Nets</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MoHSW</td>
<td>Ministry of Health and Social Welfare</td>
</tr>
<tr>
<td>NIMR</td>
<td>National Institute for Medical Research, Tanzania</td>
</tr>
<tr>
<td>Open HDSS</td>
<td>Open Health and Demographic Surveillance System</td>
</tr>
<tr>
<td>SSC</td>
<td>Sibling Survival Calendar</td>
</tr>
<tr>
<td>SSHs</td>
<td>Siblings Survival Histories</td>
</tr>
<tr>
<td>TDHS</td>
<td>Tanzania Demographic and Health Survey</td>
</tr>
<tr>
<td>UN</td>
<td>United Nations</td>
</tr>
<tr>
<td>USAID</td>
<td>United States Agency for International Development</td>
</tr>
<tr>
<td>VA</td>
<td>Verbal Autopsy</td>
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</table>
DEFINITION OF KEY TERMS

**Data** refers to facts or concepts or instructions in a formalized manner, suitable for communication, interpretation or processing by manual or electronic means (Abdelhak, Grostick, Hankin, & Jacobs, 1996).

**Data quality** is a complex construct which encompasses multiple dimensions such as completeness, timeliness, relevancy, consistency, and accessibility (Cassidy *et al.*, 1998).

**Health and Demographic Surveillance System (HDSS)** record data for individuals, households and residents, whereby demographic characteristics are included, within a specified Demographic Surveillance Area (DSA) (International Network of Field Sites with Continuous Demographic Evaluation of Populations and their Health [INDEPTH], 2002).

**Verbal Autopsy (VA)** is a method used to ascertain the cause of a death based on an interview with next of kin or other caregivers (World Health Organisation [WHO], 2012).
ABSTRACT

Health and Demographic Surveillance Systems (HDSS) in developing countries established to generate quality population based health and demographic surveillance data to explain reasons for diseases and deaths occurrence in specified demographic surveillance areas. However, poor reporting, inconsistency and inaccuracy are common problems in HDSS data. Therefore, this evaluation was designed to assess the quality collection processes of Ifakara HDSS data particularly on malaria deaths data.

The evaluation assessed the Ifakara HDSS staff skills, essential tools, and procedures incurred to facilitate quality collection process of malaria deaths data. The case study evaluation design employed for both qualitative and quantitative approaches, where its sample drawn from IHDSS data collectors and IHDSS programme heads. A rough guide criterion was used to draw questionnaire respondents among IHDSS data collectors while purposive sampling was used to obtain interview respondents among programme heads. Data obtained analysed using stata and Atlas ti software packages.

The results showed that 96.4% of data collectors in IHDSS had appropriate skills acquired through training and long working duration of more than 6 months, but lacked competent supervisors. Necessary tools such as technology (software i.e. CSPro, window XP OS, and kaspersky, and hardware i.e. computer desktops and PC tablets) and transportation means such as bicycles, motorbikes, and cars were in use but, too old and out dated. Also data collection procedures applied guidelines such as DSS manual, disease classification manual, verbal autopsy and standard operation procedures though data collectors were not familiar with most of the contents within those manuals.

The evaluation concludes that the collection process of malaria deaths data in IHDSS was not as quality as it was supposed to be, since it is characterised by incompetent supervisors, outdated data collection tools, and unfamiliarity of the contents involved in the data collection guidelines by data collectors.
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CHAPTER ONE: INTRODUCTION

1.1 Overview

This chapter provides background information. It starts with a description of the Ifakara Health and Demographic Surveillance System (IHDSS) programme to create an insight about IHDSS programme to the reader. It further, elaborates the background information for the evaluation, problem statement, evaluation questions and objectives, significance of the evaluation and finally presents scope of the evaluation. The description of the IHDSS programme which covers the background of IHDSS, location and operation, objectives, strategies, logic model, and stakeholder analysis for this evaluation is presented first.

1.2 Description of the IHDSS programme

1.2.1 Background of IHDSS

The Ifakara Health and Demographic Surveillance System (IHDSS) programme was established in 1996 in Ifakara under the auspices of Ifakara Health Institute (IHI) in collaboration with the Swiss Tropical and Public Health Institute (TPH) (Schellenberg et al., 1999). The programme is composed of three working units: the fieldwork unit, data management unit and supporting unit. The field unit is composed of field managers, data collectors, field supervisors, key informants, coders and coordinator (IHDSS, 2013). Data management unit is composed of data manager, assistant data manager, data clerks and filing officers. The supporting unit is composed of the human resource department, procurement and supplies department, which are functions of the institute and support the IHDSS. The main functions of IHDSS programme are to monitor basic health and demographic events by collecting, analysing and disseminating basic health and demographic indicators which are necessary for decision making in health settings (IHDSS, 2013). The programme which utilises the IHDSS platform receives financial support from different sources, including the European Union (EU), Bill and Mellinda
Gates Foundation (BMGF), The Global Fund for AIDS, Tuberculosis and Malaria, Grand Challenges Canada (GCC), and IHI (Shamte, 2013).

1.2.2 Location and operations of IHDSS

The IHDSS is located in the southern part of Tanzania in Morogoro region (See Figure 1). The IHDSS is comprised of three different centres, namely: Kilombero district site, Ulanga district site, and Ifakara town site. The districts (Kilombero, Ulanga and Ifakara) cover an area of 2400km² (Geubbels et al., 2014). The Ifakara HDSS operates both in the urban and rural areas covering 30 villages (25 rural and 5 urban) with a total population of 168000 people and 38000 households. The Ifakara HDSS collected health demographic data on both morbidity and mortality specifically on malaria, HIVAIDS and TB, non communicable diseases, and data on maternal and new born health (IHDSS, 2013; Geubbels et al., 2014). Data on Malaria deaths were formally collected in quarterly basis, usually were after every three months period, then currently the system changed into two times collection (after every six months) within a year (Shamte, 2013). The data generated by IHDSS serve as an important resource for researches, programmes and project developers.

Figure 1: A map locating Ifakara HDSS

Source: (Shamte, 2013)
Key:
A. Shows a map of Tanzania indicating Kilombero and Ulanga area for Ifakara HDSS.
B. Shows Morogoro region indicating Kilombero and Ulanga areas covered by Ifakara HDSS. C. Shows a map indicating the coverage of Ifakara rural and urban HDSS.

1.2.3 Objectives of Ifakara HDSS programme

In order for a programme to be successful it should have a set goal through which it can achieve its intended outcomes (Görgens-Albino & Kusek, 2009). The Ifakara HDSS has formulated the following objectives in order to achieve quality health and demographic information to help in decision making (IHDSS, 2013).

1.2.4 Overall goal of Ifakara HDSS programme

The overall goal of Ifakara HDSS programme is to collect health and demographic data that will provide reliable information to stakeholders in order to promote evidence-based planning and priorities to public health services (IHDSS, 2013).

1.2.4.1 Specific programme objectives

According to IHDSS (2013), the specific objectives of IHDSS include the following:

i. To collect accurate health and demographic information;

ii. To facilitate the use of this information for the improvement of health services at the national and district levels; and

iii. To provide a framework for population-based health research relevant to local health priorities and needs.

1.2.5 Major programme strategies

To achieve its objectives, the IHDSS has set up a number of strategies in its strategic plan document 2013-2018 (IHDSS, 2013) as follows:

i. Advocating demographic health indicators to the policy makers;
ii. Strengthen coordination mechanism linking key stakeholders such as the offices of the registrar-general and national statistics, the Ministry of Health and vital registration system;

iii. Reviewing and revising forms for recording births and deaths;

iv. Introducing computerized systems for civil registration, and for data transfer, storage, and analysis;

v. Applying verbal autopsy techniques to generate data on cause-specific mortality patterns in settings where deaths do not occur in medical facilities;

vi. Making maximum use of data from the existing health and demographic surveillance sites to generate evidence based on levels of mortality by age and sex;

vii. Mobilizing communities by conducting information of health education and communication campaigns on the importance of civil registration; and

viii. Facilitating access to available data by decision-makers and researchers.

1.2.6 Programme logic model and its application in an evaluation of quality collection process of IHDSS malaria deaths data

1.2.6.1 Introduction

Logic model, also known as logic framework or matrix is among the management tools that have been used for more than 20 years in management and evaluation processes in illustrating usefulness and efficiency of projects or programmes (Will Keith Kellogg Foundation, 2004). It is used to describe rational connection between project inputs, processes, outputs, outcome and impacts (Görgens-Albino & Kusek, 2009). According to Will Keith Kellogg Foundation, (2004), the logic model helps to explain project components and stakeholders’ desire in different project interventions. In evaluation, the levels of logic model promote proper collection of data which can be used to describe the programme and its outcome. The logic model creates understanding among stakeholders by demonstrating programme input, process, and the expected results of the
programme. The logic model also helps to forecast and prioritize resource allocation (Georgens-Albino & Kusek, 2009).

1.2.6.2 Components of the logical framework

According to Georgens-Albino and Kusek (2009), a logical framework has five main components, namely: input, process, output, outcome, and impact. Input refers to the necessary requirements for programme and project implementation such as finance, human and material resources (Will Keith Kellogg Foundation, 2004). Process is a set of activities which are used by implementers or coordinators in achieving the intended output. Therefore, the process components elaborate the main activities performed by the project and the programme (Georgens-Albino & Kusek, 2009). Output provides the immediate results which are quickly and directly achieved by the project and the program. Output is measured immediately after the implementation of the project and program activities. The outcomes are the intermediate results which show what beneficiaries have achieved after the project or programme implementation (Will Keith Kellogg Foundation, 2004). The impact in a logic model reflects changes or long term effects of the project or programme to the beneficiaries. The components of IHDSS logic model reflect the five components of a log-frame suggested by Georgens-Albino and Kusek (2009) namely the input, activity, output, outcome, and impact. Each component is described below and their interaction is summarised and presented in Appendix 1.

1.2.6.3 Relevance of the log-frame in the evaluation of quality collection process of IHDSS malaria deaths data

As stated in the previous section that the log-frame composed of input, process, output, outcome and impact. This section illustrates the application of IHDSS log-frame components in the evaluation of quality collection process of IHDSS data. The description of these components is as follows:
i. **Inputs–level:** In IHDSS programme, the resources include funds; human resource, technology and equipment that employed to enhance the quality collection of IHDSS data (IHDSS, 2013). In this evaluation, inputs were categorized as human and material resources which are involved in the programme to facilitate the processes of acquiring quality data.

ii. **Activity-level:** The IHDSS programme consisted of different activities such as training, recruiting, supervision, installation of database, collection of data, data ware housing, procuring and supplying of different electronic data equipment (See Appendix 1). In this evaluation, activities were real events which occur in the programme (Georgens-Albino & Kusek, 2009) and this included supervision, supplying of all needed equipment and data collection process.

iii. **Output-level:** Ifakara HDSS programme had immediate results such as the number of successfully trained staff, proper data storage and electronic devices, which had been procured (See Appendix 1). In this evaluation, the outputs were observed by determining the proportion of data collectors who received appropriate training, types of guidelines or protocols available for data collection, data collection supervision, and materials resource procured and supplied to support data collection in IHDSS.

iv. **Outcome level:** As stipulated in Appendix 1 the intermediate results of IHDSS programme include: staff adherence to guidelines and tools, proper data storage, easy data transportation, low shortage of material supply, reduction of human error and workload, secured data management system and quality collection process.

v. **Impact level:** In Ifakara HDSS programme, the long term effect is the production of quality data that can be applied in decision making to improve public health services and wellbeing of the society (See Appendix 1).

For the purpose of this evaluation, the logical model of IHDSS was applied to assess the collection process of quality data on malaria deaths in IHDSS. During the evaluation the input, process, output, and outcome components were considered as the centre of
evaluation focus since they provided important variables that were used to assess the
quality of data collection process in IHDSS. Under input component, the evaluation
assessed skills of human resource (training, experience and supervision), and essential
tools (technology and transportation means) for quality collection of malaria deaths data
in IHDSS. The process component was applied to assess the procedures employed in
IHDSS to promote quality collection of malaria deaths data; it involved identification,
perception and applicability of standard guidelines by IHDSS to facilitate quality
collection of malaria death data. The output component was used to assess proportions
of data collectors who received appropriate training, and proportion of required tools
necessary for quality collection of malaria deaths data in IHDSS. The outcome
component determined the quality collection process of malaria deaths data within
IHDSS.

1.2.7 Stakeholder Analysis

1.2.7.1 Introduction

The purpose of stakeholder analysis is to identify stakeholders’ role, interest and
influence within a project or programme (Frooman, 1999). This section briefly describes
types of stakeholders and implication of stakeholders in the evaluation of the quality of
data collection processes in IHDSS based on malaria deaths data.

1.2.7.2 Types of stakeholders

Stakeholders vary due to their responsibilities in the project or programme. As described
by Ngailo (2012), there are three types of stakeholders: primary, secondary, and tertiary
stakeholders. The author described these types as follows: primary stakeholders are
those who can affect or be affected by programme or project activities, these
stakeholders are known as end users or beneficiaries of the project or programme;
secondary stakeholders are people or organisations such as development partners and
implementers who provide resources to enhance project and programme
implementation; and tertiary stakeholders are those people or organizations that do not
engage directly on the project or programme success since they formulate policies and rules which govern accomplishment of the project or programme objectives.

1.2.7.3 Implications of stakeholders in the evaluation of quality of data collection processes in IHDSS particularly malaria deaths data

As presented in Table 1 the main important stakeholders for this evaluation were IHDSS field staff (field interviewers and verbal autopsy interviewers), and IHDSS heads of units (coordinator, supervisors, coders, field managers and data managers). The involvement of field staff in this evaluation enabled the evaluation to acquire necessary information about training received to promote quality collection of deaths data in IHDSS, experience in collection of deaths data, and supervision acquired to enhance quality collection of deaths data. Involvement of the IHDSS programme heads created favourable environment that supported evaluation activities, promoted selection of evaluation topic, shaped the evaluation questions, facilitated staff readiness to provide information during the evaluation and promoted acceptability and applicability of evaluation findings in IHDSS programme. Information in Table 1 summarises the important stakeholders by highlighting group of stakeholders involved in this evaluation and their roles in IHDSS programme and in the evaluation, means of communication and levels of importance.
<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role in a Programme</th>
<th>Interest in Evaluation</th>
<th>Role in the Evaluation</th>
<th>Means of Communication</th>
<th>Level of importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHDSS</td>
<td>Governing body, set standards for implementation and guidelines and overseas of programme implementation</td>
<td>Programme progress and performance</td>
<td>Provide technical and material support. Advice to shape the tools and research questions in the evaluation. Provide basic and necessary information</td>
<td>Emails, meetings, presentations Skype and direct conversation.</td>
<td>High</td>
</tr>
<tr>
<td>data</td>
<td>Project implementers (collection of deaths data and assessing causes of deaths)</td>
<td>To assess progress of their performance, understand if their implementation is in line with set standards and targets</td>
<td>Source of information for evaluation, provide human resource, and provide necessary assistances especially during work plan or seminars.</td>
<td>Presentation, meetings, direct conversation</td>
<td>High</td>
</tr>
<tr>
<td>collectors,</td>
<td>Release permission to implement the project.</td>
<td>To assess programme implemented in line with national and community priorities in the country.</td>
<td>Provision of certification to carry on with the study.</td>
<td>Meetings, emails and presentations</td>
<td>High</td>
</tr>
<tr>
<td>field staff</td>
<td>(field interviewers, and Verbal autopsy interviewers)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IHI</td>
<td>Programme implementer (Verify causes of deaths from the collected death data).</td>
<td>To assess progress of their performance, understand if their implementation is in line with set standards and targets</td>
<td>Source of information</td>
<td>Village group discussions, medias, project feedback meetings.</td>
<td>High</td>
</tr>
<tr>
<td>Physicians</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Coders)</td>
<td></td>
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**Source:** Evaluator initiative (2015), based on literature review.

High level of importance suggests that, the stakeholders were rated as powerful and influential with very high stake in the evaluation and that would provide access or even block the evaluation. Their involvement was necessary to win support for the evaluation. Failure to involve them would have led into poor technical support and perhaps rejection of evaluation findings.
1.3 Background to the study

Data quality is a complex construct which encompasses multiple dimensions (Cassidy et al., 1998). The quality dimensions include accuracy, reliability, precision, completeness, timeliness, integrity, and confidentiality (Hardee, 2008; Ledikwe et al., 2014). Data quality plays a critical role in all business and governmental applications (Gorgens-Albino & Kusek, 2009). In healthcare sector data quality promotes high standard of patient care, promotes effective resource use and budget allocation, and provides criteria for judging the performance of health service and employees (World Health Organisation [WHO], 2003). High quality of information in the health system is also critical for addressing global health challenges and building effective public health systems. According to AboudZahr and Boerma (2005), quality data are important for monitoring project goals and objectives, guiding evidence-based in project management, and ensure appropriate policy formulation and resource allocation.

Quality is an essential part of every step of data management process that includes sourcing, collecting, collating, analyzing, reporting and using data (Görgens-Albino & Kusek, 2009). In each step, all aspects of quality dimensions namely accuracy, timeliness, completeness, comprehensiveness, and accessibility are involved to assure that the data collected are valid (Görgens-Albino & Kusek, 2009). According to Cassidy et al. (1998), accuracy in data collection involves competent data collectors who received appropriate education and training that promote quality of data collected, also clear understanding of data definitions be collected. Timeliness involves appropriate recording and reporting of an event when it occurs. Even if data are collected in large amounts comprehensiveness involves ensuring that the data contain all the required variables (Cassidy et al., 1998). Finally, data accessibility implies that data are supposed to be available to authorized persons when and where needed. It is claimed that many health systems fail to comply with the quality dimensions of data management process; as a result, they provide data which cannot fulfil the demands of daily decision making (Byass & Sankoh, 2012). Such health systems are characterised by poor design of data collection forms, lack of logical sequence in data collection, having incompetent data
collection staff, and inadequate training which results to poor recording of health system
data (WHO, 2003).

In view of the above deficiencies different strategies have been adopted to improve the
quality of data; such strategies include the establishment of Health Management
Information System (HMIS) and Health and Demographic Surveillance System (HDSS)
(INDEPTH, 2002). As earlier stated the HMIS was established by WHO in 1978 during
Alma Ata Declaration (Smith, Madon, Anifalaje, Lazaro-Malecela &Michael, 2008) to
collect routine clinical health data while HDSS was introduced to collect health
demographic data that could not be obtained through HMIS (Gerritsen et al., 2013). The
HDSS records health and demographic data for individuals and households within a
specified Demographic Surveillance Area [DSA] (INDEPTH, 2002).

Historically, HDSS originated in Africa in the late 1900’s when African nations were
struggling for independence. HDSS was established to address the lack of adequate
quality population health data that were required to support health care interventions in
terms of projects, policies and strategies (Faso et al., 2010). Since that time, many
HDSS sites were introduced in African countries such as Pholela HDSS which was
introduced in 1940 in South Africa, the Niakhar which was introduced in 1962 in
Senegal, the Bandafassi introduced in 1970 also in Senegal, the Bandim in 1978 and in
1992 in Guinea-Bissau and in the Mozambique boarders respectively (Garenne &
Cantrelle, 1991). In 1996, Tanzania mainland adopted HDSS by establishing the Ifakara
Demographic Surveillance System (DSS) to evaluate the impact of Insecticide Treated
Nets (ITNs) so as to reduce childhood mortality from malaria (Ifakara Health
Demographic Surveillance System [IHDSS], 2013; Shamte, 2013). Currently, the HDSS
supports national efforts towards the achievement of the Millennium Development
Goals (MGDs) by tracking down the trends of morbidity and mortality in the society
(Sankoh & Byass, 2012).

In Tanzania, HDSS is used to collect data on different health and health related problems
such as Malaria, Human Immunodeficiency Virus/ Acquired Immune Deficiency
Syndrome (HIV/AIDS), malnutrition, maternal deaths, neonatal deaths in all HDSS sites that include Ifakara, Magu and Rufiji (Manuel et al., 2007). According to INDEPTH (2002), the HDSS plays an important role in generating health and demographic information that provide reasons for deaths and incidence of diseases which occur in the communities in a specified Demographic Surveillance Area (DSA). The Ifakara HDSS, which is located in Ulanga and Kilombero districts in south eastern Tanzania, is a particularly influential system for generating key health and demographic indicators which are useful for planning and allocating healthcare resources in the community (Shamte, 2013). The IHDSS facilitates the collection and provision of evidence-based health and demographic data; which are necessary for planning processes, policy formulation, and prediction of public health and health related problems (IHDSS, 2013). Moreover, the IHDSS promotes the setting of strategies, monitoring of both diseases and deaths occurrences, and improvement of health services in the society.

Purposely, the HDSS was established to collect health and demographic data that will provide reliable information to stakeholders in order to promote evidence-based planning and priorities to public health services (INDEPTH, 2002). However, studies conducted in various HDSS sites on the quality of HDSS data such as Byass and Sankoh (2012), argued that the quality of HDSS data are of low quality and cannot be applied to adequately address public health problems which occurred in the society. Claims such as misspelling, data duplications, inconsistency, inaccuracy, incompleteness (Chilundo, Sundby & Aenestad, 2004) are the common complaints of stakeholders on HDSS data. These complaints disvalue the quality of HDSS data and one can argue about the capability of HDSS to generate quality data, hence the quest to determine factors that lead to low quality of HDSS data. Therefore, the current evaluation intended to determine factors that can lead to low quality data by assessing the collection process if it leads to quality data.
1.4 Problem statement

According to Faso et al. (2010), the need for the Health and Demographic Surveillance System (HDSS) in developing countries especially in Sub Saharan Africa (SSA) arose due to limited data on population health and weak supporting evidence on formulation and measurement of outcomes of health care programmes or projects. As stated above, HDSS was designed to collect data that explained the reasons for diseases and deaths occurrence in a specified Demographic Surveillance System Area (DSA) (INDEPTH, 2012). According to Sankoh and Byass (2012), HDSS generates data that forms a basis for national and international health targets. The HDSS is expected to provide accurate information that facilitates proper allocation of health resources and generate data on different health and health related problems (Carrel & Rennie, 2008).

Several efforts have been taken to improve the quality of data in IHDSS, such efforts include the introduction of Sibling calendar (Helleringer et al., 2014) to eliminate errors in adult mortality data in HDSS, but still the qualities of generated data are not yet assured. Studies such as Chilundo et al. (2004) observed that inconsistency, incompleteness and incorrectness of health and demographic data are common in health care industries. Meanwhile, there are some claims such as lack of competence among data collectors (Marson, Taylor, Ashby & Cassell, 2005) is assumed to be the leading source of poor data quality. Currently, there is inadequate information on how the collection process can result to poor data quality, hence a quest to examine the processes employed by health care industries to ensure quality collection of HDSS data.

1.5 Evaluation questions

The evaluation attempted to address the following questions:

i. Do the data collectors in Ifakara Health and Demographic Surveillance System (IHDSS) possess adequate skills to collect quality data on malaria deaths?

ii. Does the Ifakara HDSS have and use the necessary tools for collecting high quality data on malaria deaths?
iii. Do the procedures used for data collection in Ifakara HDSS promote quality of data collected on malaria deaths?

1.6 Evaluation objectives

This part presents the evaluation objectives, including the general objective and specific objectives.

1.6.1 General objective

The general objective of this evaluation was to evaluate the quality of processes involved in collecting data on malaria deaths within Ifakara HDSS.

1.6.2 Specific objectives

i. To find out whether the IHDSS staffs have required skills to collect quality data on malaria deaths.

ii. To explore the availability and use of essential tools for collecting high quality data on malaria deaths within the Ifakara HDSS.

iii. To examine whether the data collection procedure used, promote the collection of quality of data on malaria deaths within the Ifakara HDSS.

1.7 Significance of the evaluation

The evaluation is significant in view of the following:

i. Need to explore the strengths and weaknesses of the IHDSS in the collection of data on malaria deaths in terms of human resource capacity, resource availability; appropriateness of methods employed;

ii. To establish whether IHDSS collects quality data on malaria deaths;

iii. Need to establish a benchmark, which other studies will use as a reference point;

iv. Filling an evaluation gap by examining the quality of the process of collection rather than assessing the quality of data which has been the focus of many studies; and
Finally, the evaluation was also designed to help stakeholders and programme managers to take stock of the data collection process and use the finding of this evaluation to make necessary improvements. Need to obtain a partial fulfilment of the requirement for an award of Master Degree of Science in Health Monitoring and Evaluation at Mzumbe University.

1.8 Scope of the evaluation

The focus of the evaluation was to determine the quality collection of data on malaria deaths in IHDSS programme. The evaluation examined the following dimensions: human resource skills, necessary tools and procedures employed in IHDSS to collect data on malaria deaths. Under human resource skills, the study examined training, experiences, and supervision available to data collectors to enhance collection of quality data on malaria deaths. Tools entailed assessing the availability and use of technology and transportation means such as cars, motorcycles and bicycles necessary for collection of data on malaria deaths. Under procedures, the evaluation examined availability, staff perception and applicability (use) of guidelines to support the collection of data on malaria deaths in IHDSS.
CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter was to review various literatures on quality collection of data. The review was significant for the following reasons: it facilitated the establishment of evaluation gap. It created awareness and understanding on the concepts concerning collection process of data collection. It also provided necessary information that modified the evaluation questions, objectives, conceptual framework, methodology and analysis of evaluated data. This chapter reviews theoretical and empirical literature on quality of data collection processes. It culminates with the selection and discussion of the conceptual framework of the evaluation.

2.2 Theoretical literature review

This section reviews literature on the concept of data management process, data quality, the data quality collection process and tools of assessing the quality of data. The section also reviews models of collection of quality data. Presentation of the data management process presented first.

2.2.1 Data management process

Data management implies proper organisation and controlling of acquired data (Georgens-Albino and Kusek, 2009). According to the authors data management process involves six elements: data sourcing, data collection, data collation, data analysis, data reporting, and data use. The authors described data sourcing as the element that use standard forms e.g workshop attendance register to fill in and record important details for the specific purpose. Collection is the process of gathering information from different sources using appropriate tools (Cassidy et al., 1998), while collation is the creation of summary of the collected data (Georgens-Albino and Kusek, 2009). Analysis is the obtained summary of the collated data for analysis and reporting is the submission or presentation of the summary organisation of collected data into information to the
organisation, also data *use* is the application of the obtained data for decision making (Cassidy *et al.*, 1998).

### 2.2.2 Data quality: concept and characteristics

Data quality refers to the accuracy and reliability of information collected in an organisation adequately to represent programmes (Mswia, Williams, Whiting, Hemed & Setel, 2007). Görgens-Albino and Kusek (2009) defined data quality in terms of six data quality components such as accuracy, timeliness, reliability, completeness, precision, timeliness and integrity. The authors referred to accuracy as a measurement of data values in which collected information measures what it is intended to measure; timeliness refers to collecting and reporting of information in an appropriate agreed period of time and makes the information available anytime when required. Reliability refers to consistent collected information that gives results which represent the true facts (Mswia *et al.*, 2007). Completeness refers to the degree to which information is inclusive and represents the complete set of items or variables (USAID, 2008). Integrity implies the extent to which information collected is free from deliberate bias or manipulation for personal or political reasons and precision refers to resolution in which data collected are repeatedly measured using an instrument to provide the same results (Görgens-Albino and Kusek, 2009).

### 2.2.3 Quality data collection process and tools to assess quality of data

Section 2.2.2 presented the concepts and characteristics of data quality, but this section will purposely elaborate different concepts on the quality of data collection process. The section describes data collection process and tools applied for the collection process of data and tools used to assess the quality of data collection. The quality of data collection process is presented first.
2.2.3.1 Quality data collection process

According to Georgens-Albino and Kusek (2009) data collection is among the component involved in data management process. The quality collection of data involves several activities: data identification, methods to be applied in data collection, time requirement, assigning responsibilities, data storage sites and quality assurance (Fenton & Bieman, 2014). The authors further elaborated that, identification of data to be collected refers to the establishment of clear definition of variables to be collected and specification of necessary indicators which the organization intends to observe so as to serve its (organizational) purposes and goals. Methods explain where and how data will be obtained; they include establishment of clear mechanisms, guidelines, and confirmation of standards to be applied in data collection. Time specification in data collection refers to description of the time or duration data need to be collected and reported (USAID, 2008). Assigning responsibilities is selecting people and giving them tasks to perform including: data collection, data collation, data analysis reporting and usage (See section 2.2.1).

According to Condelli, Castillo, Seburn and Deveaux (2002), staff involved in data collection should have clear written job descriptions and understanding of their roles and responsibilities for data collection. Specification of data storage illustrates the means of data storage including data collection forms, computer and software applications to support data storage. Quality assurance involves mechanism such as training to data collectors, checking for data errors and missing data to promote consistency, completeness and accuracy of the data collected (Condelli et al., 2002).

The review of the quality data collection process provides important information on essential aspects such training for data collectors, computer and software applications that need to be considered to ensure quality data collection process. Therefore, this information provided important variables that contributed in the development of conceptual framework of this evaluation.
2.2.3.2 Tools used for data collection in HDSS

The common tool used to collect deaths data in HDSS is the Verbal Autopsy (VA) (World Health Organisation [WHO], 2012). The VA is an international standard tool developed by WHO to collect data on causes of death which occur in the community (Mswia et al., 2007). The main purpose VA is to generate data on deaths in the community or certain population as a reliable demographic source. The VA is designed in a form of questionnaire to be administered to care givers or family members to bring out signs, symptoms and durations of illnesses that lead to deaths (Mswia et al., 2007; WHO, 2012). Individuals involved in the collection of data on deaths are supposed to be accepted by the community and be familiar with the language used in that community. They should have the ability to communicate and engage with the households so that they provide detailed information. According to WHO (2012), the VA is an appropriate tool to identify causes of deaths in the community especially in the areas where only clinical data are available. The tool is commonly used in longitudinal studies, epidemiological studies, evaluation studies and research interventions. Moreover, the data obtained through VA is applicable for planning and policy formulation.

2.2.3.3 Tools to assess quality of data

Literature shows that various tools are used to assess the quality of health information, which includes Performance of Routine Information System Management [PRISM] (Aqil, Lippeveld & Hozomi, 2009) and Routine Data Quality Assessment [RDQA] (Global Fund, PEPFAR, UNAID, Measure evaluation & USAID, 2008). These tools are classified below:

i) Performance Routine Information System Management (PRISM)

PRISM was designed to assess the quality of health information system through technological, behavioural and organizational factors (Aqil et al., 2009). Technological factors assess the tools involved in data collection process. Organisational assessment management functions in terms of planning, training, supervision quality assurance and resource availability. Behavioural factors determine the knowledge of staff involved in
management of data. The review of this tool provided necessary variables such as technological tool and human resource skills which were necessary aspects in the development of conceptual framework (See Section 2.5). For instance the conceptual framework for this evaluation applied necessary tool (technology) factor to assess the availability and use of hardware and software technology to enhance quality data collection process whereby human resource skills were applied to assess training, experience and supervision of competent officers to data collectors who enhanced quality collection processes of malaria deaths data in IHDSS.

ii) Routine Data Quality Assessment (RDQA)
RDQA is a tool that assesses the quality of data in the health care system through the following (Global Fund et al., 2008): (1) verifying the quality of reported data through determination of data quality characteristics in the healthcare industry. Such characteristics include: completeness, timeliness, confidentiality, accuracy, reliability, precision and integrity of the collected data (See Section 2.2.2), (2) examine the system that generate data in terms of training offered, M&E system performance, indicators definition, link with higher authorities, and data collection, reporting and quality control, and (3) to develop action plan for improvement. The review of RDQA tool provided necessary aspects such as assessment of system that generate data which supported the development of evaluation questions and conceptual framework of this evaluation. For instance training stated in the RDQA was applied to assess human resource skills that enhance quality collection process of deaths data in IHDSS.

2.2.4 Models for quality data collection process

There are various theoretical frameworks developed to assess the quality of data collection process, these include: (i) Data Quality Management Model (DQM) and (ii) Culture of Data Quality Framework. This section provides a brief description of each model by stating their strengths and weaknesses; and finally the section discusses model that was applied to assess the collection of quality data on malaria deaths in IHDSS. The DQM model is presented first.
i) Data Quality Management Model (DQM)
Data Quality Management Model (DQM) was developed by the American Health Information Management Association (AHIMA) in 1998 as a means to assure quality health system data through a routine collection process to influence decision making (Cassidy et al., 1998). Figure 2 summarises the components and characteristics of DQM.

Figure 2: Data Quality Management Model

<table>
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<tr>
<th>Data Quality Management Model</th>
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<tr>
<td>Application</td>
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<tr>
<td>Collection</td>
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<tr>
<td>Analysis</td>
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<tr>
<td>Warehousing</td>
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Characteristics of Data Quality

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Accuracy</th>
<th>Consistency</th>
<th>Comprehensiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currency</td>
<td>Definition</td>
<td>Granularity</td>
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<tr>
<td>Relevancy</td>
<td>Precision</td>
<td>Timeliness</td>
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</table>

Source: Cassidy et al. (1998, P 2).

The model (See Figure 2) illustrates data quality as a result of critical interaction of components in data management process, namely: application, collection, warehousing and analysis (See Figure 2). According to Cassidy et al. (1998), application illustrates the reason to collect data. Collection refers to a process of capturing required information from appropriate sources using appropriate means. Warehousing is the technological process of data storage either in paper or computer based, whereas the analysis refers to a process of transforming the collected data into meaningful information which an organization can put into use. According to DQM model, each of these requirements (components) possess the data quality dimensions such as accessibility, consistency, currency, granularity, precision, accuracy, comprehensiveness, definition, relevance and timeliness. In data collection these
dimensions are quality when there are skilled staff, recording, proper methods and procedures in during collection (Cassidy et al. 1998).

The DQM model evaluates the data management process through four elements: collection, warehousing, analysis and application, that set out important components for examining the quality of data management which represented variables formulated in the conceptual frame work of this evaluation (See Section 2.5). However, the model does not clearly explain the requirements and activities involved in the collection of quality data. If this model was applied in the evaluation of the collection of quality data on malaria; it is unlikely to fully answer evaluation questions, therefore there would be a need to adopt additional model which could determine requirements for quality collection such as people, procedure, and technology.

ii) Culture of data quality framework
The framework was developed by Massachusetts Department of Education in 2012 to assess the culture of data quality in education system (Massachusetts Department of Education, 2012). The model (See Figure 3) illustrates that in order for the system to have quality data collection processes, a system must have effective interaction of three factors: procedures, people, and infrastructure. According to Massachusetts Department of Education (2012), procedure refers to rules and process that governs the type of data to be collected, stored and reported. The framework emphasises on the utilisation of quality standard and guidelines to govern data collection process. People refer to human resources with capacity to effectively carry out data collection, storage, and reporting. This component emphasises on staff training, professional development, and improved communication that encourages exchange of ideas and experiences among members involved in data collection. Infrastructure describes the environment which supports data collection, storage, and reporting. It illustrates on the technology used in the collection process. The effective interaction of these components generates accuracy, security, utility, and timeliness of the collected data which can be used for decision making.
The presence of various sources and two frameworks or models reviewed above: DQM and culture of data quality framework, provided useful inputs that had contributed to the conceptual framework of this evaluation, for example human resource capacity, data collection procedures, and necessary tools for quality collection of data. The culture of data quality framework is specifically applied in this evaluation to develop the independent variables in the conceptual framework evaluating the quality collection of malaria deaths data in IHDSS since it offered powerful variables that enabled the evaluation to examine the quality of data collection process in IHDSS programme. Therefore the reviewed models applied to evaluate quality collection process of malaria deaths data in IHDSS by investigating three parameters of the conceptual framework in this evaluation (See Section 2.5): human resource skills available to enhance quality of data collection in malaria deaths, availability and use of essential tools necessary for
collection malaria deaths data, and procedure employed to enhance collection process of malaria deaths data in IHDSS.

2.3 Empirical literature review

The purpose of this section is to review selected previous studies relating to this evaluation and describe their strengths and weaknesses of the generated discussions that help to shape the focus, scope and methodology of the evaluation (Creswell, 2007). This review is also essential since it provides information on what was done or was not done in the related field of this evaluation. The review of the empirical studies in this section is guided by the following subheadings related for the factors affecting the collection of quality health system data: the presence of skilled human resource, the role of essential tools, and the role of methods and procedures in collection of data. The presence of skilled human resource is presented first:

2.3.1 Presence of skilled human resource

A study conducted by Marson et al. (2005) examined Factors that Impact upon the Data Quality: Victorian Emergency Minimum Dataset (VEMD). The study determined the factors that impact adversely on the collection of high quality VEMD data. The study followed a cross-sectional design involving nursing, medical and clerical respondents who collect and enter data into VEMD. The researcher applied self administered questionnaire focus group discussion and documentary review as methods for data collection. The researcher found that 30% of the study respondents had poor knowledge patterning to VEMD which led to incompleteness of the data entered in VEMD. Also it was found that the presence of inadequate training and software problems among respondents was challenging to high quality of data. Hence it was concluded that poor knowledge of the VEMD staff was the main cause of low data quality, and the authors proposed staff education, training and feedback as the best mechanism to improve data quality.
Another study by Mphatswe et al. (2012) on *Improving public health information: a data quality intervention in KwaZulu – Natal, South Africa*. The study evaluated the effect of an intervention to improve the quality of data used to track the “prevention of mother - to - child transmission” of the Human Immuno Deficiency Virus in South Africa. The study focused on three components: regular training on data collection, monthly review of collected data and data audit at individual facilities in order to determine the accuracy and completeness of the data collected. The researcher applied a random selection of 78 locations where comparison was made before and after the intervention. The study found that data completeness was increased from 26% to 64% and accuracy improved from 37% to 65%. The author concluded that a simple, practical data improvement intervention significantly promoted the accuracy and completeness of the data generated to track or monitor services of prevention of mother - to - child transmission of the Human Immuno deficiency virus in South Africa.

The above reviewed studies show that staff education and training were important factors to improve data quality and they had proven that the quality of data is measured by data quality criteria, therefore these aspects were adopted in the development of the conceptual framework, analysis and identification of gap of this evaluation e.g skills were measured by training received.

### 2.3.2 Essential tools

Arikpo et al. (2013) carried out a study on *Optimum hardware, software and personnel requirements for a paperless health and demographic surveillance system: a case study of Cross River HDSS Nigeria*. The study focused on highlighting the essential personnel, hardware and software packages that are necessary for managing an IT-based paperless HDSS in low income locations. The study collected data using both questionnaire and interview through four update rounds. The study analysed the data using STATA, EPI Info and R data analysis software. The study found that low income HDSS settings can apply data collection hardware instruments such as computer desktops, tablets PCs, and android phones, also the web based open source software such as Open Health and
Demographic Surveillance (HDS) and My Structured Query Language (SQL). Moreover, the author revealed that the presence of well trained and computer knowledge personnel can collect and report high quality data. Though the study reported some few challenges like, poor network connectivity and insufficient staff with IT skills hence recommended strategies to be applied to solve these obstacles. The study corresponds with the culture of data quality model, which addresses issues pertaining to technology necessary for collection of quality data. Similarly to this evaluation, that hardware and software technology is measured to determine their usefulness and availability for quality collection processes of deaths data. Therefore the reviewed study helped the analysis of this evaluation.

On the other hand Pascoe, Lungo, Kaasboll and Koleleni (2012) examined a study on Collecting Integrated Disease Surveillance and Response Data through Mobile Phones. The study focused on Improvement of the routine reporting of health data by determining the challenges associated with timely reporting of the routine data and examined how mobile phones can be used to overcome the problem. The study applied both qualitative research designs where interview, observation and documentary review used as the method of data collection. The study findings demonstrated that the accuracy and completeness of data collected is challenged by poor network connectivity, cost, poor infrastructure (remoteness), and skilled staff. Introduction of the District Health Information System database using a mobile phone increased accuracy and completeness from 50% to 89%.

In contrary a study carried out by Doctor, Olatunji and Jumare (2012) on Bridging the communication Gap, Successes and Challenges of Mobile Phone Technology in Health and Demographic Surveillance in Northern Nigeria. The study assessed the infrastructure of NHDSS in relation to “mobile communication capacity in supporting data collection, field management, and data processing activities”. The study found that challenges on poor mobile network coverage, inadequate power supply, and cost for airtime facilitated inaccuracy and incompleteness of the data collected in NHDSS. The study recommended the Nigerian government, network companies and community to
address the challenges. The reviewed study applied triangulation of data collection methods to enhance rigor of the findings made, similarly this evaluation applied both questionnaire and interview complemented obtained findings.

2.3.3 The role of methods and procedures

Chilundo et al. (2004) carried out a study on Analysing the quality of routine malaria data in Mozambique. The study assessed the correctness, consistency and completeness of the data generate within the management. The researcher applied a qualitative design and used observation, semi structures interview and documentary review method for data collection. The findings indicated that the processed data were of low quality: in complete, in accurate and in consistent due to lack of data collection tools, poor process of data capturing flow and inaccuracy of data in different levels. The study recommended a logic framework as a guide or protocol to be followed to enhance information communicated among the provincial and national level to enhance proper procedures and methods for quality data collection. Here the researcher demonstrated the importance of guidelines for quality data flow system which is relevant to the evaluation objective three and the independent variables of the conceptual framework of this study.

2.4 Evaluation Gap

Existing studies such as Improving public health information: a data quality intervention in KwaZulu-Natal, South Africa (Mphatswe et al., 2012), analysis of the quality of routine malaria data in Mozambique (Chilundo et al., 2004) and factors that impact upon the data quality: Victorian Emergency Minimum Dataset (Marson et al., 2005) have mainly focused on the quality of data generated in terms of accuracy and completeness and not on the quality of collection process. Little is known on the quality of data collection and processes involved to facilitate quality collection of the data which remains less explored by the researchers. This evaluation intended to make contribution toward filling this gap.
2.5 Conceptual framework

This section describes the conceptual evaluating of the quality collection process of malaria deaths data in IHDSS which provided the basis for analysis of evaluation findings. This section involves description of conceptual framework for the evaluation and it’s Operationalisation. The description of the conceptual framework is presented first.

2.5.1 Description of the conceptual framework

Conceptual framework explains the concepts and factors or variables emerged within a study and relationship existing among them (Babbie, 2010). According to Miles and Huberman (1994), conceptual framework helps the evaluator to establish aspects to be assessed and build up applicable and practical evaluation questions to be answered. In this evaluation the conceptual framework illustrates the interaction of dependent and independent variables. Dependent variable refers to factor manipulated within a program while independent variables represent factors that bring changes (effects or outcome) to dependent variable (Huberman & Miles, 1994). Based on the PRISM model and Culture of Data Quality Framework described earlier in Section 2.2.3.3 and 2.2.4, the independent variables for this evaluation were: (1) human resource skills, (2) essential tools and (3) procedure, while the dependent variable was quality collection process of malaria deaths data in IHDSS. The description of each variable with its associated indicators are explained below and summarised in Figure 3.

1) Human resource skills for quality collection of deaths data in IHDSS

Skills refer to knowledge and technical knowhow possessed by data collectors in IHDSS acquired through training, supportive supervision and experience (Faso et al., 2010). During evaluation, this factor which, corresponding to the first evaluation question established in Section 1.4 was assessed by using three indicators: (i) to find out whether the data collectors in IHDSS received appropriate “training” to facilitate quality collection of malaria deaths data (ii) to find out whether the data collectors in IHDSS had adequate experience in collection of deaths data (iii) to find out whether the data
collectors in IHDSS received *supportive supervision* to enhance quality collection of deaths data. The description for each indicator is as follows:

i. To find out whether the data collectors in IHDSS received appropriate “training” to facilitate quality collection of malaria deaths data. Training refers to formal educational sessions deliberately conducted to influence data collectors’ capability to perform a particular task. This can be short or long term sessions offered within or outside the organisation. In this evaluation, the indicator was assessed by determining the proportional of IHDSS data collectors who received appropriate training concerning collection of deaths data and identify types of training offered to facilitate quality collection of deaths data.

ii. To find out whether the data collectors in IHDSS had adequate experience in collection of deaths data. Experience refers to familiarity on collection of deaths data acquired over long working period which resulted to master data collection activities. In this evaluation, the indicator was assessed by determining the proportional of IHDSS data collectors who worked in IHDD as data collectors for a period of more than six months.

iii. To find out whether the data collectors in IHDSS received supportive supervision to enhance quality collection of deaths data. Supportive supervision allows two way communications between data collectors and field supervisors to promote data collection performance, problem solving, and improve the quality collection of data. In this evaluation, the indicator was assessed by identifying supervision approaches employed by IHDSS to enhance quality collection of HDSS deaths data.

2) **Essential tools necessary for quality collection of malaria deaths data in IHDSS**

It refers to both physical objects such as computer desk top and technology such as software computer programmes used to facilitate proper collection of malaria deaths data (Arikpo *et al.*, 2013). During evaluation, this factor which corresponds to second evaluation question was examined by using two indicators: (i) to determine whether
IHDSS data collectors used appropriate technology that facilitates quality collection of malaria deaths data (ii) to determine whether available transportation means like vehicles enhanced quality collection of malaria deaths data. These indicators are described below:

i. Technology clarifies the application of scientific devices and techniques (computer desktop and programmes) by data collectors to support quality collection of data. This indicator was assessed by highlighting the available hardware and software programmes that facilitated collection of malaria deaths data in IHDSS.

ii. Transportation means refers to all devices e.g cars and bicycles available in IHDSS that support data collectors to travel from one location to another during data collection process. During evaluation this indicator was assessed by investigating all transport mechanisms employed by IHDSS data collectors to facilitate the collection of malaria deaths data.

3) **Procedure employed in IHDSS for collection of malaria deaths data**

Procedure refers to a series of activities employed in IHDSS programme to ensure quality collection of malaria deaths data (INDEPTH, 2005). The indicators which were used to assess this factor that corresponding to third evaluation question were: (i) to examine whether availability of standard guidelines used in IHDSS support collection of malaria deaths data, (ii) examine perception of IHDSS unit heads on available guidelines, and (iii) examine the applicability of available guideline to support collection of deaths data. An elaboration of these indicators follows:

i. Availability of data collection guideline refers to available procedures and instructions in IHDSS programme that guide data collectors how best the data collection should be done. During study this indicators was assessed by identifying the available guidelines used by data collectors to support quality collection of malaria deaths data.
ii. Staff perception towards data collection guidelines refers to thoughts or idea of data collectors toward the available data collection guidelines. During study this indicator was assessed by exploring the view points of data collectors towards the available data collection guideline in relation to quality collection of deaths data.

iii. Applicability of data collection guideline refers to ability of data collectors to apply necessary steps stipulated in the standard guideline during data collection. During the evaluation, this indicator was assessed by determining view points of data collectors towards the use of guidelines that facilitate the collection of deaths data.

4) Quality collection process of malaria deaths data in IHDSS

Quality refers to the degree of which data collected possesses quality criteria that includes accuracy, completeness, integrity, precision and timely collection of data (Cassidy et al, 1998). According to Massachusetts department of education (2012) quality collection process of data is determined by effective use of appropriate tools, skilled human resource and standard guidelines. In this evaluation quality collection process of data presented as the outcome factor, which indicated that, the collection of malaria deaths data was quality only when appropriate tools, skilled human resource and standard guideline were available and used within the IHDSS programme.
Figure 4: Conceptual Framework for evaluating the quality collection of malaria deaths data in IHDSS

Independent variables

Human resource skills
- Training
- Experience
- Supervision

Essential tool
- Technology
- Transportation means

Procedures
- Availability of guidelines
- Perception on guidelines
- Applicability of guidelines

Quality collection process of malaria deaths data in IHDSS

2.5.2 Operationalisation of conceptual framework

This section describes key concepts of the conceptual framework which involves both study variables and corresponding indicators as described in Section 2.5. It operationalises key components which support evaluation questions: (1) Training, experience and supervision, (2) technology and transportation means, and (3) availability of the guidelines, perception on the guidelines and applicability of the guidelines. Training, experience and supervision are presented first.

1) Training, experience and supervision possessed in IHDSS to collect malaria deaths data

The first evaluation question aimed to find out human resource skills available in IHDSS to facilitate quality collection of malaria deaths data. Data obtained to answer this question derived from questionnaire and complemented by interview address the three indicators: training, experience and supervision. Training is presented first.
I. Training: this indicator was assessed through two factors: (a) proportion of IHDSS data collectors who received appropriate training and, (b) the types of training offered by IHDSS programme to data collectors:

a) During evaluation, questionnaire respondents were asked to state if they received any type of training concerning to data collection; data derived from questionnaires responses were categorical (ordinal) providing two (Yes, No) response categories: Respondents who provided “Yes” response were considered as received appropriate training concerning to data collection in IHDSS while those provided “No” responses were not. The total number of questionnaire respondents was used as denominator while total respondents by response categories were used as numerators to derive the proportion of IHDSS data collectors who received appropriate training concerning to data collection. Indeed, questionnaire responses were supplemented with interview through which programme heads were asked to explain if they have formal system to offer training to data collectors.

b) Regarding the type of training received; questionnaire respondents were asked to state the types of training offered. Data generated were categorical (ordinal) responses providing two response categories: (short term training and long term training) were analysed to provide total number of questionnaire respondents received specific training category. Interview respondents supported the questionnaire findings through opinions.

II. Experience: this indicator was assessed by determining the individual work duration in collection of deaths data in IHDSS. Data generated from the questionnaire were categorical (ordinal) respondents categorised work duration as less than six months and more than six months. Those respondents who worked for more than six months were considered as possessed required experience, since the first round of data collection ends after a period of six months. During analysis total number of respondents who were knowledgeable (as described above) was
used as denominator while total number of respondents who had required experience provides the numerator to establish proportion of skilled data collectors in IHDSS. Direct quotations were used to compliment the findings.

III. Supervision: this was determined to whether IHDSS data collectors received appropriate supervision from competent supervisors. Questionnaire respondents were asked to state if they received supervision from programme heads. Data obtained were ordinal in nature (‘Yes’, ‘No’ responses). Where analysed to provide frequency and relative frequency. Findings from questionnaire responses were supplemented by interview findings to provide a concrete conclusion on the supervision approach performed.

2) Technology and transportation means employed by IHDSS to collect malaria deaths data.

The second evaluation question aimed to determine available tools used in IHDSS to facilitate quality collection of malaria deaths data. Data generated to answer this question derived from three indicators: Technology and transportation means. Technology and transportation means were tested by assessing amount of available and function tools used in IHDSS to support collection of deaths data. Technology assessed hardware and software programmes while transportation means assessed motor vehicles and bicycles. Data generated from documentary review using a checklist followed with direct observation confirmed the number and types of available, functioning and deficiency of hardware, software programmes, and transportation means used in IHDSS. Since findings were nominal data, they were presented by showing item name, amount required, available, function and gap identified for each item. Direct quotations were used to compliment the findings.
3) Procedures employed by IHDSS to collect malaria deaths data

The third evaluation question designed to examine methods used in IHDSS to facilitate quality collection of malaria deaths data. The investigator examined availability, perception and applicability of guidelines used in IHDSS to support collection of deaths data.

I. As regards to the availability of data collection guidelines, the evaluator assessed whether clear guidelines that support collection of deaths data in IHDSS were in place. The study employed documentary review method followed by direct observation was able to determine all types of data collection guidelines available in IHDSS. Findings were nominal data, that presented by showing name and user of each guideline. Direct quotations were used to compliment the findings.

II. Perception and applicability of available data collection guideline, the evaluation intended to determine perception of IHDSS unit heads and their opinions on applicability of data collection guidelines to support collection of deaths data. Data obtained from interview used to explain respondents’ opinions concerning the available guideline. Since the finding was qualitative in nature, direct quotations were used to explain respondent’s perception and degree of applicability.
CHAPTER THREE: EVALUATION METHODOLOGY

3.1 Introduction

This chapter presents the methodology applied in the evaluation. It discusses the evaluation approach, evaluation design, evaluation period, study population, unit of analysis, variables and their measurements, sample size and sampling techniques, types and sources of data, data collection methods, validity issues, data management and analysis methods and ethical issues.

3.2 Evaluation approach

According to Görgens-Albino and Kusek (2009), there are several evaluation approaches which include formative, process, outcome, economic and impact evaluation. This evaluation adopted a process evaluation approach, which is appropriate for evaluating the ongoing programmes. This evaluation is intended to assess the quality of data collection process in IHDSS. According to Patton (2002), process evaluation is an appropriate evaluation approach to describe continuing programme operations and identify problems and areas that need improvement.

3.3 Evaluation design

Evaluation design is a blueprint for action or a map that shows the direction on how the evaluator can be able to plan strategically to accomplish research objectives and gather quality data for the respective study (Brink & Wood, 1998). According to De Vaus (2001), there are four types of study design namely: experimental design, longitudinal or survey design, case study design and cross sectional design.

For the purpose of this evaluation, the case study design was employed. A case study design refers to an assessment of a certain phenomenon or event in its real context using several sources of evidence (Yin, 2003). A quest to adopt a case study design was due to study evaluation questions and its objectives, since the aim of this evaluation was to assess the collection process of deaths data in IHDSS particularly on the case of malaria.
deaths data. The report of event or case can either be a single or multiple cases (Creswell, 2007). In this evaluation, a single case study was employed to describe the collection of quality data on malaria deaths in IHDSS. The selection of a single case study design in this evaluation was due to the following reasons suggested by Yin (2013) and Creswell (2007): (i) inadequate resource did not make possible for the conduct of multiple cases, since multiple cases design require more resources than single case design, (ii) the need to provide detailed information about the context under investigation since multiple cases are assumed to dilute the context, (iii) it allows collection of both qualitative and quantitative data so as to come up with thick description of evaluation results, (iv) the selected context is representative of the investigated phenomena, and (v) it allows long term observation (longitudinal cases) for the phenomena under investigation.

3.4 Evaluation period

This evaluation was conducted from October 2014 to September, 2015. Detailed evaluation activities and schedule are stipulated in Appendix 5 (the work plan for evaluation).

3.5 Study area

This evaluation was conducted in Ifakara HDSS managed by Ifakara Health Institute (IHI), which is a nongovernmental organisation, originally established in September, 1949 as Swiss Tropical Institute Field Laboratory, but later registered in 1996 as an independent organization under the Tanzanian Trust Law (IHDSS, 2008), during that period the IHDSS was also launched as stated in section 1.2.1 The site was selected because IHDSS is one of the centre in Tanzania responsible for counting of morbidity and disease incidences and advice the government on health care policy. It was compelling to examine how this institute collects and merges health related data specifically on malaria deaths. This institute is engaged in collection of data on malaria deaths and use the same to inform or advise policy on fighting malaria. IHDSS presented
and provided an important opportunity to investigate the quality of data collection process which ultimately determined the quality of data used to inform health care policy. Presence of people in IHDSS willing to cooperate with the investigator in data collection promised the prospect for effective data collection. Literature such as Silverman (2006) advises researchers to avoid research site, with no prospect for accessing required data. Based on the evaluator’s experience on the evaluation site, it was easy to establish and maintain relationship with evaluation participants, something which facilitated the collection of data in a given resources and time.

3.6 Study population

Study population refers to aggregation of subjects that poses specific characteristics of which the study sample is drawn (Babbie, 2010). Study population in this evaluation were field staff (field interviewers and Verbal Autopsy interviewers) and IHDSS programme heads (Supervisors, coders, coordinator and managers). The selection of these categories was made due to the reason that field staff and programme heads are directly involved in the collection and management of data on malaria deaths on daily basis, and therefore they were in a position to provide information required to answer the study questions.

3.6.1 Inclusion and exclusion criteria of the study population

I. Inclusion criteria

Rees (1997) defines inclusion criteria as specific characteristics that participants to be selected should have. This implies features or characteristics of the people involved in the study. For the purpose of this evaluation the inclusion criteria involved all individuals who had 6 months or more experience in the field of data collection in IHDSS, those directly involved in data collection, those who supervised data collection process, those responsible for planning and producing guidelines and processes of data collection and immediately users of the data (programme heads and coordinator).
II. Exclusion criteria
The study excluded all individuals with the experience of less than six months in IHDSS (programme officials, field staff and data unit staff). Also the study excluded all staff not involved in collection and or management of malaria deaths data.

3.7 Unit of analysis
Study unit defines who and what the study will investigate (Creswell, 2007). According to Yin (2003) units of the study could be people, things, or processes investigated. The study unit for this evaluation were individuals involved in data collection process and heads or programme heads responsible for coordinating, supervising and even supporting the data collection, processing, storage and use.

3.8 Variables and their measurements
As described in the conceptual framework, this evaluation composed of three variables: (1) human resource skills, (2) essential tools, and (3) procedures used for quality collection of malaria deaths data. The indicators for each variable are as follows while their measurement was described in chapter two Sections 2.5.2 of the operationalisation of conceptual framework.
Table 2: Summary of evaluation variables and their measurements

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicators</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human resource skills</td>
<td>i. Whether the HDSS had adequate well trained data collectors for quality collection of malaria deaths data;</td>
<td>Proportion of trained data collectors</td>
</tr>
<tr>
<td></td>
<td>ii. Whether the IHSS had well experienced data collectors who could facilitate quality collection of malaria deaths data; and</td>
<td>Proportion of data collectors with for more than 6 years experience</td>
</tr>
<tr>
<td></td>
<td>iii. Whether IHSS offered appropriate supervision to data collectors from competent supervisors that enhanced quality collection of malaria deaths data.</td>
<td>Proportion of data collectors received data collection supervision</td>
</tr>
<tr>
<td>Essential tools</td>
<td>i. Whether the IHSS programme have appropriate technology to facilitate quality collection of malaria deaths data</td>
<td>Types and number of software and hardware available</td>
</tr>
<tr>
<td></td>
<td>ii. Whether the IHSS programme has appropriate transportation means to facilitate quality collection of malaria deaths data</td>
<td>Availability, function and proportion of transportation means in IHSS</td>
</tr>
<tr>
<td>Procedure</td>
<td>i. Determining the available guidelines used by data collectors to support quality collection of malaria deaths data.</td>
<td>Identification (types) of available guidelines</td>
</tr>
<tr>
<td></td>
<td>ii. Determining the perception of data collectors towards the guideline that facilitate collection of deaths data; and</td>
<td>Unit heads opinions and views</td>
</tr>
<tr>
<td></td>
<td>iii. Determining the view points of data collectors towards the use of guideline that facilitate collection of deaths data.</td>
<td>Unit heads opinions and views</td>
</tr>
</tbody>
</table>

Source: Evaluator initiative (2015) (based on literature review)

3.9 Study sample and sampling techniques

This section clarifies the study sample and sampling techniques. The study sample was presented first and sampling techniques were presented thereafter.

3.9.1 Study sample

The evaluation employed two types of samples, namely: interview and questionnaire samples (See Table 3). The interview sample was used to obtain respondents among programme heads. The interview sample involved a few selected heads of IHSS programme who were able to provide detailed information with regard to the process of collection of data on malaria deaths at IHSS. As presented in Table 2, questionnaire
sample involved a large number of respondents involving data collectors (field interviewers and VA interviewers). Such a large sample enabled statistical analysis to be carried out and also some generalization of the findings (Bailey, 1994).

**Table 3: Study samples**

<table>
<thead>
<tr>
<th>Type of sample</th>
<th>Categories involved</th>
<th>Sample size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview</td>
<td>IHDSS coordinator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Field managers</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Assistant data manager</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>VA coder</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Field supervisors</td>
<td>2</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Field interviewers</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>VA interviewers</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>63</td>
</tr>
</tbody>
</table>

Source: Questionnaire and interview data (2015)

**3.9.2 Sample size**

The interview sample involved eight (8) respondents who were IHDSS programme coordinator, data managers, coder and field supervisors responsible for the collection of deaths data on various health concerns including malaria deaths. The principle of sample saturation was used to derive into this sample size. Initially, the sample of five (5) programme heads was interviewed. Sample saturation was reached by the fine eight (8) interviewees and respondents had been interviewed, meaning that no new data were obtained beyond the eight interviews (Patton, 2002).

The questionnaire sample involved 55 respondents obtained via rough guide criteria suggested by Gay (1987). As summarised in Table 4, the author suggested sample size based on the size of the population, for example, 100% sample size is proposed if the population is less than 100 people. Since the population of field staff (field interviewers and Verbal Autopsy interviewers) in Ifakara HDSS programme were 55 which was less than 100, therefore the whole population was included into the questionnaire sample. Indeed some authors for stance Kothari (2004) and Rees (1997) suggest that a sample of at least 30 respondents is sufficient to carryout statistical analysis and also caution generalization of the study results.
Table 4: Sample selection: The rough guide criteria

<table>
<thead>
<tr>
<th>Size of Population</th>
<th>Sampling Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-100</td>
<td>100%</td>
</tr>
<tr>
<td>101-1,000</td>
<td>10%</td>
</tr>
<tr>
<td>1,001-5,000</td>
<td>5%</td>
</tr>
<tr>
<td>5,001-10,000</td>
<td>3%</td>
</tr>
<tr>
<td>10,000+</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: (Gay, 1987)

3.9.3 Sampling techniques

Sampling can be probability or non probability. Probability sampling technique provides equal chances for every individual in the study population to be selected into study sample. It is mainly used in quantitative research studies (Michael, 2008). There are different types of probability sampling: systematic, stratified, simple random and cluster sampling (Kothari, 2004). A non probability sampling does not provide equal chance to population members or elements to be selected into study sample (Burns & Grove, 1997). The common types of non probability sampling include convenient sampling, purposive sampling, and theoretical sampling (Patton, 1990).

This evaluation involved two sampling techniques: rough guide criteria approach and purposive sampling. As stated before, the rough guide approach (See Table 4) was used to select questionnaire sample involving 55 respondents who were field staff also known as data collectors (field interviewers and VA interviewers) (See Table 3). Purposive sampling approach was applied to obtain interview sample where some programme heads (coordinator, coder, data managers and field supervisors) (See section 3.) were selected into sample based on their resourcefulness or ability or position to provide vital information.

3.10 Types and sources of data

There are two types of data: primary and secondary data. According to Kothari (2004) and Krishnaswami (2003) primary data are first hand data collected by investigator at the field while secondary data are collected and recorded by other researchers and or
people. In this evaluation, the study used both primary and secondary sources of data as described below:

**i. Primary sources**

As stated above primary data for this evaluation were obtained through two data sources: questionnaire and interview. Questionnaire was applied to collect data patterning to human resource capacity available in IHDSS to promote quality collection of malaria deaths data in relation to first evaluation question. Interview was used to obtain data concerning procedures involved in IHDSS to promote quality collection process of malaria deaths data in relation to third evaluation question.

**ii. Secondary sources**

The secondary source for this evaluation was obtained through documentary review. The source was applied to obtain data concerning necessary tools used for quality collection of malaria deaths data within IHDSS in relation to second evaluation question.

### 3.11 Data collection methods

There are different methods for data collection which include interview, observation, focus group discussion, documentary review and questionnaire (Creswell, 2007). For the purpose of this study an interview, questionnaire and documentary sources were applied as described below:

**i. Interview**

Interview refers to two way conversation between interviewer and interviewee aiming to obtain detailed information to answer the evaluation questions (Turner, 2010). The interview method is applied to generate respondents’ own insight, opinions and experience on certain events Weiss (1994). According to Turner (2010) an interview can be structured (standardised open ended interview), semi structured (general interview guide approach) or unstructured (informal conversation interview). In this evaluation the semi structured interview was applied using the interview guide (See Appendix 4) to collect data pertaining to procedures applied in IHDSS to enhance and support collection
of quality data on malaria deaths. Also this technique was used to supplement data obtained from questionnaire respondents and documentary reviews. The semi structure interview was applied to guide the interviewer to focus on the particular phenomena under discussion and ensure exploration of the same area of information to all evaluation respondents that answered the basic evaluation questions (Weiss, 1994).

ii. Questionnaire
A series of proposed evaluation questions that posed to large number of respondents (survey) so as to generate the desired information to answer the general evaluation questions (Mathers, Fox & Hunn, 2009). There are three types questionnaires which include structured (using close ended questions), semi structured (using both open and close ended questions) and unstructured (open ended questions). In this evaluation, a semi structured questionnaire method was employed to collect quantitative data concerning skills of available human resources in IHDSS (See Appendix 2). The semi structured questionnaire gave a room of pre coded questions to respondent which enabled additional explanation that an evaluator did not think about (Mathers, Fox & Hunn, 2009). The findings obtained from the questionnaire respondents were supported by interview quotes.

iii. Documentary review
Documentary review refers to a systematic process of reviewing secondary data that exists in the organization; this may be an achieved data, memoranda or written reports (Yin, 2003). In this evaluation, documentary review technique using structured checklist (See Appendix 3) was applied to collect quantitative data concerning essential tools that facilitated collection of data on malaria deaths. During the evaluation, store ledger books and programme asset register were reviewed followed by direct observation to proof read the reported items.
3.12 Reliability of evaluation

According to Babbie (2010) reliability is made when there is a consistency of results after using the same instrument of measurement elsewhere. To ensure reliability of this evaluation, the following was implemented:

First, provision of a detailed description of the environment where data were generated which influenced the reader to have an insight of the real picture. In this evaluation the IHSS programme description (section 1.2) and description of study area (section 3.5) were given to provide detailed understanding of the evaluation context.

Second, clear evaluation process: the investigator provide a clear process from the start to the end of evaluation showing activities involved in between which promotes the reader to follow the evaluation trail.

Third, theoretical evaluation process was used to guide the data collection process, analysis and interpretation of the evaluation.

Fourth, pretesting/pilot study was conducted to test the questionnaires of the evaluation to determine the reliability of the findings.

Fifth, provide a thick description of evaluation findings in which the investigator applies theoretical and empirical literatures to debate the evaluation findings so as to generate a strong conclusion of the evaluation.

3.13 Validity of evaluation

The term validity refers to an extent to which an instrument is capable to measure what is intended to be measured (Babbie, 2010). In this evaluation validity reflects the ability of evaluation findings to answer the evaluation questions. To ensure validity in this evaluation the following strategies as suggested by Creswell (2007), Miles and Huberman (19994) and Patton (2002) were applied during the evaluation:
Fist, triangulation strategy: this strategy involved different but complementary design triangulation (qualitative and quantitative designs), methods triangulation in data collection (interview, questionnaire and documentary review) sources triangulation (primary and secondary data sources), theory triangulation (different theories and models to generate conceptual framework);

Second, peer review strategy: in this strategy data collection tools, interview transcripts and the evaluation report were sent to two expert experiences on data management for review and consultation to determine if they were able to answer the basic evaluation questions and objectives. To add on peer review was implanted through checks during the meeting with organizational and school supervisors.

Third, preliminary analysis strategy: the preliminary results were sent back to evaluation respondents to reflect on the quality of work presented and gave their views that increased credibility of the findings.

The fourth reason was the operationalisation of variables in the conceptual framework: the strategy applied to identify variables and indicators to be used in the evaluation in relation to specific evaluation questions and objectives (See Section, 2.5).

The fifth reason was pretesting strategy: the strategy used to enhance appropriateness of questions to be asked in the field in relation to evaluation objectives. It aimed to ensure the ability of data collection tools to capture required data responsible for answering evaluation questions and objectives.

### 3.14 Data management and analysis

This section presents data process involved in data management and analysis, it discusses data entry, data cleaning and data analysis. The section starts with data entry where the data cleaning and analysis were presented thereafter.
3.14.1 Data entry

Data entry refers to the process of recording data, regularly into a computer programmes (Rahm & Hai Do, 2010). During the evaluation, data were entered into computerised software packages to assist in analysis process. Quantitative data from questionnaires and documentary review were entered to stata software programme whereby qualitative data obtained from interviews were entered to Atlas.ti software. A verbatim (transcription) was performed to transform word by word audio recorded interview data to written a document (Creswell, 2007), which by then were translated from Swahili to English language before being entered into Atlas.ti where the local translator was consulted to review the interview transcript.

3.14.2 Data cleaning

Data cleaning refers to systematic procedure to identify and correct data errors and inconsistencies and omit them to enhance quality of collected data for analysis (Rahm & Hai Do, 2010). In this evaluation all qualitative and quantitative data undergo cleaning process to ensure its consistency and accuracy. In this evaluation data cleaning for qualitative data involved a series of activities that included the followings as suggested by Miles and Huberman (1994): summarizing the qualitative information generated from interview transcript, read the interview transcripts repetitively to identify inconsistency, spelling and grammatical errors; choose specific information related to the evaluation from a massive of qualitative interview data (winnowing). The quantitative data cleaning involved reviewing filled questionnaires check for errors, inconsistency and editing them (Kothari, 2004). In this evaluation questionnaire responses were checked for consistency, and completeness for each item in the questionnaire. The process also applied to identify calculation errors and data entering errors in the data set. Once quantitative data entered in the data set (stata software package) were reviewed for entering errors and its consistency with questionnaire responses.
3.14.3 Data analysis

Data analysis is a systematic process to organise patterns of data set to provide meaningful information to answer research objectives, hypothesis or questions (Polit & Beck, 2004). Data can be analysed through qualitative or quantitative approach. In this evaluation both approaches were used, their description are as follows:

i. Quantitative data analysis approach

The quantitative analysis approach is a systematic approach used to analyse quantitative data through a statistical techniques to provide meaningful information. According to Kothari (2004), quantitative data analysis can be descriptive or inferential statistical analysis. In this evaluation the quantitative data analysis technique was employed to analyse quantitative data derived from questionnaires responses and documentary review by using a descriptive statistical analysis technique. This technique was used to provide frequencies and relative frequencies by means of stata software package. The results of the analysis were presented in terms of frequency tables, pie charts and histograms.

ii. Qualitative data analysis approach

According to Creswell (2007), qualitative data analysis is an iterative process that involves four interrelated procedures: (1) data managing, (2) reading and memoing, (3) describing, classifying and interpreting, (4) presenting and visualising. The description of these procedures and its relation to this evaluation is as follows: first, data managing is an organization of data into appropriate format. In this evaluation interview data collected and transcribed were appropriately arranged and put into folders to represent statement describing the situation. Second, is reading and memoing, which involves several reading of transcripts to identify key concepts or phrases that emerged in the interview. The evaluation selected key concepts or phrases that generated from the interview patterning to procedures used to enhance quality collection of IHDSS malaria deaths data. Third, is describing, classifying and interpreting and illustrates the systematic process to establish patterns or groups of information emerged from the analysis (Creswell, 2007). The evaluator generated codes and gave them meaning to
generate themes concerning to availability, perception and applicability of the IHDSS guideline to enhance quality collection of IHDSS data, also an ATLAS ti software package was used to generate themes and used themes to interpret meaning of the evaluation. Lastly, is representing and visualizing of data, which involve presentation of data using tables, figures or direct quotes (Patton, 1990). In this evaluation data presented using direct quotes through respondents’ opinion and views on procedures for quality collection of malaria deaths data.

3.15 Ethical considerations

Based on Belmont report, ethics refers to procedures, methods and guidelines which govern handling of complex situations (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1979). In this evaluation four ethical principles were considered:

Firstly was consideration of individual autonomy. This principle refers to self-determination, independence, and freedom to participate in the study (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1979). During the evaluation respondents were offered written informed consent explaining the evaluation objectives, benefits and risk as to keep them aware and give them room to decide on freely the participation in the evaluation activities. Participants also possessed the right to withdraw in the evaluation at any point without conditions.

Secondly, permission obtained to conduct the evaluation. Before data collection a legal permission from the appropriate authority was sought as per the requirement of the Belmonte report in 1978 that it is mandatory for an investigator to obtain ethical permission prior to conduct a study involves human being as a subject (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural research, 1979). Thus, permission and approval to collect evaluation data was obtained from the IHDSS programme under the authority of Ifakara Health Institute. Approval letter is attached as Appendix 5
Thirdly, beneficence principle was considered. The principle refers to an action that causes no harm to study participants (The National Commission for the Protection of Human Subjects of Biomedical and Behavioural Research, 1979). In this evaluation, respondents were assured of their privacy, safety and security. During the study, participants were not required to mention their names; information provided had no connection with their personal, social and economic affairs.

Fourthly, consideration of confidentiality; Confidentiality refers to the agreement between individuals or organisations to not disclose any information provided, including keeping secrecy of individual identity and not to divulge any information beyond the purpose of the evaluation (Huberman & Miles, 1994; Polit & Beck 2004). During evaluation respondents were not supposed to mention their names, they were identified using specific number given during the data collection for example unit of heads identified as HU from the quotes. Data obtained were treated as secret and were not disclosed to any one beyond the purpose of the study. Final evaluation report was submitted to Mzumbe University where it will be stored in database and library. According to Mzumbe by law, the University will reserve the right to store all study information and any individual or organisation that will want any part of the study will be supposed to ask for permission from Mzumbe University. Mzumbe University will deserve the rights to publish the report and access information for further research.
CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents evaluation finding obtained during field work. Data are presented according to specific evaluation objectives generated in Chapter One (See Section 1.2.3) and evaluation indicators established in the conceptual framework (See Section 2.5). The chapter first presents findings on demographic characteristics of study respondents.

4.2 Demographic characteristics of respondents

This section presents the demographic characteristic of study respondents: sex, age, and education background and work experience. The section first presents sex and age of the respondents, then education background and then work experience follows.

4.2.1 Respondents’ sex

Questionnaire and interview data in Table 5 show that 19 (30.2%) of respondents were females and 44(69.8%) were males. Findings indicate the male IHDSS staff were of a larger number than the females by a difference of 39.6%. This implies that males are much more involved in data collection process than females. Thus the findings of this evaluation were more influenced by males than females.

Table 5: Respondents’ sex in Ifakara HDSS programme in 2015 (n=63)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>19</td>
<td>30.2</td>
<td>30.2</td>
<td>30.2</td>
</tr>
<tr>
<td>Male</td>
<td>44</td>
<td>69.8</td>
<td>69.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Source: Question and interview data (2015)

4.2.2 Respondents’ age

The age group of evaluation respondents were grouped into 25-29 years, 30-34years, 35-39years, 40-44years and 45years or above. The data obtained from questionnaire responses show that the majority of the questionnaire and interview respondents ranged
from age group of 30 to 44 years (See Table 6), which implies that most of the respondents were matured and can provide rational information concerning the quality of data collection process in IHDSS.

Table 6: Respondents’ age groups in Ifakara HDSS programme in 2015 (n=63)

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-29</td>
<td>10</td>
<td>15.87</td>
<td>15.87</td>
<td>15.87</td>
</tr>
<tr>
<td>30-34</td>
<td>14</td>
<td>22.22</td>
<td>22.22</td>
<td>38.10</td>
</tr>
<tr>
<td>35-39</td>
<td>23</td>
<td>36.51</td>
<td>36.51</td>
<td>74.60</td>
</tr>
<tr>
<td>40 -44</td>
<td>13</td>
<td>20.63</td>
<td>20.63</td>
<td>95.24</td>
</tr>
<tr>
<td>45 and above</td>
<td>3</td>
<td>4.76</td>
<td>4.76</td>
<td>100.00</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100</td>
<td>100</td>
<td>100.00</td>
</tr>
</tbody>
</table>

Source: Questionnaire and interview data (2015)

4.2.3 Respondents’ level of education

The purpose for identifying educational background among IHDSS data collectors was to highlight literacy level which is vital to determine staff ability to capture and report appropriate events that occurred in the DSA society. Data obtained from questionnaire and interview respondents (See Table 7) show that 55 (87.3%) had secondary education, 6 (9.5%) had college education and only 2 (3.17%) had vocational education. This finding indicates that the majority of the respondents in IHDSS programme had secondary education while very few had college or university education which placed them in good position to undertake effective collection of death data. The findings clarify that the evaluation involved able respondents who were capable to assess and provide opinions on the quality collection process of deaths data in IHDSS.
Table 7: Respondents’ level of education in Ifakara HDSS programme in 2015 (n=63)

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Data collectors</th>
<th>Programme heads</th>
<th>Total number</th>
<th>Total Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary education</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Secondary education</td>
<td>51</td>
<td>4</td>
<td>55</td>
<td>87.30</td>
</tr>
<tr>
<td>Vocational training</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3.17</td>
</tr>
<tr>
<td>College or university and above</td>
<td>2</td>
<td>4</td>
<td>6</td>
<td>9.52</td>
</tr>
<tr>
<td>Others</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>8</td>
<td>63</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Questionnaire and interview data (2015)

4.2.4 Respondents’ work experience

Questionnaire and interview data show that 62 (98.4 %) of the respondents have worked in both Ifakara Health Institute (IHI) and IHDSS programme for more than 2 years. This finding demonstrates that the evaluation involved people who had the desired experience in both IHI and IHDSS of which provided adequate information concerning the quality collection process of deaths data in IHDSS so as to answer evaluation questions adequately.

4.3 Evaluation findings

This section presents results of the evaluation based on variables and indicators established in the conceptual frame work. The section is organised into three subsections in attempt to address the three evaluation objectives. It starts with data addressing the first objective proceeding through with the second and third objectives.

4.3.1 Human resource skills for quality collection of malaria deaths data

The intension of the first evaluation objective was to *find out whether the IHDSS staff have the required skills to collect quality malaria deaths data* as stated in the introductory Chapter. Its associated evaluation question was *do the data collectors in Ifakara Health and Demographic Surveillance System (IHDSS) acquired adequate skills*
to collect quality data on malaria deaths? During evaluation this variable was addressed by three indicators established in the conceptual frame work (See Section 2.5): (1) to find out whether the data collectors in IHDSS received appropriate “training” to facilitate quality collection of malaria deaths data, (2) to find out whether the data collectors in IHDSS had adequate experience in collection of deaths data and, 3) to find out whether the data collectors in IHDSS received supportive supervision to enhance quality collection of deaths data. Obtained data to address this variable is presented below starting with training offered.

i. Training offered to data collectors to facilitate quality collection of malaria deaths data in IHDSS.

The first indicator used to assess skills of human resource for quality collection of malaria deaths data in IHDSS was designed to determine if the IHDSS programme had adequate data collectors were equipped with the necessary skills for quality collection of malaria deaths data. During the evaluation the indicator was assessed by; (a) examining the proportion of data collectors who received appropriate training concerning collection of deaths data and, (b) types of training offered to data collectors concerning the collection of deaths data. The first part of this section presents proportion of data collectors who received appropriate training concerning the collection of deaths data.

a) Proportion of data collectors received appropriate “training” to facilitate quality collection of malaria deaths data in IHDSS

Questionnaire respondents were asked if they received any training in IHDSS programme which could shape them on a daily data collection process. Data obtained (See Figure 4) show that all 55 (100%) received training concerning collection of IHDSS data including detection and notification of deaths occurred in the specific demographic area (DSA). Indeed, data shows that 12 (21.8%) of questionnaire respondents received training concerning household interview and filling the Verbal Autopsy (VA) forms while 43(78.2%) received training concerning notification of death events.
The finding indicates that data collectors in IHDSS were equipped with the necessary training for quality collection of deaths data. One can infer that there is a good division of labour in which the programme selected specific individuals for a specific task. The interview data supported the above findings in which the respondents agreed that their performance is improved as a result of training received in periodical bases. However these training are not offered based on individual role for instance data manager and field manager receive the same training in the same session with a field interview which indicates no difference between them but in turn it affect their duties especially when the problem arises that no one can provide technical support since all (supervisor and supervisee) has the same information. To support this finding the respondents had the following to say;

Source: Questionnaire data (2015)
I believe that training offered in IHDSS is very important to us especially that concerning collection of death’s data. At the beginning we had them frequently, but it’s a little time now since we had them, but what is surprising to us was we as field supervisors and field managers receive the same training as those offered field interviewers and VA interviewers! While we are required to have separate trainings for our cadres, since we stand as coaches to others. E.g PC tablets training was given to all at once the same class, so if clarification was required in the field it’s a challenge, where will these people turn to while we all had the same one day class? So this is still a big challenge (HU.2, 8/5/2015.10:00am).

The findings indicate that training received by all respondents needed to be linked to each respondent’s role within the programme, so that each could benefit and use the knowledge acquired for effective collection of data generated in IHDSS.

(b) Types of training received by IHDSS data collectors

During the evaluation, training was categorised into two groups: long term and short term training. Long term training referred to all training acquired by IHDSS data collectors for more than one year (certification) outside the working area while short term training involved all training received within the IHDSS programme in duration of two days or less at the beginning and end of data collection rounds (Geubbels et al., 2014). Respondents were asked to state which type of training they received. Data obtained from questionnaire respondents (See Figure 5) show that all 55(100%) of the respondents received short term training, among them 4(7.3%) respondents had an opportunity to acquire long term training.
Indeed, interview data obtained from programme heads show that HDSS programme offered training before and after every round of data collection process, as the way to promote effective collection of IHDSS data. Further, the respondent had the following to say:

*But in addition to that, in IHDSS programme there was a procedure to offer refresher training for a certain period, which was compulsory for each one of us. Formally, we had these trainings in quarterly basis but currently are offered after every six months in a year. In our programme training was not optional but was misses a mandatory session. If it happens that one misses the session, arrangements would be made to fix the matter (HU.1, 5/5/2015.04:00pm).*

The finding implies that, the IHDSS programme rigorously provides training to HDSS staff so as keep them updated and capable for the collection of quality data.

**ii. Experience of data collectors in collection of data in IHDSS**

Experience of data collectors was determined by assessing work duration as data collector in IHDSS. During evaluation responses on work duration was categorised into
less than six months and six months or more. Data obtained from questionnaire respondents (See Figure 6) show that 54(98.2%) have worked as data collectors in IHDSS for more than six months while 1(1.8%) have worked for less than six months. Concurrently, this observation was supporting the demographic information that 98% of study respondents worked in IHDSS for more than two years.

**Figure 7: Proposition of IHDSS data collectors with appropriate experience in collection of IHDSS malaria deaths data by 2015 (n=55)**

![Work duration in IHDSS as data collectors (n=55)](image)

Source: Questionnaire data (2015)

Interview data supported the above findings in which it was revealed that most of the IHDSS data collectors have been working in IHDSS for many years without being replaced unless there were internal changes. It was also said the more experience possessed by data collectors resulted to more effective data collection process. To clarify the above observation respondents had the following to say:

*Filling the VA forms and conducting household interview for someone with no experience is very difficult, since you need to have a convincing language in the community we work with, but it is possible and easier task if you have worked with them for a long time. Remember, we conduct interview to someone who has just lost a relative (family member), so a convincing power is required to acquire the intended information*
otherwise it is very difficult. My experience has been a key to my success on quality data collection e.g I have worked with VA forms since it was an English version, until now I absolutely master it (HU.8,1/5/2015. 03:00Ppm).

The finding illustrates that experience builds convincing power that plays an important role in collection of IHDSS data particularly deaths data which was obtained through long working in the same field.

iii. Supervision offered to data collectors in IHDSS programme

Supervision is an important management activity which promotes effective work performance. Effective supervision reduces work related errors, promote process and can also result to good service outcome (Cassidy et al., 1998). During evaluation, the evaluator intended to determine whether IHDSS data collectors received appropriate supervision from competent supervisors. Data obtained from questionnaire responses indicated that 55 (100%) had been supervised during data collection process. Indeed, interview data obtained from programme heads show that the IHDSS programme performed two types of supervision activities: “accompany” and “re-interview”. Respondents elaborated further by the followings say:

We perform two types of supervision; accompanying and re-interview. Accompany is a participatory process whereby the supervisor visits the DSA to assess the data collector on how he/she conduct household interview so as to examine whether the interview is performed according to IHDSS instructions. During supervision we assess how the data collector introduces himself, what language used during conversation. The re-interview is another type of supervision in which we supervisors conduct interview to few household that was previously visited by data collector to assess if data collectors physically visited the household, if the collected information present the actual situation of the household visited, and whether the HDSS operating rules have been followed (HU.1,6/5/2015.04:00pm).

The findings indicate that IHDSS programme implementing a good strategy to ensure data collectors perform their duties accordingly. Further, this finding clarifies that the programme is conscious to ensure quality data collected through supervision.

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Moreover, data indicated that supervision done are not helpful to data collection processes since knowledge possessed by field supervisors and manager is mainly the same as that of data collectors (field interviewer and VA interview). As it was shown on demographic factors 55 respondents were form four level and only 8 respondents acquired college education. Apart from that, the programme (IHDSS) provided same training classes as those received by field data collectors as it was illustrated by one interviewee: “how can I solve or help my subordinate for example on PC tablets problems while what he or she understand is the same to me”? (HU.3, 11/5/2015. 10:00am). This implies that the system has failed to upgrade resourceful supervisors to enhance quality collection of HDSS data.

4.3.2 Necessary tools for quality collection of malaria deaths data in IHDSS

The second evaluation objective was designed to determine the availability and use of essential tools for collecting high quality data on malaria deaths within the Ifakara HDSS. Its associated evaluation question was does the Ifakara HDSS have the tools necessary for collecting high quality data on malaria deaths? The objective was addressed through two indicators established in the conceptual framework: (1) to determine whether IHDSS data collectors used appropriate technology that facilitated quality collection of malaria deaths data, and (2) to determine whether available transportation means like vehicles enhanced quality collection of malaria deaths data. Below are data obtained through both documentary review and interview starting with the first indicator:
i. Determination of availability and use of appropriate technology that facilitate quality collection of malaria deaths data

The evaluation intended to assess availability and use of appropriate technology that enhance collection of deaths data in IHDSS. During the evaluation technology was grouped into hardware and software. Hardware was designed to determine the availability of the physical objects that support collection of quality malaria deaths data e.g computer desktops. While the software was designed to identify availability and use of the technical objects e.g software programmes as illustrated in the conceptual framework of this evaluation. Data obtained through documentary review were presented below starting with hardware:

a) Hardware

During evaluation the investigator reviewed the programme asset register book and inventory followed with direct observation using a checklist (See Appendix 3) to see available items compared to the established standards (programme requirement). Data obtained (See Table 8) shows that the IHDSS programme had required hardware materials necessary for the collection of malaria deaths data that include desktop computers, Samsung Galaxy (PC tabulates with wifi installed, 1GB memory), mobile phones(cell phones), printer machines (HP Laser jet M601 series), solar charger, UPS machines, and power stabilizer (Inventor Sw 4024 500volt- Amp). However, the available amount did not correspond to programme requirement.

Moreover, the interview data acquired from programme heads indicated that many of the available hardware material especially desktop computers and printer machines were too old and their functionality was not guaranteed. One of the interview respondents observed that:

Some of us use solar charger provided since 2013, till today there is no replacement or any backup in case of any default. People are shouting and they are tired. They spend money from their own pocket to find alternative only to protect their employment. With electrical power challenges that we have, you cannot expect a better performance, so these people can perform their duty but quality cannot be assured. When
observing many of these instruments have missed their quality, there is no clear guideline to clarify the life span of these instrument, we just use them until they destroyed or stop functioning. Sometimes they crashed with very important data, these challenges are caused by adopting a system that we cannot afford (HU.3, 11/5/2015. 10:00am).

The finding implies that IHDSS has inadequate hardware materials necessary to support collection of malaria deaths data. This may be the result of absence or improper material and inventory management.

b) Software systems
It was the intention of this evaluation to review the programme asset register and inventory book to investigate software system used by IHDSS in collection of malaria deaths compared to established standards (programme requirement). Data obtained (See Table 8) show that the IHDSS programme used the following software systems to support collection of malaria deaths data: Window XP, Census and Survey Processing System (CSpro version 4) package and Kaspersky software programmes which corresponded to IHDSS programme requirement. The finding implies that the IHDSS programme had desired software packages that support collection of deaths data.
### Table 8: Types of hardware and software technology available in IHDSS for data collection by 2015

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Required</th>
<th>Available</th>
<th>Work duration with item in years</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Motor cars</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Motorcycles</td>
<td>17</td>
<td>14</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>Bicycle</td>
<td>43</td>
<td>43</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Galaxy mobile phones (PC tablets with wifi installed, 1GB memory)</td>
<td>64</td>
<td>61</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Mobile phones (normal)</td>
<td>64</td>
<td>64</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Printer machine (laser jet M601 series)</td>
<td>3</td>
<td>1</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Mobile phone power bank</td>
<td>55</td>
<td>5</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>Inverter</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Power stabilizer (Inventor Sw 4024 500volt- Amp)</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Generator for power backup</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology</th>
<th>Model required</th>
<th>Model available</th>
<th>Total available</th>
<th>Total functional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td>Window vista, window 7or 8, window XP</td>
<td>Window XP</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Software system</td>
<td>Census and survey processing system (CSPro version 4)</td>
<td>CSPro version 4 /pc</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Data security system</td>
<td>CSPro package</td>
<td>CSPro /pc &amp; database source code</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Antivirus</td>
<td>Kaspersky</td>
<td>Kaspersky/Pc</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Survey data (2015)
ii. Determination of availability of transportation means to enhance quality collection of malaria deaths data

The second indicator used to assess availability and use of essential tool used by IHDSS to enhance quality collection of deaths data was transportation means. The indicator was assessed by determining availability and use of the following transportation means in collection of malaria deaths data compared to programme requirement: cars, motorcycles, and bicycles. During evaluation, the investigator reviewed programme asset register and inventory books followed with direct observation to identify all types and amount of required transportation means. Data obtained (see Table 8) show that the IHDSS had 43(100%) Bicycles for field interviews, 14(82.4. %) motor cycles for field supervisors and VA interviewer and 1(33.3%) cars for heads of units. Indeed data show that the life span of these equipments has been for more than 5years and 3(21.4%) motor cycles were not functioning and not used for data collection process.

Further data obtained during interview show that transport is a great challenge facing data collection process in IHDSS. Respondents claimed that many bicycles and motor cycles were too old and not reliable which gave them a hard time to cope with complicated working environment. Indeed the respondent had the following say:

_The second challenge we face is when we require bicycles, we do not receive them timely as expected, and then we have motorcycles that require weekly maintenance but that depend on how quick that service can be performed. Normally, our mechanics claimed not to perform the services because there is no stock for spare parts. We were always advised to wait for cash to pay for the required spare parts. So we keep on working for field activities without repairing until the motorcycles get damaged (HU.5, 4/5/2015.02:00pm)._ 

The findings imply that IHDSS has necessary transportation means, however, their dysfunction and poor maintenance system hampers the data collection process.

4.3.3 Procedure employed in collection of malaria deaths data in IHDSS

The third evaluation objective was designed to examine whether the data collection procedures used promote the collection of quality data on malaria deaths within the
Ifakara HDSS. Its associated evaluation question was *Do the methods used for data collection in Ifakara HDSS promote the quality of data collected on malaria deaths?* The objective was addressed through the following three indicators established in the conceptual frame work: (i) To assess whether availability of standard guidelines used in IHDSS support collection of malaria deaths data (ii) to examine perception of IHDSS unit heads on available guidelines and (iii) to examine the applicability of available guideline to support collection of deaths data. Data obtained are presented below starting with data concerning to availability of standard guidelines.

i. **Assessing the availability of standard guidelines that promote quality collection of malaria deaths data**

The first indicator used to assess *procedure employed in collection of malaria deaths data in IHDSS* was assessment of available standard guidelines that promote quality collection of malaria deaths data. This indicator aimed at identification of the necessary guidelines available and used in IHDSS to guide data collection process. During evaluation the investigator intended to identify all guidelines available in IHDSS that support collection of deaths data. Data to address this indicator was obtained through interview with programme heads followed by direct observation.

The data revealed that IHDSS programme had the following standard guidelines: (1) *Demographic Surveillance System (DSS) manual* that govern data collection and management process in IHDSS, (2) *Standard Operating Procedures (SOPs)* under data unit, (3) *Disease Classification* used by VA coders and (4) Verbal Autopsy tool for deaths data collection. Availability of these guidelines facilitated systematic collection of all demographic events including death events since they clarify procedures by explaining step by step to be followed in data collection and management process as explained by study respondent that; “*there are Standard Operating Procedures stipulated in DSS manual which insists on specific conditions that should be adopted so as to ensure that data collectors thoroughly perform their duties step by step*” (HU.2, 8/5/2015.10:00am). It was also revealed that data collection process involved with a
coding process to identify or rule out the cause of death. Coders also have a manual guiding them through the process, as observed by one of the respondent that; “We have books that just guide us during identification of the cause of death from the filled VA forms, we termed them as Disease Classification manual. it is not like we just make coding, no we use our guideline” (HU.8, 1/5/2015. 03:00Ppm). This implies that in the IHDSS there are guidelines which used by all levels and all carders to enable effective collection of deaths data i.e. data collector level, supervisor level, managerial level and data central unit level are involved.

However, IHDSS currently revising the DSS manual to make an appropriate change that goes simultaneously with change occurred in data collection and management system. Formally, the system used a paper based system to report all demographic events but at the present the system changed to web based open electronic system (Open-HDS). However death events still collected though paper base VA interview as elaborated by one of the interviewed that; “Currently, the system reviews and wants to modify the SOP in DSS since the data management system has changed from paper based to electronic web based DSS. Formally, we used a DSS operating manual which also contains standard operating system, it clarifies all steps form field work to data entry.” (HU.7, 9/5/2015. 11:30am). Findings obtained during interview with programme heads revealed that operated guideline in IHDSS have been there for many years though review is done to cope with the new open-HDS system.

During direct observation, the investigator was able to retrieve the HDSS manual which had the following sections: introduction and purposes of IHDSS, flow of information relating to IHDSS work roles of interviewers in IHDSS, description of the interview on primary data, corrections of the described interviews and after each six months. This finding clarifies that the IHDSS programme has necessary guidelines to support collection of deaths data.
ii. Perception of IHDSS programme heads towards standards and guidelines
The study aimed to describe perception of programme heads towards available standards and guidelines in IHDSS. Data obtained from interview shows that the majority of study respondents are aware of the available guidelines. Participants perceived the guideline as best resource to govern data collection, handling and management in IHDSS. Though majority of interview respondents revealed that, the DSS manual as programme asset and not workers asset since they were not involved in its preparation, one of the interviewee said,

There is a guideline known as DSS manual which was perhaps prepared by coordinator, we data collectors as workers in IHDSS are oriented on its contents only during trainings which are normally conducted for after every six months in a year, during that training period we are given an opportunity to explain our concerns on its improvement (HU.6, 10/5/2015,12:00pm).

This implies that it is likely for IHDSS workers to be unfamiliar with work guidelines in which may constraint their ability to adhere to steps required to their daily data collection and management activities. Further, not all IHDSS workers have the opportunity to attend workshops and seminars in every round. Failure to circulate DSS manual to all DSS staff may limit their reference points especially when the problem arise during their exercise.

iii. Applicability of guideline in IHDSS
The study aimed to describe perception of programme heads towards available standards guidelines in IHDSS. Its applicability was tested to see the ability of data collectors to apply necessary steps using the guideline in place (IHDSS guideline) to collect data. Data obtained from the interview show that collection of deaths data in IHDSS involves collection and recording of health and demographic events which include deaths events. Data unit in IHDSS receive data from field interviewer through electronic devices (PC tablets) being entered in the data base before generating death lists. The death lists are circulated to field supervisors (VA interviewers) who are supposed to interview the household (where death has occurred) by using special questionnaires known as VA
(verbal autopsy) form. Filled questionnaires are then forwarded to coders (special medical doctors) to review the form, sit for discussion to decide the actual cause of death through deceased history. This was revealed by one of the interview respondent when he said:

Collection of deaths data involves two stages; we use field workers (field interviewers) to collect and update household health and demographic events. Normally, data obtained are forwarded to data management unit for entering in data base and generation of deaths list. The death list by then are given to field supervisors who go to interview the house hold using a special form known as VA form. A filled VA form is recorded to data unit then it is forwarded to special medical doctors (coders) possibly more than one doctor, two or three and onwards, in order to identify source of death for a deceased person by reviewing questionnaires forms (VA) to judge and identify the cause of deaths. After reviewing the forms they reach a similar conclusion to what the cause of disease was and report back to us, in case if a death was caused by malaria, diarrhoea, or any other disease (HU.7, 9/5/2015. 11:30am).

This indicates that all deaths that occurred in DSA are likely to be reported and causes of death can be identified. The tendency of using VA forms which is an international questionnaire (See Section 2.4.2), ensures a thorough investigation of all complains and symptoms of the deceased person before his/her death.

On the other hand, most of the interview participants argued that, they were not supplied with available guidelines, instead they are given an overview of what is present in the guideline during seminars and workshop. This was supported by an explanation given by a respondent saying: “we only get a time to be oriented with the DSS manual when we meet for seminar, that all” (HU.2, 8/5/2015.10:00am). This implies that during data collection there are procedures involved to guide the data collectors in collecting data, but this was not clear to them if they followed IHDSS guideline since they were not aware of even how the guideline looks like and which contents were involved. This has been only done by word of mouth during seminar rounds that are normally done twice in a year.
CHAPTER FIVE: DISCUSSION OF FINDINGS

5.1 Overview

This chapter discusses data obtained during field work based on interview, documentary review and questionnaire as presented in Chapter Four. It starts with general discussion of findings based on evaluation objectives as stated in chapter one. Finally, the chapter presents dissemination of preliminary results to different levels.

5.2 Discussion of evaluation findings

5.2.1 Introduction

Collection of quality data involves several steps and requirements that need be assured so as to promote quality collection of data. Many studies have discussed several issues concerning data quality but very few if any present little aspects concerning quality collection of deaths data in HDSS (Carrel & Rennie, 2008). The current evaluation focused on assessment of quality data collection processes in Ifakara health and demographic surveillance system (IHDSS) programme specifically on collection of malaria deaths data. This evaluation was designed to address the following specific evaluation objectives: (1) to examine whether the IHDSS staff have required skills to collect quality data on malaria deaths, (2) to determine the availability and use of essential tools for collecting high quality data on malaria deaths with IHDSS, and (3) to examine whether the data collection procedures used promote the collection of quality of data on malaria deaths within IHDSS. The quality collection of malaria deaths data in IHDSS as the outcome of this evaluation that is determined by three factors (human resource skills, essential tools and procedures) as presented in the conceptual framework (See Section 2.5). The discussion is presented based on evaluation objectives corresponding to evaluation questions, variables and indicators established in the conceptual framework supported by existing theories and empirical studies. The section starts to present the first evaluation objective.
5.2.2 Human resource skills for quality collection of malaria deaths data

The first evaluation objective was designed to find out whether the IHDSS staff have the required skills to collect quality malaria deaths data as stated in the Introductory Chapter. Its associated evaluation question was “Do the data collectors in Ifakara HDSS posses adequate skills to collect quality data on malaria deaths?” During evaluation this variable was addressed by three indicators established in the conceptual framework (See Section 2.5): (i) to find out whether the data collectors in IHDSS received appropriate “training” to facilitate quality collection of malaria deaths data, (ii) to find out whether the data collectors in IHDSS had adequate experience in collection of deaths data, and (iii) to find out whether the data collectors in IHDSS received supportive supervision to enhance quality collection of deaths data.

The findings clarify that IHDSS data collectors received appropriate training that enhanced their ability to quality collection of malaria deaths data. Data obtained show that 55 (100%) of respondents received appropriate training concerning to collection of IHDSS data including deaths data. This indicates that IHDSS programme provide adequate training to data collectors to ensure that they are competent with the assigned tasks. The findings corresponding the WHO (2012) suggestion that to ensure appropriate collection of VA data, data collectors require training on VA tool and procedures to be applied in data collection process. Further, the observation is consistent with culture of data quality framework (Massachusetts Department of Education, 2012) (See section 2.2.4) which emphasised training to data collectors in order to acquire appropriate knowledge that can lead to quality data collection process. However, this observation is contrary to an observation made by Marson et al. (2005) that the quality collection of Victorian Emergency Minimum Data (VEMD) were due to lack of knowledge and training on VEMD data base.

These arguments verify that training is very important to ensure effective performance. Knowledge can be acquired through effective training in which the IHDSS was able to provide, but this was different to field supervisors and managers as trainings received did not match to their role since the training and classes received were equal to their
subordinates (field interviewers and VA interviewer) which made them more or less the same.

Moreover the finding indicated that all study respondents (100%) received short term training and about 7.3% received long term trainings concerning collection, handling management and storage of data. This implies that all IHDSS data collectors were able to attend short term training (refresher courses) that keep them up to date, the IHDSS provide a room for HDSS staff to share their experiences on challenges that occurred and the appropriate corrective measure to be taken. However, it was revealed that only 7.3% of IHDSS data collectors have received professional development training outside IHDSS programme. This indicates that IHDSS programme does not provide opportunity for data collectors to acquire higher level of education to develop their professional background. This tendency may lead to stagnant thinking (lack of new skills) in decision making which may distort quality collection of deaths data. This may be due to the reason that IHDSS programme lack enough funds, or lack of access to further training opportunities, but also can be one of the strategies for retention mechanisms. This observation is contrary to observation made by Arikpo et al. (2013) and Sie et al. (2010) who found that, the cross river HDSS in Nigeria and Nouna respectively provide opportunity to staff for university studies to enhance their capability and support organisation strategy for staff retention.

Pertaining to experience, findings demonstrated that 98% of IHDSS questionnaires respondents have more than two years working in IHI and 98.2% worked in IHDSS programme as data collectors for more than six months. This reveals that IHDSS staff have adequate experience of working with IHI which promote the ability to perform their duties accordingly since they are aware with organizational goals, objectives and activities. Findings are corresponding with the Culture of Data Quality Model (Massachusetts Department of Education, 2012) (See section 2.2.4). Since, the model explains collection of data with major focus on human capacity in terms of experience acquired by data collectors. On the other hand, the finding is contrary with the model when very few professional developments training (long term training) were performed.
in the programme, while both short and long term training enhance new skills that facilitate quality collection of deaths data. The same was observed by Sie et al. (2010) that, short term and long term trainings bring staff update on various perspectives regarding data collection exercise.

Concerning supervision, the findings illustrated that IHDSS implement effective supervision strategy that promote staff capability and enhancing quality of data collection, these are accompanying and re-interview strategy. Presence of effective supervision reduces errors that tend to occur during data collection by enforcing data collectors to follow the desired data collection process. Indeed, its data showed that 100% of respondents had received periodical supervision from field supervisors, however, it was claimed that most of field supervisors were not competent due to inappropriate training. According to Faso et al. (2010), supervision ensures maintenance of quality standards, collection of complete and accurate data, proving opportunity for feedback also it serves as immediately training to data collection. Therefore the tendency of IHDSS to perform supervision during data collection facilitates effective data collection processes in the field. However, lack of competency among supervisors disvalue the quality of supervision and also may affect the quality of data collection process.

5.2.3 Essential tools for quality collection of malaria deaths data

The second evaluation objective was designed to assess the availability and use of essential tools for quality collection of malaria deaths data in IHDSS. Its associated evaluation question was “Does the Ifakara HDSS have the essential data collection tools necessary for achieving high quality data on malaria deaths?” The objective was addressed through two indicators established in the conceptual framework: (1) to determine whether IHDSS data collectors used appropriate technology that facilitate quality collection of malaria deaths data, and (2) to determine whether available transportation means like vehicles enhanced quality collection of malaria deaths data.
Technology was grouped into hardware and software programme. Regarding to software programme, findings in Section 4.3.3 show that IHDSS programme used computers operating on Windows XP OS and the CSPro package for the IHDSS survey data, while Kaspersky antivirus is used for computer security. The presence of window XP allows for smooth running of CSPro data base, the existence of CSPro data base allow effective collection of all indicators available in the VA forms, as well Kaspersky ensures security of IHDSS computers from virus. The data security system ensures security of data from unauthorised individuals. The finding goes concurrently with the culture of data quality framework (See Section 2.2.4) that emphasises the availability of infrastructure of both physical and technical requirements to facilitate data collection process. On the other hand, the available technology in IHDSS remains the source of delay in which it’s still using CSPro non web-based programme that do not allow data entry outside working station (paper baseb system). This is beyond the international practice in which many HDSS such as the Nouna in Bukinafaso use web based programme to fasten data entry and report generation (Sie et al., 2010).

Patterning to hardware technology, findings in Section 4.3.3 clarify that the IHDSS are equipped with desktop computers, printer machines and galaxy mobile phones (PC Tabulate) which are used to support data collection in IHDSS. However, the length of service for the available materials had been too long without replacement. This implies that it is difficult to sustain the data collection procedure due to old working tools. The finding is concurrent with Arikpo et al. (2013) observation that in order to enhance quality HDSS data through a paperless HDSS system hardware technology (saver, personnel computer and smart phones) need to be in place. However the availability of too old materials without replacement may challenge the data collection process and may reduce the quality of data collected.

Concerning transportation means such as cars, motorcycles, and bicycles, the finding demonstrated that IHDSS programme is equipped with 1car, 8 motorcycles and 43 bicycles that used for transportation from one household to the other. Though, available amount did not match with IHDSS programme requirement and it was claimed the
available equipment were too old but, there was no replacement which in turn affected the data collection process. It is implying that, IHDSS has necessary transportation means facilitate data collection process, however, many of those facilities claimed to be too old and cannot defy the hardness of data collection activities. The presence of too old equipment in IHDSS may be the results of low purchasing power due to lack of funds or poor procurement system and or poor working environment like poor roads and too long distances to travel for data collection. This observation is the same as observation made by (INDEPTH, 2002; Sie et al., 2010) who found that many IHDSS are affected by poor infrastructure that includes the absence of necessary equipment.

5.2.4 Procedures employed in IHDSS for quality collection of malaria deaths data

The third evaluation objective was designed to examine whether the procedures employed during data collection promote quality of data on malaria deaths within the Ifakara HDSS. Its associated evaluation question was “Do the methods and procedures used for data collection in Ifakara HDSS promote quality of data collected on malaria deaths?” The objective was addressed through the following three indicators established in the conceptual frame work: (i) To assess availability of standard guidelines used in IHDSS to support collection of malaria deaths data (ii) examine perception of IHDSS unit heads on available guidelines and (iii) examine the applicability of available guideline to support collection of deaths data.

The assessment of available guidelines within IHDSS was essential since it gave direction on how quality collection of data could be performed. The finding revealed that IHDSS has standard guidelines employed to support quality collection process of IHDSS deaths data, through the use of different guidelines includes Demographic Surveillance System Manual (DSS) manual for all IHDSS staff, Operating Procedures (SOPs) for data unit and Guideline for Disease calcifications for Verbal Autopsy coders, and VA tool. The presence of these guidelines correspond the requirements for effective HDSS stipulated in the starter kit manual (INDEPTH, 2005; 2010). On other hand, Burgoon et al. (2005) supported this evaluation finding by stating that: quality analysis
and interpretation of data developed from microarray technology to measure genes in the laboratory was enhanced by a development of the quality control protocol. This indicates that, the presence of these guidelines ensures systematic and uniform collection of IHDSS data, then involvement of different principles to govern data collection activities required to all staff in order to provide integrity of the data quality.

The perception of IHDSS unit heads towards available guideline helped the investigator to identify the familiarity of the available standards and guidelines stipulated for quality collection of data. The finding reveals that IHDSS staff were unfamiliar with work guidelines since they were not involved during its preparation or given soft copy to carry for review. It was said their only chance to view on the available guidelines was done during seminars. This indicates that the top management are only involved and familiar with IHDSS guidelines, which may constraint the ability of data collectors to adhere to steps required to their daily data collection and management activities. In contrary, Bhutto, Khoumbati and Kalhor (2010) demonstrated that, a guideline developed in the system should be agreeable by the whole management given clear clarification on the contents available, its protection and give access to those required. Hence, failure to provide adequate training and supply of these guidelines as working aid to workers diminished reference materials among data collectors and contradicted data collection system.

The applicability of available guideline to support collection of deaths data in IHDSS was determined following the issue pertaining to procedures employed in IHDSS to collect deaths data, findings obtained during interview with programme heads indicated that the IHDSS has two procedures used for collection of malaria deaths data. These procedures are, collection of mortality data using field interviewers to allocate death event and collection of information patterning to source of death using VA questionnaires by field supervisors (VA interviewers). It indicates that, it is likely for IHDSS to capture all deaths that occurred in the population within DSA. The procedure adopted by IHDSS to collect deaths data using VA forms goes simultaneously with the international procedure designed by WHO to collect deaths events in HDSS (Ye et al..)
2013). However it is claimed to have various short comings in classifying the cause of deaths especially those with rare symptoms and the argument remained to be that, guidelines are only discussed to data collectors during seminars which they were not given opportunity to get involved fully in its preparation.

5.3 Dissemination of evaluation findings

The preliminary results were presented to IHDSS heads; it was a special forum that allows an open discussion with project heads to provide their views and constructive comments that brought more understanding and expansion of presented results. The final report disseminated to Mzumbe University for final marking and presentation. Through Mzumbe University’s permission, publication will be made to national and international well known journals.
CHAPTER SIX: SUMMARY, CONCLUSIONS AND IMPLICATIONS

6.1 Introduction

This section summarises the evaluation and draws conclusions based on findings and discussion presented in chapter four and five. The chapter also highlights policy and programme implications and finally it justifies areas that need further investigations.

6.2 Summary

Many studies have been conducted to assess the quality of data in many HDSS countries; findings concerning the quality collection were not clearly demonstrated. But these studies did not adequately address issues involved in data collection process, and instead failed to explain the quality of the collection processes of deaths data. The present evaluation aimed to assess the quality of the data collection processes in IHDSS particularly on malaria deaths data. Mainly, the evaluation intended to: (1) find out whether the IHDSS staff have required skills to collect quality data on malaria deaths, (2) to explore the availability and use of essential tools for collecting high quality data on malaria deaths within the IHDSS, and (3) to examine whether the data collection procedure used promote the collection of quality of data on malaria deaths within the IHDSS. The associated evaluation questions were: (1) “Do the data collectors in IHDSS acquired adequate skills to collect quality data on malaria deaths?” (2) “Does the Ifakara HDSS have the tools necessary for collecting high quality data on malaria deaths?” and (3) “Do the procedures used for data collection in IHDSS promote quality of data collected on malaria deaths?”. The evaluation was conducted under case study design employing both qualitative and quantitative (mixed method) evaluation approaches to answer the evaluation questions.

By using a case study design, the study was involved with both qualitative and quantitative approaches to obtain both primary and secondary data. The quantitative approach applied questionnaire and documentary review to generate information
concerning human capacity, accuracy, completeness, timeliness, availability and use of essential tools for quality data collection in IHDSS. On the other hand, qualitative approach was used to obtain data concerning procedures employed in IHDSS program to enhance quality collection of deaths data. Respondents were drawn from IHDSS programme heads, IHDSS supervisors and IHDSS field interviewers by using questionnaire and interview samples. Data obtained were analysed through case study analysis design and descriptive statistical analysis. In case study analysis design data were summarised and entered in the Atlas.ti software programme to generate common themes which were presented using direct quotations. Patterning to descriptive statistical analysis, quantitative data were analysed by using stata software programme to obtain tables, figures, percents, frequency and relative frequency. The results were presented as per specific objectives and evaluation questions. The following are the evaluation findings:

First, with respect to human resource skills the evaluation revealed that the majority of data collectors in IHDSS programme received appropriate training and had adequate experience in data collection process. However, they did not received supportive supervision from competent officers because training offered to unit heads (supervisors and field managers) did not relate to their roles.

Second, with regards to availability and use of tools in IHDSS programme this evaluation observed that the IHDSS programme had intended technology and instrument to facilitate quality collection of deaths data. However, the available tools did not match with programme requirements, and many were too old to enable effective work, also required repair and maintenance promptly.

Third, with regards to the procedure used in IHDSS, findings revealed that the IHDSS had operating standards or guidelines to follow for quality collection processes of IHDSS malaria deaths data. Guidelines existing were Demographic Surveillance System (DSS), Standard Operating procedures and Disease Classification. On the other hand it was found that, IHDSS members are not involved during preparation of these guidelines,
the only time this opportunity is made is during seminars and/or workshops inside the IHDSS programme.

6.3 Conclusions

Based on findings presented in chapter four and the discussion made in chapter five of this evaluation concludes that the collection process of malaria deaths data in IHDSS is not as quality as desired since it faces the following challenges:

i. Data collectors have inadequate skills since they received supervision from incompetent supervisors which brings doubt on their ability to overcome challenges raised during data collection.

ii. The programme used too old data collection tools which perceived to hinder effective data collection process.

iii. Procedures followed during data collection were doubtful because the data collectors were not adequately adhered since majority of data collectors were not familiar with contents available in the guidelines.

6.4 Policy implications

It is a long time since IHDSS started to collect deaths data, though the high quality of data obtained still needs room for improvement, due to the above arguments. Their application in decision making do not prevail the expected effect in many health and health related projects. Findings obtained in this evaluation emphasize the need for improvement of current IHI policy to promote quality collection of malaria deaths data. Therefore, the updated policy should consider the following;

i. Emphasize on recruiting field supervisors and managers with professional development, particularly should consider additional skills that relate to health and data management.

ii. To consider provision of specific training for field supervisors to as to increase their supervisory capabilities and enhance quality collection of deaths data.
iii. To use items (technology and transportation means) within its life span (before the scrap value) so as to avoid unnecessary costs and inconveniences during the field work.
iv. Employ a paperless VA data collection system that can promote the high quality of data generated in the programme.
v. Engagement of all management, including data collectors on guidelines preparation, also making a short manual which the data collectors can carry with them for reference every time they go out for field work.

6.5 Programmatic implications and use of findings for strategic planning

This evaluation elucidates strengths and weaknesses of IHDSS programme in collection of malaria deaths data. Indeed, findings advocate certain activities that need to be addressed so as to strengthen collection system of deaths data in IHDSS. With respect to study results, the proposed intervention should consider the following:

i. Provide long term training to field supervisors so as to strengthen their supervision ability and promote quality collection of deaths data in IHDSS.
ii. Use of up to date technology for active collection of deaths data.
iii. Increase opportunities for professional development among data collectors, so as to add new skills, work morale and create ability to work with data collection challenges.
iv. To re allocate or employ VA coders close to IHDSS working areas so as to allow quick determination of diseases that cause death.
v. Prepare and supply working aids (guidelines) to data collectors simultaneously with appropriate training.

6.6 Limitations of the evaluation

There were some pertinent issues or limitations encountered during the study:

Firstly, it was hard to access the study respondents in the same locality due to the nature of their work; this was addressed through:
i. Establishing relationship with the study participants, prior data collection.
ii. Avoiding self administered questionnaire, encouraging face to face interaction.
iii. Motivation (lunch and soft drinks) to encourage attention and participation.

**Secondly**, instability of the interview schedule due to overwhelmed of interview respondents daily duties; this was addressed through:

i. Providing prior information to the expected respondents to keep them aware of the study.
ii. Asking for their convenient time and places to conduct interview.
iii. Follow interview respondents from distant places where interviews could be done.

**Thirdly**, is the presence of difficulties (bureaucracy) to access key documents; this was mitigated through:

i. Identification of key documents required;
ii. Provide prior information to specific respondents;
iii. Give them time to search and prepare needed documents.

### 6.7 Areas for further evaluation

It is clear that, this study has raised different questions that need to be answered; therefore new studies based on the following can be conducted:

i. To determine the level of quality of malaria deaths data generated by IHDSS;
ii. Community perception towards VA interview;
iii. Challenges faced by IHDSS data collectors during collection process;
iv. The same study using observation method and focus group discussion;
v. Factors leading IHDSS not to supply DSS manual to data collectors;
vi. Use the same study but focussing on all sources of deaths data.
REFERENCES


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Ngailo, L. N. (2012). *Project planning and management, a logical framework approach. (2nd ed).* Moshi Tanzania: MUCOBS.


Appendix 1: The IHDSS Logic Model

**Project goal**
To collect health and demographic data that will provide reliable information to stakeholders in order to promote evidence base planning and priority sets.
Appendix 2: Questionnaire for field staff

Introduction
Greetings! Nice to meet you, my name is Mwajabu Hamis, HM&E master student from Mzumbe University. I am currently doing my evaluation research on quality collection of malaria deaths data in Ifakara Health Demographic Surveillance System (IHDSS) programme at Ifakara Health Institute). I am glad that you are part of the accomplishment to provide answers on my evaluation questions. This study is a requirement for completion of the field research on Msc. HME course and that can be fulfilled by the information that you will provide. The information you give will be confidential thus won’t be revealed except for this purpose only. I kindly ask you to participate in this conversation. I value your contributions towards success of the study and there is no right or wrong answers except the truth that comes from you. So, may I request you to participate in this design study and our interview might take about 15-20 minutes.

Part A. Demographic information
Kindly indicate an appropriate number in a box provided and give explanation when required.

1. Sex
   0= Female
   1= Male

2. Age of a person in years

3. Marital status
   0= Single
   1= Married
   2= Divorced
   3=Widow
   4=Others, specify; .................................................................

4. Place of residence

90
0 = Rural
1 = Urban

5. Educational level
0 = No formal education
1 = Primary education
2 = Secondary education
3 = College or University
4 = Others, specify;

6. Professional background
0 = Community development
1 = Information technology
2 = Environmental health
3 = Nurse
4 = Medical background
5 = Others, specify;

7. Work position in IHDSS programme
0 = Programme coordinator
1 = Field work supervisor
2 = Research officer
3 = Field worker
4 = Key informant
5 = Others, specify;
Part B. Experiences and trainings in collecting IHDSS Malaria deaths data

8. How many years or months of employment you have in IHI?
   0=1<year
   1=1year
   2=2>year

9. How many years or months of employment you have in IHDSS?
   0=1<year
   1=1year
   2=2>year

10. For how long have you worked in Ifakara Health Demographic Surveillance System (IHDSS) as data collector?
    0=6<months
    1=6>months

11. What field of experience did you possess before joining IHDSS?
    0=Teaching
    1=Data collection
    2=Data clerk
    3=Physician
    Others specify;
    .................................................................................................................................
    .................................................................................................................................

12. Have you ever received any on job training in IHDSS programme?
    0= No
    1= Yes

13. What subjects did you learn on those trainings? (Describe all);
    .................................................................................................................................
    .................................................................................................................................
14. Have you ever received any training in IHDSS programme in data collection process?
   0= No
   1= Yes

   If yes, answer the following questions:

15. How many trainings have you received to date?

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

16. What number of training do you receive per year? (Mention);

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

17. How often are trainings conducted?
   0=Before data collection
   1=During data collection
   2=After data collection
   3=All of the above
   4=Before and after data collection
   5=Others, specify;

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

18. What are you taught in those trainings? (Mention and Explain);
..................................................................................................................................................
..................................................................................................................................................

19. When was the last time for you to attend the training?
   0 = < 6 months
   1= > 6 months
20. What were the subjects of the last trainings did you receive? Mention:
..................................................................................................................................................
..................................................................................................................................................

21. Which topics or subjects were well understood by you from the trainer?
..................................................................................................................................................
..................................................................................................................................................

22. Which topic or subjects were not well understood by you from the trainer?
..................................................................................................................................................
..................................................................................................................................................

23. Were the trainings helpful to this job?
   0= No
   1= Yes
   If yes or no, explain;
..................................................................................................................................................
..................................................................................................................................................

24. Are these trainings helpful during data collection process?
   0= No
   1= Yes
   If yes or no, explain;
..................................................................................................................................................
..................................................................................................................................................

25. What are the benefits of these trainings as a data collector? Mention:
..................................................................................................................................................
..................................................................................................................................................

26. Are there challenges you face during these trainings?
   0= No
   1= Yes
If yes, explain;
........................................................................................................................................
........................................................................................................................................
27. Do you think that there should be improvements in these trainings?

0= No
1= Yes
If yes, mention;
........................................................................................................................................
........................................................................................................................................

28. Have you been supervised in your data collection activities?

0= No
1= Yes
If yes, comments on the quality of supervision you received, .........................
........................................................................................................................................

Thank you for your cooperation
Appendix 3: Documentary review protocol

Name of the department

Contact person

Part one: assessment of equipment, technology and data collection tools.

Types of equipments and technology available in IHDSS for data collection by 2015

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Required</th>
<th>Available</th>
<th>Work duration with item in years</th>
<th>Gap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor cars</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motorcycles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phones (PC tablets)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mobile phones (normal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer machine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar charger</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UPS machine/ Inverter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power stabilizer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generator for power</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Technology</th>
<th>Model required</th>
<th>Model available</th>
<th>Total available</th>
<th>function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Software system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data security system</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antivirus</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Appendix 4: Interview guide

Introduction
Greetings! Nice to meet you, my name is Mwajabu Hamis, HM&E master student from Mzumbe University. I am currently doing my evaluation research on quality collection of malaria deaths data in Ifakara Health Demographic Surveillance System (IHDSS) programme at Ifakara Health Institute. I am glad that you are part of the accomplishment to provide answers on my evaluation questions. This study is a requirement for completion of the field research on Msc. HME course and that can be fulfilled by the information that you will provide. The information you give will be confidential thus won’t be revealed except for this purpose only. I kindly ask you to participate in this conversation. I value your contributions towards success of the study and there is no right or wrong answers except the truth that comes from you. So, may I request you to participate in this design study and our interview might take about 25-35 minutes.

Part one: Demographic information
1. Sex of respondent.
2. Education level.
3. Professional background.

Part two: Standards and guidelines applied in collection of HDSS malaria deaths data
5. How do IHDSS collect deaths data?
   Probes
   • Death notification
   • Person involved
   • Procedures involved
6. How IHDSS confirm causes of death in the community?

**Probes**

- Clinical criteria
- Word of mouth from the community (Gossips)
- Care giver witness

7. What formal design of protocol guide used to diagnose and classify causes of deaths?

**Probes**

- Types of protocols
- Items involved in the protocol
- Individuals involved

8. How do you perceive guidelines and standards used in the IHDSS programme?

- Strengths and weaknesses

9. How do you ensure the quality process of data collection?

**Probes**

- Knowledge, skills and experience
- Rules and regulations
- Supervision and feedback

10. What are the rule governing collections of malaria deaths data in Ifakara Health Demographic Surveillance System (IHDSS)?

**Probes**

- Formulation
- Applicability
- Sustainability
11. What challenges you face that interfere collection of malaria deaths data?

**Probes**
- Human capacity
- Infrastructure and technology
- Community response

12. What is your suggestion to improve the process of malaria data collection process in Ifakara Health Demographic Surveillance System (IHDSS)?

**Probes**
- The top management.
- The data collectors.
- IHDSS programme

*Thank you for your constructive ideas.*
## Appendix 5: Work plan for the evaluation

<table>
<thead>
<tr>
<th>Activities</th>
<th>TIME FRAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction of proposal writing (evaluability assessment)</td>
<td>Oct 2013</td>
</tr>
<tr>
<td>Preliminary proposal preparation (Background and literature review)</td>
<td>Nov 2013</td>
</tr>
<tr>
<td>Preliminary writing of methodology and work plan</td>
<td>Dec 2013</td>
</tr>
<tr>
<td>Preliminary writing of data analysis plan</td>
<td>Jan 2014</td>
</tr>
<tr>
<td>Effective proposal writing</td>
<td>Feb 2014</td>
</tr>
<tr>
<td>Submission of the proposal</td>
<td>Mar 2014</td>
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<td>Permission letter for data collection</td>
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<td>Data collection process</td>
<td>May 2014</td>
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<td>Data analysis</td>
<td>Jun 2014</td>
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<td>Final report submission</td>
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<td>Presentation of the report</td>
<td>Aug 2014</td>
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<td>Report corrections and official submission</td>
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