# QUALITY OF THE HEALTH MANAGEMENT INFORMATION SYSTEM DATA: A CASE STUDY OF NUTRITIONAL STATUS SURVEILLANCE IN ARUSHA

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**MSc. (Applied Epidemiology) Dissertation**
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# QUALITY OF THE HEALTH MANAGEMENT INFORMATION SYSTEM DATA: A CASE STUDY OF NUTRITIONAL STATUS SURVEILLANCE IN ARUSHA,

**By**

**Happy Saneti Saiguran**

**A dissertation submitted in (partial) fulfillment of the Requirement for the degree of Master of Science (Applied Epidemiology) of Muhimbili University of Health and Allied Sciences**

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## CERTIFICATION

The undersigned certify that she has read and hereby recommend for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled **Quality of the Health Management Information System data: a case study of nutritional status surveillance in Arusha,** in (partial) fulfilment of the requirements for the MSc Applied Epidemiology Programme of Muhimbili University of Health and Allied Sciences.

…………………………………………………………………………………………

**Dr. Germana H Leyna**

Supervisor

Date……………………………………………………………

# DECLARATION AND COPYRIGHT

I, **Happy Saneti Saiguran** declare that this **dissertation** is my own original work and that it has not been presented and it will not be presented to any other University for the similar or any other degree award.

Signature………………………………… Date ……………………………..

## ACKNOWLEDGEMENTS

# DEDICATION

To my lovely daughter,

 Jocelyn Joel my beloved daughter who answered the God's call and passed away during this course.  She will always remain in my memory.

May God grant you internal life, Rest in peace Jocelyn!

## DEFINITION OF TERMS

*Data quality*: Is defined as fit for intended use in operations, decision-making and planning. There are a number of theoretical frameworks for understanding data quality. This study will use the WHO Data Quality Report Card framework to assess the quality of the HMIS data. The main elements of quality that will be assessed in this study are accuracy, completeness and timeliness.

*Accuracy*: Inaccurate reporting is harder to detect because inaccuracy comprises unintentional and intentional errors. However, in this study, data accuracy has been determined by comparing the data recorded in the report book with the data obtained from individual facility registers during data review. The report is defined as accurate if the values recorded in it are 95% or above similar to the corresponding aggregated values obtained from the registers during the data audit. The 95% threshold is based on that used in previous studies (1).

*Completeness*: Is defined as the proportion of missing values in the register book. Completeness in this study measures the extent to which facility reports include all reportable events. The report is considered as complete when 80% or more of the data expected are filled.

*Timeliness*: The report is considered to be timely if it is received at the District Medical Officer by the 5th day of the month, following the period covered in the report. The information was obtained at the district level by reviewing the dates the report was received.

## ABSTRACT

**Background: Background:** Complete, timely and accurate public health information is essential for monitoring health and for improving the delivery of health-care services. Studies of public Health Management Information Systems (HMIS) in resource-poor countries frequently document problems with data quality, such as incomplete records and untimely reporting. Yet these systems are often the only data sources available for the continuous, routine monitoring of health programmes in the districts.

Funding and support for public health activities, such as maternal and child health (MCH) services, depends on demonstrating coverage using routine data. Assessment of nutritional status is one of the services offered at MCH clinics where data is also routinely collected. The quality of nutrition surveillance data from MCH clinics under the health information system remains a challenge. This study, therefore, aimed at assessing the quality and factors associated with nutrition status surveillance data quality collected at health facilities under the HMIS.

**Methods**: A cross-sectional study design was conducted in 20 health facilities of Arusha City from October 2013 to February 2014. These health facilities were selected using a stratified random sampling technique from 67 health facilities of the council. Documentary review was conducted to obtain information on data quality. Observation checklist and interviews were used to collect data on determinants of data quality. Data were analyzed using Epi Info computer software. Descriptive statistics was done to summarize the characteristics of study participants and facilities. Regression analysis was performed to determine independent factors associated with quality of data and presented as AOR at 95% CI. A p-value < 0.05 is considered as statistically significant.

**Results:** A total of 99 respondents from 20 health facilities in Arusha City were interviewed. About 87.0% (86/99) of the participants were female. The mean age of respondents was 37 (SD 9.68) years. On average the level of data accuracy in the health facilities was 55.1% ranging from 8.1% to 97.0% and the average completeness rate was 67.5%. The health facilities submit reports to the district on average eleven (11, SD 4.3) days after the pre-set deadline (Range: 1 to 38 days). Facilities with motivated health workers had high odds of

having accurate AOR 7.0 (95%CI 3.7, 77.5) and complete data AOR 12.0 (95%CI 2.1, 69.8) compared to facilities with unmotivated workers. The availability of data collection tools increased the likelihood of having complete data (COR 2.3(3.19, 27.57)). The presence of HMIS focal person was significantly associated with data accuracy (COR 25.0(2.16, 73.37)) and completeness (COR 16.0(2.40, 61.74)). Knowledge on HMIS, perception of importance of good quality data and supportive supervision did not influence significantly data quality.

**Conclusion:** The quality of HMIS data for nutritional status is of modest quality and below the recommended level, that is 95% accurate, 80% complete and timely (reported before or on the pre-set deadline). Extra efforts are required to improve the quality of data for effective use in decision-making and planning in the district and facilities.

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## ABRIVIATIONS

AFENET – Africa Field Epidemiology Network

CDC – Centre for Disease Control and Prevention

DHIS – District Health Information System

DMO – District Medical Officer

HMIS – Health Management Information System

JODI – Joint Organization Data Initiative

MCH – Maternal and Child Health

MDG – Millenium Development Goals

MOHSW – Ministry of Health and Social Welfare

MTUHA – Mfumo wa Taarifa za Utoaji Huduma za Afya

MUHAS – Muhimbili University of Health and Allied Sciences

RCH – Reproductive and Child Health

RMO - Regional Medical Officer

TFELTP- Tanzania Field Epidemiology and Laboratory Training Program

WHO – World Health Organization

# INTRODUCTION

## 1.1: BACKGROUND

### 1.1.1: Health Management Information System

A health management information system (HMIS) is a process whereby health data are recorded, stored, retrieved and processed for decision-making. Decision-making broadly includes managerial aspects such as planning, organizing and control of health care facilities at the national, regional and district levels. Evidence-based decision making is critically important for the appropriate use of scarce resources particularly in resource limited countries like Tanzania (2,3). The aim of Health Management Information System is to provide up to date, relevant, adequate, timely, reliable and reasonably complete information to health managers at various level and sharing of technical and scientific information by health personnel in order to make well informed management decisions about programme performance and operations. The Health Management Information System has to provide information to support planning and control functions of the managers and help them in decision making (4).

The Health Management Information System (HMIS) is considered to be the single biggest routine data system under the Ministry of Health and Social Welfare (MoHSW). It is so because it collects its information from all health facilities in the country (5). Health Management Information system was introduced in Tanzania mainland in the late 1980's. The system was then developed in the early 1990s, piloted in 1993 and rolled out to all regions by 1997. The tool has been revised several times aiming to optimize the performance of health services at all levels of administration through the timely provision of necessary and sufficient information needed by the health managers to monitor, evaluate and plan their activities (6).  Since the system could not meet the objectives of programmes such as National AIDS Control Program, Reproductive and Child Health, National Malaria Control Program, these programs have developed their own tools for data collection.  The use of different data collection tools in the same health facilities causes double work and burden to health workers and eventually generation of poor quality data (7).

It is important for quality data on health sector performance to be available regularly, that is, monthly, quarterly and annually to support proper decision-making. Population-based

surveys are conducted only periodically, usually once every 3-5 years, and collect retrospective information. Thus, surveys are generally not a reliable reflection of the current demand of the health system. By contrast, health facility data are collected and aggregated on a continuing basis and have the potential to present a more up-to-date picture of disease portfolios in the health system (19).

 Good health information systems are crucial for addressing health challenges and improving health service delivery in any country. However, the quality of the data produced by such systems is often poor resulting in data not being used effectively for decision-making (8). Simba et al describe poor performance of the HMIS in Tanzania where the magnitude of incompleteness, inaccuracies and untimeliness in reporting data collected from Dar es Salaam health facilities was high (9). It is well recognised that no data are completely accurate. The real concern with data quality is not to ensure that the data are perfect, but that they are accurate enough, timely enough, and consistent enough for the organisation to make appropriate and reliable interventions (10).

The absence or incomplete availability of data affects proper allocation of resources. For decision makers to decide where to put more effort in tackling the health problems depends on the magnitude of that problem, which can be readily identified in collected data. So when there is no complete, accurate and timely data of a certain health problem which really exists in the community the decision-makers will not have evidence based information to support the health system on service provision (11).

### 1.1.2: Nutrition status surveillance

The World Health Organisation (WHO) has identified a number of health problems that need special attention and need to be under control. Childhood malnutrition is one of the health problems that were identified to be given high priority in terms of its management and control (12). The United Nations has also adopted the  Millennium Development Goals that seek to halve childhood malnutrition indicators by 2015 (13). However, malnutrition is still contributing significantly to the death and burden of disease of children in many parts of the world especially in Africa (14)

About 9 million children die annually before celebrating their fifth birth date. One-third of these deaths are attributed to malnutrition. In developing countries including in Tanzania,

malnutrition is estimated to be responsible for 35% of infant deaths and 55% of the burden of disease. It is one of the most serious public health problems affecting children in Tanzania. Approximately 63% of children are affected by one or more forms of malnutrition, including stunting, underweight and wasting (15). Maternal nutrition during the pre- and postnatal periods is extremely important for the outcome of pregnancy as well as infant feeding. Underweight status contributes to poor maternal health and birth outcomes. Maternal under-nutrition is often reflected in the proportion of children born with low birth weight (below2.5 kg). Representative data on the prevalence of malnutrition is not readily available (16).

In order to better understand the scope of the problem of malnutrition throughout the country and to measure progress in addressing it, the nutritional status of the population must be monitored on a regular basis (17). This requires the collection of quality nutritional data, and its analysis and management. The recommended way to assess malnutrition is to take body or anthropometric measures, that are, weight and height (18). Nutrition status of children less than five years and pregnant women has been part of Health Management Information System since it was established. However there is a questionable accuracy and reliability of these data that diminishes the knowledge of the real situation of nutrition status and therefore become difficult in proper allocation of resources.

It is understood that efforts to improve health care quality have been guided by reports of the health facilities and research from health institutions. Generation of good quality data is therefore important in these reports for better and proper health interventions. Assessment of Health facility data is a critical input in assessing national progress and performance on regular basis and they provide the basis for district performance assessment (19). Quality data, particularly with regard to timeliness and accuracy, are needed for administrative purposes such as allocation of human resource in different health facility departments and for planning services to ensure that they are cost-effective (20).

## 1.2: LITERATURE REVIEW

### 1.2.1: Global magnitude of quality of HMIS data

Despite the fact that quality data are critically needed in order to enable global assessment of progress on measures of coverage, impact, financing, and equity related to women and children's health, the data are not reliable for such assessment. Often the data available are inaccurate, untimely, and inconsistent and perhaps not complete for countries to be able to effectively manage their health systems and allocate resources according to need(21).

It has been estimated that up to 5% of data found in organisations are of poor quality and that the average perceived cost of poor data quality is as high as 10% of an organisation's revenues (22). In the healthcare sector, lack of quality data has far-reaching effects. Planning and delivery of services rely heavily on data from clinical, administrative and management sources. In developing countries decision are made basing on poor produce data (23). In Ethiopia for instance, 75% of the health facilities have data which are inaccurate and non-completely filled (24). Also completion of the reports is observed in 12% available district reports and only 39% reports are received on time at the district level. The same study revealed that 11% of facility reports have accuracy of below 70% (25).

In Uganda, about 33% of districts had the facility completeness rate below 80%. Also 18% of the districts had at least one missing data in their reports while 47% of the districts had percentage difference greater than 33% between the monthly reports and end of the years report (19) . Similar findings have been reported in Malawi where HMIS data in the health facilities is incomplete, in a number of ways; 1). Not all health facilities are sending complete reports to the district health office 2). Not all data elements are properly recorded; as such there are gaps in the registers. The same study documented that the reporting rate is low as more than 50% of health facilities do not send complete report to the next level (26).

### 1.2.2: HMIS data quality in Tanzania

There is limited information on data quality in Tanzania. The few studies that have been carried out report HMIS booklets are not completed in 25% - 55% of the facilities. Nyamtema A. reported that of all reviewed HMIS booklets only a single delivery register

from only one health facility is 100% complete. These booklets were not filled in as many as 55% of the health facilities. The types of information that was found not recorded in the booklets for postnatal services are child vaccination and/or weight (27).

Poor quality data in malaria surveillance which is under HMIS hinder the prompt and adequate action towards the reduction of malaria predisposing factors (28). Furthermore, case-reporting in HIV/AIDS is compromised by poor data quality, including under-reporting and discrepancies across different reporting channels and organisational levels (29,30). The study done in Kinondoni Municipality showed that, the average data completeness rate ranges from 32.1% to 64.2% in health facilities. The highest reporting rate of health information from the health facilities to district level is 43.3% (9).

### 1.2.3: Determinants of HMIS data quality

Ensuring data quality has been a concern of those dealing with the information systems. There are many factors that can impede data quality. Inadequate management structures for ensuring complete, timely and accurate reporting of data, inadequate supportive techniques, training and procedure guidelines for those involved in data collection are some of the major factors that can impede quality of data (26,31). The quality of HMIS data as well as quality of care depends on a number of factors such as the attitudes of health workers, necessary skills, and others organisational issues (32). In general factors influencing continuous quality improvement implementation can be grouped into components namely: Technological factors and Organizational factors and Individual factors.

**Individual determinants**

Negative attitude among clinicians and other health workers such as, data collection is a useless activity or a waste of care-provider time, are detrimental to data quality. The efficiency with which a job is carried out may depend in part upon the technical apparatus available to do the job, and the extent to which the job provides satisfaction (33,34). In Malawi, 33% of health workers are implementing the HMIS with enthusiasm while others show lack of interest and commitment. About 35% of health workers consider HMIS an extra workload as it asks them to fill the registers and perform analysis (26). An assessment of HMIS in same country found that health workers were motivated to use

HMIS by its ability to generate data that helps them identify issues and problems, its ability to show their performance and to make data available for decision making. De-motivating factors included the process being too involving since there were too many forms to fill in, lack of supervision and feedback, and lack of teamwork among health facility staff to share the task of filling in forms

## Organizational determinants

Low management support, lack of supervision and leadership in the health care system all contributed to the efficient delivery of health services (40). It is revealed in Addis Ababa that health facilities where supportive supervision is done regularly have a quality of data of 62.7% as compared to 43% in health facilities where supervision is not done (35). Pointing out a person responsible for data in the facilities has shown to be important in determining the quality of data. Presence of a focal person, responsible for day to day HMIS activities, had a positive influence on the quality of data in 67% of the health facilities (36)

## Technological determinants

It is revealed that inadequate knowledge on importance of quality data is a challenge affecting data collection, reporting and usage. In Addis Ababa 89.3% of the health workers reported availability of adequate material, knowledge of HMIS, and training as factors that affect quality of HMIS data and decision making (35). Quality of data in health facilities who receive training had higher average data quality score of 68.3% as compared with facilities who did not receive training (53.7%) though the association was not statistically significant. The introduction of computerized system in HMIS in developing countries has increased the quality of data as compared to paper-based system.

In Uganda, the study on evaluation of Computerized HMIS shown the major advantage is time saved by the system and timeliness of data reporting improved in 80% of the health facilities (37). Similar findings were obtained in Addis Ababa where the average quality of HMIS data is found to be 70.05% after the implementation of computerized HMIS which is an improvement from 64.2% before computerized system. However the major

challenges also remained to be the availability of computers and trained health workers to use the system (35).

The few studies done in Tanzania noted problems of poor data quality and its impact in evidence based decision making (9,27) and factors contributing to poor quality of data in health information system (36). Balthazar, 2004 and Mboera et al 2010, also reported quality of data on HIV/AIDS and malaria respectively. There are no studies done on either quality of data or factors contributing to quality of data in nutrition which is the important problem to given priority in prevention and control.

## 1.3: STATEMENT OF THE PROBLEM

The recommended quality of data in Health Management Information System is 95% accurate, 80% complete and reported before the pre-set deadline. Quality of data in HMIS in Tanzania is far from the recommended level. The completeness rate ranges from 32% to 64% and accuracy ranges from 34% to 94%. The highest health facility-reporting rate is 43.3%. The above reported levels are the general HMIS data performance. Non-inclusion of specific condition including malnutrition is a problem. Malnutrition is one of the major health problems in the country to be given priority of intervention. However, the quality of routinely collected data on malnutrition is not known. There are gross discrepancies in the estimates of malnutrition between routinely collected data on nutrition status and that of population-based surveys (0.4% vs. 22%, respectively). Although differences are expected due to different methodologies used, the magnitude of the difference has been of a questionable range. Hence, the need for a study to assess the quality of data generated in the HMIS at different health facility levels.

The quality of data produced depends on a number of factors such as attitudes and motivation of health workers, necessary skills, availability of required equipment and supplies and supportive supervision. The determinants of data quality that are important in nutrition status surveillance and specifically in Arusha are not known. This study therefore aims to assess the level of data quality and determinants of data quality in nutrition status surveillance in Arusha

## 1.4: CONCEPTUAL FRAMEWORK

**Technological determinants:**

1. Knowledge of health workers/ Trained health workers

2. Availability of data collection tools

**Individual determinants:**

1. Attitude of health workers

2. Health workers motivation

**Good quality of information (Complete, timely and accurate)**

**Organizational determinants:**

1. Supportive supervision

2. Availability of HMIS focal person
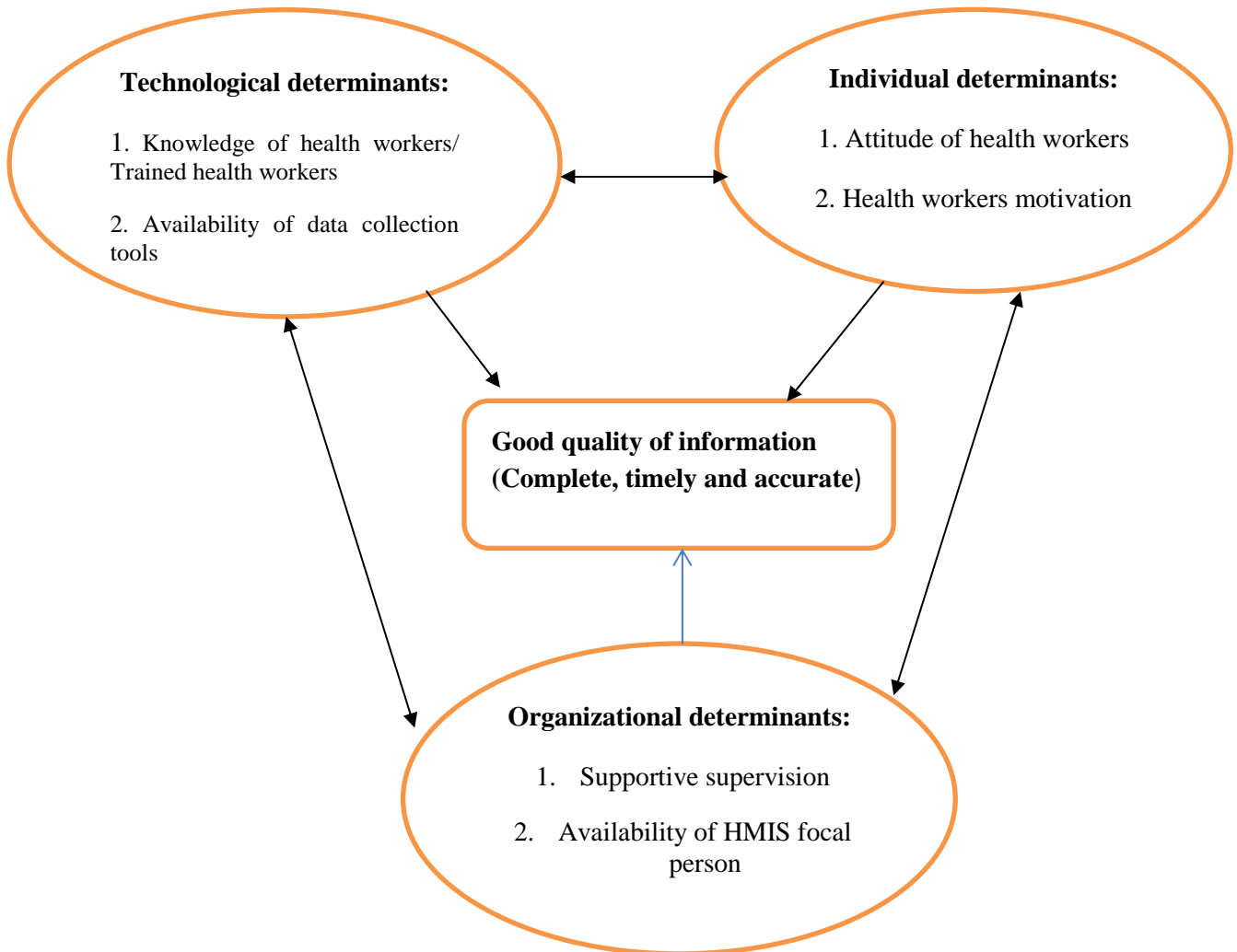
Figure 1: Conceptual framework

## 1.5: RATIONALE

Good public health decision-making is dependent on accurate and timely statistics and data. It was therefore important to do this study in order to assess the quality of data in nutrition status surveillance under HMIS and the determinants of data quality. The study generated knowledge on understanding the level of data quality and what determinants contribute to the quality of data in nutritional status surveillance. The findings of the study if will be considered will be used by Council Health Management Team (CHMT) for proper planning of interventions. The findings will also be useful in stimulating the Ministry of Health and Social Welfare to develop techniques to address data quality issues

in the health system. The recommendations that have been given if considered are going to benefit the public at large as improvement in the surveillance system finally lead to improved health status of the population. The data can also be utilised as baseline data in future related researches.

**1.6: RESEARCH QUESTIONS**

In order to achieve the purpose of the research, the following guiding questions were developed.

**General question**

What is the level of quality of nutritional status data in the health facilities?

**Sub-questions**

1. What is the level of completeness of nutritional status data in the health facilities?
2. To what extent are the nutritional status surveillance data accurate?
3. How timely are nutritional status surveillance reports submitted to the district level?
4. What are the determinants of nutritional status data quality?

**1.7: OBJECTIVES OF THE STUDY**

**1.6.1: Broad objective**

    To assess the quality of nutritional status data and its determinants in the HMIS tool in Arusha City

**1.6.2: Specific objectives**

1. To assess the quality (accuracy, completeness and timeliness) of nutritional status data collected at different health facility level under the HMIS tool in Arusha city
2. To identify determinants (technological, organizational and individual) of quality of nutritional status data in the HMIS tool in Arusha city

## METHODOLOGY

This chapter is about the methods that have been used for collecting information in the field. This chapter is mainly explaining how this study has been conducted, the methods that have been applied and techniques in data collection according to the objectives of the study.

### 2.1: Study Area

This study was carried out in health facilities of Arusha City. Arusha City is the head quarter of Arusha Region located in Northern Tanzania. According TDHS 2010, Arusha Region has 28.2% of children who are under weight. Arusha City is served by 67 health facilities (5 hospital, 13 health centres and 49 dispensaries). The government owns 5 dispensaries and 6 health centres. There is one government hospital that also serves as the regional hospital. Health information has been collected through the HMIS in all health facilities regardless of ownership. However, not all health facilities in the district provide maternal and child services. These services are provided in at least 36 health facilities including all 5 hospitals, 5 government health centres and dispensaries and in some of the private facilities. The government hospital gives maternal and child services to clients with health complications (referrals).  In 2012 the reports from the health facilities show the prevalence of malnutrition to be 1%

### 2.2: Study Design

A descriptive, cross-sectional study was undertaken to determine data quality and factors influencing data quality. A descriptive study is an investigation aimed at ascertaining the status of a set of variables, such as the number and variety of persons with specific conditions in a specified population. A descriptive study is useful in health service evaluation and can be used periodically to determine whether a particular service is improving. This study employed descriptive design in order to evaluate the quality of data under HMIS by health facility level.

### 2.3: Study Population

The study population included Health workers from the ANC and child clinics who provided information on factors contributing to quality of nutritional status data.  Registers from both ANC and child health monitoring were reviewed. These have been used to obtain information on accuracy and completeness of data.

**2.4: Sampling Technique**

Arusha region is conveniently selected because of the concern raised by the Regional Medical Doctor (personal communications). Arusha City council was randomly selected from the 7 councils of Arusha region. A stratified random sampling technique has been used to obtain 3 hospitals, 5 health centres and 12 dispensaries from the 67 health facilities of the City council. This total of 20 health facilities fulfils WHO recommendation to cover at least 30% of the health facilities in the area when assessing quality of care (38). At each health facility, Maternal and Child health register books have been checked for data completeness and accuracy. Thirty per cent of the past three years registers have been randomly selected for review.

All health workers providing RCH support in their health facilities were eligible for inclusion in the study. It was assumed that at least 15 health providers work under RCH units in hospitals, 10 in health centres and 2 in dispensaries. Thus, a total of 119 ((15*3) + (10*5) + (2*12)) were expected to participate; only 99 (83.2%) health workers have been surveyed for the study.

**2.4.1: Inclusion criteria**
- Health facilities that provide maternal and child health services were included in the study.
- All health workers in the selected facilities who provide RCH services

**2.4.2: Exclusion criteria**
- Any health facility that did not have any record for the past 3 years was excluded in the study.
- A health worker who could not be located after 2 consecutive attempts

**2.5: Data collection techniques**

The study used both qualitative and quantitative methodologies in order to have broader information on the concept. Interviews, observations recorded in a checklist and document review were done accordingly.

**2.6: Data collection instruments**

**2.6.1: Interview**

In this study, interviews with health workers in the health facilities on the factors contributing to quality data were conducted. The use of interview schedule was used as a guide in seeking information. It had structured questions that revealed some things that the unstructured approach could miss. The interview schedule captured data relating to background of respondents, health workers motivation, perceptions on data quality and other factors contributing to data quality.

**2.6.2: Observation checklist**

The observation checklist was used to guide the observer to obtain information on the quality of data and availability of equipment. The checklist was also used during review of HMIS registers and reports in order to record and tally completeness and discrepancies noted during the review. Checklist was mainly aiming to see if the basic characteristics of data quality are met. Review of maternal and child health registers were done to check for missing data. Health facilities monthly registers was summed by the research team and compared with figures in the report book. This provides the information of accuracy. The proportion of filled cells in the register was calculated in the four randomly selected months of each of the three years. This provides the information of completeness. The dates of submission of the specific reports from the respective health facilities were reviewed at the district level in order to obtain the information of timeliness.

**2.7: Ethical Considerations**

The study obtained ethical clearance from MUHAS high degree ethical committee of research and publication. The researcher sought for permission to do the study from regional and district authority. Consent for health workers' participation was sought from them and confidentiality on their information was maintained.

**2.8: Training and Pre-testing of research instruments**

A pre-test survey has been conducted at Levolosi Health centre. The pre-test has been done to expose the data collectors to the data collection instruments, and to check for the validity and reliability of the research instruments. It also helped to determine whether the format is

appropriate including sequencing and wording of questions. Modifications of the instruments were done according to findings from the pre-test survey.

## 2.9: Data analysis

The information that was obtained from the study was analysed using Epi Info computer software. Descriptive statistics were done to summarize the characteristics of study participants and facilities. Mean of quality of data, frequencies, and contingency tables have been produced.

Data completeness was defined as the extent to which the observed records were filled in. Four months in each of the three years were randomly selected for checking data completeness.

This was measured by determining the proportion of cells that were filled in the register among the selected. The total number of cells filled in was counted against the expected total number of cells to be filled in. Mathematically calculated as follows;

Completeness of data = (A * 100)/B

Where,          A = Number of cells filled in

B = Total number of cells in the expected to be filled in a register for a specific month

Data accuracy was defined as the extent of variation between actual (sum in monthly registers) and recorded (quarterly reports). The registers that were used to produce the respective quarterly reports were used in the study. If a quarter had a missing register, the available registers for that quarter were excluded. Accuracy was measured by calculating the difference between summation done by health workers as found in the data book and a re-calculated value from the registers done by the research team.

Calculation of accuracy was done using the following formula:

Accuracy = ((B − A) / B) * 100

Where,          A = Re-calculated value from the registers done by research team.

B = Total number (for the respective data item) as found in the report book (HMIS - Book 2)

Timeliness: Time of submission of the report was obtained from the District Medical Officer records indicating the date the report was received. The report was considered to be timely if it was received on or before the 5th day of the month, following the period covered in the report.

Logistic regression models have been built to determine independent factors associated with data accuracy and data completeness. This was performed using health facility level and health workers level. Independent variables from health facilities level were used to fit the tables and health workers responses were used to fit the regression model. Their OR at 95% CI is presented. A p-value of less than 0.05 has been considered as statistically significant. The factors with the p-value of $\leq 0.2$ in the bivariate analysis were subjected to multivariable logistic regression in order to control for potential confounding factors. Health workers who were motivated by either training, availability of working tools or appreciation were defined as motivated. In terms of cadres nurse officers and nurse mid-wives were grouped, as nurses while clinician and other cadres were grouped as others. The age of health workers and working experience were dichotomized by their mean. Data quality was defined as a facility that had any two of the following; accuracy of 95% or above; completeness of 80% or above or submitted the report on time.

## RESULTS

### 3.1: Demographic characteristics

A total of 99 respondents (83.2% response rate) from 20 health facilities in Arusha City were interviewed. All of the respondents were involved in RCH activities. About 86.9% (86/99) were female. The respondents' age ranged from 23 to 62 years with the mean of 37 (SD 9.7) years. On average, the respondents had 12.2 (SD 9.9) years of experience in the health sector.

**Table 1:** Demographic characteristics of study respondents

| Characteristics of respondents | Frequency (n =99) | Percent |
|---|---|---|
| **Sex** | | |
| Female | 86 | 86.9% |
| Male | 13 | 13.1% |
| | | |
| **Age group** | | |
| 21-30 | 29 | 29.9% |
| 31-40 | 35 | 36.1% |
| 41-50 | 21 | 21.6% |
| 51+years | 11 | 12.3% |
| | | |
| **Cadre** | | |
| Clinical officer | 16 | 16.2% |
| Nurse midwife | 43 | 43.4% |
| Nursing Officer | 22 | 22.2% |
| Others | 18 | 18.2% |
| **Years of service** | | |
| <5 | 25 | 25.0% |
| 5- 8 | 21 | 21.4% |
| 9-12 | 17 | 17.3% |
| 13 + years | 35 | 35.5% |
| Level of health facility | **Frequency (n = 20)** | |
| Hospital | **3** | 60.0% |
| Health centre | **5** | 25.0% |
| Dispensary | **12** | 15.0% |
| Health Facility ownership | | |
| Government | 3 | 15.0% |
| Private | 9 | 45.0% |

| | | |
|---|---|---|
| Faith Based Organization | 7 | 35.0% |
| Parastatal | 1 | 5.0% |

## 3.2: Quality of data

The criterion of data quality was met by 3 health facilities. These facilities have accurate and complete data.

### 3.2.1: Accuracy

On average the level of data accuracy in the health facilities was 57.9% ranging from 8.1% to 97.0% with differences from one year to another. There was a gradual increase in accuracy from 2011 to 2013 in both public and private owned health facilities (Figure 2).
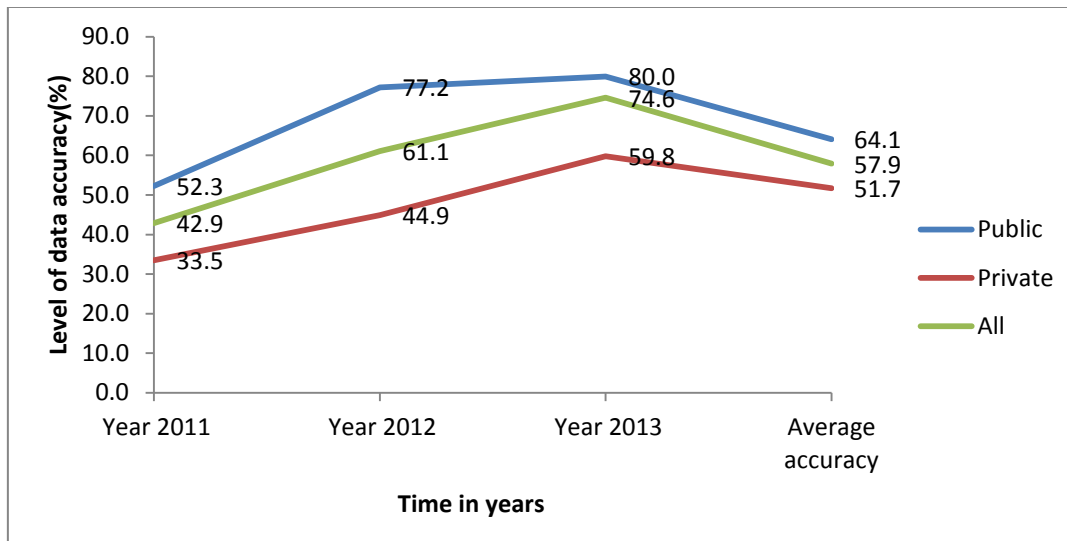


**Figure 2:** Health facilities data accuracy over time

Table 2 below shows the number of children weighed and under- weight as reported in the registry and quarterly reports in the health facilities. The registers were considered as the gold standard in the study. All registers that were used to produce the respective quarterly reports were used to obtain the number of children recorded weighed. Children under-weight were over-reported in two years but under reported in one year in the surveyed facilities.

**Table 2:** Number of children recorded weighed and the proportion of under-weight as in the registers and report books.

| | Registers | | Report book | | |
|---|---|---|---|---|---|
| Year | No. of children recorded weighed | % of children under-weight | No. of children recorded weighed | % of children reported underweight | Direction of reporting bias |
| 2011 | 18298 | 1.1 | 21636 | 8.0 | Over reported |
| 2012 | 26545 | 1.4 | 25865 | 3.2 | Over reported |
| 2013 | 16896 | 1.0 | 16130 | 0.9 | Under reported |
| **Total** | **61739** | **1.2** | **63631** | **4.2** | Over reported |

### 3.2.2: Completeness

The study found that the average completeness rate was 67.5%. The completeness rate was found to be lower in 2013 compared to the previous two years. None of the dispensary had a completeness rate of 80% or above (Figure 3).
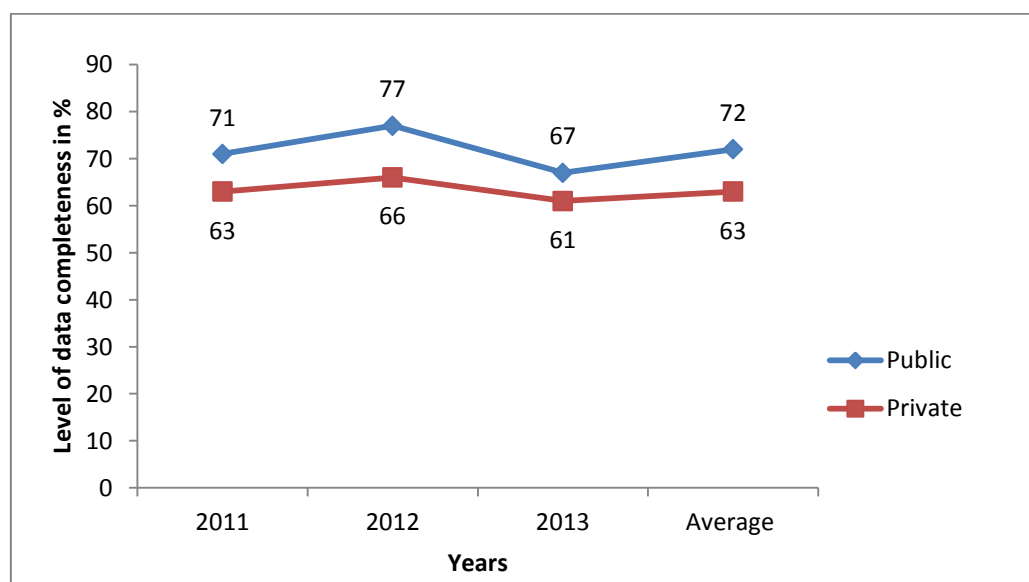


**Figure 3:** Health facilities data completeness over time

**3.2.3: Timeliness**

The HMIS reference manual clearly states the procedures for preparing reports and deadlines for submitting reports from facility to district level. From the responses obtained in all facilities, the deadlines that have been set for submitting quarterly reports to the district level are clearly known. On average the health facilities submit reports to the district eleven (11; SD 4.3) days after the set deadline (Range: 1 to 38 days). The graph below shows the number of health facilities reporting on time increase over time in 20 but there is decrease in quarter 4 (Figure 4)
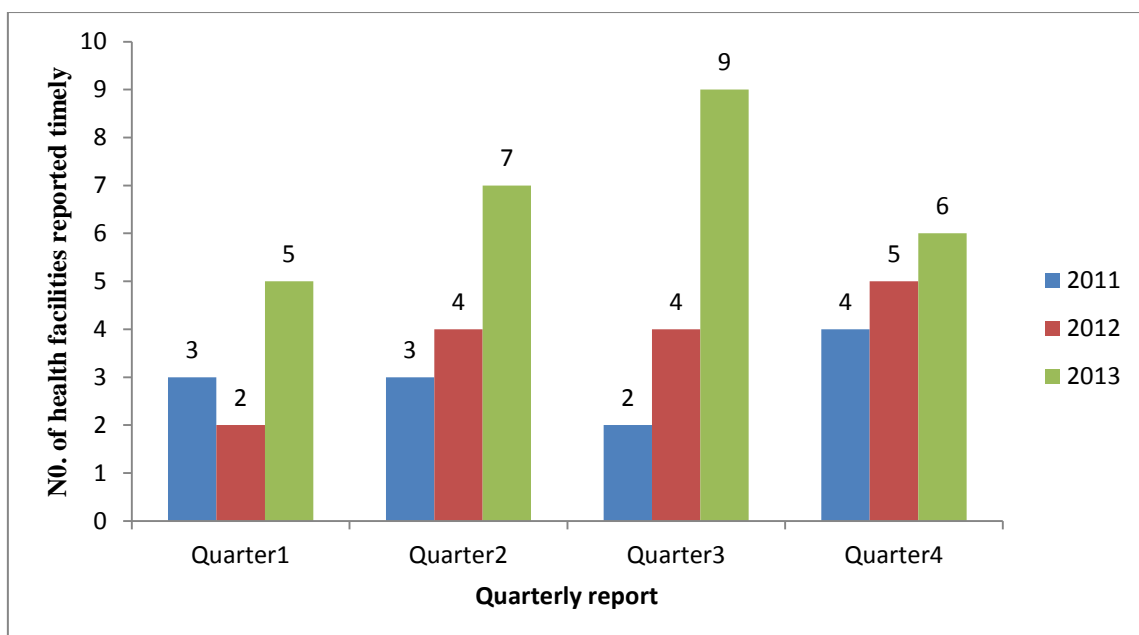


**Figure 4:** Health facilities reporting quarterly reports on time in Arusha City Council

**3.3: Reflection on the structural quality of the system**

**3.3.1: Technological Factors**

It was found that 53% of the respondents in the survey participated in an initial HMIS training and although more than half of the respondents attended training for the revised HMIS training, only 44% reported to know the system. The remaining respondents, 29% indicated that a co- worker had briefed them about HMIS or were taught at their respective colleges (6%). Eleven percent (11%) of the respondents said they knew the system through their own initiative.

### 3.3.2: Organizational factors

### 3.3.2.1: Availability of HMIS focal person

About 25% (5/15) of the health facilities reported having a focal person for HMIS activities. These persons were responsible for ensuring registers were properly filled, data was accurately collected and aggregated from various sections and to prepare quarterly reports. It was observed that health facilities have weigh scales, child health monitoring and ANC cards and registers during the time of the study. However, only three facilities had length board which were actually not utilized.

### 3.3.2.2: Supportive supervision

Although all health facilities receive supportive supervision, about 91% (90/99) of the health workers in the visited facilities reported receiving at least one supervisory visit in the last three months. Of these, 91% reported that they were allowed to ask questions regarding HMIS during the visit. About 78.8% (78/99) of the respondents reported that there is a checklist that should be used during supervision and 82.9% reported it actually being used. CHMT was the main body conducting supervisory visit (82%; 83/99).

### 3.3.2.3: Availability of data collection tools

About eighteen percent (26/99) of the health workers reported shortage of registers, in the year 2012. Of those, half (13/26) had stock out for at least one to three months while 19.3% (5/26) had stock out for four to six months and 30.8% were seven to nine months. Using the observation checklist, there were eight out of twenty health facilities that that had shortage of registers.

### 3.3.3: Individual factors

### 3.3.3.1: Health workers perception

About 89% of health workers interviewed agreed that good quality data is important for planning health services delivery and that the reports from their health facilities are of good quality (completely filled and submitted timely to the required level). Over 76% (76/99) reported that they prepare accurate reports, 75% said the reports they prepare are complete and 69.4% submit the reports on time.

### 3.3.3.2: Health workers motivation

About 75 % of the respondents fill the registers because it is their responsibility. A modest proportion (34%) were motivated by the availability of working tools while 30% filled the forms because they are trained and only 5% received appreciation of the work they do from the high authority.

### 3.4: Results of advanced analysis

### 3.4.1: Accuracy

Below are the results of the analysis assessing of factors associated with data accuracy in health facilities and as health workers responses (Table 3 and 4). Table 3 shows the analysis of the health facilities and table 4 shows the analysis for health workers response. Variables from the health facilities could not be subjected in the regression model due to the small sample size.

**Table 3:** Table showing factors influencing data accuracy in the HMIS in Arusha City Council

| Variable | n=20 | % of facilities with accurate data | COR, 95%CI | P-value |
|---|---|---|---|---|
| **Health Facility level** | | | | |
| Hospital and health centre | 8 | 37.5 | 6.6(0.54,80.00) | 0.15 |
| Dispensary | 12 | 6.3 | | |
| **Facility owner** | | | | |
| Government | 3 | 33.3 | 2.0(0.16,34.80) | 0.5 |
| Private | 17 | 17.6 | | |
| **HMIS focal person available** | | | | |
| Yes | 5 | 60.0 | **25.0(2.16,73.37)** | |
| No | 15 | 6.3 | | **0.01** |
| **Registers available** | | | | |
| Yes | 15 | 25.0 | 2.3(0.20,27.57 | 0.46 |
| No | 8 | 12.5 | | |
| **Supportive supervision done** | | | | |
| Yes | 20 | 20 | | |
| No | 0 | | | |

The analysis shows that, presence of HMIS focal person in the health facility has an association with accuracy of data. A health facility with HMIS focal person is 25 times more likely to have accurate data than facilities with no HMIS focal person (Table 3).

**Table 4:** Logistic regression model showing factors influencing data accuracy in the HMIS in Arusha City Council

| Variable | n= 99 | % HCW report HF with Accurate data | COR, 95%CI | AOR* (95% CI) | P-value |
|---|---|---|---|---|---|
| **Sex** | | | | | |
| Female | 86 | 32.6 | **1.6 (0.41,6.31)** | 1.3 (0.16,10.75) | 0.8 |
| Male | 13 | 23.1 | | | |
| Age | | | | | |
| 37+years | 48 | 35.4 | 1.4 (0.6, 3.4) | NA | |
| <37 years | 51 | 27.5 | | | |
| **Cadre** | | | | | |
| Nurse midwife officers | 65 | 35.4 | 1.8 (0.7,4.68) | 3.7 (0.69,19.85) | 0.12 |
| Other cadres | 34 | 23.5 | | | |
| **Experience** | | | | | |
| 12+ years | 41 | 41.5 | 2.2 (0.94,5.3) | NA | |
| < 12years | 58 | 24.1 | | | |
| **Motivation** | | | | | |
| Yes | 34 | 70.6 | **9.9 (6.78,38.36)** | **7.0 (3.7,77.5)** | **0.0002** |
| No | 65 | 10.8 | | | |
| **Knowledge** | | | | | |
| Yes | 44 | 22.7 | 1.01(0.19,1.16) | NA | |
| No | 55 | 38.0 | | | |
| **Trained health worker** | | | | | |
| Yes | 51 | 29.4 | 0.9 (0.36,1.95) | NA | |
| No | 48 | 33.3 | | | |
| **Health workers perception** | | | | | |
| Good | 91 | 33.0 | 3.4 (0.4,29.3) | NA | |
| Poor | 8 | 12.5 | | | |

* Adjusted for Sex, cadre and age; NA – Not applicable

The analysis has revealed that knowledge of health workers on HMIS, availability of data collection tools, supportive supervision, perception of health workers on importance of good quality data have no significant influence on data accuracy. Knowledge of health workers on HMIS does not influence data accuracy. The analyses show that the facilities having motivated staff are more likely to have accurate data compared to facilities whose workers fill the registers because it the job (AOR 7.0; 95%CI: 3.7, 77.5) (Table 4).

**3.4.2: Completeness**
Below are the results of analysis assessing factors influencing data completeness obtained in the study, table 5 and 6. Table 5 shows the analysis of the health facilities and table 6 shows the analysis for health workers response.

**Table 5:** Factors influencing data completeness in the HMIS in Arusha City Council

| Variable | n=20 | % of facilities with complete data | COR, 95%CI | P-value |
|---|---|---|---|---|
| **Health Facility level** | | | | |
| Hospital and health centre | 8 | 62.5 | | 0.01 |
| Dispensary | 12 | 0.0 | | |
| **Facility owner** | | | | |
| Government | 3 | 33.3 | 2.3(0.16, 34) | 0.51 |
| Private | 17 | 23.5 | | |
| **HMIS focal person available** | | | | |
| Yes | 5 | 80.0 | **16.0(2.40,61.74)** | |
| No | 15 | 6.7 | | **0.01** |
| **Registers available** | | | | |
| Yes | 12 | 30.8 | **2.3(3.19,27.57)** | **0.04** |
| No | 8 | 14.3 | | |
| **Supportive supervision done** | | | | |
| Yes | 20 | 25 | | |
| No | 0 | 0 | | |

Availability of data collection tools is significantly associated with data completion rate that health facilities with registers are 2.3 times more likely to have high data completion

rate compared those reported the stock out. Like in data accuracy, data completeness is also significantly influenced by the presence of HMIS focal person in the health facilities.

**Table 6:** Logistic regression model showing factors influencing data completeness in the HMIS in Arusha City

| Variable | n= 99 | % HCW report HF with complete data | COR, 95%CI | AOR* (95% CI) | P-value |
|---|---|---|---|---|---|
| **Sex** | | | | | |
| Female | 86 | 36.0 | 0.9 (0.3,3.0) | NA | |
| Male | 13 | 38.5 | | | |
| Age | | | | | |
| 37+years | 48 | 39.6 | 1.3 ( 0.6, 2.9) | NA | |
| <37 years | 51 | 33.3 | | | |
| **Cadre** | | | | | |
| Nurses | 65 | 38.5 | 1.3 (0.5,3.1) | NA | |
| Not nurses | 34 | 32.4 | | | |
| **Experience** | | | | | |
| 12+years | 41 | 46.3 | 2.1 (0.9, 4.8) | 1.2 (0.2, 8.0) | 0.9 |
| <12years | 58 | 29.3 | | | |
| **Motivation** | | | | | |
| Yes | 34 | 66.7 | **10.6 (4.0, 27.9)** | **12.0 (2.1, 69.8)** | **0.01** |
| No | 65 | 18.5 | | | |
| **Knowledge** | | | | | |
| Yes | 55 | 41.8 | 1.7 (0.73, 3.97) | 3.9 (0.8,19.4) | 0.06 |
| No | 44 | 29.5 | | | |
| **Trained health worker** | | | | | |
| Yes | 51 | 35.3 | 1.0 (0.4,2.0) | NA | |
| No | 48 | 37.5 | | | |
| **Health workers perception** | | | | | |
| Good | 91 | 37.4 | 1.8 (0.3,9.4) | NA | |
| Poor | 8 | 25.0 | | | |

The odd of having complete data is 12 times higher in health facilities where health workers reported to be motivated compared to those with health workers who reported to be unmotivated (OR = 12.0; 95%CI: 2.1-69.8; p = 0.01). Health workers perception,

receiving supportive supervision and knowledge on HMIS were found to not have influence on data completeness in the health facilities (Table 6).

### 3.4.3: Timeliness

In each of the three years, 80 reports were assessed for timeliness, that are, quarterly reports of the 20 health facilities. About 15% (12/80) of the health facilities reports were submitted on time in 2011, 17.5% in 2012 and 33.75% in 2013(Figure 4). The facility that report on time in one quarter is hardly the one which report timely in the subsequent quarters hence it was not possible to run analysis to identify the determinants of timeliness

## DISCUSSION

**Summary of findings**

The objective of this study was to assess the quality (accuracy, completeness and timeliness) of HMIS data. It also aimed at assessing the technical, organisational and individual factors that influence the quality of HMIS data. The study revealed the quality of HMIS data in health facilities in Arusha Council (data accuracy - 57.9%; completeness - 67.5%; and timely reporting ranged from 0% to 75% with average delay of 11days). Data accuracy was associated with motivation of health workers and presence of HMIS focal person in the facility. Data completeness was influenced by availability of data collection tools, motivated health workers and presences of HMIS focal person.

**Main discussion**

Health facility data are an important input into assessing national progress and performance and they provide the basis for district performance assessment. However data collected in Tanzania and other developing countries are reported to be of poor quality (they are incomplete, inaccurate and not delivered on time). Poor quality data (inaccurate, incomplete and late reported) can lead to incorrect analysis and inappropriate decisions. It can bias measurement of performance and can mislead important health care decision-making (9,32). This study found that only three health facilities out of twenty had data that met at least two elements of quality of data. Similar findings were found in other studies that health management data are of poor quality (28–30).

Accurate public health information is essential for monitoring health and for evaluating and improving the delivery of health-care services and programmes. As countries report their progress towards achieving the Millennium Development Goals, the need for high-quality data has never been greater (7). We observed that accuracy of data in the health facilities are lower than the recommended level which is 95%. On average just over fifty percent (57.9%) of the audited register-quarterly report pairs were accurate. Data accuracy level differs from one country to another, for example in South Africa - 65% while in Kenya - 30% of health facility data is accurate. The level of accuracy found in this study is different from what has been reported in India (95%) (40). This difference may have been contributed by the use of different methods of data collection in the health facilities (India

uses computerized systems while Tanzania uses paper-based system). It is assumed that the computerized system is simpler with minimum increase in workload leading to better compliance to reporting. There was a gradual increase of data accuracy over time in this study, which may be due to re-structuring of the HMIS in the country where district HMIS focal persons validate the report before entering it into the district health information system (DHIS).

Motivation of health workers and presence of a HMIS focal person in the health facilities were found to be significant contributors to better quality of the data. Health facilities with motivated health workers were 7 (AOR = 7.0; 95%CI: 3.7, 77.5) times more likely to be in health facilities categorized as having accurate reports compared to health facilities with unmotivated health workers. Recognizing hard work or appreciation for good work during supportive supervision improves performance of the health workers by giving more attention toward improving the quality of data. Health workers can also be motivated by good working environment in the form of availability of working tools or availability of refresher trainings as mentioned by the respondents. Similar findings have been reported from other countries (26,41–43). The odds of having accurate data was 25 (OR = 25.0; 95%CI: 2.16, 73.37) times more probable in health facilities with HMIS focal person compared to the facilities with no focal person. The focal person facilitates, validates and provides guidance in the process of data collection, compilation, report writing and submission to the required level. Similar findings have been found in other studies conducted in Tanzania and in other countries (26,36).

Incomplete data raises doubts on the reliability of data and its utilisation in the management of health services. Secondly, incompleteness of data may result in late report compilation and submission to the next level thereby rendering the data not to be used by the different users (26). The findings of this study show that completeness of data is below the recommended level (80%) and the levels have been decreasing from 2012 to 2013. This may have been attributed to the introduction of revised HMIS tools in July 2012. The revised child health register requires the health worker to fill in various health variables including, among others age, height and weight of a child. Height of the children is not usually recorded in health facilities because of lack of length boards for taking such measurement. The three health facilities included in this study did not record height in

spite of having length boards. Studies done elsewhere have shown a mixed picture with data completeness being above the recommended level in some countries while quite low in others. Examples of data completeness from a few African countries confirms this mixed picture, where in Ethiopia it ranges from 83% to 96%, in Kenya it is 19% and in South Africa it is 64% (7,24). Differences in these findings may be due to health system structures of the specific countries and the cut-off points used to define complete and incomplete data.

Data collection tools, motivated health workers and presence of HMIS focal person in the facility were found to influence completeness of data in our study. Knowledge of health workers and their perception of the importance of good data quality in service delivery were also associated with data completeness although, this had marginal significance. These findings are contrary to other studies conducted by Kinabo et al. in Ethiopia where they reported that data collection tools were not a problem to 95% of the health facilities (27,35).

Similar to the arguments for data accuracy, HMIS focal persons facilitate better attention to filling of registers and quarterly reports leading to better data completion. In Ethiopia, 75% of health facilities have HMIS focal person and data completeness ranges from 83% to 96% (24).Simba et al. in Tanzania reported that facilities that have HMIS focal person had a completeness rate of 69.9% compared to those without 44.7% (36). Motivated health workers are more likely to pay attention to detail to ensure that HMIS provides complete data for use in decision-making. We observed health facilities with health workers who reported they were motivated were more likely to have complete reports compared to those where the health workers reported otherwise (AOR = 12; 95%CI 2.1, 69.8). Refresher training and availability of data collection tools on site were mentioned as among the motivating factors. Similar finding have been reported in other studies conducted in other countries (26,44).

Timely decision-making is dependent on receiving information on time. In this study health facilities submitted reports to the district on average eleven days after the set deadline. None of the sampled health facilities had submitted a quarterly report on time in the sampled time periods. In Ethiopia proportion of reports that were timely submitted to

higher level ranged from 67% to 100%, while in Uganda 80% of the reports were submitted on time (24,45). This difference may be due to the small sample size of this study and the use of technology for data management in other countries. Also, incomplete and inaccuracy of data may have lead to health facilities delaying submission in an attempt to rectify the shortcomings of their reports.

Our findings may be fraught with some limitations that may affect the interpretation of our results. Desirability bias from health workers who may have felt uncomfortable to reveal the truth given their knowledge of the procedures in implementation of the HMIS may have under estimated our findings. Good rapport was established with the respondents during the face-to-face interviews to minimize this bias. In addition, the use of different methods used to collect the same information gives validity our observations. The quality of nutritional status data as an indicator of HMIS, may not be representative of other HMIS data.

Hence, generalization of these findings to other disease/conditions reported in HMIS should be done with caution. Validity of secondary data information on documents may have errors and may not be the true reading that the client actually had. However, we concentrated on aggregation of data between two summary measures (registers and quarterly reports), hence we do not anticipate individual errors to have much influence on our findings. The registers information was used as the 'gold standard' and was assumed to be correct. Inference to causality is limited; because it is a cross section study design, it is difficult to establish a causal relationship between the determinants of and quality of data.

# CONCLUSION AND RECOMMENDATION

## 5.1: Conclusion

This study has described quality of HMIS data using nutritional status surveillance data as a case study in select health facilities in Arusha City Council, Tanzania. We observed that the quality of nutritional status data assessed through HMIS is below the recommended level of 95% accurate, 80% complete and timely submitted to higher levels.. The level of quality was on average 57.9% accurate, 67.5% complete and submitted 11 days after the set date. Health workers motivation, availability of resources and presence of focal person in the health facility positively influenced HMIS data accuracy and completeness.

## 5.2: Recommendations

Extra efforts are required to ensure the quality of data is of reasonable level in the district and health facilities. To improve data quality on routine health indicators requires innovative interventions that motivate the health workers to improve performance in service delivery and generate required information. The study recommends that:

**For policy maker**

1. Put more emphasis on incentive schemes that encourages health workers and facilities to generate good quality data.

2. The Ministry of Health and Social Welfare has a role to play in ensuring data quality. It should therefore empower the district health and facility management teams by equipping them with the adequate data collection tools, simple standard operating procedures, and provide more logistical support in the form of focal persons and regular trainings. In the long run, the Ministry should plan for adding to the guidelines for establishment of a health facility the element of having HMIS focal person at the facility level. The Ministry should also include proposed HMIS interventions in the districts and Ministry's implementations plans and sufficiently fund such activities.

**For health managers**

3. The district authority should introduce and strengthen innovative ways of providing supportive supervision to health facilities that give attention on checking quality of data and provide solution onsite. Development of a simple supervision guide, regular performance feedback and on-site trainings as part of supervision may

improve the quality of data. It is the responsibility of the district and facility management teams to take a leading role to ensure that all reports produced are of good quality data that is fit for use.

**For researchers**

4. More large-scale representative studies should be done in order to get a national estimate and better information on other specific conditions.

## REFERENCES

1.    Makombe, Simon D, Hochgesang, Mindy, Jahn, Andreas, Tweya H. Assessing the quality of data aggregated by antiretroviral treatment clinics in Malawi. Bulletin of the World Health Organization , 2008. 2008;86 (4):310–4.

2.    Evans T, Stansfield S. Health information in the new millennium: a gathering storm? Bulletin of the World Health Organization [Internet]. 2003 Jan;81(12):856. Available from: http://www.pubmedcentral.nih.gov/article

3.    Abouzahr C, Boerma T. Policy and Practice Health information systems : the foundations of public health. Bulletin of the World Health Organization 2005;83:578-583. 2005;014951(04).

4.    Ramesh PS. Evaluation Of Health Management Information System For Maternal And Child Health Services At Subcentre Level In A Rural Block Of Haryana, India. The Internet Jounal of third world medicine 2007. 2007;6(2).

5.    MoHSW. Ministry of Health and Social Welfare: Strengthening Health Information System. 2010.

6.    MOHSW. Health System Strengthening Technical Assistance: Health Management Information system Review and plan. 2010. 2010;(June).

7.    Mphatswe W, Mate KS, Bennett B, Ngidi H, Reddy J, Barker PM, et al. Improving public health information: a data quality intervention in KwaZulu-Natal, South Africa. Bulletin of the World Health Organization [Internet]. 2012 Mar 1 [cited 2013    Aug    12];90(3):176–82.    Available    from: http://www.pubmedcentral.nih.gov/article

8.    Braa J, Heywood A, Sahay S. Improving quality and use of data through data-use workshops: Zanzibar, United Republic of Tanzania. [Internet]. Bulletin of the World Health    Organization.    2012.    p.    379–84.    Available    from: http://www.pubmedcentral.nih.gov/article

9.    Simba DO. Quality of a routine data collection system for health : case of Kinondoni district in the Dar es Salaam region , Tanzania. South African Jounal of Information management 2006. 2005;7(June).

10.   Kerr K, Karolynkerrcentraltasconz E, Norris T, Stockdale R. Data Quality Information and Decision Making : A Healthcare Case Study. 2007;1017–26.

11.   Kawale P. Determinants of Use of Health Information in Nathenje Health Area of Lilongwe District By. 2011;(August).

12.   Maditsi MJ. Prevalence of childhood malnutritionamong under 5 years children in Regae village in Great Mable Hall Sub district in Limpopo province; Research

dissertation submitted in partial fulfilment of the requirement for the degree of Master of Public Health MAST. 2009; (Unpublished)

13. Harold Alderman, Jere Behrman JH. Improving Child Nutrition for Sustainable Poverty Reduction in Africa; Africa. In: Institute IFPR, editor. Sustainable solutions for ending hunger and poverty; Washington D.C 2004; 2004.

14. Caulfield LE, de Onis M, Blössner M, Black RE. Undernutrition as an underlying cause of child deaths associated with diarrhea, pneumonia, malaria, and measles. The American journal of clinical nutrition [Internet]. 2004 Jul;80(1):193–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15213048

15. Republic U, Bureau N, Dar S, Calverton M. Tanzania Demographic and Health Survey. 2011;(April).

16. MoHSW. The National Road Map Strategic Plan To Accelerate Reduction of Maternal , Newborn and Child Deaths in Tanzania 2008 - 2015. 2008;(April).

17. WHO. Food and nutrition policy for schools;A tool for the development of school nutrition programmes in the European Region. Programme for Nutrition and Food Security WHO Regional Office for Europe Copenhagen 2006. 2006;(14).

18. WHO. The World Health Organization Global Database on Child Growth and Malnutrition: Methodology and applications, Journals Medicine International Journal of Epidemiology. Geneva 27, Switzerland: Oxford; 2003. p. Volume 32, Issue 4 Pp. 518–526.

19. WHO. Assessment of health facility data quality Data quality report card. 2011 p. 2010–1.

20. Koronios A. Assessing data quality issues in the Emergency Department through data and process mapping. 2012;1–12.

21. Jose V. Gallegos IB. Using mobile phone nutrition surveillance: A review of evidence reportE Report. Institute of Development Studies. 2013;(reducing Hunger and malnutrition).

22. Redman T. Data Quality The Fied guide, Amazon. 2001.

23. Straus SE. Evidence-based medicine: How to practice and teach EBM. 4th Ed.: 2. dinburgh: Churchill Livingstone; 2011.

24. Woldemariam H, Habtamu T, Fekadu N HA. Implementation of an integrated health management information system and monitoring and evaluation system in Ethiopia: progress and lessons from pioneering regions. 2011.

25. Gebrekidan Mesfin. Data quality and information use: A systematic review to improve evidence, Ethiopia. 2012.

26. Moyo CM. An assessment of the quality fo Health Management Information System data in selected health facilities in Lilongwe district; Dissertation submitted in partial fulfilment of the Master of Public Health degree requirements of the College of Medicine, Unive. 2005. (Unpublished)

27. Nyamtema AS. Bridging the gaps in the Health Management Information System in the context of a changing health sector. [Internet]. BMC medical informatics and decision making. 2010. p. 36. Available from: http://www.pubmedcentral.nih.gov/article

28. Mboera LE, Makundi EA KA. Uncertainty in malaria control in Tanzania: crossroads and challenges for future interventions. Am J Trop Med Hyg. 2007 Dec;77(6 Suppl). 2007;:112–8.

29. Baltazar Chilundo SS& JS. The quality of HIV/AIDS case-detection and case-reporting systems in Mozambique. African Journal of AIDS Research. 2004;3(2):145–55.

30. Hedt-Gauthier B. Improving data quality and supervision of antiretroviral therapy sites in Malawi, an application of Lot Quality Assurance Sampling. BMC Health Services Research 2012, 12:196. 2012;

31. Chiemeke SC, Egbokhare FA. A Study of the Critical Success Factors Influencing Data Quality in Nigerian Higher Institutions. 2012;5(2):45–50.

32. Mshana S. Health Management Information System: a Tool for Decision Making in Health Care Planning and Development (a Case of Tanzania) A dissertation paper submitted to the Faculty of Social Sciences, Department of Health Policy & Management, University of Kuopio,. 2003;(July).

33. WHO. Framework and Standards for Country Health Information Systems [Internet]. Second. Geneva 27, Switzerland; 2008. p. 8. Available from: http://www.healthmetricsnetwork.org

34. Mbilinyi D, Daniel ML, Lie GT. Health worker motivation in the context of HIV care and treatment challenges in Mbeya Region, Tanzania: a qualitative study. [Internet]. BMC health services research. 2011. p. 266. Available from: http://www.pubmedcentral.nih.gov/articlere

35. Kinanbo M. Assement of HMIS design and implementation in Ethiopia: The case of selected public health facilities; In partial fulfillment of the requirement for the degree of masters in health informatics. 2012;(June).

36. Simba O.Daudi and MAM. Factors influecing quality of Health Management Information System(HMIS) data: The case study in Kinondoni in Dar es Salaam Region;Tanzania. East African Journal of Public Heath 2010. East African Journal of Public Heath, Vol. 3, No. 1; 2010;3:28–31.

37. David R Hotchkiss1*, Anwer Aqil2 TL and EM. Evaluation of the Performance of Routine Information System Management (PRISM) framework: evidence from Uganda. MC Health Services Research 2010, 10:188 doi:10.1186/1472-6963-10-188. 2010;

38. UNICEF, WHO, UNFPA. Guidelines for Monitoring the Availability and Use of Obstetric Services. Second. New York, NY, 10017 USA; 1997. p. 43–8.

39. CDC. Data Collection Methods for Program Evaluation [Internet]. 2009. Available from: http://www.cdc.gov/healthyyouth/evaluation/pdf/brief17.pdf

40. Krishnan A, Nongkynrih B, Yadav K, Singh S, Gupta V. Evaluation of computerized health management information system for primary health care in rural India. BMC health services research [Internet]. 2010 Jan [cited 2014 May 19];10(1):310. Available from: http://www.pubmedcentral.nih.gov/article

41. Shaikh BT, Hatcher J. Health seeking behaviour and health service utilization in Pakistan: challenging the policy makers. Journal of public health Oxford England [Internet]. Faculty Public Health; 2005;27(1):49–54. Available from: http://www.ncbi.nlm.nih.gov/pubmed/15590705

42. Abdoulaye SEYE 1, Dr. Olufemi ADEYEMI 2 DA, 2 D. Bottleneck Analysis, a programmatic approach an ent ry point to improve the quality of Monitoring System at decentralized level –Nigeria Health Management and Information System. 2013;

43. Centre AM, Studies HS, Sciences M. Evaluation of Health Management Information Systems A study of HMIS in Kerala , India.

44. Muhammad Suleman Qazi ( UNFPA P). Pakistan's Health Management Information System Health Managers' perspectives. Journal of Pakistan Medical Association; 2009.

45. D. Sera, L. Cicciò, F. Odada MM. Compleness and timeliness of health management information system data in a post conflict setting. Uganda: International AIDS Society; 2011.

40. PRISM framework: A paradigm shift for designing and evaluating routine health information system, Health policy plan. 2009 May; 24(3): 217-228

**APPENDICES**

**5.1: QUESTIONNAIRE - ENGLISH VERSION**

SECTION 1: BACKGROUND CHARACTERISTICS

1) Date of interview:    ___/___/201___

2) Name of interviewer _____

3) Name of health facility:    _____

4) Type of health facility (level)

   1. Hospital

   2.  Health centre

   3. Dispensary

   4. Maternity home

   5. Others (Specify) _____

5) Type of ownership of health facility

   1.  Government

   2.  Parastatal

   3.  Private

   4.  FBO

   5. Others (specify) _____

6) Sex of respondent

   1. Male

   2. Female

7) Age of respondent: _____Years

8) Cadre of respondent

   1. Medical doctor

   2. Assistance medical officer

   3.  Clinical officer

   4. Nurse Officer

5. Nurse mid wife

6. Nurse Assistance

7. Other (Specify) _____

9) How many years have you been as a health care provider?  _____years

**SECTION II: FACTORS RELATED TO QUALITY OF HMIS DATA**

**A: KNOWLEDGE/TRAINING**

10) Can you define HMIS?

   _____

   _____

11)  How did you become aware of the HMIS?

   1.  Attended an initial HMIS training  workshop

   2.  Briefed by co workers

   3.  On my own

   4.  Through morning CHMT meeting

   5.  Others (specify)_____

12)  During your period as a health service provider, have you ever filled any HMIS register in your day-to-day practice?

   1.  Yes

   2.  No

13)  If yes to question 12, in which section

   1.  OPD

   2.  ANC

   3.  RCH

   4.  Other (Specify) _____

14)  Is there any HMIS capacity building program to health workers?

   1.Yes

   2.No

15) If yes, have you ever attended any?

   1.Yes

2.No

16) Is there a clearly defined guideline on training of the staffs on HMIS?

     1.Yes

     2.No

17) Can you define quality of data?

_____

_____

**B) HEALTH WORKERS PERCEPTION**

18) Good quality data is important for planning health service delivery.

     1.Strongly Agree

     2.Agree

     3.Neutral

     4.Disagree

     5.Strongly Disagree

19) Data generated from the ANC unit in your facility (s) is of good quality.

    1. Strongly Agree

    2. Agree

    3. Neutral

    4. Disagree

    5. Strongly Disagree

20) Give reason (s) to support your answer

_____

_____

21) Data generated from Child health unit in your facility (s) is of good quality.

    1. Strongly Agree

    2. Agree

    3. Neutral

    4. Disagree

    5. Strongly Disagree

Give reason (s) to support your
answer_____
_____

22) Our health facility(s) prepares the required HMIS reports in a timely manner

      1   Strongly Agree

      2   Agree

      3   Neutral

      4   Disagree

      5   Strongly Disagree

23) In your opinion, what is the biggest problem observed in HMIS reports of your health facility?

      1.  Delay in submission

      2.  Incompleteness/missing

      3.  Inaccuracy of data

      4.  Others, specify _____

## C: AVAILABILITY OF DATA COLLECTION TOOLS

24) In your opinion are ANC registers readily available?

      1   Very scarce

      2   Scarce

      3   Average

      4   Some available

      5   Always available

25) In the last year (2012), did the health facility ever have shortage of ANC registers

      1.Yes

      2.  No

26) If yes, how frequently did this happen?

      1.   One to three months

      2.  Four to six months

      3.  Seven to Nine months

    4. Ten to twelve months

27) In your opinion are Child Health Monitoring registers readily available?

    1. Very scarce

    2. Scarce

    3. Average

    4. Sometimes available

    5. Always available

28) In the last year (2012), did the health facility ever have shortage of Child Health Monitoring Registers?

    1. Yes

    2. No

29) If yes, how frequently did this happen?

    1. One to three months

    2. Four to six months

    3. Seven to Nine months

    4. Ten to twelve months

30) Is the following equipment available in the health facility?

| Name equipment | No available | No. functioning |
|---|---|---|
| Weighing scale for adult at ANC | | |
| Weighing scale for children at RCH clinic | | |
| Tape measure at RCH clinic | | |
| Length board at ANC | | |

## D: AVAILABILITY OF HMIS FOCAL PERSON

31) Is there a focal person responsible for HMIS in your health facility?

    1. Yes

    2. No

32) If yes, what are his/her responsibilities

| HMIS focal person responsibilities | Yes | No |
|---|---|---|

| | | |
|---|---|---|
| To collect and compile reports | | |
| To conduct supervision at the facility | | |
| To conduct HMIS training | | |
| Others ( Specify) | | |

## E: SUPPORTIVE SUPERVISION

33) Is supportive supervision done in the health facility?

    1. Yes

    2. No

34) Is there a timetable for HMIS supervision?

    1. Yes

    2. No

35) According to the time table, how often should HMIS supervision is conducted?

    1. Daily

    2. Monthly

    3. Quarterly

    4. Annually

    5. Others (Specify) _____

36) Who performs supervision?

| Item | Yes | No |
|---|---|---|
| HMIS experts from the Ministry of Health | | |
| CHMT | | |
| Facility management team | | |
| Facility HMIS focal person | | |
| Others (Specify) | | |

37) Is there a checklist that should be used during these supervision visits?

      1.  = Yes

      2.   = No

38) What Elements are in the supervision checklist?

_____

_____

39) Is the check list used during HMIS supervision visits?

      1.  = Yes

      2.  =  No

40) During HMIS supervision, what assistance is given to improve quality of data in HMIS?

| Support offered | Yes | No |
|---|---|---|
| Onsite training | | |
| Stationary | | |
| Supplies related to child health /ANC | | |
| Provide guidelines | | |
| Feedback report | | |

41) During the supervision visits, are you allowed to ask questions regarding HMIS?

      1.  Yes

      2.  No

42) What areas regarding the HMIS do you usually ask or you would like to ask?

_____

_____

43) When was the last CHMT supervision conducted?

      1.  Less than one month ago

      2.  Two months ago

      3.  Three months ago

      4.  More than three months ago

44) How would you rate the last CHMT supervision that was conducted?

     1.   Excellent

     2.   Good

     3.   Adequate

     4.   Poor

     5.  Very Poor

45) Do you make use of the data generated from the HMIS at your health facility?

     1.   Yes

     2 .  No

46) If yes, how do you use the data?

| Use of report | Yes | No |
|---|---|---|
| To generate facility report | | |
| For planning purposes at the facility | | |
| To know magnitude of diseases | | |
| Other (Specify)_____ | | |

47) In your opinion, are you motivated to fill in HMIS tools?

     1.  Yes

     2.  No (If no, go to question 49)

48) What motivates you to fill in the HMIS tool?

     1.  Training

     2.  Appreciation

     3.  Like my job

     4.  Given feedback

     5.  Working tools available

49) In your opinion do you think it is important to have HMIS data?

     1.  Yes

     2.  No

**OBSERVATION CHECKLIST**

DATA QUALITY (Data accuracy and completeness)

1.      Completeness (Observe ANC and child health registers to see if there are missing values in the items for at least 3 months)

| Year | Month | Total entries | Number missing | Item missing |
|------|-------|---------------|----------------|--------------|
|  |  |  |  |  |
| 1 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 2 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| 3 |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

**Accuracy (Compare the value for item in book 2 with re-calculated value in the register)**

| Year | Quarter | No. of children weighted | Value recorded in report for corresponding item | Total No. of children with malnutrition in the register | Value recorded in report for corresponding item |
|------|---------|--------------------------|--------------------------------------------------|---------------------------------------------------------|--------------------------------------------------|
| 1 | 1 |  |  |  |  |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
|  | 4 |  |  |  |  |
| 2 | 1 |  |  |  |  |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
|  | 4 |  |  |  |  |
| 3 | 1 |  |  |  |  |
|  | 2 |  |  |  |  |
|  | 3 |  |  |  |  |
|  | 4 |  |  |  |  |

**Availability of equipment**

| Name equipment | Physical presence (Yes/No) | Number available | Number function |
|---|---|---|---|
| Weighing scale for adult at ANC | | | |
| Weighing scale for children at RCH clinic | | | |
| Tape measure at RCH clinic | | | |
| Length board at ANC | | | |
| ANC register | | | |
| Child health register | | | |
| Child health monitoring card | | | |
| Pregnancy monitoring card | | | |

**5.2: DODOSO - SWAHILI VERSION**

SEHEMU YA 1: UTANGULIZI SIFA

1) Tarehe ya mahojiano:__/__/201___

2) Jina la mhojaji: _____

3) Jina la kituo cha afya: _____

4) Aina ya kituo cha afya (ngazi):

    1. Hospitali

    2. Kituo cha Afya

    3. Zahanati

    4. Nyingine (Taja)

5) Aina ya Umiliki wa kituo cha afya

    1. Serikali

    2. Taasisi

    3. Binafsi

    4. FBO

    5. Nyingine ( Taja) _____

6) Jinsia ya mhojiwa

    1. Mme

    2. Mke

7) Umri wa mhojiwa, miaka _____

8) Kada ya mhojiwa

    1. Daktari

    2. Daktari Msaidizi

    3. Tabibu

    4. Afisa Muuguzi

     5.   Muuguzi mkunga

     6.   Nyingine (Taja)  _____

9) Je una muda gani tangu uajiriwe kama mtoa huduma ya afya? Miaka_____

## SEHEMU YA II: VISABABISHI VYA UBORA WA TAKWIMU

## A) UJUZI / MAFUNZO

10) Je, unaweza kufafanua kuhusu  MTUHA?

_____

_____

11) Je, umepataje kujua kuhusu MTUHA?

     1.   Kuhudhuria semina ya MTUHA

     2.    Kutoka kwa wafanyakazi

     3.   Kupitia  Vikao vya CHMT

     4.  Nimejifunza mwenyewe

     5.  Nyingine (taja) _____

12) Katika kipindi chako kama mtoa huduma ya afya, umewahi kujaza kitabu chochote cha MTUHA?

     1.   Ndiyo

     2 .  Hapana

13) Kama ndiyo, kitengo kipi?

     1.   Wagonjwa wa nje

     2.   Kliniki ya mama wajawazito

     3.  Kliniki ya   watoto

     4.   Nyingine (TAJA)_____

1)   Je, kuna mpango wa kuwajengea uwezo wa ujazaji vitabu vya MTUHA wafanyakazi wa afya?

       1. Ndiyo

2. Hapana

2) Kama ndiyo, umewahi kuhudhuria yoyote?

1. Ndiyo

2 . Hapana

3) Je, kuna mwongozo wa mafunzo kwa wafanyakazi juu ya MTUHA?

1. Ndiyo

2. Hapana

4) Je, unaweza kufafanua ubora wa takwimu?

**B: MTAZAMO WA AFYA WAFANYAKAZI**

5) Takwimu bora ni muhimu kwa ajili ya kupanga mipango ya Utoaji Huduma za afya.

1. Nakubali kabisa

2. Nakubali

3. Wastani

4. Sikubali

5. Sikubali kabisa

6) Takwimu za kitengo cha mama wajawazito katika kituo hiki zina ubora mzuri.

1. Nakubali kabisa

2. Nakubali

3. Wastani

4. Sikubali

5. Sikubali kabisa

7) Toa
sababu_____

8) Takwimu za kitengo cha watoto katika kituo hiki zina ubora mzuri.

1.Nakubali kabisa

2.Nakubali

3.Wastani

4.Sikubali

5.Sikubali kabisa

9) Toa sababu

_____

_____

10) Kituo hiki huandaa na Kutoa taarifa za MTUHa kwa wakati.

1. Nakubali kabisa

2. Nakubali

3. Wastani

4. Sikubali

5. Sikubali kabisa

11) Kwa maoni yako, ni mapungufu yapi zaidi yanakuwepo katika taarifa za MTUHA za vituo

1. Ucheleweshwaji wa taarifa

2. Kutokamilishwa kwa taarifa

3. Takwimu zisizo    sahihi

4. Nyingine, Taja _____

## C: UWEPO WA VITABU VYA MTUHA

12) Kwa maoni yako, rejista za mama wajawazito zinapatikana kwa urahisi?

1. Haba sana

2. Haba

3. Wastani

4. Vinapatikana

5. Daima vinapatikana

13) Katika mwaka wa mwisho (2012), kulikuwa na uhaba wa rejista za mamawajawazito

    1. Ndiyo

    2. Hapana

14) Kama ndiyo, kwa muda gani?

    1. Mwezi 1 hadi 3

    2. Miezi 4 hadi 6

    3. Miezi 7 hadi 9

    4. Miezi 10 hadi 12

15) Kwa maoni yako, rejista za watoto zinapatikana kwa urahisi?

    1. Haba sana

    2. Haba

    3. Wastani

    4. Vinapatikana

    5. Daima vinapatikana

16) Katika mwaka wa mwisho (2012), kulikuwa na uhaba wa rejista za mama wajawazito

    1. Ndiyo

    2. Hapana

17) Kama ndiyo, kwa muda gani?

    1. Mwezi 1 hadi 3

    2. Miezi 4 hadi 6

    3. Miezi 7 kwa miezi 9

    4. Miezi 10 hadi 12

18) Je, vifaa vya vifuatazo vinapatikana katika kituo?

| Jina la vifaa | Idadi zilizopo | Zinazofanya kazi |
|---|---|---|
| Kipimo cha uzito kwa watu wazima | | |

| | | | D: **UWEPO WA MRATIBU WA MTUHA** |
|---|---|---|---|
| Kipimo cha uzito kwa watoto | | | |
| Futi ya kupima urefu | | | |
| Kibao cha kupima urefu | | | |

19) Je, kituo kina mtu anayeratibu shughuli za MTUHA?

      1.   Ndiyo

      2.   Hapana

20) Kama ndiyo ni nini majukumu yake

| **Majukumu ya mratibu wa MTUHA** | **Ndiyo** | **Hapana** |
|---|---|---|
| Kukusanya taarifa | | |
| Kufanya usimamizi katika kituo | | |
| Kuendesha mafunzo ya MTUHA | | |
| Nyingine (TAJA) | | |

E: **USIMAMIZI SHIRIKISHI**

21) Je, usimamizi shirikishi hufanyika katika kituo?

      1.   Ndiyo

      2.   Hapana

22) Usimamizi shirikishi hufanyika mara ngapi?

      1. Kila siku

      3.   kila mwezi

      4.   Kila robo mwaka

      5.    Kila mwaka

      6.   Nyingine (TAJA) _____

23) Nani hufanya usimamizi?

| **Jibu** | **Weka 'V'** |
|---|---|

| | panapohusika |
|---|---|
| Wataalam wa MTUHA kutoka Wizara ya Afya | |
| Timu ya uendeshaji Huduma za afya kutoka wilayani (CHMT) | |
| Mratibu wa MTUHA wa kituo | |
| Nyingine (TAJA) | |

24) Je, kuna mwongozo unaotumika wakati wa usimamizi?

      1.    Ndiyo

      2.  Hapana

25) Je, mwongozo huo unatumika wakati wa ziara ya usimamizi

      1.    Ndio

      2.    Hapana

26) Je, msaada gani hutolewa wakati wa ziara ya usimamizi?

Weka (V) panapohusika

| Jibu | Ndio | Hapana |
|---|---|---|
| Mafunzo ya papo kwa papo | | |
| Vifaa kuhusiana na afya ya mtoto / mama mjamzito | | |
| Kutoa miongozo | | |
| Maoni taarifa za miezi ya nyuma | | |
| Nyingine (TAJA) | | |

27) Wakati wa ziara ya usimamizi, unaruhusiwa kuuliza maswali kuhusu MTUHA?

      6. Ndiyo

      7.  Hapana

28) Ni maeneo gani kuhusu MTUHA kawaida unauliza au ungependa kuuliza?

| Jibu | Weka 'V' panapohusika |
|---|---|

| | |
|---|---|
| Jinsi ya kujaza rejista | |
| Umuhimu wa takwimu za MTUHA | |
| Upatikanaji wa vitabu vya MTUHA | |
| Mrejesho wa usimamizi uliopita | |
| Nyingine (TAJA) | |

29) Ziara ya usimamizi ulifanyika lini kwa mara ya mwisho?

      8. Mwezi huu

      9. Miezi 1- 2 iliyopita

      10. miezi 3 iliyopita

      11. Zaidi ya miezi 3 iliyopita

30) Je, unaweza kutumia takwimu za MTUHA katika kituo chenu?

      1. Ndiyo

      2. Hapana

31) Kama ndiyo, ni jinsi gani unaweza kutumia takwimu?

| Jibu | Ndio | Hapana |
|---|---|---|
| Kuandaa taarifa za kituo | | |
| Kupanga malengo ya kituo | | |
| Kujua ukubwa wa magonjwa | | |
| Nyingine (TAJA) | | |

32) Je unafikiri kuna umuhimu wa MTUHA katika utoaji wa huduma ya afya?

      12. Ndiyo

      13. Hapana

33) Katika njia gani (Kutoa maoni yako)

_____

_____

_____

34) Ni kitu gani kinachokupa msukumo wa kujaza katika vitabu HMIS?

    14. Mafunzo

    15. Sehemu ya kazi yangu

    16. Napata mrejesho kwa uongozi

    17. Uwepo wa vitendea kazi

    18. Nyingine (Taja) _____

35) Kwa maoni yako, nini umuhimu wa takwimu za MTUHA?

_____

_____

**5.3: CONSENT FORM**

**English Version**

CONSENT TO PARTICIPATE IN A STUDY TITLED "ASSESSMENT OF QUALITY OF DATA AND DETERMINANTS OF QUALITY DATA IN THE HEALTH MANAGEMENT INFORMATION SYSTEM, A CASE STUDY OF NUTRITIONAL STATUS SURVEILLANCE''

Greetings!

My name is Happy Saiguran from Muhimbili University of Health and Allied Sciences. I am involved in a study on Assessment of quality of data and determinants of quality data in in the health management information system, a case study of nutritional status surveillance

Purpose of the Study

18 health facilities will be used in this study to assess the quality of data and determinants of quality data in in the health management information system, a case study of nutritional status surveillance. 150 health workers from RCH unit will be involved in the study (25 from hospitals, 18 from each health facility and 3 from each dispensary)

 Participation

If you agree to join the study, you will be required to answer and fill all the questions in the questionnaire which will be provided to you.

Confidentiality

All information we will collect from you will be treated confidentially and will not be used for any other purpose other than this study.

Risks

We do not expect that any harm will happen to you because of joining in this study.

Rights to Withdraw and Alternatives

Taking part in this study is completely your choice. If you choose not to participate in the study or if you decide to stop participating in the study you will continue to be treated normally. You can stop participating in this study at any time, even if you have already given your consent and if for any reason you would wish to come back into the study after withdrawal, we will be ready to accept you to continue with the study. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits

If you agree to take part in this study you will be among those who will contribute towards improving the quality of data and therefore strengthening the health information system. Your information and other's participating in the study will collectively be used by policy makers in strengthening the system which would benefit the public.

Who to Contact

If you ever have questions about this study, you should contact the following:

Ms Happy Saiguran, the principal investigator (0769 549440), email: sanetihappy@yahoo.com.

**Prof Maine Moshi,** (Chairman of MUHAS senate Research and Publication Committee). P.O Box 65001 Dar es Salaam, Tel No. 2150302-6

Do you agree to participate? Write the word 'yes' if you agree…………………..

I, _____ have read the contents in this form. My questions have been answered. I agree to participate in this study.

Signature of participant _____

Signature of investigator _____

Date of signed consent_____

**Consent Form- Swahili Version**

FOMU YA KUKUBALI KUJIUNGA KWA HIARI KATIKA UTAFITI KUHUSU UBORA YA TAKWIMU NA SABABU ZINAZOCHANGIA UBORA WA TAKWIMU KATIKA MFUMO WA TAARIFA ZA UTOAJI HUDUMA ZA AFYA

Salamu!

Mimi naitwa Happy Saiguran kutoka Chuo Kikuu cha Afya ya Sayansi ya Tiba Muhimbili. Ninafanya utafiti kuhusu ubora ya takwimu na sababu zinazochangia ubora wa takwimu katika mfumo wa taarifa za utoaji huduma za afya.


Malengo ya utafiti:

Jumla ya vituo 18 na watoa huduma 150 kutoka kila kituo  watashirikishwa katika utafiti huu wenye huu kwa  nia ya kubaini sababu zinazochangia ubora wa takwimu

Ushiriki katika utafiti

Kwa kushiriki katika utafiti huu utatakiwa kujibu kwa kujaza maswali yaliyopo kwenye dodoso utakayopatiwa.

Usiri: Taarifa zote zitakazopatikana kutoka kwako zitakuwa ni siri na hazitatumika sehemu nyingine isipokuwa katika utafiti huu tu.

Madhara: Hatutegemei kitu chochote kibaya kutokea kwa kushiriki katika utafiti huu.

Kukubali kwa hiari kushiriki kwenye utafiti:

Ushiriki kwenye utafiti huu ni kwa hiari. Unaombwa kukubali kwa hiari. Endapo utaamua kutoshiriki au endapo utaamua kujiondoa katika utafiti utaendelea kubaki na haki zako za msingi kama kawaida. Unaweza kujiondoa katika utafiti wakati wowote, na pale utakapotaka kujiunga tena utapokelewa kuendelea na utafiti. Kukataa kujiunga ama kujitoa katika utafiti hakutasababisha adhabu au kupoteza haki yako ya msingi.

Faida za utafiti

Ukikubali kujiunga na utafiti utakuwa mmojawapo wa wale watakaofanikisha kuboresha mfumo wa Taarifa za Utoaji huduma za afya nchini. Utasaidia kuwawezesha watunga sera na wataalamu wa afya kufanya maamuzi kwa kutumia takwimu sahihi ili kuboresha afya ya Watanzania. Utapatiwa mrejesho zitakazopatikana kupitia utafiti huu. Hatutegemei utaingia gharama zozote kwa kushiriki kwenye utafiti huu.

Mawasiliano : Kama una swali lolote kuhusu utafiti huu tafadhali wasiliana na:

Bi Happy Saiguran (mtafiti mkuu)

Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, S.L.P 65013, Dar es salaam

Simu ya mkononi : 0769 549 440, au

Dkt Germana Leyna (msimamizi wa utafiti), Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili, S.L.P 65013, Dar es salaam, au

**Prof. Maine Moshi (Mwenyekiti wa Kamati ya Utafiti, Chuo Kikuu cha Afya na Sayansi ya Tiba Muhimbili). S.L.P 65001 Dar es Salaam, Simu Na. 2150302-6**

Sahihi kwa wanaokubali

Je, unakubali? Andika ndio kama umekubali……………………………………………

Mimi nimeisoma fomu hii na kuelewa lengo la utafiti huu na maswali yangu yamejibiwa na sasa nakubali kwa hiari kujiunga na utafiti huu.

Sahihi ya mshiriki……………………………………........................................

Sahihi ya mtafiti………………………………………………………………

Tarehe ya kusaini…………………………………………