Assessment of Health Management Information System in Harari Regional State

By

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Dedication

This work is dedicated to my dear families, especially to my beloved brother G/Egziabhair Mezgebe T/Mariam whose encouragement and help gave me strength to successfully finish this MSC course. Thank you all!

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
BPR	Business Process Reengineering
FMOH	Federal Ministry of Health
HIS	Health Information System
HIT	Health Information Technician
HIV	Human Immune Deficiency Virus
HMIS	Health Management Information System
HMN	Health Metrics Network
HSDP	Health Sector Development Programme
IT	Information Technology
M and E	Monitoring and Evaluation
MCH	Maternal and Child Health
MDG	Millennium Development Goal
NGOs	None Government Organizations
NHISA	National health information system assessment
PICT	Provider Initiation Counselling and testing
PPD	Planning and Programme Department
RHB	Regional Health Bureau
SPSS	Statistical Package for Social Sciences
TB	Tuberculosis Bacilli
WHO	World Health Organization

Abstract

Background: an organization succeeds by bringing together and managing resources in a productive way. Health information has been variously described as the “foundation” for better health, as the “glue” holding the health system together, and as the “oil” keeping the health system running. There is a big concern for the improvement of the health care services delivery system, which is widely seen to be attributed to the shortcomings of health management information system in the developing countries; where World Health Organization calls for reform.

Objective of the research: To asses the current status of health management information system implementation in Harari Regional Health Bureau and suggest possible solutions for improvement.

Methodology: The numbers of health facilities participated in the study were 2 hospitals and 5 health centers. A cross – sectional study was used to generate data from these health facilities in Harari Regional Health Bureau. Self administered structured questionnaire and in-depth interview with administrative units and service providers were conducted for quantitative and qualitative data collection respectively. Physical observation was also made by the investigator to supplement the qualitative findings.

Result: The sex distribution of participants working in the study units showed that 121 (44.8%) were males while 149 (55.2%) were females. Out of 270 respondents 179 (66.3%) answered that there was no regular training given about the new health management information system but 55 (20.4%) of them reported that there was regular training given to the staff’s. The remaining 36 (13.3%) didn’t know whether training was given to the staff or not. Regarding utilization of information generated from the facility at the unit/department level, 60 (22.2%) of them reported that they were using the information, whereas 202 (74.4%) of them were not utilized the information at all. Other 8 (3%) of them didn’t know whether the information was utilized or not.

Conclusion: from this study it can be concluded that the utilization level of health management information system in health facilities under the study was far below the standard expectations. It is recommended from this study that assignment of adequate staff, given on job training, and given periodic feedback to improve the HMIS of the studied facilities.

Key words: HMIS, HIS, data quality, utilization of health information system

1. Introduction

1.1 Background

An organization succeeds by bringing and managing resources together in a productive way. The traditional list of resources comprises human, financial and material resources. Only since the past two decade that information comes to be other resources. One that is crucial to the management of the other resources and under certain circumstances may be substituted for them cost effectively (1).

Health information has been variously described as the “foundation” for better health, as the “glue” holding the health system together, and as the “oil” keeping the health system running (2). There is also a broad consensus that a strong health information system (HIS) is an integral part of the health system, the operational boundaries of which include:

> … *all resources, organizations and actors that are involved in the regulation, financing, and provision of actions whose primary intent is to protect, promote or improve health*(3,4).

At the beginning, health information systems were oriented only to collect information on disease and health services outputs; but in the contemporary era health information systems are referred to be part of the health system and hold great importance in the planning and decision-making of health care delivery services.

In most literatures, “Health Information System” (HIS) and “Health Management Information System” (HMIS) are used interchangeably. However, Health Management Information System (HMIS) is becoming more popularly used (5).

HIS provides information for the management of health program and service. The health information obtainable through HIS comprises different ways of information collection that are epidemiological surveillance, service record and reporting, program monitoring and evaluation, administration and resource management system and vital registration.

HMIS is a sub subsystem of HIS emphasises the regular collection and analysis of information from health records as well as the available resources, thus to assist health personnel in planning and management of health services.

Countries need to have sufficiently developed health information systems to permit regular monitoring and evaluation. Different activities have been implemented so as to integrate HIS in the health system including the introduction of appropriate technologies, allocation of funds specifically for HIS, providing equipments and conducting on job trainings for the health workers (6, 7).

HMIS is important to strengthening the health system particularly in developing countries because HMIS helps improve the health service delivery to satisfy health care demands and competitiveness on the supply side and thereby satisfy the clients demanding quality health care services (8).

The Federal Ministry of Health (FMOH) of Ethiopia initiated a major reform of the HMIS/M&E following the Business Process Reengineering principles since 2006. A strategic plan was developed by the FMOH to implement the new system throughout the country as discussed and agreed by all. Following assessment of the old system a new system was designed and pilot tested in 2006 and 2007 and approved for national scale up in December 2007. In the newly designed system, the mission of HMIS/M&E (monitoring and evaluation) as indicated in the HMIS and M&E strategic plan is to support continuous improvement of health services and the health status of the population through action-oriented, evidence-based decision making, based on quality information (9).

Part of the interventions to strengthen the HMIS and reverse the lack of accurate, timely and complete report of the old system and limited use for action at all levels, the establishment of strong new HMIS at federal, regional, woreda, health facility and community levels is required. The understanding of the principle of use of information for improving health planning and service performance needs to be strengthened. Attention to data quality assurance is one of the

major areas of focus in the new design. Avoiding parallel reporting will increase the efficiency of the HMIS, by eliminating additional work load caused by late error detection, and improve the effectiveness of the HMIS, by increasing the reliability of evidence for decision-making (9).

HIS generate information to inform health planners and decision–makers on what is happening at the health delivery facilities. HMIS improves health management; which is pre-requisite for good health care delivery services. HMIS is there to fill the gap between disease occurrence (health problems) and the response of the health service providers.

As resources are allocated for preventing and treating priority burden diseases decision-makers need to be able to measure whether policies and programs are working, and whether progress is being made towards the goals that have been set. Clinicians need the health information to make appropriate decisions and to track progress of their services to patients and clients. Districts health offices, RHBs and MOH need health information to allocate resources, to monitor progress and to make necessary management decisions. Non government organization also place emphasis on release of funds based on performance.

1.2 Statement of the problems

There is a big concern for the improvement of the health care services delivery system, which is widely seen to be attributed to the shortcomings of HMIS in the developing countries; where WHO calls for reform.

Reliable and timely information on disease-specific treatment within a health system is critical for the planning and monitoring of service provision. Health Management Information Systems (HMIS) exist to address this need at national scales across Africa but are failing to deliver adequate data due to widespread under-reporting by health facilities. Faced with this inadequacy, vital public health decisions often rely on crudely adjusted regional and national estimates of treatment burdens(9).

Despite the credible use of HMIS for evidence based decision making (strategic planning, improved patient care, efficient allocation of scarce resources and effective targeting of intervention to those in greatest need leading for better outcome), countries with the highest burden of ill health and the most acute needs for good data have the weakest HMIS in the vast majority world's poorest countries (9).

Countries with most limited resources need to make assessment to identify critical priority in planning. This is because planning is very much dependent on the quality, quantity, reliability and timely available information (data) which in turn is dependent on: standardization of formats and indicators, structural organization, method of collection and relevance of data, quality of reporting (completeness, timeliness, accuracy and comprehensiveness), human capacity to collect and analyze the data and culture of information utilization for decision-making and others.

Activities related to health management information capacity strengthening are also felt to have suffered from general limited resources. The old HMIS Ethiopia is characterized by lack of accurate, timely and complete report consequently affecting effective management and decision-making by the managers at all levels. The challenge faced in relation to old HMIS system are lack of coordinated

effort and leadership, lack of strategy and policy, shortage of skilled human resource and lack of guideline. The accuracy (<60%), timeliness (less than 50%) and completeness (<57%) of HMIS reporting remains poor, and such delays contribute to the failure of the utilization of data for informed decision-making in planning and management at all health service delivery. The other dimension was that data is collected primarily for reporting and use of data at lower levels was poor. These all have consequent effect to poor data quality, poor customer satisfaction and poor staff motivation. Furthermore, the continuous effect of parallel reporting mechanisms with programmatic and donor-supported creates multiple reporting formats and an increased administrative workload (10).

Health facility in general is providing complex services to a large number of clients which implies that they manage complex and large amount of health related data. Information that is often used for decision making in health sector comes from the data that originate from heath facility. However, the Ethiopian National Health Information system assessment report of 2007 identified that HMIS is among the major problems of the sector. It is characterised by burdensome and uneven, inadequate staff skill and the information flow is also fragmented and characterized by parallel reporting system with no integration among the various subsystems. This resulted in redundant and conflicting reports and poor quality of data in terms of accuracy and timelines, preventing information users from effective utilization of information for decision-making and research (11).

Based on the above facts, the Federal Ministry of Health has developed new Health management information system (HMIS), as one of the major reform initiatives, to improve the health care delivery system of the country. After tested in selected pilot sites, full-fledge implementation has started in a few regions (7). Harari Regional Health is one of the regions started full-fledge implementation before two years ago.

So, assessing the features of the current HMIS of Harari regional Health Bureau can demonstrate the characteristics of HMIs how efficiently information is generated and utilized with the current necessary inputs (material, financial and human), and what are the prevailing problems of the system to support decision making at each level to addresses community health problem at grass root level and yet be integrated at higher levels.

1.3 Research Questions

- Does the current HMIS generate the necessary data and information to support planners to address health problems of the society at different levels?
- Do the health managers and the staffs at different level are utilize health information as resource input in their day to day activities?
- What inputs, activities and outputs were involved in the HMIS and where is the gap?
- What are the factors affecting information utilization in the new HMIS implementation in all levels of HMIS implementing health facility?

1.4 Significance of the research

Assessment is one of the initial steps in planning activities and its concern is identifying the nature of the problems, the magnitude, severity, distribution and trends. It helps to determine the strength and weaknesses of the existing system.

If planning is to make any difference or improvement in output, specific objectives can be defined and intervention can be measured only after baseline assessment is available and repeated assessments provide a logical basis for modifications.

Improving any information system means first of all identifying the strengths and weaknesses of existing system so as to focus on areas functioning least. HMIS assessment is then the early step in the strategy for strengthening and improving it.

The value of generated information is determined by its utility in decision-making. This is expressed in turn by the extent of the managers' and staffs commitment to generate reliable information or make use of the currently available information (data) for decision- making and for setting priorities to be responsive to health service demand at each level. So it is important to identify information problem at its root and plan for more integrated approach for improvement.

Though this research is targeted to fulfil academic requirement; it can serve as a good starting point for reviewing the current HMIS situation in the region to identify the strengths and weaknesses of the system so as to address the problem areas. In addition it contributes to understand of theoretical and practical views of the existing HMIS in Ethiopia that might be relevant to further studies for academicians, the health sector and its allies. It will also provide information to Federal MOH for the current NHMIS strategy scale up to other regions.

The knowledge gained in the research can be directed into two main audiences.

- It helps in diagnosing the region's HMIS problem and for the preparation of further intervention.
- It can be a base for future research practices setting

1.5 Scope of the research

The study focused on routine service reporting system in the HMIS and is limited to health facilities and management units at district and regional levels.

2. Literature review

This chapter discuss issues that are relevant to the topic of the study, starting with defining basic concepts and discuss ideas that are related to Information System, Health Information, Health Information System, Management Information System, and Health Management Information System. Health information system in Ethiopia and related researches undertaken by different authors at different areas are also discussed sequentially.

There are various efforts invested on improving health care services globally. Improving quality of health service for instance, is a major component of millennium Development Goals (MDGs). Among the efforts made to an effective health care service, one is improving the HIS of the facilities. Health information system plays major role on making evidence based decision for a better health of a nation.

2.1 Information system

An information system can be defined as an arrangement of people, data, process, Interfaces, networks and technology that interact to support and improve both the day-to day operations in a business as well as support the problem-solving and decision-making needs of management. According to Smith, information system can also be seen as a set of elements working interactively to gather and process input data and to disseminate and distribute output information. Information system is composed of five components: hardware, software, data, process, and people (12).

2.2 Health information

Health information refers to information that is related to health and it is highly required in the processes of improving the quality of health care services (13). As healthcare is a field of high developmental priority and the wealth of a nation depends on the health of its population (14), appropriate information and Health Information Systems are seen as crucial to strengthen the health system especially in developing countries (15).

Information about diseases or use of health services can help to build up a picture of the health needs of a local population. Such kind of information gives a picture of a population's health but without comparative information, this will be of incomplete use in planning health services. It also enables to make comparisons like national or regional or within the same population over time.

If health services are to respond to the changing health needs of their local populations, then planners and managers need useful and timely information about the health status of these populations. Some of this information can come from routine data sources or may be collected from large population studies. Some information can be obtained from community surveys (16).

2.3 Health information system

Health information system, is an information system in the domain of health, which is the collection of people, procedures and equipments designed, constructed, operated and manipulated to collect, record, process, store, retrieve, disseminate and use information concerning health. Application of Information System in health care service directs to what is referred to as Health Information Systems (HIS) which is defined as sets of components and procedures organized for the sake of generating information to improve health care management decisions at all levels of the health system (17). The health information systems serve wide ranges of users for wide ranges of purpose. It is used for the generation of information enabling decision-makers at all levels of the health system, identify health related problems and needs, make evidence-based decisions, make optimal allocation of scarce resources (18).

2.4 Management information system

Management Information System is defined as an integrated system of man and machine for providing the information to support the operations, management and decision making function in organization. Its objective is to provide information for a decision support in the process of management and thereby achieve stated goals efficiently (18). Management information system supports the process of collection, analysis, storage, distribution and utilization of an organization's information resources, business processes and operations. Management

information systems are not just statistics and data analysis, but also assessment of human capabilities. They help to establish relevant and measurable objectives; monitor results and performances and send alerts to managers at each level of the organization, on all deviations between results and pre-established objectives and budgets (19). Good management of information system produces quality information which creates managerial impact leading to attention, decision and action (18).

2.5 Health management information system

Health Management Information system can be defined as a set of interrelated components working together to gather, retrieve, process, store and disseminate information to support the activities of health system planning, control, coordination, and decision-making both in management and service delivery (17).

A principal goal of HMIS is to optimize the health of individual patients and of the population as a whole in an equitable, efficient and effective manner that is acceptable to patients, providers and administrators. Information Systems alone do not achieve dominant reforms of service delivery; rather, improvement from the implementation of the HMIS results in incremental changes at all levels of health system (20).

The purpose of designing a national HMIS is to provide access to information so that Nations can monitor and evaluate health services programs, collect baseline information on health status of the populations served, and then, over time, analyze health outcome trends of their population. This then provides the nation with information about the population and subsets within the population, so as to be able to make changes to program initiatives and to evaluate program change effects (20).

Health management information incorporates all the data needed by policy makers, clinicians and health service users to improve and protect population health. Few countries in the world today have effective and comprehensive systems in place to gather this data.

Yet there has never been a greater need for robust health information. As the world community has turned its attention to meeting Millennium Development Goal targets, and ever increasing resources are going towards preventing and treating high burden diseases such as HIV and AIDS, tuberculosis and malaria, decision-makers need to be able to measure whether policies and programmes are working, and whether progress is being made towards the goals that have been set. Donors are also placing more emphasis on performance, linking the release of funds to performance based measures (21).

The World Health Organization (WHO) argues that investment in health management information systems (HMIS) now could reap multiple benefits, including:

- helping decision makers to detect and control emerging and endemic health problems, monitor progress towards health goals, and promote equity;
- empowering individuals and communities with timely and understandable health-related information, and drive improvements in quality of services;
- strengthening the evidence base for effective health policies, permitting evaluation of scale-up efforts, and enabling innovation through research;
- improving governance, mobilising new resources, and ensuring accountability in the way they are used.

2.5.1 Theoretical concepts of health management information system

The structure of the HMIS needs two major components in terms of input and in terms of process.

System input:

a) The HMIS system resource includes:

- Persons- planners, managers, statisticians, epidemiologists, data, Collectors and others;
- Hard wares- registers, telephone, computers etc
- Soft ware- report forms, data processing programs, logistics

b) Organizational input includes:

- Rules, standards, definitions, responsibilities, procedures to ensure sufficient use of HMIS (22).

System Process:

- a) Information management: data collection, data processing and analysis
- b) Using information for management purpose: problem identification, prioritization, decision making, action and results monitoring (23).

2.5.2 Major subsystems of HMIS

1) Epidemiological surveillance for notifiable infectious disease, certain environmental condition and risk factors.
2) Routine service reporting from basic services at community level, health- center first level hospitals, referral hospitals, and special and territory referral hospitals.
3) Special program reporting system (TB, HIV AIDS, Malaria etc)
4) Administrative systems financing, personnel, drugs and logistics, training, research and documentation and external health resource.
5) Vital registration:–formal recording of events of human life: birth, death, marriage, divorce and migration.

The routine service reporting components of HMIS subsystems are categorized by WHO (24).

__ **Data input**: validity and completeness of data recording and collection, including surveillance, routine case and activity data, surveys, data emerging from administrative process, and registration data.

__**Data analysis,** transmit ion and reporting: efficiency, completeness, and quality of data analysis, at all levels of the health system, in order to produce actionable information.

__**Data presentation:** includes production of reports with graphs, charts, tables and maps,

__**Use of information:** decisions and actions for patient/client, community, health unit, and executive management:

__**Information system resources**: sufficiency and use of critical resources to support: the health system budget; facilities such as space for record storage, records and formats; and necessary equipment for data communication, storage, analysis, and document preparation.

__Information system management: organization and coordination mechanisms for ensuring that data and information are properly defined standardized, produced, maintained, shared and reported.

2.5.2.1 Routine health management information systems

As the focus of the study is on routine information system; only routine HMIS will be dealt with. Routine health information can be defined as "information that is derived at regular intervals of a year or less through mechanisms designed to meet predictable information needs" (22). Routine HMIS should support three functions; patient/client management, health unit management and the health system management. Routine data collection methods are classified into three (2).

I. Health unit data collection: The most common form of routine data collection is health unit managed data collection; that is particularly geared towards data based on the health care services or activities carried out on the people who use the regular health service of the facility. It is data recorded by regular health staffs working in the facility while performing their daily health care activities. However, it is the most criticized one for its poor quality and low utilization rate. But, this type of routine data collection at the facility level not only can be transformed to helpful Information tool for planning and management of the health service at different level but can become the trigger for sustained improvement in the health service delivery system through utilization of information at institutional level.

II. Community data collection: is an approach which helps to adapt or bring health care delivery system to the needs and limitations at the community level and involving the community in planning and management of local health services. It does not only help managers and care providers understand better the community health needs, but also increases community participation in the generation and use of information specially in health promotion and disease prevention activities.

Routine community-based data can be obtained from home-based records, such as immunization card, visit reports, community-based supervisions coordinators. Local government and local NGOs are also good data sources and intervention instruments.

III. Civil (vital events) registration*:* is also a form of routine data collection system related to health. However in developing countries, these function poorly.

Yet most experts agree that routine health information systems in most countries, Industrialized as well as third world countries, are woefully inadequate to provide the necessary information to support individual care and public health activities. In fact, poor use of information for evidence-based decision-making is probably one of the main causes of the current lack of linkages between individual care and Public health activities (2).

Rarely is sufficient consideration given to the amount of data that are collected. In a study carried out in Atlantis, in South Africa, it is reported that, "a comprehensive evaluation of the information system showed that the volume of data collected is enormous but that the quantity of useful information produced from it is minimal". Collecting data on diseases for which, there is no effective response is obviously of little value" (25).

There are several reasons why routine information systems in developing countries do not provide the necessary information support for decision-making. The following reasons are reported in many literatures. Poor quality of data, weak analysis of data, lack of an information culture, lack of trained personnel and HIS activities seen as a burden due to high workloads especially at the health facility level(26, 27).

2.5.3 The role of HMIS in improving health services delivery system

The role of health management information systems is to timely generate, analyse and disseminate sound data for public health decision making. Data have no value in themselves. The ultimate objective of a health information system is to inform action in the health sector. Performance of such a system should therefore be measured not only on the basis of the quality of data produced, but on evidence of the continued use of these data for improving health systems operations and health status.

Health is an integral part of national socio-economic development. And information is crucial input at all management level of the health services from periphery to the centre, for patient/client management, for health unit management as well as for health planning and system management. The question is; how can information become a real “resource” (input) to solve health problem at all level of the health services system?

Information system should be able to, define essential indicator, standardize reporting systems at different levels, assure quality of information (in Accuracy, Timeliness, Comprehensiveness, representative ness, Relevance, Complementarily and Ownership) reflect the use of information at all level of health service management and quality of health service delivery, and arouse or motivate the personnel to develop the culture of responsibility accountability and appreciation of information use (28).

Planning is an indispensable arm of health services management and has also moved from spontaneous and subjected projection based on the past experience; too much deliberate, systematic and objective process of mobilizing information and organization of resources. This justifies the basis for the importance of information system in the health services making information available; that can be manipulated to particular planning, objectives, decision making, and functional use. However excessive flow of traditional habits, borrowed formats and redundancy in the developing countries HIS; increase the burden of the peripheral units where data starts through which not only the data are not trusted but are not even looked at (26).

Of the major obstacles to effective and improved health management in the developing countries; lack of information support is the one most frequently sited. The need for well designed routine information system to ensure that services are delivered according to standards is thus stressed. Unlike the traditional reporting system (data-driven), which emphasizes on data collection to satisfy the administrative and routine requirements; HMIS involves routine activities that increase knowledge of inputs, processes, outputs and outcomes to provide operational (action–led) information required for management decisions at each level (22).

2.5.4 Background of health management information system in developing countries

Many health information systems in developing countries, for example, Mozambique and Tanzania deal with routine data collection at the health facility level, which are the main sources of data in healthcare information systems. The routine data collection involves the various health programmes: Maternal and Child Health (family planning, antenatal care, deliveries and immunization), Tuberculosis and Drug programmes.

Data collection is the first step of the information process within the health information system, so health information systems are often classified according to data collection method. Studies show that there are two basic ways in which to collect data: routinely and periodically (non-routine). Periodic data collection usually means conducting surveys and these can appear to be expensive at first glance. However, they involve one-time costs, and may be less expensive than routine data collection in the long run (29). Without external financial and technical assistance, most developing countries cannot afford to rely on periodic data collection methods for generating information. (22).

There are people living in remote areas who cannot reach the health facilities due to poor infrastructure and long distances from the community to the health facility. Therefore, there is a need to combine routine data collection with other data sources and data collected on a periodic basis, particularly to obtain more data at the community level. As Lippeveld argues, No single data source can provide all of the information required for planning and management of health services. A national health information system in support of health services always uses a

combination of data collection methods, depending on the nature and the use of the information for which data need to be collected (2).

Factor affecting HMIS are mostly common in developing countries. A report presented in Thailand noted that there are a number of constraints common in many developing countries in terms of data collection and transmission, data presentation and analysis and, use of HMIS for decision making at different levels of the health system. These are said to be mainly due to inadequate training of staff in data presentation, analysis, and use, and lack of feedback mechanism (30).

A research done by Marcel c. Azubuike suggested that while most advance countries have well developed health information systems to inform health services planning and delivery, many less developed countries have yet establish effective health information systems. Consequently, planning and implementation of health programmes in these parts of the world are conducted with out sufficient information about the population and groups using the services. Programme planning and implementation are therefore often based not only on expressed sentiment of communities and groups but also an estimation guess work a situation which could contribute to inefficiency, in equity, and waste in the provision of health care services (31).

The chaotic status and inefficiency of most existing information system in developing countries are linked to structural weakness of the system and lack of integration (WHO, 2000). In line with this, WHO took a global stance on the utility of information system in its statement of cooperation for countries and regions in building their analysis interpretation and dissemination to improve the health related decision making in its statement at International Conference on Population Development held in Cairo 1994 (32).

Assessment of HMIS implementation done in Zambia: considers that eight years of experience of implementing HMIS at national, regional and provincial levels in Zambia. Many of the challenges were found to stem from the way existing organisations and systems were set up. They included problems with creating a "data culture," as well as rapid turn over of health workers, which resulted in data collection falling to inexperienced staff (33).

Mamuka Djibuti undertook health information system assessment in Georgia using Health Matrix Network Framework and Health Information System Situation Analysis Tool. The study attempted to assess the entire system of the country including all Components that are important for proper functioning of the country's HIS by using Health Matrix Network. The result of the assessment shows that, data management scores the lowest which is 25%, then indicators (35%), dissemination and use (36%), resource (37%) and classified as "not adequate". The situation was better in the case of data sources which are classified as "present but not adequate" but information products (74%) become the best and classified as "adequate (34).

The work of Lungo, 2003 on the data flows in health information systems found that the health data being reported were not sufficient to support informed decision-making and health planning. The causes of the low quality of the data identified include incomplete, inaccurate, and untimely reporting; lack of resources and office space; existence of legacy information systems; and the existence of parallel reporting systems in the health information systems. The findings also indicated the major challenges in introducing computer databases to be the participation of users and the existing computer database systems. The study demonstrated that the DHIS is suitable software for the health information systems, and that data locked in legacy information systems can be safely extracted and migrated to new information systems (24).

A study conducted in South Africa also pointed out several factors affect the lack of data utilization, including a severe shortage of health informatics skills needed to provide the necessary support, feedback and training in information utilization (35).

Another article that have studied factors affecting nursing information systems, which is one type of health information system, states that age, computer knowledge, and usage, and incentive (usage benefit), training, system usability, time spent on planning are the main factors affecting use of the information. The study further indicates that when the incentive to perform and to monitor quality is low, the use of information can be expected to be equally low (36).

Hence, from the above review it can be concluded that resource, technological, behavioural, societal, organizational and cultural factors are affecting the use of health information system.

2.5.4.1 Health information system in Ethiopia

HMIS has been one of the seven major components of the third Ethiopian health sector development plan HSDPIII (7). It is clearly stated on the development plan that HMIS will help evaluate and monitor the progress of the country towards better health delivery. Ethiopia, like other countries in the world have gone through various reform programs to monitor and evaluate the existing HMIS. There are also different guidelines whose overall aim is to stimulate and support evidence based decision making (37).

However, the performance of the system is often reported to be very low in terms of data quality for decision making. A report from Ethiopian HMIS Reform team noted that the HIS does not address the root cause of overall poor data quality and insufficient use of information to improve health service delivery across the country. The report further implies that if information is not used by those who produce the service; it has limited value to the organization (10, 37). It is also added that the focuses of HMIS reforms were to make sure information use.

Despite the efforts made to improve the HMIS of the country, the progress towards a better HMIS which leads to better health delivery is far below satisfactory (10, 37). This may imply the presence of policy and implementation gaps. Ethiopia has limited capacity in core health information services to meet health Information needs. There are independent epidemiological surveillance systems that could support timely decision-making in case of emergencies. Though functional central HIS unit established in the Ministry of Health which supposed to play the roles coordinating, strengthening and maintaining the national HIS, including the ongoing HMIS reform, however, the unit lacks adequate resources to effectively maintain and upgrade the status of HIS to a level that meets the health information requirements of the country. The problem progressively increases as we move down to the Woreda health offices and health facility (11).

According to HSDP III, delivering health care services to the population is a complex attempt that is highly dependent on information for proper planning, implementation, monitoring and evaluation which requires functional HMIS. In Ethiopia, it has long been recognized that health information is rarely used for management decision-making. A number of data is collected from different health facilities and reported in a number of formats, which is in poor quality, incomplete and untimely. The major problem for this is that, lack of awareness given to HMIS, shortage of resources (human, material and financial), and lack of strategic decision (6).

Quality of data justifies its precision to promote evidence based decision making. Low quality data thus results in poor performance monitoring which results in irrelevant decision making. Thus there is a need to measure the quality of data generated (10).

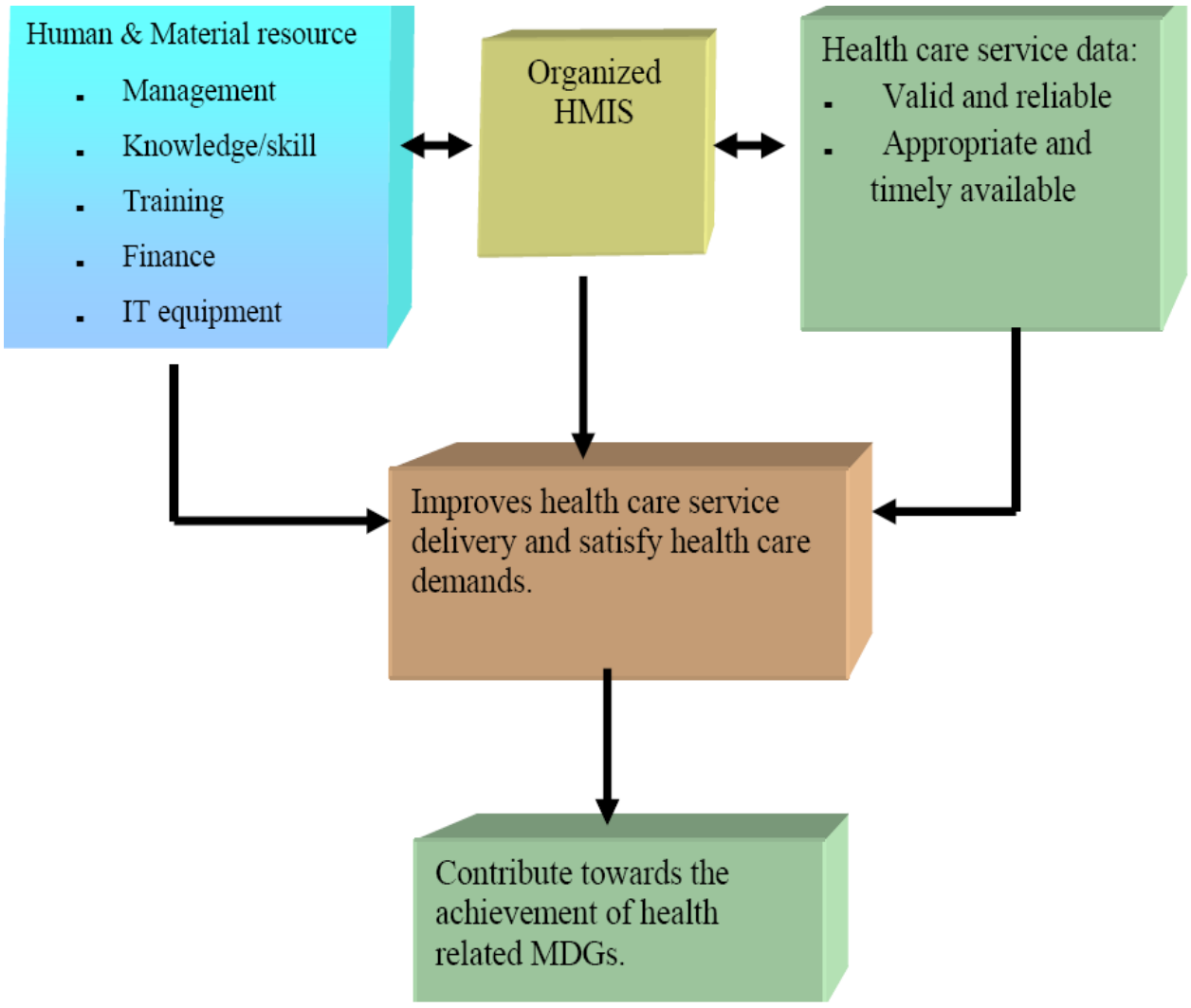
Assessment of the utilization of Health Information System at district with particular emphasis to HIV/AIDS program that carried out by Gashaw, 2006 shows that, the Utilization rate of information was 22.5% in all the study units and 8% for HIV/AIDS Units and the general implementation of health information system was 12%. The author identified salary, training, presence of standard data collection methods, transmission, processing, and reporting rules as the major factors hindering utilization rate. (38).

In general observation, assessment on obtaining reliable data and information use for decision making have been conducted in several countries like Ghana, Nepal, Latvia, South Africa, Zambia, Rewanda,Uganda and Pakistan; all have stated the presence of similar problems, which mainly emphasized on the lack of culture of use of information, even the available data and information at al levels of heath management units and facilities, lack of motivation and work overload of data collectors, and system failure specially computerization at district level. “Most of the time planning and management decisions are done without relevant information and there is culture of non-evidence based decision making (39).

2.6 Conceptual frameworks

In the growing demand of quality health care services and complexity of health related data, organized HMIS is vital to improve the quality and efficiency of supply and thereby satisfies the demand. Availability of qualified human resources responsible to provide valid, reliable, and timely information to decision makers determines the efficiency of health management information system (figure 1). Therefore, organized health information helps to improve the health service delivery to satisfy public health care demands and competitiveness of the sector.

Figure-1: Conceptual frame work for the assessment of HMIS implementation



3. Objective of the research

3.1 General objective

To asses the current status and problems of HMIS implementation in the study area and suggest possible solutions for improvement.

3.2 Specific objectives:

- To assess the availability of resource (human, financial, & material) for HMIS.
- To describe the process of data generation and transmission in the current HMIS implementation;
- To assess the status utilization of the generated information for health programme management in planning, monitoring, and evaluation
- To investigate the factors affecting the HMIS from valuing of generated data, sense of responsibility in the system and information culture perspective.

4. Methodology

4.1. Study area and period

The study was conducted in Harari Regional state. It is 515 km away from A.A to the south-east part with estimated area of 304.5 km^2.The estimated total population for 2002 EFY is 179,000 (of which 60% urban and 40% is rural). This is divided in to 9 districts and 36 Kebeles. There are 6 hospitals in Harari region of which 2 are owned by the regional health bureau while the rest are owned by other governmental and private organizations. In addition to this, there are 8 health centers and 22 health posts. Moreover, there are 10 private clinics (not for profit) and 15 private clinics (for profit) (40). And the duration of study was conducted between January and June, 2010.

4.2 Study design

Cross sectional study design was employed using both quantitative and qualitative methods of data collection.

4.3 Source population

All public health facilities in the region, woreda health office and RHB who were implementing HMIS, all staffs who has been working in those health institutions, all patient encounter registers and statistician were considered as source population for both the qualitative and quantitative methods.

4.4 Study population

The study populations were those health institutions which fulfilled the inclusion criteria i.e. coordinating and implementing the new HMIS in the region. Study population was categorized in to two major groups-the administrative units and the service providers.

1. Administrative units' Regional level
   District level

2. Service providers	Hospital level
	Health Center

Inclusion criteria

All public health facilities under the regional health bureau that have started implementing HMIS before one year were included in the study.

Exclusion criteria

Those newly constructed health facilities and health posts didn't start full implementation of HMIS excluded from the study population. Moreover, the new HMIS was not yet implemented in all private health facilities. Therefore, all of them were excluded from this study.

4.5 Sample size and sampling procedures

In this assessment no sampling technique was used to select study facilities because all health facilities which have implemented the reformed HMIS in the Harari regional health bureau were considered in the study. In addition to this the Regional Health Bureau (RHB) and Woreda Health Offices (WorHO) were included in the study.

For quantitative data collection methods, all health professionals and statisticians or data clerk involved in the implementation of HMIS (a total 300 staffs found in 2 hospitals and 5 health centers) were included in the study.

The investigator has employed non random sampling method (particularly purposive sampling) to select all the units/ departments from the source population for the qualitative study.

For qualitative methods on administrative unit
From RHB

a. Head Planning Program Department
b. Disease Control Program Officer
c. Maternal and Child Health (MCH)
d. Health Information Technician (HIT) if assigned or HMIS in-charge,

From the woreda, a health coordinator was considered for in-depth interview. From service providers (head of hospital, head of health center and HMIS focal person in the health facility) were considered by purposive sampling for in-depth interview too. Physical observation was also made by the investigator to supplement the qualitative findings.

4.6 Data collection techniques and instruments

The quantitative method has employed a self administered questionnaire. This questionnaire was used to assess the training level of health care providers in relation to information handling, use of information for their action and pattern of feedback. Besides, it aimed to assess the attitude of health care providers and health managers on data collection and the time they spend collecting/ reporting data.

In-depth interview was used for the qualitative method on administrative unit, head of service providers and HMIS focal persons. The interview was mainly on the availability of adequate resources including trained human resource, HMIS unit, information flows, use of information for program improvement, and on problems related with the implementation of HMIS. A Semi-structured open-ended in-depth interview guide was prepared and used.

Checklists were also used for recording the information obtained from physical observation (checking the structures, activities, working environment, availability of equipments and indicators).

4.7 Study variables

Dependant variable

- Information utilization in the reformed Health management information system

Independent variable

- Sex
- Work experience
- Monthly income
- Feedback and supervision
- On job training

- Easily accessibility of records
- The presence of incentives
- The attitude of staffs and health managers
- Clear data definition
- Participation in planning
- Presence information technology equipments
- Quality of data
- The commitment of staffs and health managers

4.8 Operational definitions

Data: Is collection of facts that an information systems transforms into useful Information

Feedback: get response to the reports they send, negative or positive.

Health Management Information system: service based data and information that are Collected routinely from day-to-day delivery of services and combined together to achieve a certain objective.

Information: an organized set of data that gives meaning

Legislative and regulatory and planning framework concerning the use of HMIS: are the rules that are set out by the facility itself or adopted from some standard that govern the use of HMIS in the facility in terms of data collection, processing, storage, retrieval, dissemination and use for other purposes.

Utilization of Information: use of information for different purpose (planning and decision making, to observe service delivery, to provide information for those who need it) at all levels of health sector.

4.9 Data analysis procedures

After the data cleaning, sorting, coding and entering finished, it was analyzed using SPSS and Epi-info software. Description of data was made using tables and graphs for quantitative data. For the in-depth interview after data was collected by using tape record, it was carefully

transcribed and translated then it was grouped to similar data. Finally thematic analysis technique was used to analyze the in-depth interviews for qualitative data.

4.10 Data quality management

Various efforts were made to assure the data quality. Personal supervision was made especially in data collection process. The questionnaire was pre tested with a similar study population in hospitals and health centers a week before deployment for data collection which helped to make final modifications of the questionnaire. A short briefing was given to the informants when the questionnaires were distributed to make sure the respondents well understood what the researcher wanted to investigate. Completeness and legibility of the questionnaires filled by the informants were checked on the spot. The researcher has attempted to carefully enter and analyze the collected data.

4.11 Ethical considerations

The study was carried out after getting permission from the ethical clearance committee of Addis Ababa University, Medical Faculty through School of Public Health. Data were collected after getting written Ethical clearance from Harari Regional Health Bureau. Information sheet and written consent forms were delivered along with each questionnaire and all the subjects were asked if they are willing to participate in the study. Informed verbal consent was obtained from all interviewed subjects. Objective of the study was discussed with each participants and privacy was maintained during interview. All the interviews were transcribed with great care and questionnaire were also distributed in such a way that the respondents were helped in case they face a difficulty.

5. Result

Results of the survey

Out of the 300 questionnaires distributed 270 were returned which gives response rate of 90%.The none responses were due to reasons such as being on annual leave and work overload.

Socio-demographic

Table-1 describes that the socio-demographic characteristics of respondents. The sex distribution of individuals working in the study units showed that 121 (44.8%) were males while 149 (55.2%) were females. One hundred thirty respondents (48.1%) were within the age of 23-27 years old with a mean age of 29 years. The majority of the respondents 128 (47.4%) have a salary ranging <1000 Eth.Birr with 560 to maximum 5700 minimum salary and 176 (65.2%) with 0-4 year of services. The majority of the respondents were nurses 157 (58.1%) and distribution of level of education showed that health workers with diploma constituted 207 (76.7%), Degree 42 (15.6%) and Medical doctor 21 (7.8%). Most of the respondents 192 (71.1%) were technical staffs (those staffs giving care service), department heads who comprise 69 (25.6%) and methrones (head nurse) 9 (3.3%) of the respondents respectively.

Table-1 Socio-demographic characteristics of the respondents working in study units, Harari region, 2010.

Socio demographic characteristics(n=270)	N	%
1. Sex		
Male	121	44.8
Female	149	55.2
2. Age disruption		
18-22	26	9.6
23-27	130	48.1
28-32	50	18.5
33-37	22	8.1
38-42	20	7.4
>42	22	8.1
2. Monthly income		
<1000	128	47.4
1000-1500	73	27.0
1501-2000	42	15.6
>2000	27	10.0
3. Work experience		
0-4	176	65.2
5-9	42	15.6
10-14	24	8.9
15-19	10	3.7
20-25	11	4.1
>25	3	2.6
4. Qualification		
Health officer	11	4.1
Nurse	157	58.1
Information technician	23	8.5
Laboratory technician	29	10.7
Midwife	3	1.1
Pharmacy technician	21	7.8
General practitioner (MD)	12	4.4
Other	14	5.2
5. Level of education		
Diploma	207	76.7
Degree	42	15.6
Medical doctor	21	7.8
6. Position of the respondent		
Department heads	69	25.6
Methrones	9	3.3
Technical staff	192	71.1

Table-2 discussed that the number of respondents by health facility. Majority of the respondents were from Hiwot fana hospital and Jegole hospital that comprises 132 (48.9%) and 79 (29.3%) of the total participants respectively

Table-2 The type health facility by number of respondents, Harari region, 2010

Name of the facility(n=7)	N=270	%
Hiwot fana hospital	132	48.9
Jegole hospital	79	29.3
Hassenge health center	15	5.6
Genella health center	13	4.8
Sofi health center	12	4.4
Arer health center	10	3.7
Arategna health center	9	3.3

Table-3 showed that the number of respondents by their departments in the study facility. Majority of respondents 40 (14.8%) and 31 (11.5%) were from Medical out patient and from Medical ward (in patient) department respectively.

Table-3 The departments by the number of respondents, Harari region, 2010

Variable	n=270	%
Medical OPD	40	14.8
Medical ward (IPD)	31	11.5
Laboratory	29	10.7
MCH	25	9.3
Emergency OPD	22	8.1
Pharmacy	22	8.1
Medical record	15	5.6
OBS and Guyn	15	5.6
ICU	14	5.2
Surgical	12	4.4
VCT/ ART	17	6.3
Paediatrics	8	3.0
PICT OPD	7	2.6
Tb clinic	7	2.6
Radiology	4	1.5
Physiotherapy	1	0.4
Telemedicine	2	0.7

Assessment of facility HMIS inputs

Table-4 discussed that the availability of necessary inputs used to implement the new HMIS in the facilities. Out of all the health facility's respondents 168 (62.2%) have revealed that the existence of legislative, regulatory and planning framework concerning the use of HMIS but 62 (23%) respondents assured that there was no legislative, regulatory and planning framework concerning the use of HMIS. The rest of 40 (14.8%) respondents didn't know whether the existence of legislative, regulatory and planning framework concerning the use of HMIS or not. The presence of a unit/department with focal person specific to HMIS was also approved by 163 (60.4%) respondents while the other confirmed that there is no unit and they didn't know whether department/ unit with focal person existence or not. The numbers of respondents who have answered "yes" to the question that asks if they believe adequately organized (personnel, space, logistics) assigned specifically to HMIS unit were 53 (19.6%) of the respondents.

Out of 270 respondents 179 (66.3%) answered that there was no regular training given about the new HMIS but 55 (20.4%) of them reported that there was regular training given to the staff's. The remaining 36 (13.3%) didn't know whether training was given to the staff or not.

According to the study only 44 (16.3%) respondents approved that their facility assign budget for HMIS activities. These respondents were further enquired to rate the adequacy of the budget. Among the 44 respondents all except 5 respondents were found to have inadequate budget.

Table-4 Availability of HMIS inputs by number of respondents, Harari region, 2010

Variable	Yes%	No%	n=270
Existence of legislative, regulation Concerning planning framework HMIS	168(62.2)	62(23)	230
Have HMIs unit/ focal/Person	163(60.4)	70(25.9)	233
Budget allocation	44(16.3)	122(45.2)	166
The presence of on job training	55(20.4)	179(66.3)	234

Figure-2 demonstrated that the availability (continuity of supply or copies) of the formats most of the health facility by respondents. 131 (48.5% have assured that they rarely faced shortage of formats and 100 (37%) respondents assured that they never face any shortage of formats. The remaining 39 (14.4%) of the respondents approved that they usually face shortage of formats. Out of those face shortages formats usually, 20 (51.3%) respondents try to solve it by getting the formats by bring from other health facility and 17(43.6%) respondents they assured that they make photo copy with their money respectively.

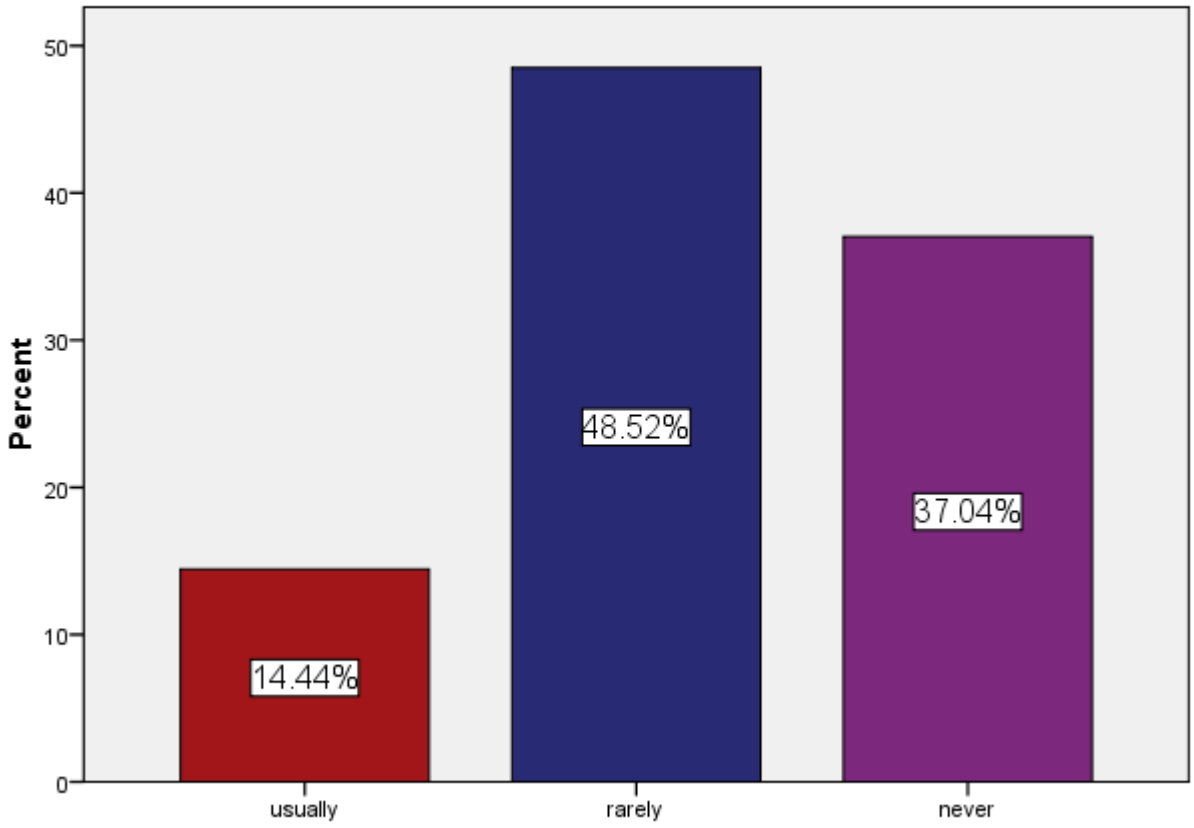


Figure-2 Shortage of formats in the facilities by number of facilities, Harari region, 2010

Table-5 showed that the Availability of IT Equipments by number of respondents. Respondents were also asked for the presence of the necessary IT (information technology) equipments to perform HMIS tasks. 212 (78.5%) respondents of the facilities reported that they have the equipments although the type varies as described below but the remaining were reported that no presence of IT equipments in their facility.

Table-5 Availability of IT Equipments by number of respondents, Harari region, 2010

IT equipment	Numbers of respondent who says yes (n=212)			
	N	hospital	Health center	%
Computer	211	174	37	99.5
Fax machine	11	9	2	5.2
Printer	156	129	27	73.6
Telephone	62	51	11	29.2
internet	22	18	4	10.4

The sum exceeds the total number of respondents because of multiple responses.

Table-6 Illustrated that the common tools used to collect HMIS data in the facility were registers and tally sheet as approved by 224 (83%) and 145(53.7%) respondents respectively.

Table-6 Common tools for collecting HMIS data by numbers of respondent used, Harari region, 2010.

Common tools	**Numbers of respondent who says yes (n=270)**	
	N	**%**
Patient card form	84	30.4
Registers	224	83
Tally sheet	145	53.7
Other(white paper)	2	0.7

The sum exceeds the total number of respondents because of multiple responses.

Assessment of HMIS process

Table-7 described that the information on HMIS core process of the facility. Of all the respondent's 200 (74.1%) revealed that they collect health data on a daily activity of patient care but only 59 (21.9%) they didn't collect health data on daily activity of patient care. The remaining 11 (4%) respondents they didn't know whether they collect health data or not. Out of the total respondents 88 (32.6%) of them thought that the data to be collected on new HMIS was excess from the old HMIS but majority of the respondents 145 (53.7%) thought that the data to be collected on new HMIs was not excess from the old HMIS. 37 (13.7%) of the respondents didn't know which one was excess over the other. According to the study 156 (57.8%) respondents approved that socio-economic and demographic data were included in the new HMIs but 98 (36.3%) respondents revealed that socioeconomic and demographic data were not included in the new HMIs. Among all the respondents 103 (38.1%) revealed that there was frequent feedbacks and supportive supervision given for their department from respective supervisors in every month. 148 (54.8%) respondents have stated that they take data collection as part of their job, out of these 53 (19.6%) and 52 (19.3%) respondents gave (devote) their time for data collection monthly and daily respectively. 119(44.1%) respondents state that they didn't take data collection as part of their duty.

Table-7 Information on HMIS core process of the facility by number of respondents, Harari region, 2010

Variable	Yes%	No%	n=270
Collect health data on daily Patient care	200(74.1)	59(21.9)	259
Overload of data to be collected In new HMIS	88(32.6)	145(53.7)	233
Collect socio-economic and Demographic data	156(57.8)	98(36.3)	254
Presence of frequent feedbacks And supervision	103(38.1)	148(54.8)	251
Consider data collection as a job	148(54.8)	119(44.1)	265

Totally out of 270 respondents 166(61.5%) of them approved that the reformed HMIS was rated easily accessible (retrievably) of the information for appropriate staffs. In addition with this respondents also asked on clearly understand of the reformed HMIS data, majority of them 174 (64.4%) assured that it was clear to understand.

Figure-3 stated that self assessment on staffs and health manager commitment to ward the collection data, prepare report and use information. 135 (50%) respondents thought that the staffs and health managers of their facility were poorly committed to ward the collection data, prepare reports and use information but 44.07% of the respondents stated that the staffs and health managers of their facility were committed to ward the collection data, prepare reports and use the information for decision making. 5.93% of the respondent didn't know their staffs and health managers committed or not toward the collection data, prepare reports and use the information for decision making.

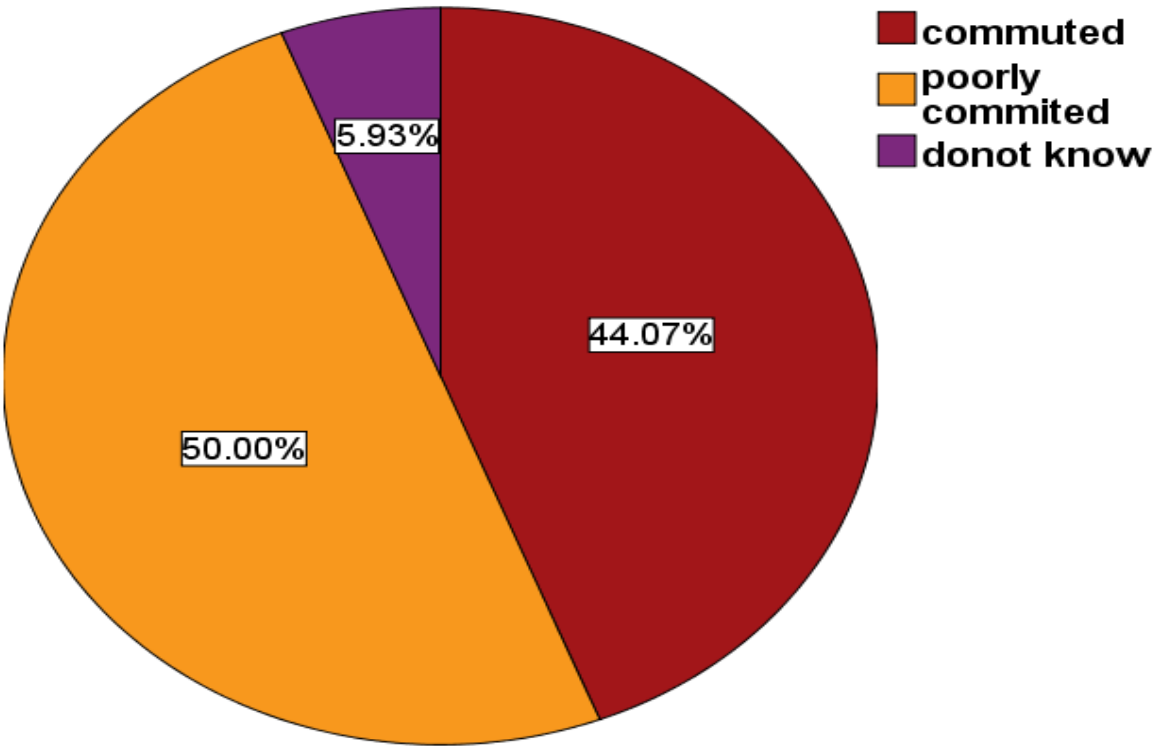


Figure-3 Self assessment on staffs and health manager commitment to collection data prepare report and use information, Harari region, 2010

Table-8 illustrated those possible reasons by personal feeling on the gap between the service providing by the participants and the report generating in the facility. Based on the personal feeling of individual working in the study area, respondents were asked about whether they feel a gap between the service they provide and the report they generate with available data. 171(63.3%) respondents argued that there was a gap. Out of those respondents feel gab, 120 (70.2%) respondents stated that the possible reason was because of the data were not fully recorded and 115 (67.3%) respondents approved that it was because of data were not properly compiled.

Table-8 Personal feeling on the gap between the service providing and the report generating, Harari region, 2010

Possible reasons	Numbers of respondent who says yes (n=171)	
	N	%
The service had not equipment and human resources	108	63.2
Data were not fully recorded	120	70.2
Data were not properly compiled	115	67.3
Other(some diseases need detail diagnosis can't be classified	27	15.8

The sum exceeds the total number of respondents because of multiple responses.

Two hundred fifteen respondents (79.6%) believed that HMIs by it self has direct impact on improved functioning of health service delivery but the remaining 55 (20.6%) respondents believed that HMIS by itself has not direct impact on improved functioning of health service delivery.

Respondents were asked whether they have computer program/software in use to prepare reports. Two hundred) respondents (74.1% approved that they have computer program/software in their department.

Figure-4 showed that the types of soft wares found in Harari region. Out of those who have software in their department, 117 (58.5%) respondents have Microsoft Excel, 70 (35%) respondents have District health information system and 11 (5.5%) respondents have Microsoft word processing used for generating report in their department.

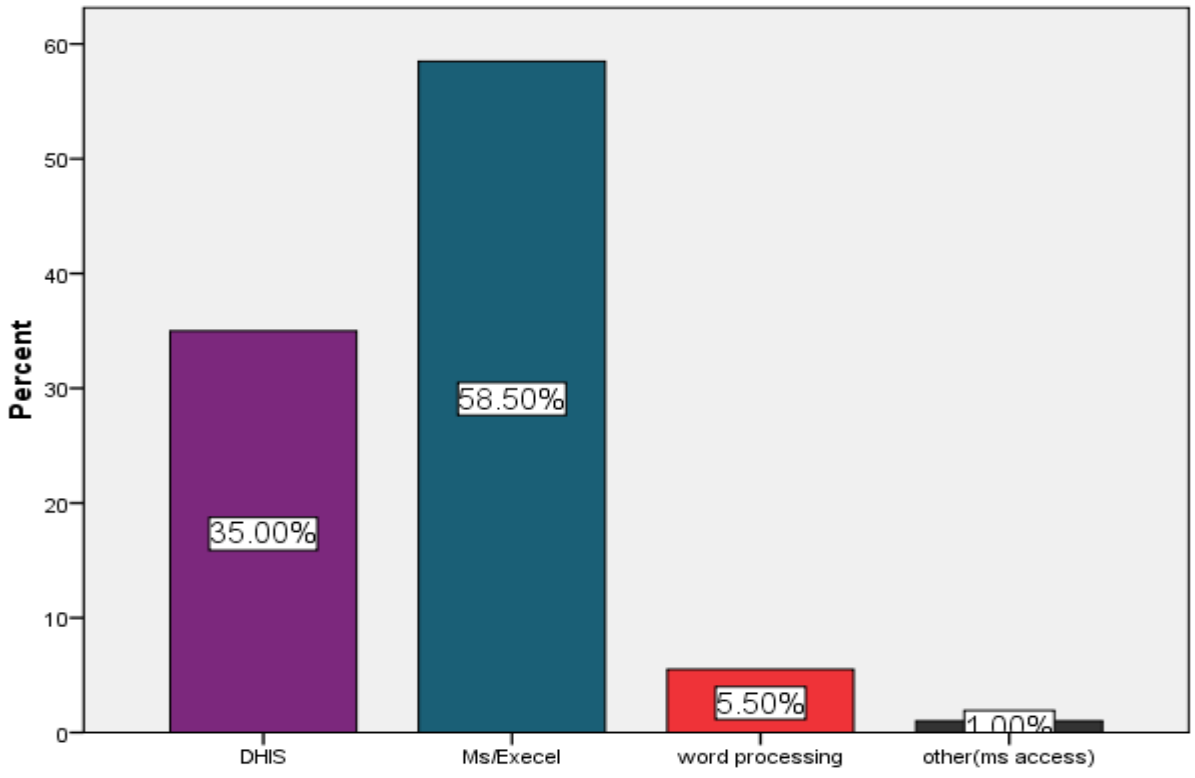


Figure-4 Types of the software by respondents, Harari region, 2010

Figure-5 showed that participant on how far they benefited from the soft ware. Among 200 respondents that have soft ware for generating report, 120 (60%) respondents thought that they were used poorly. only 38 (19%) respondents approved that the software was very helpful to analyze data and generate new information and 13 (6.5%) respondents believed that the software was helpful to sum-up data. The remaining 29 (14.5%) respondents approved that they haven't used before. The respondents also asked on the introduction of the software in to facility whether improved the efficiency of their department. 121 (60.5%) of respondents didn't know whether it has efficiency or not the software on their department. 43 (21.5%) respondents approved that the introduction of the software improved the department's efficiency. out of this 19 (44.2%) respondents claimed that the software improved the department in terms of minimizing burden.

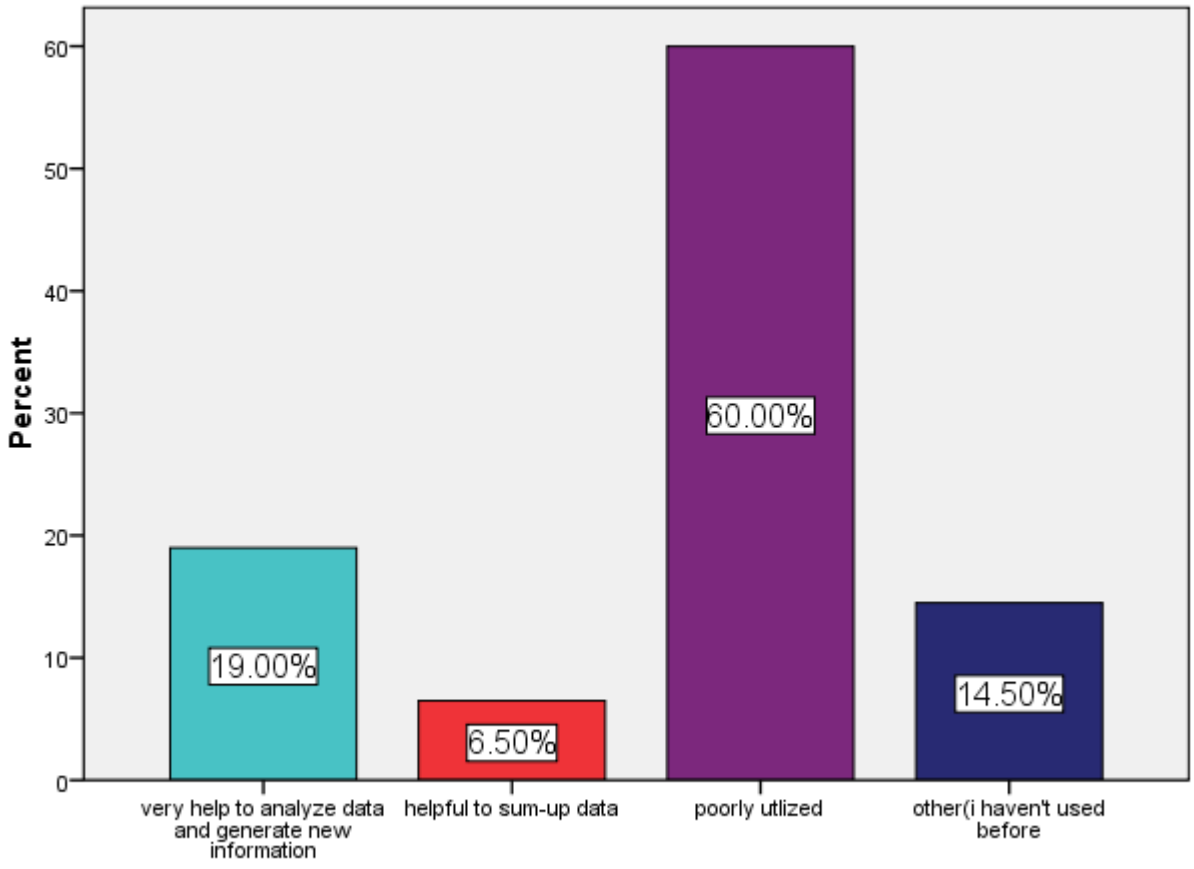


Figure-5 Benefited from the soft ware by participants, Harari region, 2010

Regarding documentation of HMIs data 254 (94.1%) respondents reported that the HMIS data were documented in paper form. 55 (20.4%) respondents reported that they were documented in computerize form.(**the number of respondents is greater than the sample size because of multiple answer possible)**

Table-9 described that measurement of data quality by participant's agreement on the. The data quality indictors like timeliness, consistency, representative ness, disaggregating and completeness were assessed. Among the total participants 138 (51.1%) agreed that the data collected was timely and 137 (50.7%) respondents said that the records were consistent. 133 (49.3%) respondents reported that the data collected was representative while disaggregating and completeness of the data reported by 196 (72.6%) and 103 (38.1%) respondents agree respectively.

Table-9 Measurement of data quality by number of participant's agreement, Harari region, 2010

Variable	Agree%	Disagree%	n=270
Timely	138(51.1)	101(37.4)	239
Consistent	137(50.7)	108(40)	245
Representative	133(49.3)	103(38.1)	236
Disaggregated	196(72.6)	53(19.6)	249
Completeness	103(38.1)	132(48.9)	235

Concerning the existence of data quality controlling and continuous quality assurance mechanisms, 105 (38.9%) of the respondents reported that there was a mechanism for data quality control but 115 (42.6%) responded assured that there was no mechanism for data quality control. 50 (18.5%) responded reported that they didn't know whether there was a mechanism or not. Out of those who said there was mechanism for data quality control 69 (65.7%) reported that they undergone a mechanism of monthly review on data quality control and continuous quality assurance.

Assessment of HMIS out put

Figure-6 demonstrated that the level of information utilization in the reformed HMIS. 60 (22.2%) of respondents reported that they were using the information, whereas 202 (74.4%) of them were not utilized the information at all. Other 8 (3%) of them didn't know whether the information was utilized or not.

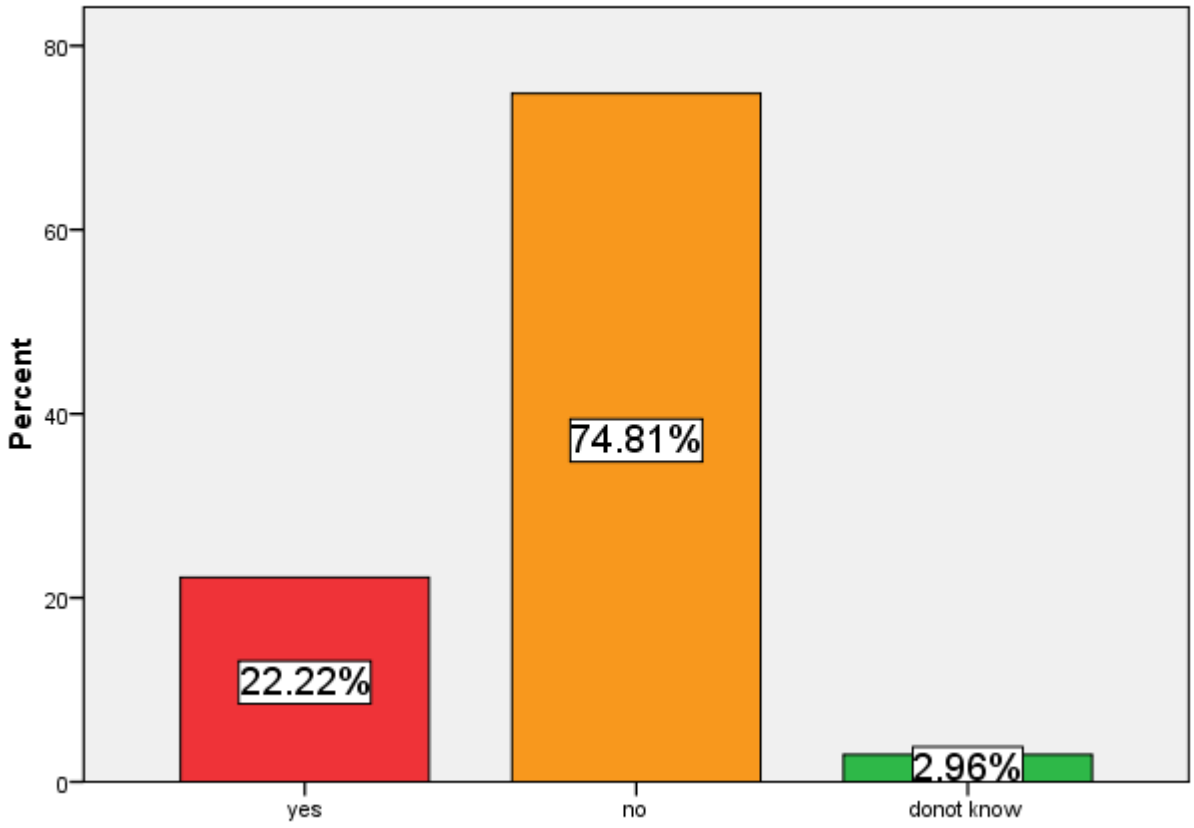


Figure-6 The level of information utilization in the reformed HMIS, Harari region, 2010

Table-10 Illustrated that the purpose of utilizing health information in the new HMIS by respondents. 20 (33.3%) of the participants reported that they utilize the information for planning and decision making, 22 (36.7%) of them reported that they utilize the information to observe trends on service delivery, 58 (96.7%) of them reported that they utilize to forward for upper level and 17 (28.3%) of them reported that they utilize the information to pass for financial assistance (subsidy) NGO's and governmental health offices.

Table-10 Purpose of utilizing health information in the new HMIS by number of respondents, Harari region, 2010

Purpose of the health information	**Numbers of respondent who says yes (n=60)**	
	N	**%**
For planning and decision making	**20**	**33.3**
To observe trends on service delivery	**22**	**36.7**
To for ward for upper level	**58**	**96.7**
To pass the data for subsidy health office	**17**	**28.3**

The sum exceeds the total number of respondents because of multiple responses.

Concerning the frequency of preparation reports majority of participants 168 (62.2%) approved that they were prepare reports every month and 111 (41.1%) respondents also reported that they prepare the reports quarterly.

Table-11 explained that the health information was actually utilized by whom. 164 (60.7%) respondents claimed that the regional health bureau actually used the information generated in their facility.

Table -11 The actual utilizing of health information in the new HMIS, Harari region, 2010

Actual use of information	Numbers of respondent who says yes (n=270)	
	N	%
Only the manager	77	28.5
The administrator	73	27
The health professional in each level	124	45.9
Harari regional health bureau	164	60.7

The sum exceeds the total number of respondents because of multiple responses.

Majority of participant 220 (81.5%) agreed that HMIS workers were being allowed to participate in planning process of the facility. Participants were also asked on major communication with regional health bureau or woreda health office in the new HMIS implemented. 119 (44.1%) respondents reported that the major communication was supervision, 92 (34.1%) participants revealed that there was no communication but only 70 (25.9%) and 40 (14.8%) participants approved that the major communication were feed backs and seminars respectively. (**The sum exceeds the total number of respondents because of multiple responses**)

As regards to the generated information presented in the form of to upper level, majority of respondents 268 (99.3%) approved that they send it as paper form to upper level.

Majority of respondents 167 (61.7%) reported that they distribute the information for department head.

Out of all respondents 214 (79.3%) answered that there was no any kind of incentives/motivation given in the new HMIS information utilization for decision making but 33 (12.2%) of them reported that there was incentive/ motivation given 23 (8.5%) they didn't know whether incentive/ motivation given. Out of those who answered there was incentive/ motivation majority of respondents 18 (54.5%) reported that training was given as incentive/motivation.

As it showed in the figure-7 below, 140 (51.9%) respondents thought that the staffs and health managers of their facility were low attitude to ward the new HMIs.

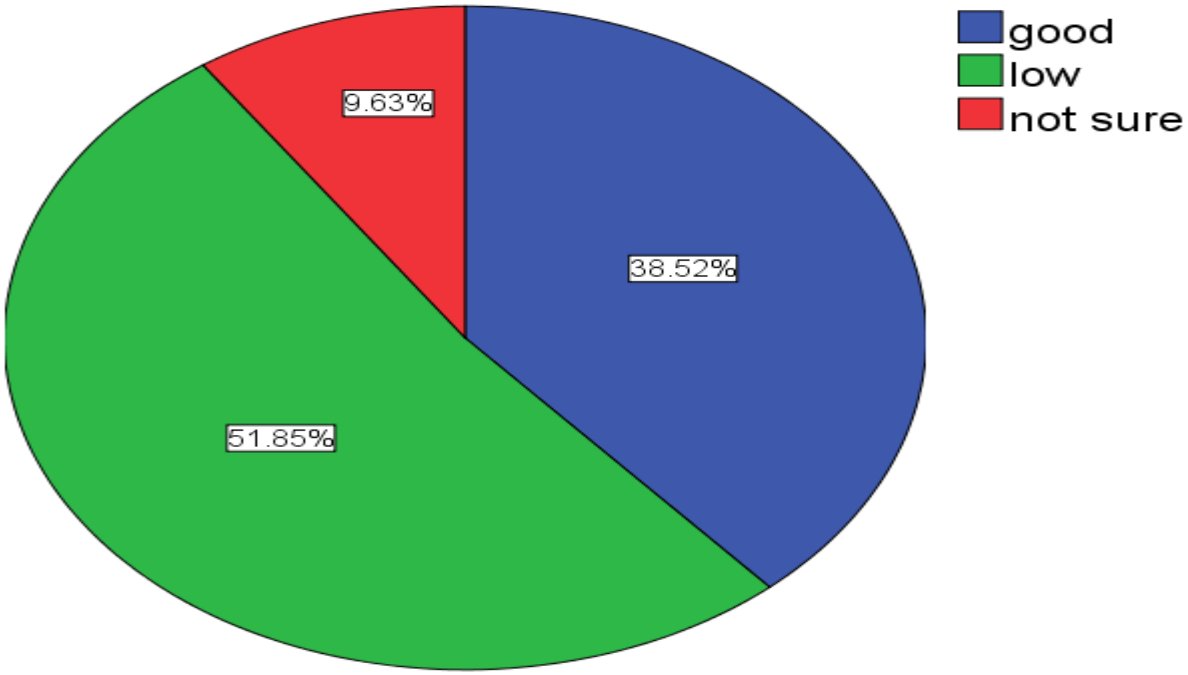


Figure-7 Self assessment on staffs and health manager attitude to the new HMIS, Harari region, 2010

Table-12 described that the respondents of the facilities faced challenges in connection to the new HMIS implementation. 200 (74.1%) and 210 (77.8%) respondents identified that there was lack of coordinated effort and leadership and shortage of skilled human resource respectively.

Table-12 Challenges faced in relation to new HMIs by respondents, Harari region, 2010

Actual use of information	Numbers of respondent who says yes (n=270)	
	N	%
Lack of coordinated effort and leadership	200	74.1
Lack of strategy and policy	24	8.9
Shortage of skilled human resource	210	77.8
Lack of guide lines	182	67.4
Lack of training on new HMIS	188	69.6

The sum exceeds the total number of respondents because of multiple responses.

Factors affecting HMIS utilization

As table-13 and table-14 shown, multiple logistic regression analysis was done to control potential confounders. Utilization of information in the new HMIS implemented was compared with socio-demographic variables such as year of services; sex and monthly income were analyzed. The entire socio-demographic variable did not showed statistically significant associations even before and after adjusted multiple logistic regression.

Utilization of information in the new HMIS implementation was also compared with other important (key) selected variables like presence or absence of feed back and supervision, given among units/departments from respective organization, presence of IT equipments, incentives/ motivation and on job training for HMIS workers. Clarity of definition data, and easily accessible (retrievably) of the records for appropriate staffs in the new HMIs, measuring data quality of the facilities, staffs and health managers of the facility attitude to ward the new HMIS and commitment of the staffs and health managers to collect, prepare reports and use the information for action. Finally HMIs workers participating in planning process of the facility were analyzed. Among the variables listed in table 14 that were considered to affect the utilization of information, commitment of the staffs and health manager to collect, prepare reports and use the information for decision making in crude and adjusting odds ratio showed that it was significant in the odd ratio of 0.53 at confidence interval of (0.05, 0.83). This implies that those staffs and health managers poorly committed less likely to collect data prepare report and use the information for decision making than those committed to do these.

Table-13 Relationship between socio-demographic variables and utilization of information in new HMIS at department level, Harari region, 2010

	Utilization of Information		OR (95%CI)
Variables	**yes**	**No**	**crude**
Sex distribution			
Male	21	95	1.00
Female	39	107	1.65(0.9, 3.00)
Monthly income			
<1000	29	96	1.00
1000-1500	12	59	1.22(0.47, 3.19)
1501-2000	12	28	1.81(0.62, 5.626)
>2000	7	19	0.86(0.29, 2.58)
Work experience			
0-4	43	128	1.00
5-9	6	34	0.5(0.06, 4.24)
10-14	4	19	0.94(0.10, 9.3)
15-19	4	6	0.79(0.74, 8.52)
20-25	2	9	0.25(0.02, 2.95)
>25	1	6	0.75(0.1, 10.23)

Table-14 Relationship between selected variables and utilization of information in new HMIS implementation at department level Harari region, 2010

		Utilization of Information		OR (95%CI)	
Variables		**yes**	**No**	**crude**	**adjusted**
Getting feedbacks					
And supervision	**yes**	**20**	**83**	**1.00**	**1.00**
	No	**35**	**105**	**1.38(0.74, 2.57)**	**2.93(0.90, 9.49)**
HMIS workers					
Participating in planning					
Process	**agree**	**51**	**163**	**1.00**	**1.00**
	Disagree	**9**	**39**	**0.74(0.34, 1.63)**	**0.55(0.13, 2.30)**
Presence of IT equipment					
	Yes	**43**	**162**	**1.00**	**1.00**
	No	**15**	**34**	**1.66(0.830, 3.33)**	**1.03(0.30, 3.56)**
Presence of on job training					
	Yes	**11**	**44**	**1.00**	**1.00**
	No	**41**	**130**	**1.26(0.60, 2.67)**	**0.76(0.22, 2.66)**
Presence of incentives					
Or motivation	**yes**	**8**	**25**	**1.00**	**1.00**
	No	**52**	**156**	**1.0490.44, 2.50)**	**1.05(0.24, 4.56)**
Staff's and health managers					
Commitment	**committed**	**35**	**81**	**1.00**	**1.00**
	Poorly committed	**20**	**111**	**0.42(0.22, 0.87)**	**0.21(0.05, 0.83)***
Staffs and health managers					
Attitude	**good**	**26**	**76**	**1.00**	**1.00**
	Low	**28**	**117**	**0.70(0.38, 1.28)**	**1.01(0.31, 3.27)**
Easily accessibility of records					
Easy		**32**	**128**	**1.00**	**1.00**
Difficult		**13**	**59**	**0.88(0.43, 1.80)**	**0.53(0.15, 1.85)**

Clearly understand of the data				
Clear	**36**	**133**	**1.00**	**1.00**
Unclear	**13**	**59**	**1.23(0.61, 2.49)**	**1.96(0.49, 7.81)**
Measuring data quality				
Agree	**19**	**60**	**1.00**	**1.00**
Disagree	**30**	**127**	**075(0.39, 1.43)**	**0.99(0.31, 3.12)**

*significant because one is not included in the confidence interval at p value 0.026

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Results of the in-depth interview

An in depth interview was conducted in two hospital, five health centers, two woreda health office and regional health bureau. In-depth interview was conducted with HMIs focal persons, medical directors and head of health centers who are the key personnel with respect to data generation and utilization at hospital and health center level. In-depth interview was also conducted with woreda health office coordinator and four department's heads (PPD, disease control program, MCH and HMIS focal person) from Regional Health Bureau.

In-depth interview on service providers

The HMIS focal persons are the one who lead the data collection, analysis and reporting while; medical directors and head of health centers are the ones leading the management decisions at hospital level and health center level.

Four questions was raised to HMIS focal persons, head of health centers and medical directors of the facility dealing with over all HMIS process, supervision and feedback system, skill development of training staffs with motivation of staff's and existing challenges in connection to HMIs implementation.

All key informants discussed on the input and resource availability at the hospital and health center. They all stated that "*All formats and registration books are available at health centers and hospital. The card room is non-standardized in terms of space, shelf. There is also shortage of Master patient index box and other necessary furnishing materials for assisting the HMIS implementation"*.

The head of health centers expressed that "*there is Shortage of budget and it is not allocated directly to health centers. Even though the budget is allocated on behave of the health center, our budget is found at woreda level, so that we are not able to decide or utilize based on the health center needs. In general there is financial deficit at all"*. They also explained that there were no guidelines of HMIS at all, so that they did not follow the guidelines. However they

follow a short day training manuals. Hiwot fana hospital HMIS focal person said that "*I don't expect the availability of effectiveness and efficient utilization of information for better decision; there fore it will be important to give emphasis on availability of guideline at service giver sites. There is low skill and experience of HMIs seen at some staffs"*.

Jegole hospital's HMIS focal person disclosed that, "*There is no standard card room in the hospital with shortage of tally sheet, paper, marker and graph papers so how can I say HMIS is implemented in the hospital. Before they implement it they should think of it what first come according to the standard"*.

The two hospital medical directors stated that "We had had adequate computers from TUTAPE. But, there is no HIT at hospital";

The head of health centers expressed that "*there is Shortage of budget and it is not allocated directly to health centers. Even though the budget is allocated on behave of the health center, our budget is found at woreda level, so that we are not able to decide or utilize based on the health center needs. In general there is financial deficit at all"*. All HMIS focal person informants of the service providing stated that, "*there is lack of training for new staffs and even the previous training was not sufficiently provided and it was not given to all staffs."*

HMIS focal persons of the two hospital respondent argued that" *record keeping is difficult in the hospitals where the health works are working under pressure. They get exhausted visiting a number of patients per day, neglect adequately recording patients' information. The quality of information produced under such circumstances is unreliable"*. The interviewees reported that the presences of regular meeting with units/departments to discuss about issues of the hospitals on HMIS which problems encountered were discussed to find solutions and feedbacks. All of the informants disclosed that they have no written HMIS guide lines documents that are currently in use by the hospitals.

The head of the health centers and medical directors said that, "*training was provided for five days before implementing the reformed HMIS. This training was not given to all staffs and was*

not adequate to know different standards/guidelines of HMIS. Refreshment training was not provided for those who have taken the five days of HMIS training. At a moment new staffs who are assigned at this facility is not taking the basic training on HMIS so that, because of lack of training they have low capacity to implement it".

In terms of staff motivation most of the informants of HMIS focal persons stated that, "It is not necessary to avail big difference of salary payment between staff working at health facilities and to the other staffs of TUTAPE mentors assigned at health institutions. This might increase dissatisfaction with in staff of hospital and health centers. However, we don't say we need additional payment to the HMIS activities performed. In general we suggested that, it is necessary to think motivation package to all staff".

They also commented that, the HMIS is already fully implemented but still it is necessary to facilitate and creating owner ship as the other programs by the staff working at health facilities. However, one of the informants said that, "*We are observing that it lacks institutionalizing of the system of health information"*. They suggested that, if the staffs will equip with full update information of HMIS including technical guidelines, it can able to stand with good performance by the staff themselves. This can help to create ownership at all units of the hospital. They also gave emphasis on the necessary of availability of budget as such of other programs by the decision makers.

Most of the informants argued that there was strong support from RHB and mentors from TUTAPE especially on equipping computer, shelf and other necessary materials to new HMIS and Supervision was given every month by TUTAPE mentors and RHB. Even though technical support (supervision) is giving by mentors, the supervision is like administrative type.

Both the head of health centers and medical directors argued that there was supervision with feed backs but the facility HMIS focal persons argued that there were no feedbacks given from any

one. The health centers head and HMIs focal person showed that, there was low support from Woreda Health office in terms of supervision and feedbacks at all.

The major problems reported by all informants in connection with HMIS implantation were:

- Shortage of qualified personnel
- Inadequacy of HMIS trainings
- Budget limitation to conduct regular staff capacity/skill development trainings, to fulfil resources
- Limited skill to information technologies equipment like computer and Internet
- Limited commitment and attitude to ward HMIS among all staff and management of the facility.
- The HMIS focal person stated that, “still we have challenges on engaging physicians to record data on daily bases and also they expect to handle such data by nurses. He suggested that, it is necessary to involve them by providing continuous training”.
- One of the informants strictly suggested that “Still there is a big challenge which is not solved regarding disease classification. Some disease not able classified based on the new HMIS and even difficult to categorized to the nearest available disease classification. Even though, the reformed HMIS helps to minimize disease classification from previous old HMIS, we expected some important missed diseases which will be included in the new HMIS disease classification. As his opinion it is necessary to revise the disease classification in the HMIS. The hospital medical director also provided additional comment on necessary of revision to ward disease classification.

In-depth interview on administrative unit

The questions raised for the interviews were on availability of resources/inputs, for health management information system implementation in the facilities and the necessary processes and outputs of Health management information system implementation; what challenges the use of HMIS in general.

Woreda Health office:

The Woreda health offices head stated that, "there was only one staff alone assigned at woreda health office level. It was difficult to conduct the expected work alone successfully".

As the head of the woreda health offices stated that, there was no deficiency of input/resources except technical standard guidelines of HMIS and finance. They also argued that, "*there is poor communication with RHB. For instance, they were conducted supportive supervision directly with out the knowledge of woreda health office in the facility. In terms of HMIS, still there is low support from RHB and this is due to low capacity on HMIS and resources like registration book and formats are distributed directly to the health facilities through them"*.

The head of woreda health offices said that "Training was provided once for five days. However, it needs basic training for the new staffs as well as refreshing training to those trained staffs."

The head of woreda health offices also said that "*at Woreda health office the administration is handled by pulling system, due to such problems we are not empowered fully in terms of accessing/manipulating the planned budget (as they said, we have got the actual finance without considering the Woreda health office need/or planned budget)"*. They discussed with RHB on especial shortage of finance that helps to strengthen the health service including HMIS. They also reported that there was lack of vehicles/motor cycles that will help to give support to the health facilities.

They also insisted to suggest on comparing the reformed with old HMIS: "After reformed implementation of HMIS, it minimizes burden of work load (due to presence of uniformed format and quarterly reporting system), improves data quality in terms of accuracy, completeness and time lines. However, the old HMIS have a lot of indicators, not simple, not integrated, and

every service unit expected to compile and send report to different stockholders by different formats.

The major challenges reported by head of woreda health offices informants in connection with HMIS implantation were:

- Inadequacy of HMIS trainings
- Budget limitation to conduct regular staff capacity/skill development trainings, to fulfil resources
- Limited skill to information technologies equipment like computer and Internet
- Limited commitment and attitude to ward HMIS among all staff and management of the facility.
- Poor communication with regional health bureau
- Lack of vehicles/motor cycles that will help to give support to the health facilities.
- Limited human resources like midwifes, clinical nurses and card clerk in health centers

Lastly they recommended that, “it is important to distribute technical guidelines, all necessary formats, tally on time, and support (in terms of training, finance, HMIS technical guidelines and human resources) from higher body for better service provision including strengthen the reformed HMIS. It is also important to create better communication with RHB”.

Regional Health Bureau:

The questions raised for the interviews were on availability of resources/inputs, for health management information system implementation in the facilities and the necessary processes and outputs of health management information system implementation; what challenges the use of HMIS and the solution given.

More than two informants said that, "*The registration and formats are available adequately. There is lack of HIT at region and facility. Computers are adequately available at all sites, at RHB and woreda health office level. There is lack of technical guidelines. There is good communication and leader ship internally and from higher levels. The new HMIS is simple, integrated, minimize burden of data, and improve data quality from old HMIS"*.

In terms of Job satisfaction, they discussed that,*" because of the availability of uniformed format we expected to report to FMOH. But previously before implementation of reformed HMIS, different NGO, FMOH and other stakeholders requested us different report depend on their needs and this was dissatisfied us as well as created work load"*.

Almost all the key informants discussed that, "Before implementation of HMIS five days training was provided to all staff at all levels. However it was not adequate and every staff is not materialized the different technical guidelines on how to use and information utilization for making better decisions".

In terms of information use to wards better decision making they explained that, "*information utilized for reviewing the performance against plan developed. We are able to focus on the HSDP success through HMIS findings. At a regional level the performance is reviewed quarterly on key indicators which refer to HSDP III. The poor performance was identified based on HMIS indictors and followed for improvement/better achievement but at facility and woreda health*

office even though they undergone performance review, they only focus on data quality rather than use the information for decision making".

The major challenges reported by head of department's informants of RHB in connection with HMIS implementation and the solution given are:

- At the beginning of the new HMIS implementation, there was resistance by some staffs and low commitment on the side of ownership. But, held several discussions the problem was subsided.

- Key informant from disease control core process said that, "the public emergency activity report as the standard/ guidelines of public emergency is not included the reformed HMIS format), There is a still challenge to list of disease classification that was not found in reformed HMIS". As he explained that still it is not solved.

- "There is lack of basic and refresher training to the new staff as well as for those already trained on HMIS respectively. The training was not adequately provided at all levels, especially on facilitating the technical guidelines. As a solution we were discussed staff and decide to orient the trained staff to others. Even though some orientation provided for the new staff, there are staffs existing with poor HMIS knowledge and skill".

- There is also lack of technical guideline. However we already utilized the training manuals.

- Some health facilities has shortage of formats, tally sheet and registration room. As a solution they did requisition from RHB or manually prepared and report at a time.

- Still there is a challenge on lack of software like smart care for facilitating the data analysis for improving utilization of data for better decision.

- Still there is a budget constraint in general.

- Some health facilities are not requesting their needs on time unless the RHB and mentors who are the technical supporters visit and distribute every thing which is referring to

HMIS implementation. So that, some needs further commitment for strengthening ownership.

Results of Physical observation

The physical observation includes seven facilities (two hospitals and five health centers and it was mainly focused on the selected departments/units of the studied hospitals and health centers hence these units are responsible to handle HMIS data on day to day activity of patient care.
From the physical observation, the researcher noted that:

All the facility implemented HMIS used standard register book, tally sheet and patient card form to collect on daily patient care.

All the facility have HMIS unit with focal person that coordinate the HMIS activity of the facility and they have also standard reporting formats which helps to integrate the HMIs data around the facility.

Photograph-8 showed that non function computers found in department of the facility. Except sofi health center all facilities have computer in their department that was given by TUTAPE but the computers were not function when the observation take place because they were locked by administrator with unknown reason. The health providers didn't know the reason why the computers locked in their department but they cover the commuters with plastic in order to prevent dirty.

Photograph-8 Non functional computers found in department of the facility, Harari region 2010

Photograph-9 demonstrated that Hiwot fana hospital medical card room. In this hospital the medical card room was organized according to the standard. Even if, they have not avoiding duplicate medical record.

Photograph-9 Hiwot fana hospital medical card room, Harari region, 2010

With the exception of Hiwot fana hospital all those HMIS implementing facility; they have no standard card room. That means they were not furnishing their card room at all according to the standard as shows in the Figure-10 below.

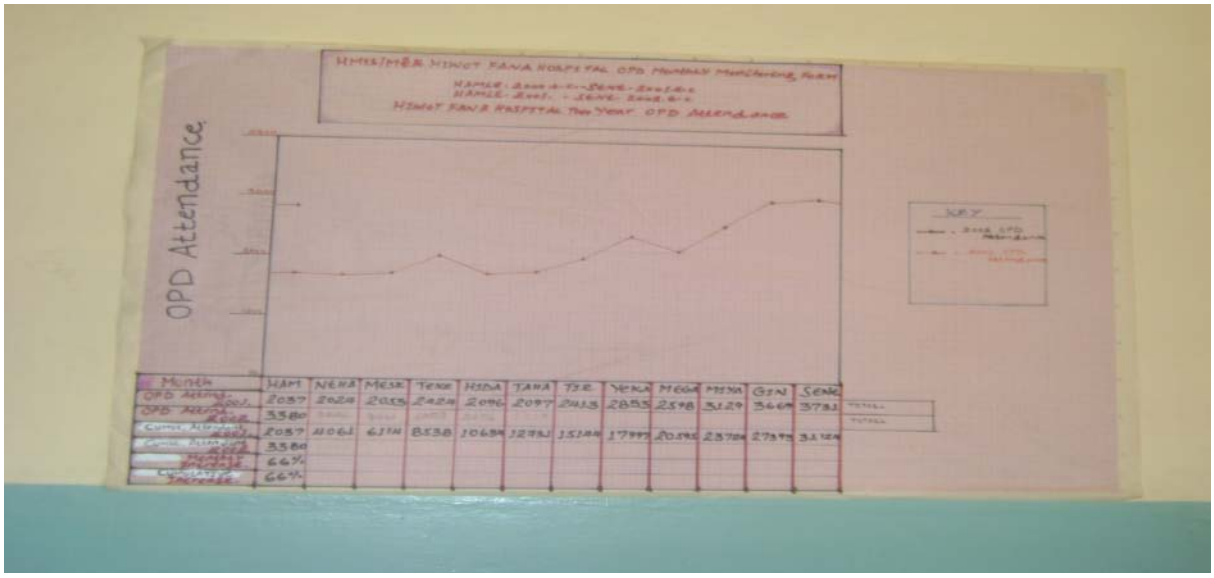
Photograph-10 Other facilities medical card room, Harari region, 2010

All the health facilities also have not adequate skilled human resource especially at card room and other department that is graduated in HIT or IT.

In the Photograph-11 below showed that ten top cause of morbidity in adults and under five years posted in department of the facility except Aere and Hassenge health center all the remaining health facilities posted ten top causes of morbidity adults and under five in their department.

Photograph-11 ten top cause of morbidity in adults and under five years posted in department of the facility, Harari region, 2010.

Photograph-12 confirmed that Annual and quarterly plan performance monitoring chart is posted in the wall of the department's of the facility. Except Aere and Hassenge health center all the remaining health facilities posted the annual and quarterly plan performance monitoring chart in the departments of the facilities.



Photograph-12 Annual and quarterly plan performance monitoring chart is posted in the wall of the department's of the facility, Harari region, 2010.

Photograph-13 shows that computer program or software found in Hiwot fana hospital, all the facilities have not yet any software that is used for generating and used information. But hiwot fana hospital only used software to register new comer patients in order to give Id number before going to other departments.

Photograph-13 computer program or software found in hiwot fana hospital, Harari region, 2010.

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6. Discussion

This study was tried to assess the availability of resources, how data and information generated and utilization of information in Harari regional health. In addition, the study also tried to see the associations between utilization of information with the basic socio-demographic variables and selected variables which may affect the utilization of information at each level.

Availability of inputs in the new HMIs implemented facilities

As the research result showed that the basic inputs of the HMIS (except IT materials and legislatives and planning frame works) have not sufficiently in HMIS implemented facilities. In Oct, 2007 the national information system report of Ethiopia showed that there is lack of adequate resources to effectively maintain and upgrade the status health information system to a level that meets the health information requirements of the country (11). There fore, from these analysis it could inferred that the HMIS of Harari region health bureau that need tremendous effort to change the existing situation particularly, the in adequacy of HMIS resources is of paramount importance because no HMIS reform will ever be successful if adequate resources are not available.

The IT equipment such as computers, printers and internet are believed to be an essential infrastructure required for the development in HMIS as they have great importance in helping to improve data storage, economize time and improve accuracy. Availability, sufficiency and use of resources like computer, printer, fax etc are important to support the enhancement of health information system (41). Though, the study found that with exception of internets and fax machine in the study hospitals and health centers are fully equipped with the essential infrastructures, utilization of the existing infrastructures in processing of routine health information system (data collection, processing, analysis, display, transmission, and quality checking) is found to be very poor. Out of 212 respondents of health care service providing units covered, 211 (99.5%) have computers, 156 (73.6%) have printers, 22 (10.4%) have internet connection and very few 11(5.2 %) have fax machine. As a result these activities are done manually. This is mainly because of inadequate skill and training among the staff which have been seen as bottleneck to the use of IT. These was also checked by making physical observation

by the investigator, except sofi health center all facilities have computers in their department that was given by TUTAPE but the computers were not function when the observation take place. These implies that before fulfilling the hard ware (infrastructure) in the facility, it should first develop the software (creating the skills) how to manipulate the computers unless the result will be happen as the figures shown in the physical observation.

It is important that people who are responsible for managing health data have some formal training in collection, analysis and presenting the information. A study conducted in Tanzania and Mozambique (2003) indicated that 81% health workers have been trained on completing registers. But in the case of the research finding only 20.4% health workers were given on job training on how to change the data in to information and how they utilize the information for decision-making. According to the in-depth interview results showed that the training is given only for five days. Even those who trained staff's couldn't keep in their work area that means there is high turn over experienced staffs in the region. So most of the HMIS activity was done with inexperience and with out trained staff's in general.

Concerning to the in-depth interview, on the reason for the absence of budget in health centers was at Woreda health office the administration is handled by pulling system, due to such problems they were not empowered fully in terms of accessing/manipulating the planned budget. They have got the actual finance without considering the Woreda health office need/or planned budget). There was lack of vehicles/motor cycles that would help to give support to the health facilities. There was lack of basic and refresher training to the new staff as well as for those already trained on HMIS respectively. The training was not adequately provided at all levels, especially on facilitating the technical guidelines. In addition, some staffs are new comers and have no experience at all even though they fulfilled the educational back ground of the MOH standard. According to the key informants confirmed on the importance of the availability of guidelines and updating the staff, if staff train and get such opportunities to read and access to new information, they can improve their experience and having a capacity for better implementation of HMIS".

Regarding to physical observation done by the investigator found that with the exception of Hiwot fana hospital all those HMIS implementing facility, they have no standard card room. That means they were not furnishing their card room at all according to the standard.

HMIS process

Healthcare providers will be inspired to collect and maintain the data quality if they consider the selected data set to be relevant for the task they perform. If in contrary routine information systems collect excessive quantities of data that are not relevant to the health professionals responsible for data recording, then the quality of data often suffers and data use at collection level becomes minimal. Involving all potential users in the selection of the data elements to be included in the essential data set has proved fruitful in increasing ownership and perceived relevance of the information system (38). In this case almost every facility has been collecting health data on a daily activity of patient care. Due to this, majority of the respondents have responded that the case of data to be collected in the new HMIS was not excess than the old HMIS.

Although there is a growing recognition that supportive supervision is important, the practice of supervision often continues as in the past, with the aim of finding fault and blaming the supervisee rather than being supportive and empowering. Higher levels make little effort to use information that is readily available to them through HMIS reporting to understand the weakness and strengths of a lower level so that supervisory support is targeted and tailored to the needs of the supervisee. In addition, supervisors make little use of any information collected during supervision to support a lower level that may be performing poorly. Feedback based on the findings of supervision is rarely provided. Regular supervision, feed back and timely staff training are very important in building the capacity of the HMIS at all levels. HMIS is supposed to be a continuously evolving system through periodic monitoring and feedback mechanisms. However, the reality observed from the findings is different where there is no regular feedback given for HMIS workers for the report they generate and submitted to immediate and the highest decision making bodies. Among these 54.8% of the participant respondents reported that they

didn’t have received any feedback from the higher management bodies. Even though those who reported the presence of feedback and supervision agree that the feedback is not timely but they had had supervision in every month. This shows majority of the respondents have no mechanism of checking themselves whether they were performing well or not. These implies that the regional health bureau should focused on feed backs not only giving supervision only. The supervision and feedback should also give in collaboration with woreda health bureau.

As the researcher referred to the health data reported in (2003) Tanzania and Mozambique were not sufficient to support informed decision-making and health planning. The cause of the low quality of the data identified include incomplete, in accurate, and untimely reporting, lack of resources and office space, existence of legacy information systems, and the existence of parallel reporting systems in the health information systems(24). The old HMIS Ethiopia is characterized by lack of accurate, timely and complete report consequently affecting effective management and decision-making by the managers at all levels(9). Inline with these the research finding showed that most of the respondents have given a response saying that the data was untimely, inconsistent, incompleteness, and representative with the exception of disaggregate in addition, the in- depth interviewees said that the quality the data is low. As well, the lack of quality control and absence of trainings on quality assurance were raised by most of the key informant respondents. Quality of data is mostly measured using these quantities (timeliness, completeness….). There for, it can conclude from the above responses, still the new HMIS is the same with old HMIS. This could be due to absence of on job training in the facility. The study found also weak data quality checking procedures. For instance, out of the total 270, 115 (42.6%) of the respondents reported that there is no mechanism for data quality control while 50 (18.5%) even didn’t know whether there is a mechanism or not.

HMIS out put

A unified, effective and action oriented HMIS is very important for health care data management. It is sometimes implicitly assumed that the value of information is understood by health workers, and that this will lead to evidence-based decisions, and thus to more effective and appropriate use of scarce resources and better execution of work priorities. A report from HMIS reform team noted that the HMIs do not address the root cause of overall poor data quality and insufficient use of information to improve health service delivery across the country. The report further implies that if information is no used by those who produce the service; it has limited value to the organization. It is also added that the focuses of HMIs reforms were to make sure information use (10, 37). However, this is not the case in the study facilities. The reformed HMIs was implemented in Harari region before two years but the study found that utilization rate of HMIS information at the facility level is 22.2% which is relatively the same as compared to finding of Gashaw, 2006 which, the utilization rate of 22.5% in all the study units and 8% in HIV/AIDS units. From these we can understand that still the utilization of information at the facility was not improved. Out of these only 33.3% of respondents reported that they used the information for planning and decision making purpose, 36.7% respondents used the information for observing the service delivery and 28.3% respondents use the information for passing to subsidy health office. But majority 96.7% of the respondents used the information to forward for upper level. In most of the cases, the purpose of collection is to complete the reports. This indicates that still in the reform HMIs information utilization at the department is low.

The research finding indicated that the reason given by the respondents for low utilization of information was lack of coordination effort and leadership 74.1%, shortage of skilled human resource 77.8% and lack of training 69.6%. But the least 8.9% chosen by the respondents was lack of strategy and policy.

Reliable health statistics and other health information can be obtained through well organized HMIS and infrastructure. Creation of the unit alone will not ensure achievement of the desired objectives. There should be well-organized team at the Regional Health Bureau to guide and follow the performance of the units at all levels. The absence of organized HMIS team has an adverse effect on the over all performance of the unit. Inadequacies in the system lead to

production of low quality information. Limited knowledge of health managers on the importance of health information leads to poor appreciation of data quality and limited information utilization for decision-making.

Currently the reform is undertaking and the newly organized HMIS is functioning. Health professionals record data on the newly prepared formats, tally sheets and registration books manually. The HMIS unit clerk at the health facilities level collects these records. Data are summarized and sent to woreda health office and RHB HMIS units using paper form within a determined time schedule for further aggregation and analyses. The district information desk officer further summarizes these reports and sends them to the Regional Health Bureau using paper form. Hospitals send their reports directly to the RHB HMIS unit. Finally the RHB HMIS unit further aggregates the received reports to prepare variety of information.

With the current policy of decentralization; health managers at regional and district level are expected to play major role in producing health plans cooperating with local government and administrative units to promote local heath. This can be achieved if sufficient and reliable heath information is available; and if health managers have the capacity to analyze and interpret results so as to use it as an input and promote local innovations. The facility staff members should get adequate training, feed back and supervisory support to enhance staff motivation and commitment in the generation of reliable data. However at present the primary purpose of data collection continues to be reporting to the higher level.

Factors Affecting HMIS Use

Identification of factors affecting HMIS use in the health facilities was the other objective of this study. The factors that have affected the use of HMIS in this study are similar to those who were presented on the literatures, especially those of developing countries.

According to the forum takes place in Dare Salaam the major challenges face in implementing national HMIS was lack of (inadequate policy), coordination and harmonization, inadequate managerial support for HMIS development and maintenance, inadequate human and technological resources and no evaluation of quality assurance of HMIS to understand what is

and what isn't (42). This was the same with the study found but no variable was significant with expectation of commitment of the staffs and health managers in the facility. Commitment of HMIS workers and health managers found to be the key to HMIS success in this research. It was the only factor that found significant in this study. This implies that those staffs and health managers poorly committed less likely to collect data, prepare report and use the information for decision making. But no research finding was found to compare the strength of the significance with this study.

The process of transmitting, compiling, analysis and presenting data is usually so tedious that by the time a report is prepared, the data are frequently outdated and decisions are often made with out any information input. Planners and managers face deadlines and time constraints in their daily decision making. Out dated information, even if of high quality is of low value to them. Delays in data transmission and lack of feedbacks at the facility level are often caused by the presence of strong vertical programmes. Similar, with this the lack of feedback mechanism and lack of support have made the facilities to consider the data as a burden rather than an opportunity. This kind of situation, according to the interviewees, has made the workers think that it is not as such an important activity, instead it is a job added to them. They think that if the data was vital to those who need it, they should have come and tell them what to do and support the facilities in all the way possible.

Although there is a growing recognition that supportive supervision is important, the practice of supervision often continues as in the past, with the aim of finding fault and blaming the supervisee rather than being supportive and empowering. Higher levels make little effort to use information that is readily available to them through HMIS reporting to understand the weakness and strengths of a lower level so that supervisory support is targeted and tailored to the needs of the supervisee. In addition, supervisors make little use of any information collected during supervision to support a lower level that may be performing poorly. Feedback based on the findings of supervision is rarely provided.

According to this study the attitude of the staff towards the HMIS has been low. This was explained on the interviews that the people have no culture of information use. The low attitude could also be from the reported lack of skill to do HMIS manipulations which has resulted in lack of confidence. The lack of awareness about use of HMIS is definitely the result of

inadequate training. This is because, knowing or not knowing the status of the facilities does not add any value on decision making, if they don't participate on the actual decision making processes. As can be seen from this explanation, it can be concluded that the factors are interrelated to each other. One could be the consequence as well as the result to the other. The reason on insignificant of these factors was because of the low utilization of the information in the new HMIS.

Strength and limitation of the study

Strength

- All the population was taken during the study which makes the conclusion valid to all the facilities under study.
- Both qualitative and quantitative data were collected so that an issue missed by one method could be picked by the other.
- The process of HMIS implementation is more or less similar in most of the implementing region, it is hoped that this finding will give insight regarding the status of HMIS implementation in the country.

Limitation

- The fact that the questionnaires are self administered may affect the validity of the responses.

7. Conclusions

The assessment revealed that the required inputs were not received by the health facilities as desired and expected. The human resources required by health facilities both as card room clerks as well as HI Technicians were not available to the standards. Card rooms were up to the required standard only in few and furnishing was not yet complete. The study found that the necessary inputs to reform HMIS such as legislative, regulatory and planning frame work concerning the use of HMIS and presence of IT materials were found sufficiently of the facility. But in terms of on job training, budget allocation and HMIS unit organization were found inadequate. Even if, there was sufficient of computers in the facility, the staff's were poorly utilized the computers in compiling and analysis of the HMIS data. All of the guideline found to have deficiencies and key indicators of relevance to district and regional level were missed.

Yet the health facilities have achieved considerably high improvements in terms of information management, transfer and use, and made impact. Timeliness, consistency and completeness of reports have increased considerably. Quality assurance or mechanisms of checking quality of HMIS data was also limited. The major communication with higher office was supervision. Even though there was limited supervision, there was no feed back at all.

The main factors expected to contribute to the low utilization of HMIS was; lack of appropriate inputs to the system, lack of incentives/motivation, lack of feedback and technical support, low attitude of health workers and health managers, lack of health workers and health managers commitment and non participation of HMIS staffs in the planning process. But among these factors to affect the utilization of health management information system only health workers and health managers' commitment to prepare report and utilize the information found to be the only significant factors after adjusted odds ratio.

In general, the findings of the study showed that, data and information was generated at the facility from routine day to day service based records of the patients who visit the hospitals and health centers. Then those data and information were compiled, analyzed by HMIs focal person and reported to woreda health office and Harari regional health bureau. The result was posted in each department by the focal person in every quarter of the year. But the utilization rate of health management information system was found to be low in the facility.

8. Recommendation

Based on the finding of the study, to improve the utilization of the reformed HMIS at facility level and woreda health office the following additional recommendations are forwarded:

- Motivation/incentives should be given to all individual working in the health institution and woreda health offices system for better utilization of information in the new HMIS.
- It is recommended that card room renovation, furnishing the card room, and assigning all the required HR is expected from RHB.
- Health facilities must be given frequent on job training to use the data generated for decision making at facility level, and the use of HMIS for their facility (local use) must be underlined in all the trainings;
- Supportive supervision and technical assistants with periodic feedback should be delivered to monitor their progress towards the reformed HMIS
- Technical guidelines should be avail at all levels accordingly and necessary to follow its implementation.
- The constraint to wards financial support should be solved especially at health facilities and woreda health office levels.
- It should be given an emphasis to strengthening commitment for ownership.
- HMIS should be included in the curriculum of higher education
- Finally the finding with in the facility shows that, the system should be supported by electronics and appropriate soft ware to use for better data collection and analysis.

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10. Annexes

Annex 1: Consent

Dear respondents:

My name is ----------I'm working with Mebrahtu Mahtsentu who is currently post graduate student in Addis Ababa University at department of Health Informatics. Currently He is carrying out a thesis research entitled *"**Assessment of the Health Management Information System Implementation in Harari regional health bureau".*** Its objective is to asses the current status of HMIS implementation in the study area and suggests possible solutions for improvement. The purpose of this questionnaire is to obtain facts and opinions related to the current health management information system such as data collection tools, reporting formats and other issues related to HMIS. Therefore, as your organization is one of the institutions selected for this study, you are kindly requested to assist through completing/filling this questionnaire. The information that you will give me is quite useful to achieve the objective of the study and to bring change in the HMIS of our health institutions. Questions and issues considered necessary for discussions related to the questionnaire are highly welcomed. If you are not willing to fill the form you are welcome. If you are willing, please continue filling the questionnaire. You are not expected to write your name so that your privacy will be highly protected. Any information that you will give me will be kept confidential and only used for research purpose. Filling the questioner will not take more than 30 minuets. Thank you for sparing your precious time and effort in completing the questionnaire.

Sincerely,

Mebrahtu Mahtsentu
Health Informatics Program
Addis Ababa University

Tell. 0913070097

Annex 2 questionnaire

Assessment of the Health Management Information System Implementation in Harari Regional Health Bureau

Interview guide for HMIS workers

Part I: Background Information

101. Name of the facility _____

102. Unit/ department you are working in _____

103. Sex of the respondent

1) Male 2) Female

104. Age of the respondent (years) _____

105. Could you specify what your field of specialization is please?

1) Health Officer
2) Environmental Health Technician
3) Nurse
4) Information technician (IT)
5) Laboratory Technician
6) Midwifery
7) Pharmacy Technician
8) General Practitioner (MD)
9) Other (please specify) _____

106. What is your current educational status? (**You can choose more than one**)

1) PhD
2) Medical Doctor
3) MSc.
4) MPH
5) Degree
6) Diploma
7) Certificate
8) Other_____

107. Monthly income (Br) _____

108. Your position in the organization _____

109. Your work of experience (years)_____

Part II. Facility's HMIS inputs

201. Does your facility have legislatives, regulatory and planning frame works concerning the use of HMIS?

1) Yes 2) No 3) Don't Know

202. Is there a unit/department assigned specifically for HMIS with focal person?

1) Yes 2) No 3) Don't Know

203. If your answer is yes do you believe your HMIS unit is adequately organized (staff, space, logistics)? But if you say No skip to **question 204.**

1) Very adequate
2) Adequate
3) In adequate
4) Very in adequate
5) Not sure

204. Is there a regular on the job training program about the new HMIS in your facility?

1) Yes 2) No 3) Don't know

205. If yes, for whom does the training given? (**You can choose more than one**) but if you say No skip to **question 206.**

1) Focal personnel
2) Unit/department heads
3) For all health workers
4) Data Collectors
5) Statistician
6) For all interested staff
7) Others_____

206. Does your facility assign budget for HMIS?

1) Yes 2) No 3) Don't know

207. If your answer is yes from the above question how do you rate the adequacy of the budget for the HMIS? **But if you say no skip to question 208.**

1) Very adequate
2) Adequate
3) Inadequate
4) very inadequate
5) Not sure

208. Are there the necessary IT equipments or materials for HMIS?

1) Yes 2) No 3) Don't know

209. If Yes for the above question, which of the following equipments are assigned to HMIS? (Tick) but if you say no skip to **question 210.**

IT equipment/facility	Yes	No	Number available
Computer			
Fax machine			
Printer			
Telephone			
Internet			

210. How frequent do you face any shortage of recording or reporting formats for data collection in the new HMIS?

1) Usually 2) Rarely 3) Never

211. If your answer is usually from the above question how do you solve this shortage of formats? _____

212. What are the common / conventional tools used for data collection in your facility? (**You can choose more than one**)

1) Forms 3) Tally Sheet

2) Registers 4) other_____

Part III. Facility's HMIS process

301. Does your department collect health data on daily activity of patient care?

1) Yes 2) No 3) Don't know

302. Do you think the data to be collected on new HMIS are excess from the old HMIs?

1) Yes 2) No 3) Don't know

303. Do the data collection cover demographic (age, sex.--) and socioeconomic (house hold, income--) factors?

1) Yes 2) No 3) Don't know

304. How do you rate the new HMIs in terms of easily accessible (retrievably) of the records for the appropriate staffs?

1) Very easy
2) Easy
3) Difficult
4) Very difficult
5) Not sure

305. In the new HMIS implemented how do you rate the clarity of definition of data elements?

1) Very clear
2) Clear
3) Unclear
4) Very Unclear
5) Not sure

306. Are frequent feedbacks and supportive supervision given for data collectors from any outside organs (regional health bureau, federal ministry of health, NGOs etc?

1) Yes 2) No 3) Don't know

307. If Yes for question #306, how frequently do you get the feed back? (**You can choose more than one**) but if you say no skip to **question 308.**

1) Every month
2) Every quarter of year
3) Every half year
4) Every year
5) If other specify ----------

308. Do you think that, the reporting formats in your organization actually address the need of the facility?

1) Strongly agree 2) agree 3) disagree 4) strongly disagree 5) not sure

309. Do you take data collection as part of your duty?

1) Yes 2) NO 3) don't know

310. If your answer is yes from question 309 how much of your time do you devote for data collection? But if you say no skip to **question 311.**

1) Daily 2) weekly 3) monthly 4) if other specify_____

311. How much do you think the staffs and health managers are committed to collect and prepare reports and use the information for decision making?

1) Very committed
2) Committed
3) Poorly committed
4) Don't know

312. What is your opinion on the time and effort spent for data collection on the improvement of health service?

1) Strongly necessary
2) Necessary
3) Not necessary
4) Don't know

313. Do you feel any gap between the services you provide and the report you generate with the available data?

1) Yes 2) No 3) Don't know

314. If yes is your answer from question 314, what are the possible reasons? (**Multiple answers are possible)** but if you say no skip to **question 315.**

1) The service has not equipment and human resource
2) Data are not fully recorded
3) Data are not properly compiled
4) If other specify----------

315. How do you document HMIS data? (**You can choose more than one**)

1) In a computerized form

2) Paper form

3) Other (specify) _____

316. Did you believe that health management information system by itself has a direct impact on improved functioning of health service?

1) Strongly agree 2) agree 3) disagree 4) strongly disagree

317. Do you have computer program/software for generating and utilization of health information in your office?

1) Yes 2) No 3) Don't know

318. If yes, what program/software do you use to generate report? (**If you say no skip to question 319.**

1) District Health Information System Software (DHIS)

2) Ms/ Excel

3) Word Processing

4) Epi Info

5) Other_____

319. How far do you think you have benefited from the system/soft ware?

1) Very helpful to analyze data and generate new information

2) Helpful to sum-up data

3) Poorly utilized

4) Other_____

320. If you are user of any kind of HMIS software/ program do you think introduction of the software/ program has improved the efficiency of your unit/department?

1) Yes 2) No 3) Don't know

321. If yes, in what way is improved the efficiency? But if you say no skip to **question 518.**

1) Accuracy
2) Time
3) Minimize burden
4) Other (specify) _____

322. Do you agree that the data collected by your facility are timely?

1) Strongly Agree
2) Agree
3) Disagree
4) Strongly Disagree
5) Not sure

323. Do you agree that the data collected by your facility are consistent (reliable)?

1) Strongly Agree
2) Agree
3) Disagree
4) Strongly Disagree
5) Not sure

324. Do you agree that the data collected by your facility are representative?

1) Strongly Agree
2) Agree
3) Disagree
4) Strongly Disagree
5) Not sure

325. Do you agree that the data collected by your facility are disaggregated (like age, disease code..?) 1) Strongly Agree
2) Agree
3) Disagree
4) Strongly Disagree
5) Not sure

326. Do you agree that the data collected by your facility are complete?

1) Strongly Agree
2) Agree
3) Disagree
4) Strongly Disagree
5) Not sure

327. Is there any mechanism that controls the data quality and continuous quality assurance of health system data?

1) Yes 2) No 3) Don't know

328. If yes is your answer what are the mechanisms? (**Multiple answers are possible)**

1) Monthly review
2) Quarterly review
3) Annual review
4) Regular feed back
5) If other specify _____

Part IV. Facility's HMIS out put

401. Does the information produced in the facility have been utilized by each level?

1) Yes 2) No 3) Don't know

402. If your answer is yes for what purposes do you use the information you collected in department level? (**Multiple answers are possible)**

1) For planning and decision making
2) To observe trends on service delivery
3) To pass the data for subsidy health office
4) To forward for upper level
5) If other specify----------

403. How frequently do you prepare reports? (**You can choose more than one**)

1) Daily
2) Weekly
3) Every two weeks
4) Every month
5) Quarterly
6) Semi annually
7) annually

404. Who will actually use the information produced in the facility? (**Multiple answers are possible)**

1) Only the manager
2) The administrator
3) The Health professionals in each level
4) If other specify----------

405. Do you agree that HMIS workers are being allowed to participate in planning process of the facility?

1) Strongly agree 2) agree 3) disagree 4) strongly disagree 5) not sure

406. What are your challenges in relation to new HMIS in general? (**You can choose more than one)**

1) Lack of coordinated effort and leadership
2) Lack of strategy and policy
3) Shortage of skilled human resource
4) Lack of guideline
5) If other specify----------

407. What is your major means of communication with Regional or Woreda Health Bureaus in the new HMIS implemented? **(You can choose more than one)**

1) Feed back on reports
2) Supervision
3) Others (seminars, meeting etc)
4) No communication

408. In what form the generated report/information presented to the upper level? **(You can choose more than one)**

1) In paper form
2) E-mail
3) Soft copy form using flash disk/floppy diskette/ CD
4) Other (specify) _____

409. For whom do you distribute the generated report? (**You can choose more than one**)

1) For department/units
2) The higher management body of the hospital of health center
3) For harari Health Bureau
4) FMOH (federal ministry of health)
5) Other _____

410. Are there any kinds of incentives/motivation in the new HMIS information utilization for decision making?

1) Yes 2) No 3) Don't know

411. If yes is your answer specifying what kind of incentive/motivation given?

1) Money
2) Training
3) Recognition
4) Others (specify) _____

412. How do you rate the attitude towards new HMIS implemented among health care providers in your facility in general?

1) Very good
2) Good
3) Low
4) Very low
5) Not sure

Thank you

Annex 3

Guidelines for in-depth interview

Part I

Guidelines for in-depth interview for heads on woreda and RHB department heads

1. **Could you tell me about inputs and resources availability for HMIS implementation?**

   Probes: cover issues related to

   - guideline, formats and tools,
   - Infrastructure (card room, shelves, and etc
   - Financial, human resource

2. **Can you tell me about your experience in use of HMIS information for better decision making before and after the new HMIS?**

   Probe:

   - How is the data recording and compilation done;
   - Client / patient management procedures (card room and record retrieval),
   - client / patient records and registers,
   - HMIS tallies and aggregated reporting forms
   - Performance Review; Data display, Quarterly Key Indicators, Performance review process, Probe for specific activities initiated because poor performance was detected using HMIS indicators and improvement followed using HMIS indicator
   - How the staffs are use the information (decision making, planning, monitoring and evaluation.
   - What seems the feed back and supervision
   - What factors could have facilitated use and implementation (related to system, organization, staff, patient characteristics, community, socioeconomic factors, social relations, personality, personal reactions, etc.);

3. **Can you tell me about the training and skills of staff in implementing the new HMIS?**
    - motivation, attitude, educational level, experience, incentives
    - training process and outcome including use of adult learning pedagogical methods (empowerment vs. enforcement)
    - adequacy of training to implement the new HMIS on job site
    - Areas for improvement
4. **How do you see the place of the following issues in implementing the new HMIS?**
    - Leadership, and support from next higher level?
    - Communication,
    - Data processing and burden,
    - effective and efficient use of capacity,
    - simplicity,
    - issues related to job satisfaction, before and after implementation of reformed HMIS
5. **Can you summarize how you view the challenges related to HMIS implementation at your facility?**

    Probes:

    All suggestions from the interviewee should be fully explored regarding

    - short and long-term perspectives and how it contributes,
    - what mechanisms are in place to make the new system effective,
    - who is involved and at what level (related to system, organization, staff, patient characteristics, community, socioeconomic factors, social relations, personality, personal reactions, etc)
6. **How do you think the challenges can be overcome to improve implementation?**
    - how were challenges overcome
7. **Finally, I would like to ask you if there is anything that you would like to add.**

Closing

Thank you very much for sharing your views and ideas on this important issue. It will be very helpful to us.

Part II

Guidelines for in-depth interview for hospital and health center heads and HMIs focal person

1. Can you tell me how HMIS is conducted in your facility? In terms of flow of information, human resource, budget, adequate resource quality of information produced, do you use the report produced at hospital level, any documents/guidelines in use developed at national level etc
2. Are there any programme review, feedback and supervision systems on HMIS/ M and E of HMIS?
3. How does your organization support training of staff in skills for collecting data, generating quality report and using information?

4. What are the existing challenges/ problems in connection with HMIS in general? In terms of facilities, human resource, communication etc and how do you over come these challenges?

Closing

Thank you very much for sharing your views and ideas on this important issue. It will be very helpful to us.

Annex 4

Observation checklists

Name of the health facility_____

Name of Chart	hospital		HC	
	yes	No	yes	No
Standard recording registers, tally sheet				
Proper use of registers (please write at the bottom issues not filled in the register				
Standard reporting formats				
HMIS unit				
Functional computer, printer				
Standard card room				
Procedure manual and information use guideline				
Map of catchments area				

Name of Chart	hospital		HC	
	yes	No	yes	No
Ten Top Causes of Morbidity Adults				
Ten Top Causes of Morbidity In < 5 Children				
Adequate staffing				
Quarterly Plan and Performance Monitoring				
Annual Plan and Performance Monitoring				
Routine Report Submission Check				
Software used for generating information				

Adapted from HMIS information use guideline