



**ADDIS ABABA UNIVERSITY
GRADUATE STUDIES**

**Assessment of the Competence of Health Facilities to operate in
the current Health Management Information System (HMIS) in
Dire Dawa**

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**A THESIS RESEARCH SUBMITTED TO THE DEPARTMENT OF HEALTH
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V. Acronyms

AIDS ---Acquired Immune Deficiency Syndrome

BPR ---Business Processing Re-engineering

CHEWs--- Community-based Health Extension Workers

CDC----- communicable disease control

CSA--- Central Statistical Authority

ESHE ---Essential Services of Health for Ethiopia

FMOH --- Federal Ministry of Health

GAVI---Global Alliance for Vaccination and Immunization

HAPCO---HIV AIDIS Prevention and Control Office

HIS---Health Information System

HMIS---Health Management Information System

HMIS/M&E---Health Management Information System / Monitoring and Evaluation

HMN---Health Metric Network

HSDP---Health Sector Development Program

ICAP--- International Centre for AIDS Care and Treatment Programs

ICT---Information Communication Technology

ICD---- International Code of Disease

IDSR---Integrated Disease Surveillances and Response

IMCI---Integrated management of child wood illness

IHR---International Health Regulation

MCH--- Maternal and Child Health

MDG---Millennium Development Goal

MOH---Minister of Health

NGO---Non Governmental Organization

PASDEP---Plan for Accelerated and Sustained Development to End Poverty

PHEIC---Public Health Emergency of International Concern

RHB---Regional Health bureau

SNNPR---Southern Nation Nationalities People Region

TB---Tuberculosis

UN---United Nations

USD---United States Dollar

WHO---World Health Organization

WorHO--- Woreda Health Office

VI. Abstract

Introduction: - The health management information system in first instance is a “system” and, like each system, it has an organized set of interrelating components. 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. the operational boundaries of which include Routine health information systems: which is the glue of a unified health system There was a severe shortage of health informatics skills needed to provide the necessary support, feedback and, the lack of adequate basic education; poor training and heavy workload contribute to the inadequate human resource capacity to support the health management information system at facilities levels. Regarding to these scientific researches wasn’t done in the Dire Dawa and many of the other part of the country to know the strength and weakness of facilities for operating HMIS.

Objective of the study: - Asses the competence of health facilities to operate the current health management information system.

Method: - Cross sectional study was conducted from October/2009 -June/2010 quantitative and as a supplementary qualitative study design. Quantitative data were collected using standardized questionnaire and were as the qualitative study was conducted by In-depth interview and observation of records and other different formats by using semi-structure questioners. The sample size is calculated using single population Proportion. Data was entered, cleaned and analysed using EPI info and SPSS statically packages. Descriptive analysis was done for utilization rate of information for informed decision making. Frequency, percentages, mean (SD), chi square test, OR and 95% confidence interval was computed to present the findings. Associations between variables was checked using OR with 95% confidence interval and p-value <0.05 will be considered as significant. Logistic regression analysis was done to control confounding effect of variables.

Result and conclusion: - The total outcome of this research paper was found to be the utilization rate of information was 53.2% in all the study units. Problems face in recording and reporting/data generation was fond to be 30.13% and computer was available in 82.7% of the study unities. The utilization rate of information was affected by many factors but from this

research only change of data in to information was found to be significant at 5 % level of significance. So we can conclude that the utilization rate of information and implementation of health information system was found to be appreciable in the study area. Recommendation was given on the area of motivation of staffs and training of individual and standardization of data collection methods, transmission, processing and reporting rule should be given attention.

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1. Introduction

A health information system provides information for the management of health program and services. In particular it is important for monitoring the health situation, the performance of promotive, preventive and curative health service and activities and availability and utilization of health recourse(1).

Health information forms a critical backbone of strong health systems, and strengthening routine health information systems is a challenging task currently being confronted by countries throughout the developing world. A national health management information system (HMIS) should collect, integrate, and produce system and component performance indicators—financial, operational, governance, and health status—that help stakeholders at all levels throughout the health system plan and take appropriate action. Data must be collected, processed and transformed, communicated, and used to inform decisions on resource allocations, policies, staffing, service delivery, cost-recovery ,supportive supervision, and other elements working toward improved health outcomes(2,3).

Since 1990s, knowledge and understanding of the global public health picture have improved on reliable relevant and timely health information as an essential foundation of public health action and health system strengthen both national and internationally(4).

The Ethiopian Federal Ministry of Health (FMOH) has emphasized the HMIS as a key component for successful implementation of health system development program (HSDP) strategic plan since the initial programming cycle and gave much greater attention in HSDPIII which is alien with Millennium Development Goal (MDG).

The Health Management Information System / Monitoring and Evaluation (HMIS/M&E) strategy fits within the objectives and priorities set by the Health Sector Development Program's (HSDPIII) strategic plan. The HSDPIII strategic plan itself responds to the objectives and priorities of national organizations, of regional, woreda, and kebele decentralized authorities, to the health needs of the Ethiopian population, and to international agreements. Similarly, the HMIS/M&E strategy must take account of these national, local, and international requirements, as well as those of the health sector itself (5).

According to the HMIS/M&E report in the national context, Ethiopia has implemented a multi-sectoral Plan for Accelerated and Sustained Development to End Poverty (PASDEP), with specific goals related to health. The HSDPIII strategic plan responds to these national priorities and includes detailed national objectives to improve health status through strengthening health services and healthy behaviour.

In the international context, Ethiopia, along with 188 other countries, has signed the declaration to achieve the Millennium Development Goals (MDGs), including the goals related to health, by 2015. Many of these countries, including Ethiopia, have also signed additional World Health Organization (WHO) and United Nations (UN) conventions for monitoring and reporting progress towards goals within the health sector and for eradication, elimination, control, and surveillance of specific diseases.

Recognizing the importance of harmonizing the national, local, and international efforts for ongoing improvement of the health of the population, the principle of having a single common plan, budget, and monitoring and evaluation system is a cornerstone of HSDPIII.

An assessment of health information systems and recommendations for priority actions to improve their usefulness should contribute greatly toward health systems strengthening (6). This paper aims at highlighting competence of health facilities to operate on the current HMIS in Dire Dawa.

2. Statement of the problem

Developing countries are reported to have a large amount of unreliable health data, poor human resources, and poor information technology (IT) infrastructure (7). Effective Health Information Systems (HIS) are therefore needed to improve the processes of data handling in order to extract useful information for health planning, decision making, and resource allocation. In order to achieve these objectives, many attempts by governments and donors have been reported concerning the design, development and implementation of computer based HIS in different developing countries(8).

Currently the HIS do not sufficiently support management and operation of decentralized health care services. However, the current status of decentralization by itself is not guaranteed the local usage of information and improvements of the HIS. A successful and sustainable approach must recognize and address all aspects that contribute to this situation. 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 (1).

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 (human immune virus) and AIDS(acquired immune deficiency syndrome), tuberculosis and malaria, 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. Donors are also placing more emphasis on performance, linking the release of funds to performance based measures (1).

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, mobilizing new resources, and ensuring accountability in the way they are used.

Information collection is not without cost. Detailed process analysis of data collection and compilation in minister of health (MOH) Health Centres suggests that the personnel costs alone could amount to nearly 17 million birr annually. Of these costs, some 88% are associated with patient / client records, and the remaining 12% are associated with tallying and compiling data reported through the HMIS(9).

Opportunities to reduce the HMIS costs have been identified; redesign to take advantage of these opportunities is estimated to reduce HMIS costs by some 25%. There is certainly duplication imbedded in the patient / client record keeping. Insofar as these redundancies are associated with HMIS processes, they can be nearly or completely eliminated during the redesign process. When the redundancies are associated with technical record keeping requirements, the options for reducing them will be analysed with relevant program officers and health workers. Removing the bulk of these patient / client record redundancies may have the potential to reduce costs of this recordkeeping by 20-30% and all this achieve by compressive assessment of the system (9).

Assessment is one of the steps in evaluation of the ongoing existing system and one concern of assessment is identifying nature of problems and It helps to determine how much facilities have a capacity to sustain HMIS(10).

This assessment should address the resources available to the system (inputs), its methods of work and products (processes and outputs) and results in terms of data availability, quality and use (outcomes). Important “inputs” to assess include the institutional and policy environment, and the volume and quality of

financial, physical and human resources, as well as the available levels of information and communications technology (ICT). In terms of “outputs” the integrity of data is also determined by the degree of transparency of procedures, and the existence of well-defined rules, terms and conditions for collection, processing and dissemination(3).

The findings should provide the foundation for an analytical and strategic assessment of current strengths and weaknesses. Once endorsed, assessment provides the baseline against which future progress in health information system strengthening should be evaluated (3).

Major budget of the Minister of Health (MOH) is also allocated in the urban centre, which accounts for about 70% of its budget. Despite such budget absorption; the quality and access of health care delivery to the needy is questionable (11).

Regarding to these scientific research wasn't done in the Dire Dawa and many of the other part of the country to know the strength and weakness of facilities to operate in the current HMIS. Dire Dawa is one of urban centre of Ethiopia and also one of the pilot site that implement HMIS since 1999 E.C and this assessment helps to know the performance of HMIS and strengthen the existing system by identifying what is the strongest and weakest side of facilities have competent enough HMIS and give recommendation to the concerned bodies.

3. Literature review

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 however a broad consensus that a strong health information system (HIS) is an integral part of the health system, the operational boundaries of which include Routine health information systems: which is the glue of a unified health system (12).

Public health decision-making is critically dependent on the timely availability of sound data. The role of health information systems is to generate, analyze and disseminate such data. In practice, health information systems rarely function systematically. The products of historical, social and economic forces, they are complex, fragmented and unresponsive to needs (2).

By demanding health information, using HIS to formulate policy, and disseminating it through the channels open to them, they can exert greater influence in negotiations with donors and other government departments, encourage a more rational approach to decision-making that will improve the operation of health services, and stimulate greater use of information at lower levels of the health system. The ability of information systems to deliver these benefits is critical to their sustainability (13).

Adequate financial resources must be assured for ongoing system operation; including recurrent costs for stationary, equipment maintenance, and supportive supervision this has an effect on the sustainability of the entire system. Otherwise the system will break down. The total Health Centre personnel costs for patient / client records and HMIS is 16.5-16.9 million birr per year. HMIS costs (including performance review) account for some 12% of these costs. For comparison, the total annual costs of data compilation, data checking, and forwarding to the next level at all woreda health office are 1.6-1.7 million birr (9).

The report in Disease Control Priorities in Developing Countries shows that, estimates annual per capita costs for these information systems in low income countries at 0.16 USD; in Ethiopia, assuming a population of 73 million, the total annual cost becomes 11.7 million USD. This includes paper and other consumables, as well as staff time, at all levels and facilities of the public health system. In this context, a cost of some 2 million USD for Health Centre staff

time, as estimated through this HMIS assessment, does not seem entirely unreasonable.

One of the most difficult parts of improving HMIS is ensuring that the people filling in the forms at clinic level are skilled enough to report accurately, whether on diseases diagnosed or resources used (15). According to the BPR report Addis Ababa shows the highest levels of staffed HMIS units. 95 % of the public health farcicalities have HMIS unit to collect and process the data registered by the health professionals As a result 60% of them stated that they have no adequate capacity to collect and process data. The major limiting factor (47.9 %) was stated to be shortage of trained staff and lack of time (11).

Three of the larger regions with mixed urban and rural populations – Tigray, Oromia, and SNNP provide a benchmark of sorts. These regions have HMIS units established at 50-60% of Health Institutions, with some 80-90% of these units staffed at least to some degree. Some of the less populous and more remote regions like Somali, Ben-Gum and Gambella appear to have difficulty staffing their HMIS units. No institutions in Harar reported having HMIS units with job descriptions (9). In Addis Ababa More than 80% out of the total service; is registered by health professionals. However, in certain clinical areas; nurses take the major role of registration 84% of the nurse respondents register their service while only 57.2% of the doctors responded that they register their service and the remaining is registered by other personnel. 78% of the respondents have stated that they take data registration as part of their duty. As one of the problems in the HMIS is repeatedly stated to be poor staff commitment in the data registration and collection process (11).

Appropriate use of ICT can improve the timeliness and availability of information. It can free managers' time from the burden of manipulating data so that they can focus on using the information generated from the data to improve service delivery. However, without appropriate human and financial resources to support ICT, breakdowns are inevitable (9). One clear success story is from the South Peninsula Administration (SPA) in Cape Town – SPA used the District Health Information System as a core tool for bringing their TB cure rates up from 61% in late 1995 to a stable 85% in 2001 (17). And also the creative use of Information Technology (IT) in health-care systems is one of the most promising means of improving the quality, timeliness, clarity, presentation and use of relevant information for primary health care. In this case, IT is

regarded as a solution to fill the gap in information exchange and presentation (18).

On the other hand some researcher argue that Information systems are much more than computers and telecommunication equipment, as they involve also people and their actions in the organizational setting in which they work (19). Countries that have the resource to computerize should be prepared to process data manually as well. Hard ware maintenance should take into account the local capacity to bear the recurrent costs of such a network. If the HIS is being totally reliant on computer technology data processing; is likely to fail in case of hard ware break down. Therefore manual data process should also be included in training courses (20).

World-wide experiences with large health IT project are similar with 50%-80% failure rate. The process of improving HMIS requires appropriate institutional framework consisting of technical expertise, adequate funding and strong institutional commitment to ensure long-term sustainable HMIS Whenever computerization becomes the primary objective of the health information system development efforts; the most important purpose of serving the data needs of the care providers tend to get lost (21).

The HMIS relies on data collected from several sources: service delivery, finance, human resources, logistics, and capital assets. To provide as complete a picture as possible of the health sector, information from other governmental organizations and from the private for-profit and not-for-profit sectors should also be included. HMIS data should also be harmonized with health-related and multi-sect oral data collected by other organizations, such as vital events registration, census, survey, etc.(5). Most data on the provision of clinical services or health status at the time of clinical encounters are generated “routinely” during the recording and reporting of services delivered (4). Providers of HMIS and other health-related information need to establish common data definitions and understanding on how to interpret the information.

The HIS currently in place in Ethiopia generates data from two main areas: population - based health information sources and health service-based sources. Population –based health information sources include the census, vital events registration (to a lesser extent), and population-based (usually household surveys) and surveillance (22). Some evidence shows that Routine reports,

weekly identifiable diseases reports, vertical program reports and sometimes survey results was found that source of data in north Gonder (23).

In Ethiopia at national level the new system was designed with technical support from JSI and focused on rationalizing the number of indicators, forms and procedures for data collection, increasing health information staff numbers (5,000 health information technicians to be trained) and scaling up training of health workers. The new cadre of 30,000 health extension workers will also play a key role in generating community level data. The new system will be paper-based with electronic transfer of information from woreda to the higher levels of the system where possible (24).

The HMIS, which draws its data from routine service and administrative records, provides an ideal source for indicators that are reviewed frequently to monitor and refine program implementation. However, the HMIS does not provide all indicators needed to monitor the health sector. For example, some of HSDPIII goals and objectives, such as bed net utilization or safe sex practices, can only be measured by surveying the behaviour of the population at large. Within a few years there may be a possibility to estimate some of the impact indicators with data collected through the HMIS or other governmental agencies. For example, the Central Statistical Authority (CSA) has begun implementing a vital events registration system. Community-based Health Extension Workers (HEWs) will be deployed in each kebele nationwide within a few years. They may be in a position to supplement Vital Events and other population-based information (5).

An essential part of HMIS reform is improving the quality of data and its use in improving service delivery. The method recommended by FMOH to achieve these objectives is the method recognized as an international best practice – reduce the amount of data collected at each health facility by agreeing on which indicators are most relevant to signal the need for direct action and use the HMIS to collect only the data that are required to calculate those indicators (25).

Data quality was assessed with the standard methodology of having an external observer compare service delivery as recorded in health facility registers and tally sheets with the services reported on the institution's monthly aggregate form. Global alliance for vaccination and immunization (GAVI) uses a similar methodology to assess the quality of routinely reported immunization coverage. Comparison of data gathered to data reported continued up the reporting chain

through the regional level. This is a time-consuming process, particularly at the facility level, and a purposive sample is usually selected for review, as was done in this assessment (9).

There are currently cost duplication inefficient and inconsistencies between institution in the collection reporting and analysis of data, The report of the commission for Africa estimated that an additional 60 million US dollar per year would be needed to help Africa improve systems to collect and analyses statics (26).The HMIS has been criticized for collecting too much data, with negative effects on both efficiency and data quality. Reducing the number of steps in data compilation is likely to produce some cost savings and reduce the time between beginning and completing the compilation. However, the largest savings is likely to come from reducing the time required for compilation itself.

According to BPR sub-process analysis at the Health Centre found that the cost of aggregating data onto the monthly format accounts for 2/3rds of the cost of preparing the monthly report. Reducing the number of data items aggregated by half (a conservative estimate) would reduce the overall cost of preparing the monthly report at the Health Centre by 1/3. Observers and users of the HMIS have long criticized the data burden it imposes, particularly on data collectors. A survey conducted during the course of this assessment showed that woredas average 500 data items per monthly report; hospitals, 450; and Health Centres, 400. (These figures do not include diseases, which typically require some 500-600 data items per month, nor do they include reports from specialty programs, such as HIV/AIDS, TB/Leprosy, IDSR, and malaria.) There is considerable variation in data burden from region to region, within a single region, and sometimes even within a single woreda / sub city.

Quality of data and information management is highly dependent on the value and importance given both by the information generators and users. The study showed in Addis that there is marked fall; that is only 47% in the physicians' respondents to appreciate strongly the importance of health information for the improvement of health service (11). It is usually mentioned that the data received are often not helpful for health management decision-making because they are incomplete, inaccurate, untimely, obsolete and unrelated to priority tasks and functions of local health personnel (21). In terms of data use, countries have been consistently poor at supporting health workers who are collecting data to use it locally for planning and management purposes. Some observers speculate that facilitating greater local use of data could improve data

quality overall, as those doing the data collection should be more motivated (15).

Completeness and timeliness are important indicators of data quality: completeness, because it provides perspective on how representative the data are; and timeliness, because it suggests whether the data are available promptly for action-oriented decisions (9). All health facilities are required to send their periodic reports to their respective higher offices. However, 67% responded that reports are received on the required time and on the interviews conducted with the HMIS unit officers; 95% of reports received from public health institutions are sent timely. But reports from hospitals, the private and NGOs are delayed (11). In other study in north Gondar Out of 236 study units in the health centre 47 (19.92%) submitted their monthly report before 19th day, 80 (33.90%) between 20 and 24, and 109 (46.19%) after 25th day of every month (23).

The ideal correlation between data, information and decision –making is explained when the data collected are transformed into information with the knowledge of utilizing it for problem solving process (11). However, evidence shows that much of the collected data remains unprocessed, or if processed, it remains not analysed, or if analysed, it remains not read or if read it is not used or acted upon (27).

Duties of HMIS data collection are regarded as “excessive” by health workers because most of them are not used in the tasks they perform or in facility management and also analysis should not be limited to simply adding up numbers whether in the clinic or at the district, regional, provincial or central level. It should include coverage estimation for the services offered, comparing performance with targets at all levels, management of the health facilities, preparation of monthly, quarterly and annual reports. It should also include projections of what to expect in future (28).

According to the BPR report the skills that health workers bring to the procedures of planning, M&E, feedback, and supervision needs strengthening. While 72% of HMIS workers could make a bar graph (ranging from 92% at Woreda Health Offices (WorHO), to 54% at Health Posts), only 14% could detect an obvious trend shown in the graph (ranging from 30% at RHB, progressively down to 7% at Health Posts). In Addis Ababa RHB; 76.5% of the front-line staff answered that they transfer the sum to the higher management as periodical reports. 69.6% of unit heads responded they analyse. However only

23 8% stated they present their analysis as a form of graphs, charts and some printout data gathered at health facility level are analysed to get meaningful information that can be utilized as an input to support the management of health service at the institution level (11).

According to the BPR report four regions (Amhara, Oromia, SNNP, and Tigray) have been particularly active in the use of HMIS information, showing implementation of annual plans and performance review based on HMIS information in 50-60% of all health institutions. In these same four regions, health institutions report receiving feedback and supervision using HMIS information in higher proportions than in the other regions. SNNP reported the highest proportions, with 55-80% of health institutions reporting receipt of feedback, supervision, and peer review. Hospitals are a glaring exception in all regions, with 15-25% reporting receipt of these practices. This is of particular concern, given the importance of their services and the fact that approximately 40% of public health sector funds are allocated for their operation.

Supportive Supervision is the process of guiding, helping and encouraging staff to improve their performance so that they meet the defined standards of performance of their organization (29). Regular supervision, feedback and timely staff training are very important in building the capacity of the HMIS at all levels, But in Addis Ababa RHB public health institutions are rarely supervised and supervision and feedback to private and NGOs are almost non-existent (11). Such feedback helped to increase reporting rates from 73% in 1994 to 85% in 1995 and to 93% in 2000 (13).

In the dissemination of information Federal Ministry of Health publishes annual health statistical abstracts and the most recent report is available for 2006/07 (Annual Health and Health related indicators). The report is available on the Federal Ministry of Health website and contains statistics on diseases (health system building blocks, outpatient visits and admissions, causes of death, MCH), but no assessment is provided of reporting completeness, coverage and data quality. The HAPCO site publishes monthly information for all (public and private) facilities that provide HIV services and includes summary reports International reports: for instance the annual MDG report and the UNGASS HIV/AIDS 2008 report (24).

Finally many Researchers argue that the chances of a sustainable HMIS could be improved by addressing the political interests of "key actors," including the

Ministry of Health, donors and system developers. Local participation is needed in introducing the new ways of doing things that often accompany new information systems, and existing networks and infrastructures need to be cultivated (15). And countries will benefit greatly if such systems are based upon a national plan with a policy framework; core indicators; and data-collection, analysis and dissemination strategies (3).

4. Objectives of the study

4.1 General objective

- To assess the Competence of Health Facilities to operate in the current Health Management Information System in Dire Dawa.

4.2 Specific objectives

- To describe the process of data generation (source), processing and using of ICT in the current HMIS and routine reporting system.
- To examine the degree of utilization of the generated information for health Management functions (planning, monitoring, and evaluation)
- To investigate the factors affecting the utilization of HMIS.

5. Methods

5.1 Study design

The study was carried out from October 2009-may, 2010 by using facility based cross-sectional quantitative study and as a supplementary qualitative study was conducted in the form of in-depth interview and observation of records and other different formats.

5.2 Study area

The study was conducted in Dire Dawa .Dire Dawa is one of the two chartered cities (*astedader akabibi*) in Ethiopia (the other being the capital, Addis Ababa). This chartered city is divided administratively into two woredas, the city proper and the non-urban woreda of Gurgura.

Dire Dawa lies in the eastern part of the nation, on the Dechatu River, at the foot of a ring of cliffs that has been described as "somewhat like a cluster of tea-leaves in the bottom of a slop-basin." With a latitude and longitude of  [9°36'N 41°52'E](#)  [9.6°N 41.867°E](#)Coordinates:  [9°36'N 41°52'E](#)  [9.6°N 41.867°E](#)

Based on the 2007 Census conducted by the Central Statistical Agency of Ethiopia (CSA), Dire Dawa has a total population of 342,827, of whom 171,930 were men and 170,897 women; 232,854 or 67.92% of the population are considered urban inhabitants. With an estimated area of 1,213.20 square kilometres, this chartered city has a population density of 328.06 people per square kilometre. There were 75,693 households in Dire Dawa administrative council with an average of 4.5 persons per household.

According to the CSA, as of 2004, 90.76% of the total population had access to safe drinking water: 69.61% of rural and 99.48% of urban inhabitants having access. Values for other reported common indicators of the standard of living for Dire Dawa as of 2005 include the following: 11.4% of the inhabitants fall into the lowest wealth quintile; adult literacy for men is 76.6% and for women 53%; and infant mortality rate is 71 infant deaths per 1,000 live births, which is less than the nationwide average of 77; at least half of these deaths occurred in the infants' in the first month of life.

In Dire Dawa there are 13 governmental health centres and 1 hospital in these facilities around 618 mid-level and 1st degree holders and 27 general practitioners and specialists. Both computer and manual based HMIS were started in 1999 E.C as pilot site by the conjugation of MOH and Tulane University. In the computer based HMIS they have been using the so called “smart care” software.

To ensure that enough sample size is attained, the study was conducted in all government facility settings where both computer and manual based HMIS is implemented.

5.3 Source and Study population

All government health centres and hospital in Dire Dawa:-all health professionals in the health centres and hospital.

5.4 Sample size and Sampling procedures

The sample size is calculated using single population Proportion formula with the following assumptions.

- P = 50% assumed that the proportion of utilization of HMIS.
- D = 5% degree of precision.
- 95% confidence interval, $\alpha = 0.05$

$$n = \left(\frac{z}{\alpha/2} \right)^2 p (1-P)/d^2$$

5 % non- response rate

So that the sampling procedure as follows for each facility monthly salary payroll used as a sampling frame and by using systematic random sampling method (N/n) from monthly salary payroll the 1st man selected by lottery method lists from 1- N/n . After that the next person was selected in every N/n interval from the first man and if in case the N/n^{th} person fall in to administrative staff or person are not willing to participate in the study immediately take the next person from the list until the desired sample size was full filled.

By this mechanism the study included 403 study subjects with the inclusion of the non-respondent, but 9 of study unit did not participate in the study due to unwillingness to participate in the study and absence while the interview was conducted.

5.5 Data collection procedures and instrument

A face-to-face interview was conducted using structured questionnaire and in addition to this some effort were done to observe how data and information is generated from registration books, monthly and annual reports, and graph, charts and Maps in the health institutions. The questionnaire was prepared in English and translated to Amharic then back to English by another person to ensure consistency. The principal investigator had given two days training for two supervisors and six interviewers on the questionnaire and data collection techniques.

In-depth interview was conducted by using of informal and semi-structured interviews. On the one hand, discussion with health bureau HMIS members was conducted to understand condition of HMIS in the facilities. On the other hand, several interviews was done with the health staff at the selected health facilities (2 urban and 1 rural health centre and 1 hospital which are best used HMIS) in Dire Dawa to gain qualitative inputs into the many practical problems experienced by the actual users of the system. Most of the interviews at the primary health centres were done during breaks and were very informal, usually lasting between 10 to 30 minutes. In addition, informal interviews with head of the facilities and HMIS coordinators were conducted. During interviews the interviewers took notes, which later wrote in more clear text.

5.6 Operational definitions

1. Using Information for decision making- 1= planning 2= budget allocation 3= monitoring and Evaluation of programs to take immediate action.

2. Utilization of health Information system-

1= using information for decision making to take immediate action,

2 = feed back from respective supervisors

3= calculation of area coverage and preparation of Maps

4= presence of key indicators with charts or tables (indicators were not expected to be same that is it varies from one units to the other unit)

5= presentation of achievements of targets at the health facilities.

So that the study units were considered as utilizing health information system when they are practicing at list three of them out of the five criteria's listed above.

3. Analysis :adding up numbers whether in the clinic and also include coverage estimation for the services offered, comparing performance with targets at all levels, management of the health facilities, preparation of monthly, quarterly and annual reports

4. Data quality: The degree to which the data or statistics measure what was intended to measure in terms of compliances, time and periodicity.

5.7 Variables

5.7.1 Dependent variables

- Utilization of HMIS information.

5.7.2 Independent variables

- Characteristics of data (ownership; validity and reliability, aggregation of data, and, Completeness of the data, regular audit of data (quality), Tools used).
- Resource for HMIS (financial resource human resource ICT)
- Data source, analysis and use(planning Data dissemination)
- Characteristic of organizational units/departments.

5.8 Data analysis

Collected data was checked for completeness, coded, and cleaned using Epi info version 3.5.1/SPSS15.0 package. Analysis of data was done using the same package. Frequency, percentages, mean (SD), chi square test, OR and 95% confidence interval was computed to present the findings. Associations between

variables was checked using OR with 95% confidence interval and p-value <0.05 was considered as significant.

5.9 Data quality issues

Two supervisors and the principal investigator performed the supervision of data collection procedures on daily basis. They checked every completed questionnaire and gave onsite technical assistance to the data collectors. Anything, which is unclear and ambiguous, was corrected for data collectors on the next day. Data's were double entered by the clerk and the principal investigator.

5.10 Ethical issues

The study was carried out after getting approval from the research committee ethics committee of Addis Ababa University joint Medical and informatics. Data was collected after getting written consent from the Regional Health Office. During the interview each participant was informed about the aim of the study, the interviewer discussed issues of confidentiality and Interviewers were asked for verbal consent before the start of data collection. Participants were informed that they have full right to refuse or discontinue participating in the research without any compromise in the service they get from the respective facilities.

6. Results

In our study all governmental health centres and hospital were included in the study that means 13 health centre and 1 hospital. Within these Health facilities there are around 618 health professionals and 90(22.8%) the study units were from hospital and the rest 305(77.2%) from 13 health centres(Table-1).

The sex distribution of individuals working in the study units showed that 208(52.7%) were males. Among the total 152(38.5%) were within the age of 23 - 27 years old with a mean age of 28 years, 131(33.2%) of them have a salary ranging from 750-988 ETH BIRR and 187(47.3%) of them also have 1-5 year of services. Distribution of level of education showed that health workers with 12+3 degree constituted 34.7% and 55(13.9%) of the study unit were head of the respective departments. The majorities of the respondents were nurses 221(55.9%) and the least number is from health education professional 1(0.3%).

Table:-1 Socio-demographic Characteristics and Distributions of Study Subjects in the Health Facilities of Dire Dawa 2010

	Number of respondent	Percent
Type of facilities		
hospital	90	22.8
Health centre	305	77.2
Title of occupation		
Data Clerk	13	3.3
doctor	11	2.8
Environmental health	20	5.1
Health officers	37	9.4
Lab technologist & technician	27	6.8
Midwife	33	8.4
nurse	221	55.9
Pharmacist & druggist	25	6.3
Other	8	2.1
Service year		
<= 1	77	19.5
>1-5	187	47.3
>5-9	78	19.7
>9-13	22	5.6
>13-17	7	1.8
>17-21	15	3.8
>21	9	2.3

Three hundred ninety five study subjects were expected to collect data and use information for decision-making in the study areas, health units are the primary producers of data and expected to change the data in to information at the site of data generation but it is done usually in some of the study subject. Among the total aggregated 210(53.2%) were utilized information. Of 210 study units utilized information 55.1% were contributed by Health Centres and the rest 43.3% were by hospital. In most cases utilization of information in the facilities were very common by EPI, MCH units, and TB centres (Table-2).

The most common analysis observed through interviews and inspections were; the analysis prepared from summed up reports on the incidences of disease or services provided and some presented in manually prepared graphs. These reports are aggregated according to the report forms (designed) provided by the RHB and others are comparisons of plans and performances. Some graphs were prepared in a meaningful ways in some health centres; namely in Sabian health centre by the help of performance monitoring team each unit try to analyse and present their key indicator by chart and grapes.

At the national level health management information system has five levels of management (namely health institution level, district level, zonal level, regional level, and Federal ministry level). Plan and program department is authorized and responsible for health management information system at Federal ministry, regional, and zonal level and Statistics unit, district health offices. In the health facilities usually health professional person assigned as additional responsibilities to coordinate HMIS activities and overall coordination of all activities related to HMIS and others. In the study area 42.7 %of the respondent agreed that they don't have separate HMIS unit to collect and process the data registered and it is done by their own department. Data are collected and reported by the individuals working in the specific department either by the health professionals assigned to the specific area or by auxiliary staffs. On this regard only 45.8% of health professional has assistance HIS staff in designing supporting and managing the data and only in 51.4% have a meeting session on HIS performance on their department.

In general the flow of data shows as majority of the study units try to use information on their department some other transfer their data upwards that is one directional this would affect the rate of utilization of information at the facility level since there is no bi lateral communication between health offices and among units with in the same institutions and departments.

Table: - 2Information utilization in the unite department of Dire Dawa Health Facilities 2010

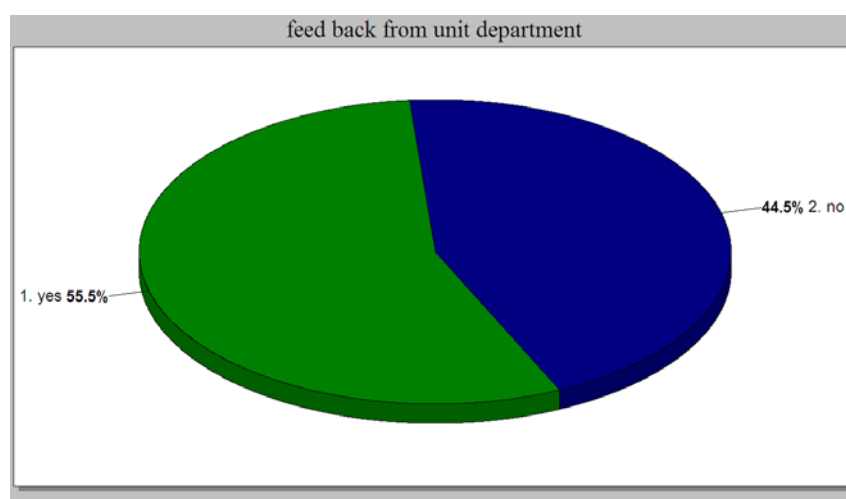
Department	Utilization of Information	
	Yes n(%)	No n(%)
Data Clerk/ Statics	1(10%)	9(90%)
Emergency OPD	13(46.4%)	15(53.6%)
Environmental	10(76.9%)	3(23.1%)
EPI	22(84.6%)	4(15.4%)
HIV	14(45.2%)	17(54.8%)
Inpatient	12(44.7%)	26(55.3%)
Laboratory	11(40.7%)	16(59.3%)
MCH	22(61.1%)	14(38.9%)
Obstetrics	17(54.8%)	14(45.2%)
OPD(adult & <5)	49(58.3%)	35(41.7%)
Pharmacy	12(52.1%)	11(47.9%)
TB & leprosy	8(61.5%)	5(38.5%)
Others	10(38.4%)	16(61.6%)

Among the total respondent 95.4% heard about HMIS but only 45.7% get training on HMIS. The research result shows that the major task of data registration is performed by the health professionals who provide the service it accounts 84.6%. However, in certain clinical areas; doctors and health officers take the lesser role of registration, 45.5% and 54.9% and the remaining is registered by other personnel.

Regular supervision, feedback and timely staff training are very important in building the capacity of the HMIS at all levels. As per the question In the past 3 months only 46.3% unit/department supervised 1to4 times the others are never supervised and the major means of communication staffs with the regional or sub-city Health Bureau are like meeting and seminar it account 51.6% and supportive supervision 30.1% but respondents stated that they rarely get Feedback from district health office on monthly, quarterly and annual basis account only in 47.4% from the all health unite departments, HIV/ and MCH are frequently given feedback and supportive supervision it accounts 66.7% and 60% respectively and 55.5% in all unit department (Figure-1) .

However, the figures from higher management and health institutions do not correspond; indicating the insufficiency of feedback and supervisions to support and improve the HMIS and health service performance.

Figure:-1 Presence of feedback from unit department in health facilities of Dire Dawa, 2010.



The objective of data processing is to produce pertinent information that aids in decision-making at all levels of the HMIS. Reports are produced by compiling and analysing the available primary data registers or tally sheets Data collection tools at the health facilities are forms, book registers that are designed and supplied by the Regional Health Bureau HMIS acting department; and; the Health Service Management Department and the Planning 81.5% of the respondents have stated that they have data collection standards formats including case definitions.

As per the conveniences of the current recording and reporting formats, 33.9% of the respondents have said to be simple and complete to register on. However 66.1% of the personal feelings of individual about data collection tools though to be ambiguous and considered to affects data quality, of the respondents expressed inconveniences; mainly stressing on redundancy of number of formats and contents difficult to manage and loss of some cases(Table -3).

Table: -3 Staff opinion about the convenience of recording on the current HMIS formats and computer distributions in the study units of Dire dawa 2010

Variables	Number of respondent	Precent
Staff opinion		
Complete and simple	131	33.9
Complete but not simple	110	28.4
Time taking and Difficult to manage	146	37.7
Computer in the unit		
yes	326	82.7
no	68	17.3

On the other hand 250(64.8%) respondents have assured use ICD codes but 59.8% of them compliant on the current ICD codes among them 26.8% are related to missing of codes for some disease conditions, from these it is possible to understand that some of the data generated in those facilities possibly inaccurate and unreliable to users due to the above and other mentioned problems in the study units and around 110 (27.8%) facing problem on recording and reporting or generation of data among them 38.2% of them is due to lack of knowledge (Table-4).

Table: -4 Problems face in recording and reporting/data generation/ in the study unit in Dire Dawa 2010

Problems	Number of respondent	Percent
Lack of knowledge	42	38.2
Lack of time	25	22.7
Lack of staff's commitment	4	3.6
Lack supervision & feed back	32	29.1
Lack facility (formats, pen, staff, computer etc)	7	6.4
Total	110	100

The major data source in the RHB is obtained from the public health facilities reports. There is no defined method or designed format for the community participation; especially for the public health institutions. There is minimal use of CBHW such as CHEW. This is evidenced in the respondents answer for the question; *how the units obtains information from the community*; 23 % responded from the Kebele, 68.1 % Community Health extension Worker(CHEW) and from individuals 9.1% and 42.1% and 34.9% of the respondent gets data from censuses and health bureau for their department to calculate denominator.

Even though 56.6% respondent reply that their institution have a Health information steering committee to set the long-term goals for HIS and needs to decide which key indicators should be measured and which data are necessary, only in 18.1% fully functional and in 54.3% of the respondent have a written set of procedure for data management including data collection storage doing quality control analysis and presentation for target audience but only 22.1% use it fully (figure-2).

Though 82.7% of the respondent have computer for management of data and report(Table -3), only 23.1% of them have computer skill for handling of data and doing some statical calculation and 12.4% of the respondent have access to telephone, internet and e-mail .Therefore, in those study units health information system was processed and analysed manually. Generally based on the operational definition set for this research taking the main points from WHO guide lines (WHO, 2000). To say health information system were implemented in those study units, when at list three of the criteria among the five criteria were applied in that study.

Only 81(20.8%) of the units /departments had training design for data collection, processing analysis, and utilization of information, and standards including standards for production and dissemination of reports and there are only in 14% of respondent have specific budget line on their department for HIS. Of the total study units/208(53.6%) would have continuous quality assurance of data and 180((46.4%) do not have continuous quality assurance of data. 247 (63.7%) of the units / change their data in to information every month but 141 (36.3%) did not change their data in to information on monthly basis(Figure -3). Majority (68.1 %) of the units/ departments were used standard graphs and charts to present their indicators.

Majority(70.9%)of the units/departments don't have statement on rule and interaction of health information System with Private sectors and in 61.1% of the unit/department present information to, and discus with facility management and community.

During the interview with head of the facilities and HMIS focal person it was identified that in some health units there was no trained and responsible individuals to run the overall activities of HMIS, moreover like any other activities all should have also standard procedure to change the data in to information.

Figure:-2 Respondents who have written set of procedure for data management including data collection storage doing quality control analysis and presentation for target audience in Dire Dawa 2010

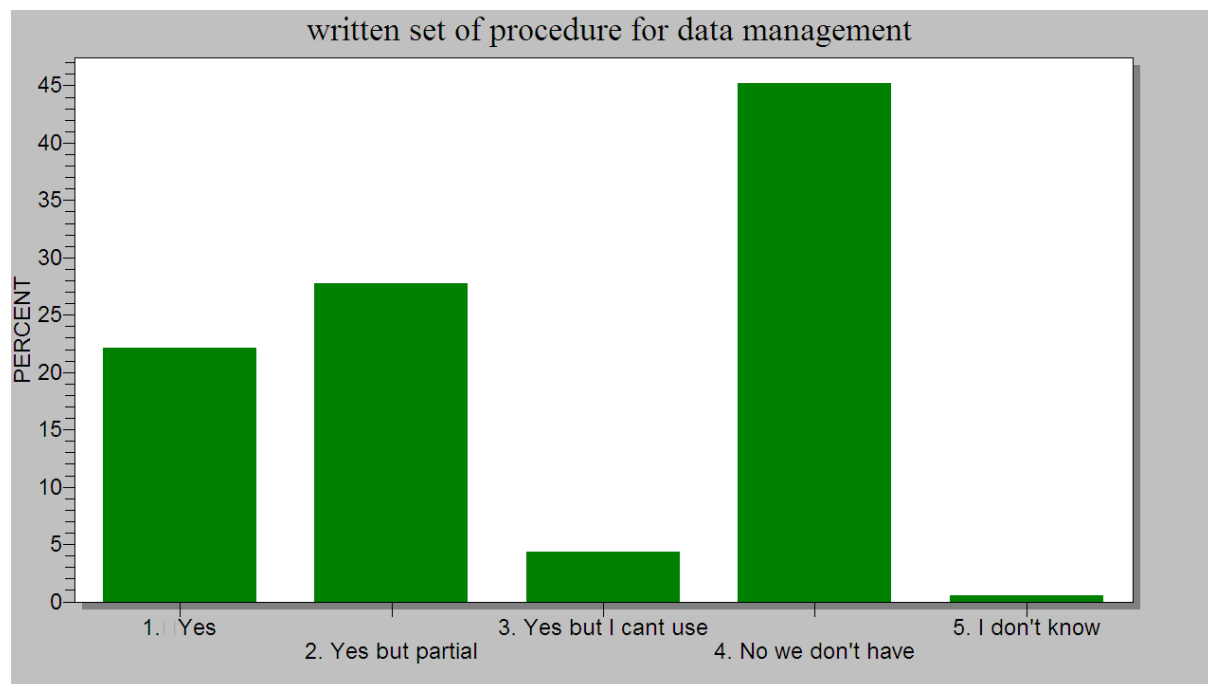
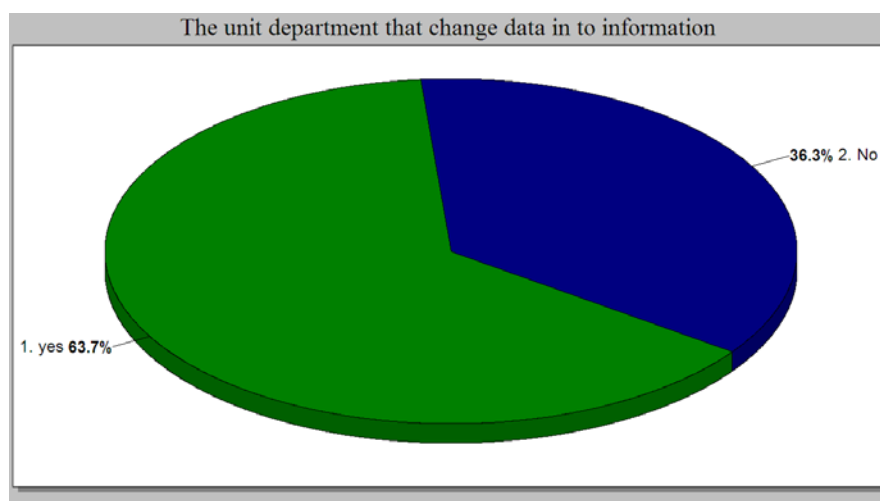


Figure -3 units/departments that change data in to information every month in Dire Dawa 2010



Among all study units 326(82.5%) of them register the health activities /services rendered routinely and 327(83.8%) of the study units take data collection as part of their duty. When we see each professional category 88.5% of the nurse and 93.3% of lab Technician respondents have stated that they take data registration

and collection as part of their job. But only 54.5% of the doctors stated that they take it as part of their duty.

As one of the problems in the HMIS is repeatedly stated to be poor staff commitment in the data registration and collection process; questions were directed to evaluate it; and 71.2% responded that the staffs are committed to collect and register data. Regarding to the staff opinion 71.6% of them strongly believe on the importance of time and effort spent for data collection on the improvement of health service; both the unit heads and other staff respectively showing that there is similar observation by all staff. Though the overall observation on the staff's commitment towards data generation does not show crucial problem, there still exists little gap between information need and the capacity to produce reliable data.

The health professionals working in the public area are mostly overloaded by clinical work specially the staff working on IMCI, laboratories and dispensaries in health centres, and in the emergency OPD in the hospitals to register their daily activities and paper reports. As a result 111(28.6%) faces problem to prepare & submit the report the main reason for this 38% due to lack of knowledge on registration and reporting 29.1% due to Lack supervision & feedback and 22.7% account for due to lack of time .However during the interviews and discussions conducted with the unit heads; there was a common understanding reached on the possibility to conduct some analysis which can be valuable input in the health service management and the design of intervention at each level.

Among the total respondent 276(70.2%) collected & submitted statistic reports for the last 3monthes; but about 29.2% of all the respondents feel a little gap between the information generate with the available data, the reports they have & the services they render (provide), the main reason which is thought by the respondents are data's are not recorded correctly it account 40.5% .Meaning that no more information can be generated with the actually available data. This response was also more pronounced during the interview by HMIS focal persons and statics, who indicating the limited capacity of staffs in the HMIS's units.

However on the interviews conducted with most of the health professionals; the most stated factor was the limitation of the knowledge they have on the essence of how to produce information and make use of it in their daily activities and have limited awareness on what can be done with the available data.

Despite the availability of computer in most of health institutions departments to make variety of analysis most the staff don't know how to analyse by using computer software “ I simply record on it but I don t know how to generate report from the computer I always did it manually”. One Bsc nurse girl from number one health centre OPD members. This shows that the computers are underutilized at all levels, which may mainly be attributed to lack of knowledge on computer system and health statistics.

On the interviews conducted with the unit leaders and facilities heads at facilities; “there is marked effort done to raise the awareness of the necessity of information utilization”, which shows a good start. However, there was a common understanding reached on; that much more can be done with the available data; if staff's knowledge on data analysis and information use are upgraded so as to act at each level of health service provision and make it responsive to community needs.

In the in depth interviews many of the staffs agree that by the current HMIS Computerisation of data collection, analysis and data transfer is often offered as the answer to health information problems. While computerisation could reduce the burden of data collation and make data more accessible and easier to analyse, data utilisation will not improve if staff have no skills in analysis and interpretation, and no understanding of how and why data should be used. So that continues supportive supervision and at least one IT supportive staff as well as staff should train on the above issues to have sustainable HMIS.

Table-5 Relationship between selected variables and utilization of information at the health facilities Dire Dawa 2010

Variable	Information Utilization		Crude OR(95 % CI)	Adjusted OR(95 % CI)	P-value
	yes	No			
Trained about HMIS					
yes	112	68	1.98(1.32,2.97)	1.60(0.98,2.61)	0.05
No	97	117	1	1	
Assistance HIS staff					
yes	109	72	1.69(1.13,2.52)	1.23(0.75,2.02)	0.48
No	101	113	1	1	
Change data into information at department level					
yes	153	94	2.47(1.61,3.77)	1.79(1.07,3.00)	<u>0.02</u>
No	56	85	1	1	
Statement on rule & interaction of HIS with privet sector					
yes	72	41	1.74(1.11,2.73)	1.01(0.58,1.75)	0.96
No	138	137	1	1	
Presenting key indicator with chart					
yes	145	117	1.14(0.74,1.75)	0.76(0.45,1.28)	0.31
No	64	59	1	1	
Present information and discuss with manager and community					

yes	94	57	1.74(1.15,2.65)	1.08(0.60,1.93)	0.79
No	115	122	1	1	
Mechanism for verifying the completeness and consistency of data					
yes	122	86	1.48(0.99,2.21)	1.08(0.64,1.81)	0.76
No	88	92	1	1	
International code of disease					
yes	135	115	1.01(0.66,1.54)	0.90(0.55,1.46)	0.67
No	73	63	1	1	
Computer to compile and analyse of data					
yes	182	144	1.80(1.06,3.06)	1.69(0.90,3.16)	0.09
No	28	40	1	1	
Data collection as part of your duty					
yes	183	144	2.06(1.18,3.59)	1.63(0.87,3.06)	0.12
No	24	39	1	1	

Multiple logistic regression analysis was done to control potential confounders. Utilization of information was compared with other important (key) selected variables like presence or absence of supervision, presence of data collection standards including standard case definition and personal filling as take data collection as part of their duty, change of data in to information every month, performance of calculating area coverage for essential services and prepare maps, use of data for plan of action, performance of presentation of information, discussion with facility management and support to community for surveillance were analysed and Among the variables listed in table 5 that were considered to affect the utilization of information showed in crude odds ratio showed that it was highly significant in all cases. Except in continuous quality assurance of data. Among the variables listed above that were considered to affect the utilization of information showed in crude odds ratio showed that it was highly significant in all cases. But majority of those factors are not statically significant after adjusted multiple logistic regression except change of data in to information the unite department every month [adjusted OR=_1.79 (95% CI= 1.09, 3.00)] at P-value =_0.0245 that is highly statically significant (Table:-5).

7. Discussion

There is no information available at the local level in the scientific literature in competence of facilities and implementation of health information system at facilities level make comparison about some of the factors. This study has tried to assess competence of facilities related to data and information generation, and utilization of information and implementation of health information system at facilities level. In addition, the study also tried to see the associations between utilization of information and important key factors which may affect the utilization of information at each level.

The ideal correlation between data, information and decision –making is explained when the data collected are transformed into information with the knowledge of utilizing it for problem solving process (11). However, evidence shows that in many developing countries much of the collected data remains unprocessed, or if processed, it remains not analysed, or if analysed, it remains not read or if read it is not used or acted upon (27).

In this study, based on the criteria set in the operational definition the general utilization rate of information was found to be 53.2%. Even though most of the developing countries have low utilization rate, general utilization of information the finding is slightly higher as compared the results reported by Gashaw in North Gonder 25% and Campblle in Ghana and Maria a GN. Mosoke et al. in Uganda as identified 10% and 20 % (30, 31).

This slight increase was may be due to training and supportive supervision of individuals who are working in some department like EPI and MCH units at health facilities level, and some of the facilities have a written set of procedure for documentation analysing and interpretation of data and in other hand even if it is not fully functional majorities of the facilities in Dire Dawa has a Health information steering committee to set the long-term goals for HIS and needs to decide which key indicators should be measured and which data are necessary.

Even though only few of the professional have capacities to analyse the data, 82.7% of the study unit have computerized. Which is far greater than that of reported from Gashaw(23). Appropriate use of computer can improve the timeliness and availability of information. It can free managers' time from the

burden of manipulating data. So that, they can focus on using the information generated from the data to improve service delivery. However, without appropriate human and financial resources to support ICT, breakdowns are inevitable (9). The creative use of Information Technology (IT) in health-care systems is one of the most promising means of improving the quality, timeliness, clarity, presentation and use of relevant information for primary health care. In this case, IT is regarded as a solution to fill the gap in information exchange and presentation (18).

According to BPR sub-process showed that at the woredas average 500 data items per monthly report; hospitals, 450; and Health Centres, 400. (These figures do not include diseases, which typically require some 500-600 data items per month, don't include reports from specialty programs, such as HIV/AIDS, TB/Leprosy, IDSR, and malaria.) There is considerable variation in data burden from region to region, within a single region, and sometimes even within a single woreda / sub city.

On this regard according to Algansh in addis 75% of the respondents have said that it is simple and complete to register on the current HMIS formats (11). However, in Dire Dawa 66.1% of the respondents expressed inconveniences about the data collection tools and mainly stressing on redundancy of number of formats and contents difficult to manage and loss of some cases this may considered to affects data quality.

In general the flow of data shows as majority of the study units try to use information on their department some other transfer their data upwards that is one directional this would affect the rate of utilization of information at the facility level since there is no bi lateral communication between health offices and among units with in the same institutions and departments.

Quality of data and information management is highly dependent on the value and importance given both by the information generators and users on this regard from general study units 71.6% and when you see specifically doctors 81.8% of strongly agreed on the importance of health information for the improvement of health service but on the other study showed that in Addis there is marked fall; that is only 47% in the physicians' respondents to appreciate strongly the importance of health information for the improvement of health service (11). It is usually mentioned that the data received are often not

helpful for health management decision-making because they are incomplete, inaccurate, untimely, obsolete and unrelated to priority tasks and functions of local health personnel (21).

In terms of data use, countries have been consistently poor at supporting health workers who are collecting data to use it locally for planning and management purposes. Some observers speculate that facilitating greater local use of data could improve data quality overall, as those doing the data collection should be more motivated (15).

Supportive Supervision is the process of guiding, helping and encouraging staff to improve their performance so that they meet the defined standards of performance of their organization (29). Regular supervision, feedback and timely staff training are very important in building the capacity of the HMIS at all levels. In the study area 47.4% of the unit get Feedback from district health office on monthly, quarterly and annual basis and 55.5% Feedback from unit/department in the organization on daily, monthly, quarterly and annual basis and according to the BPR report SNNP reported the highest proportions, with 55-80% of health institutions reporting receipt of feedback, supervision, and peer review.

According to Gashaw in north Gonder only 34.7% of the units/departments were supervised but only 12.2% of them were given feedback in the first quarter and also in Addis Ababa RHB public health institutions are rarely supervised and supervision and feedback to private and NGOs are almost non-existent (11). Such feedback helped to increase reporting rates from 73% in 1994 to 85% in 1995 and to 93% in 2000 in Papua New Guinea (13).

One of the most difficult parts of improving HMIS is ensuring that the people filling in the forms at clinic level are skilled enough to report accurately, whether on diseases diagnosed or resources used (15). According to the BPR report Addis Ababa shows the highest levels of staffed HMIS units. Which account 95 % of the public health farcicalities have HMIS unit to collect and process the data registered by health professionals (11). But in our study area only 57.3% of the study units have HMIS units from this only 21.9% are fully functional. Study from North Gonder stated that only 23.8 % of the individual were given training on health information system which is almost half of our study area which is 45.7%.

The United Nations Millennium Development Goals (UN 2004) emphasizes the lack of educated people in rural areas in developing countries, and cite education as a way of reducing poverty and building a viable workforce that is able to compete within an increasingly competitive and global economy. The shortage of skilled, experienced and adequate human capacities, for instance in IT, makes the problematic process of adapting, developing and using IT (Walsham *et al.* 1988).

Nevertheless, the lack of expertise in rural areas to deal with local problems influences the sustainability of HISs because of several reasons. On the one hand, people with little or no domain understanding of analysis, design, implementation and management of HIS are left in control over the systems when donor and external experts disappear and also, not having general expertise nearby, e.g. for fixing computer hardware, shapes the way projects are run, and creates overwork among those who have the expertise, adversely influencing both the scale and sustainability of the system.

Three of the larger regions with mixed urban and rural populations – Tigray, Oromia, and SNNP provide a benchmark of sorts. These regions have HMIS units established at 50-60% of Health Institutions, with some 80-90% of these units staffed at least to some degree. Some of the less populous and more remote regions like Somali, Ben-Gum and Gambella appear to have difficulty staffing their HMIS units (9).

In the study area 45.8% of our study units have assistance HIS staff in designing supporting and managing the data and 84.6% health professional records their daily activities and the services provided and 83.8% of the study units take data collection as part of their duty but according to Algansh in Addis Ababa More than 80% out of the total service; is registered by health professionals. However, the remaining is registered by other personnel and also 78% of the respondents have stated that they take data registration as part of their duty. As one of the problems in the HMIS is repeatedly stated to be poor staff commitment in the data registration and collection process (11).

During the in depth interview tried to revealed that fragmentation existed in the HIS even though commendable efforts had been made by the Ministry of Health to achieve an integrated HIS through the implementation of the HMIS. The fragmentation existed in that, in addition to the HMIS, parallel programme-specific reporting systems were operating. This parallel reporting was attributed

to various reasons including the fact that the HMIS did not meet the information requirements of the programmes because: it did not collect all the data elements required by the district programme coordinators and by national level programme managers like under 15 HIV status by ICAP is not included in HMIS. But according to WHO, 2000 one of the aims of HMIS to have one standard reporting system.

The high work burden reported for data collection and reporting suggests that a large amount of scarce health care worker time was required for these tasks. Therefore information-related duties are often allocated to junior staff members who may not have the appropriate skills or insight to recognise and correct problems, and no authority to take the necessary actions this may result to have less quality data and less committed staff for sustainable system.

8.1 Limitation of the Study

- Due to the fact that this study conducted for short time, it is difficult to deals with all factors related to data generation processing, analysis and utilization at the study area.

8.2 strength of the Study

- The study use both qualitative and quantitative study method.

9. Conclusions

In general the findings of this study showed that, data and information was generated at the health institution from routine reports, and vertical programs collected using both computer and manually filled formats. The duplication that was found reflects a lack of scrutiny of the essential dataset by authorities at the facilities level. This problem in information system design can be avoided by thoughtful review of forms design. High-level support is also needed for a single integrated health management information system that will not allow data requirements to bypass the essential dataset.

Any data item collected should be linked to an indicator for which there is a clear and actionable response. This can be achieved if sufficient and reliable health information is available; and if health managers have the capacity to analyse and interpret results so as to use it as an input and promote local innovations. The facility staff members should get adequate training, feedback and supervisory support to enhance staff motivation and commitment in the generation of reliable data. However at present in some unit the primary purpose of data collection continues to be reporting to the higher level. 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 facilities and 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 overall performance of the unit. Inadequacies in the system lead to production of low quality information.

In the study area generally the utilization rate of Health information system was found to be appreciable compared to other areas. Generation of reliable data

alone does not ensure information use. It should be well analysed and interpreted to identify prevailing health problems and to identify areas of intervention and also adequate infrastructure and trained staff in the area are important. But this existed only to some extents in the current situation.

On the other hand changing the social aspects, especially staff commitment to collect reliable data, information utilization for decision making and improving computer knowledge should be taken as long run achievement which needs persistent follow up and hard work to insure success and sustainable change. But except from computerization of the units the efforts to bring the above-mentioned developments at only to some extent in all facilities levels which has an adverse effect on the utilization of health information as resource input for decision-making.

Among many factors expected to affect the utilization rate of health information system only change of data in to information was found to be the only significant factors after adjusted odds ratio.

But factors like, presence of data collection standards including standard case definition, and personal filling as take data collection as part of their duty, performance of calculating area coverage for essential services and prepare maps, use of data for plan of action, performance of presentation of information, discussion with facility management and support to community for surveillance were found to be significant factors before adjusted odds ratio and insignificant after adjusted odds ratio and must be investigated later on in the larger scale since they were expected the important factors obtained from other literature.

10. Recommendations

Recommendations to health facilities

1. Motivation and in service training should be given to all individual working in the Health Facilities about health information system.
2. Standard data collection procurers, data transmission, Analysis, reporting Rules must be fully implemented.

Recommendations to health service provider

1. All health professional should take data registration as part of their duties.

Recommendations to Dire Dawa health bureau and program coordinators

1. The staffs should get adequate training how to analyse data using Computers.
2. Responsible person must be assigned in health facilities to run a health Information system activity who has given in-services training about Health Information system.
3. Supportive supervision and feedback from respective units and health bureau should be given timely.
4. Duplication of reporting system should be avoided to minimize time spent to fill too much form and minimize the workload of health workers
5. The report and recording formats and the ICD cod should be revised for their completeness.
6. High-level support should needed for a single integrated health management information system that will not allow data requirements to bypass the essential dataset.
7. The current HMIS should meet the information requirements of the district programme and national level programme by thoughtful review of forms design.
8. Utilization of information must be investigated in the larger scale study to check the important factors that obtained from other literature which expect to affect utilization of information.

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12. ANNEX I **Questionnaire**

Health Information System Base line survey Questionnaire

Code _____

Demographic data

1. Type of Health facility

1. Hospital 2. Health center

2. Title/occupation-----

3. Salary_____

4. Year of services_____

5. unit/department_____

6. Age_____

7. Sex_____ 1. Male 2. Female

8. Level of education_____

(specify)

9. Position in the organization_____

Structural/ Technical

1. Have you ever heard about HIS/HMIS?

- 1 Yes 2 No (if yes evidence required)

2. Have you ever trained about HIS/HMIS?

1. Yes 2. No

3. Who records your daily activities and the services provided?

1. I myself
2. Other health professionals
3. Trained personnel- clerk
4. Others

4. What is your major means of communication with Regional or Sub-city Health Bureaus?

1. Feedback on reports
2. Supportive Supervision
3. Others (seminars, meeting etc)
4. No communication

5. Feedback from unit/department in the organization on daily, monthly, quarterly and annual basis?

- 1) Yes 2) No

6. Is there separate unit for data collection and information processing?

1. Yes and fully functional
2. Yes but not fully functional
3. Yes not functional
4. No

7. If your answer is NO for question number 6, who is responsible for the unit?

8. Do you have assistance HIS staff in designing supporting and managing the data base?

1. Yes 2. No

9. Do you have a meeting session on HIS/HMIS performance?

1. Yes regularly 2. Yes but not regularly 3. Not at all

10. How often do you register the health activities services rendered?

1. Routinely 2. Rarely 3. No at all

11. Have you collected & submitted statistic reports for the last 3monthes?

1. Yes 2. No

12. If yes, can you show as your copies? _____

13. How do you get information from the community in case of health emergency or epidemic?

1. Kebele 2. CHEW 3. Individuals report 4. Not designed

14. Do you have a written set of procedure for data management including data collection storage doing quality control analysis and presentation for target audience?

1. Yes 2. Yes but partial 3. Yes but I can't use 4. No we don't have 5. I don't know

15. Is the institution has a Health information steering committee to set the long-term goals for HIS and needs to decide which key indicators should be measured and which data are necessary?

1. Yes, fully functional
2. Yes but not fully functional
3. Yes but not functional
4. No

16. Do you have specific budget line on you department for HIS?

1. Yes adequate
2. Yes but not adequate
3. No we don't have
4. I don't know

17. What is the source of data for your department to calculate your denominator?

1. Censuses
2. Vital registration
3. Special survey
4. Facility records
Other (specify) -----

18. Is the unit/department prepared and report monthly /quarterly reports?

- 1) Yes 2) No

19. If yes can you show the copy? _____

20. In the past 3 months, how many times the unit/department supervised?

21. Is their Feedback from district health office on monthly, quarterly and annual basis?

1) Yes 2) No

22. Is the units/departments have data collection standards including case definitions?

1) Yes 2) No (Evidence required)

23. Is the units/departments have training design and standards, including standards for Production and dissemination of materials?

1) Yes 2) No (evidence required)

24. Is the units/departments use Information at the institutional level for?

- | | | |
|--|--------|-------|
| • Planning, | 1. Yes | 2. No |
| • Budget allocation, | 1. Yes | 2. No |
| • Monitoring and evaluation
of programs to take immediate action, | 1. Yes | 2. No |
| • Giving feedback | 1. Yes | 2. No |
| • Calculation of area coverage
and preparation of Maps, | 1. Yes | 2. No |
| • Presence of key indicators with
charts or tables, | 1. Yes | 2. No |

25. Record form, paper, pencils, and other supplies that needs for recording health service and disease information are available?

1. Yes all available
2. Yes but occasionally stock out don't affect the recording and reporting
3. Yes but stock out affect the recording and reporting
4. Health service is not able to meet reporting and reporting due to stock out

26. Is the units/departments change the data in to information every month?

1) Yes 2) No (if yes evidence required)

27. Is the units/departments have statement on rule and interaction of health information System with Private sectors?

1) Yes 2) No

28. Is the unit/department has key indicators with charts, tables?

1) Yes (evidence) 2) No

29. Is the unit/department present information to and discuss with facility management and community?

1) Yes 2) No

30. Is there any mechanism in place for verifying the completeness and consistency of data?

1. Yes 2. No

31. Do you use the International Code of Disease (ICD)?

1. Yes 2. No

1. Yes 2. No

1. Lack of uniformity in definition

3. Missing of code

4. Others specify_____

1. Complete and Simple

2. Complete but not simple

3. Time taking

4. Difficult to manage

36. Do you have a computer to compile and analyse the data?

1. Yes 2. No

37. If your answer is yes for Question No 36, Do you think you have adequate computer skill for handling of data and doing some stastical calculation?

1. Yes 2. No

38. Do you have telephone, internet and e-mail access?

1. Yes 2. No

39. Do you have any problem to prepare & submit the report?

1. Yes 2. No

40. If your answer is yes for Question No 39, could you list the problems you face in recording and reporting?

1. Lack of knowledge.

2. Lack of time.

3. Lack of staff's commitment.

4. Lack supervision & feed back

5. Lack facility (formats, pen, staff, computer etc)

6. . Other ,specify-----

41. Do you think the staffs are committed to collect and prepare reports?

1. Yes 2. No

42. Do you take data collection as part of you duty?

1. Yes 2. No

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

1. Strongly necessary 2. Partially/Not that much/ Necessary 3. Not necessary

4.I don't Know

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

1. Yes 2. No

45. If your answer is yes for Question No 44, what are the possible reasons?

1. Services are not fully recorded
2. Data are not recorded correctly
3. Data are not properly recorded and compiled
4. Others specify_____

46. Please add here anything you want to add.

Thank you!!