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**ADDIS ABABA UNIVERSITY
SCHOOL OF GRADUATE STUDIES
SCHOOL OF INFORMATION SCIENCE
AND
SCHOOL OF PUBLIC HEALTH**

**FACTORS AFFECTING THE IMPLEMENTATION OF ELECTRONIC
HEALTH MANAGEMENT INFORMATION SYSTEM (eHMIS) IN
PUBLIC HOSPITALS ADDIS ABABA**

**BY
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September, 2013

Addis Ababa

Ethiopia

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**A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF
ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS DEGREE OF MASTER'S OF HEALTH INFORMATICS**

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DEDICATION

This work is dedicated to my dear families and friends whose encouragement and help gave me strength to successfully finish this Msc course.

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ABBREVIATIONS

AAHB	Addis Ababa Health Bureau
AAU	Addis Ababa University
ARM	Annual Review Meeting
BPR	Business Process Re-Engineering
CDC	Center for Disease Control
CSA	Central Statistical Agency
eHMIS	Electronic Health Management Information System
EMR	Electronic Medical Records
FMOH	Federal Ministry of Health
GIS	Geographical Information System
HIFIS	Health Integrated Financial Information System
HIS	Health Information System
HIT	Health Information Technology
HMIS	Health Management Information System
HMN	Health Metric Network
HRIS	Human Resource Information System
ICT	Information Communication Technology
IT	Information Technology
M and E	Monitoring and Evaluation
MOH	Ministry of Health
RHB	Regional Health Bureau
SNNPR	Southern Nation Nationality People's Region
TUTAPE	Tulane University's Technical Assistance Program for Ethiopia
USAID	United States Agency for International Development
WHO	World Health Organization
ZHDS	Zonal Health Departments

ABSTRACT

Background: Electronic health management information system software has been developed along with the national paper based health management information system reporting formats. Electronic health management information system is a home –grown solution developed by Ethiopian information technology experts taking advantage of international expertise made available by John Snow Inc. Electronic health management information system has been developed to suit particularly the Ethiopian health information system with ability to meet any future changes or information needs they evolve.

Objective of the Study: To identify possible factors affecting the implementation of electronic health management information system in the public hospitals Addis Ababa.

Methodology: This study was conducted in Addis Ababa from December, 2012-june, 2013 in eight public hospitals who have implemented electronic health management information system. Data were collected by self-administered and in-depth interviews of the stakeholders i.e. the electronic health management information system and planning head of the hospitals respectively in the survey study design by using qualitative method. Observational check list was also made by the investigator to supplement this qualitative finding.

Result: All of eight institutions answered that there was the legislative, regulatory and planning framework concerning the electronic health management information system and adequate organized staffs. And the study identified those hindering factors for the electronic health management information system implementation, i.e. lack of adequate training, finance, knowledge/skill, material resources and lack of attitude. Also the study found that adequate knowledge/skill, training, information technology infrastructure, finance, and adequate material resources are used to facilitate the implementation of this system. The attitudes of staffs toward the electronic health management information system implementation were medium.

Conclusion and Recommendation: The findings of the study answered the research objective i.e. it was able to explore factors that hinder or facilitate the implementation of eHMIS system in eight public hospitals Addis Ababa. The e-HMIS-Developers and Decision makers at FMOHs/ higher officials must give special attention to sustain the eHMIS system in the future and the FMOH have to assign the concerned eHMIS staffs for the implementation of eHMIS system.

1. INTRODUCTION

1.1. Background

Electronic Health management information system (eHMIS) is an electronic health record (EHR) system capturing all patient information from encounter to discharge (1). Health management information system (HMIS) is important to strengthening the health system particularly in developing countries, because it helps to improve the health service delivery to satisfy health care demands, increase competitiveness on the supply side and hereby satisfy the clients depending quality health care service (2).

The FMOH of Ethiopia has initiated a major reform of the HMIS/M & E (monitoring and evaluation) following the business process Re-engineering principles since 2006. A strategy 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 as indicated in the strategy plan is to support continuous improvement of the health services and the health status of the population through action-oriented, evidence-based decision making, based on quality information(3).

The role of information communication technologies (ICT) can no longer be ignored within the health care industry (4). The health care industry has to depend on information technology (IT) to maintain and improve both clinical and business operations (5).

The FMOH, supported by its technical partners, is involved in a number of ICT projects and services. These projects and services have been classified into the following major areas: Data Warehouse; Electronic Medical Records (EMR); Geographical Information Systems (GIS); Tele-Education; Telemedicine; Human Resource Information System (HRIS); Health Integrated Financial Information System (HIFIS); and Electronic Health Management Information System e-HMIS (6).

For each year FMOH invests ETB 120,000,000.00 for printing of the HMIS paper based reporting system but there is a problem on the quality, accuracy and timely exchange of health information at all levels of the health sector. And it has implemented eHMIS instead of the paper

based reporting system of the HMIS in order to make effective and efficient use of information for planning and decision making.

1.2. Statement of the Problem

At national level there are two different eHMIS software developed and implemented in Addis Ababa and SNNPR. The first one is smart eHMIS module that is developed using Microsoft and implemented by CDC in 31 health facilities, all public hospitals, and all sub cities in Addis Ababa including regional health bureau. The second one is web based eHMIS software with a scanning technology as a backup, and implemented by USAID in all health facilities in SNNPR and the eHMIS implementations were started three years back for both of the group. But both eHMIS system didn't address the objective stated at the project initiation such as data accuracy, data redundancy, data completeness and timely data use for planning and decision making process (7).

e-HMIS software has been developed along with the national paper based HMIS reporting formats (i.e. electronic version of the direct HMIS printed formats). This software passed the development phase and piloted in 2008 E.C and implemented in Health facilities in two different software platforms:

1st through United States Agency for International Development (USAID) and called eHMIS Scanning Technology; it is a web based system and scanning technology and implemented in Southern Nation Nationality People's Region (SNNPR).

2nd is through Center For Disease Control, Ethiopia (CDC), called e-HMIS- Smart care; it is desktop based software through public network (Internet) and implemented in the rest of Ethiopia including Addis Ababa

The main focus of this research is to identify the factors affecting the implementation of eHMIS software implemented by CDC with the help of FMOH.

1.3. Research Questions

This study attempt to answer the type of questions related to factors affecting and facilitating the implementation of the eHMIS in Public Hospitals. These questions are the following:-

- What are the possible factors that are hindering the implementation of eHMIS?
- What problem(s) exist in relation to human resource, infrastructure, and management, financial, training and material resource during eHMIS implementation?
- Which of the factors is needed to facilitate the implementation of eHMIS system?

1.4. Significance of the Research

The findings of the study will be of benefit for those Public Hospitals and FMOH to find out their problems and strength in implementing the eHMIS, with the aim of helping them to improve their eHMIS status.

The findings will also be important for planning, decision making process and serving as a starting point for other health information.

Also the findings of the study will be beneficial to the following groups:-

e-HMIS-Developers: The study will let developers to take lessons to improve the system as well as inform other e-HMIS software system development in the future.

Decision Makers at FMOHs/ Higher officials: The research will let the decision makers have more information on the factors which affecting the implementation of e-HMIS. This will in turn help them to make corrective actions and better decisions on e-HMIS as well as guide for future selection of appropriate ICT technologies on the health sector projects.

1.5. Scope of the research

The focus of this study is identification of the factors affecting the implementation of eHMIS software implemented by CDC. The study is further limited to only public Hospitals in Addis Ababa that have been involved in the implementation of the system. The reasons for these delimitations of the study are time and resource constraint.

2. LITERATURE REVIEW

In most literature, “Health Information System” (HIS) and “Health Management Information System” (HMIS) are used interchangeably. However, the HMIS is becoming more popularly used (8). and it is “defined as set of interrelated components and procedures organized with the objective of generating HIS and intelligence to monitor the health status and health services of a nation to improve public health care leadership and management decisions at all levels”(9).

Study conducted on informatics technologies in health care in India, HMIScan defined also is looked at as a process whereby health data (input) are recorded, stored, retrieved and processed for decision-making (output). Decision making broadly include managerial aspects such as planning, organizing and controlling of health care facilities at the national state and institution level(10).

The HMIS was established to support informed strategic decision –making by providing quality data that help managers and health workers plan and manage the health service system. As of 2008, a comprehensive eHMIS has been developed in conjunction with doctors associated with Tulane University and is now being deployed to health facilities in several regions of the country, with an eventually nationwide rollout eventually stated to occur and its design based on the HMIS and used for capturing patient information to allow for improvement of quality of health information management within the context of routine reporting (11).

According to the World Health Organization“HMIS is a process of collecting, organizing, storing and health information use for decision making process” (12). The WHO-HMN Guide describes the HMIS, as process of making Routine Health Data **Standardization** (definitions of indicators, data collection instruments, and data processing and analysis procedures), Integration single HMIS plan, shared by all governmental institutions and partners through ICT, **Simplification** (Collecting, analyzing, and interpreting only health information that is immediately relevant to performance improvement). Reform of the HMIS began with a Business Process Re-engineering (BPR) assessment. This technical and process assessment identified lack of standardization and duplicative information recording and reporting processes as two major barriers to providing quality Health information (13).

The WHO- HMN Countries Assessment report clearly stated “that almost every country in the world has some form of national HMIS, although many do not function well. Reports documenting country experiences confirm the presence of many of the challenges highlighted in the previous section” (14).

An e-HMIS encourages the optimal use of resources while making workplace tasks and the management of health information more efficient (15). Despite a high demand, however, there is a lack of knowledge concerning how to effectively deploy and HIS so that it meets the needs of a variety of users (16).

An article that has studied factors affecting nursing information systems, which are one type of health information system, states that age, computer knowledge, usage, incentive (usage benefit), training, system usability, time spent on planning are the main factors affecting the use of 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 (17).

A study conducted in Loughborough University, UK the factors affecting the implementation of information communication technology, some of those factors which hinder the ICT implementation are infrastructure, finance, skilled personnel and leadership style. Also identified the major factors affecting the ICT implementation, which are the lack of funds and poor infrastructure (18).

An eHMIS was initiated as a doctoral research project in Tororo Hospital (Uganda) in 2003 under the supervision of a professor at the University of Heidelberg. The system was designed to provide electronic data, such as morbidity from certain diseases, for public health decisions. It was not geared towards supporting clinical work (19).

Related research on HMIS implementation has been conducted in Tanzania and identified the limitation and challenges which were encountered during the design and implementation which include low participation from the workers due to non-understanding of the relevance and usage of the system, insufficient computers systems, computer illiteracy, incorrect and inconsistent data, and poor information culture (20).

A study conducted on electronic health record system in Uganda Tororo District Hospital, and it was identified those factors that hindering implementation of an integrated eHMIS linking all hospitals. Such as lack of a country wide network, lack of electric power and technical infrastructure problems. And also further challenges other than technical issues were greatly determine the successful implementation of eHMIS. These are clear leadership and commitment, management and organizational issues need for clear communication between management, users and implementers as well as social issues (21).

According to the East African Community (EAC) eHMIS working report, when they are thinking of launching an e-Health program in the region. There were a number of difficulties that are faced by all the EAC partner state. Such as lack of health infrastructure and service, shortage of computer savvy health care personnel, lack of training facilities with regard to ICT in health care, absence of ICT based health care in medical curriculum and unstable communication service to facilitate e-health service (22).

According to Annual Review Meeting Report (ARM Report) of Ethiopia, e-HMIS is an electronic copy of HMIS and it is best ways to overcome the major challenges exist in paper based of HMIS, such as data redundancy, accuracy and accessibility of HMIS data to all levels. like (health facilities, Woreda Health offices (WorHOs), Zonal Health Departments (ZHDs) and Regional Health Offices (RHBs) & FMOH for good planning and decision making process (23).

There are two partners of the health sector involved in implementing two different e-HMIS in two different parts of the country; one is USAID and has implemented its own e-HMIS in SNNPR. The other is CDC, and has implemented its own eHMIS in the rest of countries (24).

According to ARM conducted in December 2011, stated that “e-HMIS has implemented 31 health facilities in Addis Ababa, Oromia, and Tigraye regions. The System has evaluated for its functionality by implementing through CDC. And all hospitals, woreda, zones including regional health bureau, including establishing ICT infrastructure in SNNPR implemented through USAID” (25).

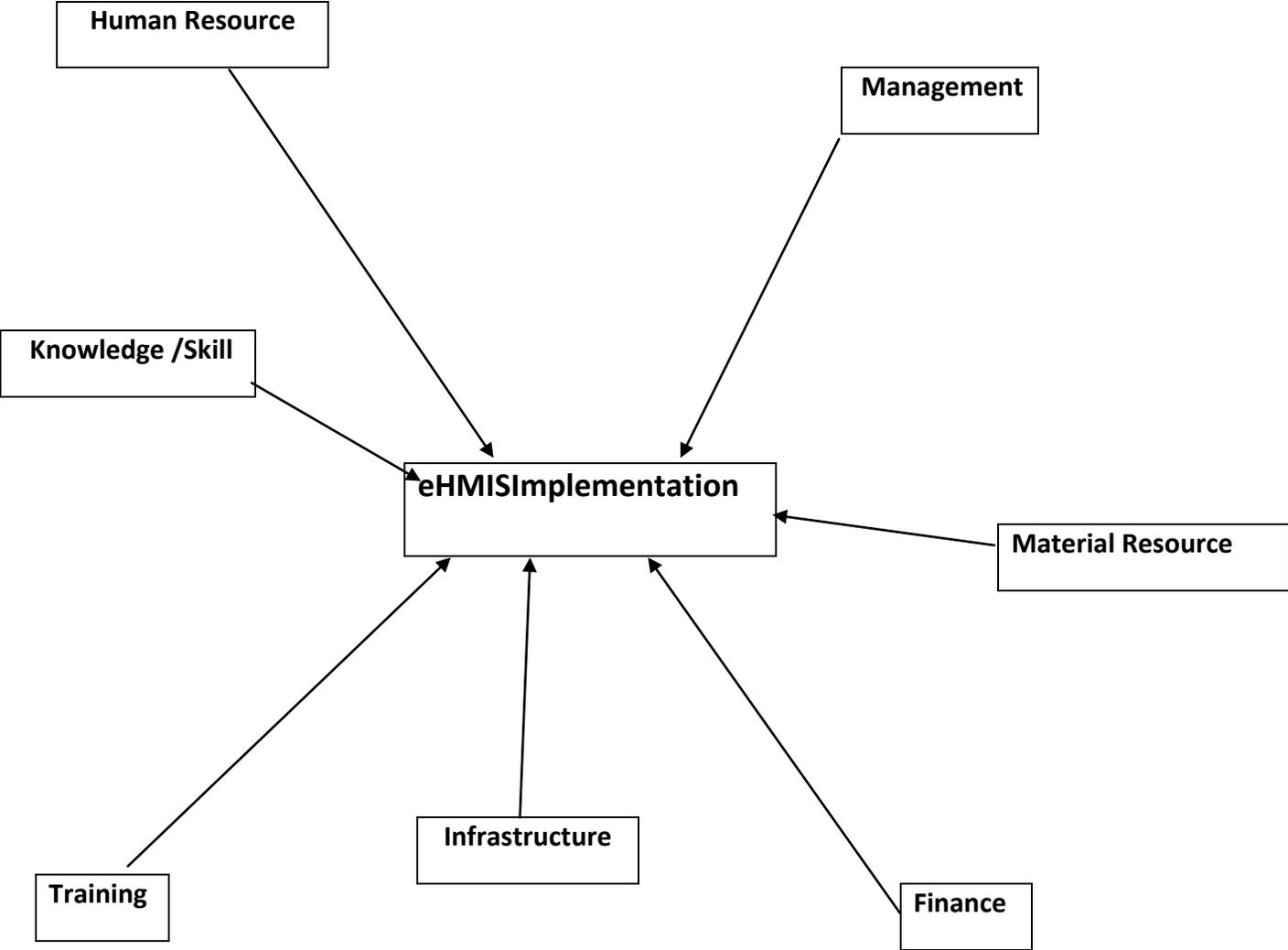
eHMIS is a home –grown solution developed by Ethiopian IT experts taking advantage of international expertise made available by John Snow Inc. The development of the application took account of the Ethiopian health system’s context and requirements, yet having the standard design and operational features see in any internationally acclaimed IT application. eHMIS has been developed to suit particularly the Ethiopian HMIS with ability to meet any future changes or information needs they evolve (26).

Availing complete and timely reports was one of the focus areas for Ethiopian fiscal year 2003. The design of this application was to enable electronic data reporting, archiving and data analysis. To this end an application, smart care eHMIS module, was designed and piloted; eHMIS was tested in Addis Ababa and evaluated for its functionality to support the decision making process(27).

To improve the time lines and quality of information, eHMIS has been implemented simultaneously with paper-based information system. Consequently, reporting module has been prepared and is being implemented in all health facilities in Addis Ababa and Harari; in all hospitals and Woreda health offices in Tigray Region; in six Woreda health offices, two hospitals and seven health centers in the three Zones of Oromia Region as well as seven Zones, 71 woredas, two special woredas and one city administration in SNNPR. A total of 4,172 computers have been procured to facilitate the successful completion of the implementation process. Based on the evaluation of the system for its functionality, corrections were made on the software and it was deployed in Tigray and Hareri Region (28).

The conceptual frame work of this research is developed by the combination of related research. Such as;Nicole (29), Kuhn (30), and Berndt (31).

Conceptual Framework for the Factors Affecting Implementation of eHMIS



3. OBJECTIVE OF THE STUDY

3.1. General Objective

The purpose of this study is to explore possible factors affecting the implementation of e-HMIS system in public hospitals Addis Ababa.

3.2. Specific Objectives

- To assess the implementation status of e-HMIS.
- To explore the factors hindering the implementation of eHMIS.
- To identify the suggestions of the respondents about what they need in order to improve their attitudes toward eHMIS.
- To explore the factors which facilitate implementation of the eHMIS.
- To propose a recommendation to improve the implementation of the e-HMIS.

4. METHODOLOGY

4.1. Study Area

The study was conducted from December, 2012 to June, 2013 in Public hospitals Addis Ababa. Addis Ababa is the capital city of Ethiopia with population size 2.738,348 million (32). There are ten public Hospitals in Addis Ababa which are located in different subcities.

Four of the hospitals (Amanuel, St. Paulos, St. Peter and ALERT) are under FMOH and five of the hospitals (Gandhi, Zewditu, Yekatit-12, Ras Desta and Minilik II) are under the Addis Ababa Health Bureau, Tikur Anbesa is Specialized Teaching hospital under Addis Ababa University. And all of the hospitals which have started the implementation of eHMIS system are selected for the study

4.2. Study Design

Exploratory study design was employed using qualitative method of data collection to explain the factors affecting the eHMIS software implementation in public hospitals Addis Ababa.

4.3. Source population

The source of population for this qualitative study was those public hospitals in Addis Ababa which have started the eHMIS implementation and their eHMIS and planning, monitoring and evaluation department.

4.4. Study Population

The study populations were the head of eHMIS departments/units or focal persons of eHMIS unit and the planning, monitoring and evaluation head of the public hospitals. The study participants were selected by using purposive sampling technique.

4.5. Inclusion and Exclusion Criteria

Inclusion Criteria:-All of those public hospitals that have started implementing the eHMIS system have been included in the study.

Exclusion Criteria:-Those hospitals that have not started implementing the eHMIS system have been excluded in the study.

4.6. Sample Size and Sampling Procedure

All of the public hospitals which have started the implementation of the eHMIS system and their eHMIS staffs who work as heads of the units/department in the eHMIS system and focal persons of planning, monitoring and evaluation department were considered in the study. The size of the source and study population was manageable so that, this study was covered the whole eHMIS units/departments in those hospitals. For this qualitative data collection method, 2 individuals were selected from each public hospital; 1 from eHMIS unit who work as the head eHMIS department and 1 from planning, monitoring and evaluation department who work as the head. A total of 20 individuals were selected but only 15 individuals were responded due to the reason one responsible person for the eHMIS system in Tikur Anbesa hospital was on annual leave and the rest of two hospitals like ALERT and Amanuel haven't yet implemented the eHMIS system. An observational check list was used to supplement the qualitative finding.

4.7. Data Collection.

In self-administered closed-ended structured questionnaire was designed for eHMIS head or focal persons of eHMIS unit/department and In-Depth interview open-ended questionnaire was designed to interview focal persons of planning, monitoring and evaluation head of the hospitals in the form voice recording system. The questionnaire was mainly focused on the factors affecting the implementation of eHMIS in relation to, human resource, management, finance, training, infrastructure, knowledge/skill, material resource, challenge And the factors which facilitating or helping to implement the eHMIS system in public hospitals Addis Ababa. Checklists were used for recording information obtained from the observation. (Checking; Availability of IT equipments, eHMIS human resources, and infrastructure).

4.8. Study Variables

Dependent Variable

- ❖ Implementation of eHMIS

Independent Variable

- ❖ Human and Material resource
- ❖ Training on eHMIS
- ❖ Presence of information technology equipment
- ❖ Finance for eHMIS department
- ❖ IT Infrastructure
- ❖ The attitude of staffs and health managers
- ❖ The presence of incentives

4.9. Operational Definitions

Implementation -- is the carrying out, execution or practice of a plan, a method, or any design for doing something and it encompasses all the process involved in getting new soft ware or hard ware operating properly in its environment, including installation, configuration testing, and making necessary changes.

Health Management Information System (HMIS) – is Service based data and information that are collected routinely from day-to- day delivery of services and combined together to achieve a certain objective.

Electronic health management information system (eHMIS) -- is computerized system designed based on HMIS.

4.10. Method of Data Analysis

The data were analyzed by using content analysis of individual responses to produce qualitative data. In this qualitative study, data was collected by the voice record system and by distributing questionnaires. Exploratory method and table form was used to analyze the responses of selected individual in public hospitals Addis Ababa. And the responses of each selected person were carefully transcribed and categorized according to their items. Finally the responses of each individual were summarized.

4.11. Data Quality Management

The questionnaires were ensured by the observation before the data was collected. Short briefing was given to the respondents when the questionnaires are distributed to make sure the respondents well understand what the researcher wants to investigate after. Completeness of the questionnaires was filled by the respondents. The investigator has been attempted carefully center and analyze the data collection.

4.12. Ethical Consideration

The study protocol was submitted to school of public health and school of information science for ethical approval. Letters was send to respective public hospitals of Addis Ababa to inform them about the aim, design and importance of the study. Permission to carry out this study was granted by the responsible body (hospital research and Ethics committee) in each of the hospitals involved in the study. Each participant was well informed about the aim and potential benefit of the study and their consent and confidentiality was ensured.

5. RESULTS OF THE STUDY

Results of Self-Administered Questionnaire

Out of the 10 close-ended questionnaires, only 8 were responded by the eHMIS head of the hospitals because the rest two hospitals, namely ALERT and Amanuel, haven't yet implemented the eHMIS system.

Table 1 The general status of the eHMIS implementation system in the public hospitals of Addis Ababa is presented in the table below. All the eHMIS head of public hospitals in Addis Ababa responded that their institution have legislative, regulatory and planning framework concerning the eHMIS implementation system and they have adequate organized staff, space, and logistics in their institution.

Table 1 The General Status of the eHMIS Implementation System in the Public Hospitals of Addis Ababa, 2013.

Variables	Number	%
Presence of Adequate Organized Staffs, Space, and Logistics		
Yes	8	100
No	0	0
Existing Legislative, Regulatory, and Planning Frame Work concerning the eHMIS Implementation System		
Yes	8	100
No	0	0

Table 2 below shows the training program on the eHMIS system in the public hospitals of Addis Ababa. Among the eight public hospitals 6(75%) of the eHMIS head stated that there is a training program on the eHMIS implementation, but 2(25%) of the respondents stated that there is a lack of training on the eHMIS implementation. Eight (100%) of the eHMIS head in the Public hospitals stated that further training is required to implement the eHMIS system. Out of the eight public hospitals 2(25%) of the eHMIS head responded that their eHMIS training is given to all health workers but 6(75%) of the eHMIS head stated that their eHMIS training is not given to all health workers. According to the respondents, out of the eight public hospitals 6(75%) the said training was highly inadequate, 1(12.5%) said fairly adequate and 1(12.5%) said adequate.

Table 2 The Training Program on the eHMIS System in the Public Hospitals of Addis Ababa, 2013.

Variables	Number	%
Presence of on Job Training		
Yes	2	25
No	6	75
Further Training Required		
Yes	8	100
No	0	0
Lack of Adequate Training		
Yes	6	75
No	2	25
Training given for all Health Workers		
Yes	2	25
No	6	75
Adequacy Rate of Training		
Highly inadequate	6	75
inadequate	0	0
Fairly adequate	1	12.5
Adequate	1	12.5
Highly adequate	0	0

Table 3 indicates availability of financial system in the public hospitals of Addis Ababa. Out of the eight public hospitals seven (87.5%) of them have lack of adequate finance. According to the eHMIS head respondents one (12.5%) responds that they have incentives but 7(87.5%) have no incentives and 3(37.5%) of the public hospitals have assigned budget but 5(62.5%) of the public hospitals have not assigned budget. According to the respondents out of the eight public hospitals 5(62.5%) of the public hospital financial was highly inadequate, 1(12.5%) of the public hospital financial was fairly adequate and 1(12.5%) of the public hospital financial was highly adequate.

Table 3 Availability of Financial System in the public Hospitals of Addis Ababa

Variables	Number	%
Presence of Assigned Budget		
Yes	3	37.5
No	5	62.5
Presence of Incentives		
Yes	1	12.5
No	7	87.5
Adequacy Rate of Finance		
Highly inadequate	5	62.5
inadequate	0	0
Fairly adequate	2	25
Adequate	0	0
Highly adequate	1	12.5

Table 4 shows the availability of IT infrastructure in public hospitals of Addis Ababa. All (100%) of the eHMIS heads in the public hospitals stated that their institutions have IT equipment but it is not adequate to implement the eHMIS system in their institution. 5 (62.5%) of the eHMIS head responded that there is no internet connection in their institution and 4 (50%) of the eHMIS head in the public hospitals stated that their institutions have network connection but 4 (50%) of the institutions have no network connection.

Table 4 The Availability of IT Infrastructure in Public Hospitals of Addis Ababa, 2013.

Variables	Number	%
Presence of Hardware		
Yes	8	100
No	0	0
Presence of Software		
Yes	8	100
No	0	0
Presence of Printer		
Yes	8	100
No	0	0
Presence of Internet		
Yes	3	37.5
No	5	62.5
Presence of Network		
Yes	4	50
No	4	50
Presence of Telephone		
Yes	8	100
No	0	0
Inadequate IT Equipment		
Yes	8	100
No	0	0

Table 5 Showed that, Availability of Human Resource in the Public Hospitals of Addis Ababa. Most 5(62.5%) of the eHMIS of the public hospitals stated that there are adequate eHMIS staffs but 3(37.5%) of the eHMIS head of the public hospitals answered that there is no adequate eHMIS staffs. And 3(37.5%) of the public hospitals have responsible person for the eHMIS system but 5(67.5%) of the hospitals have no responsible person for the eHMIS system. In general more than half the institutions have adequate eHMIS staffs.

Table 5 Availability of Human Resource in the Public Hospitals of Addis Ababa, 2013

Variables	Number	%
Presence of Responsible Person for the eHMIS System		
Yes	3	37.5
No	5	62.5
Lack of Adequate eHMIS Staffs		
Yes	3	37.5
No	5	62.5

Table 6 presents that the knowledge/skills of the eHMIS staffs in the public Hospitals of Addis Ababa. Out of eight public hospitals 5(62.5%) respondents of the eHMIS heads in public hospitals stated that their eHMIS staffs have basic skills of computer knowledge but the remaining 3(37.5%) have no basic skills of computer knowledge. Among these eight public hospitals 3(37.5%) said that the computer knowledge skills of their eHMIS staffs is highly inadequate, 1(12.5%) said fairly adequate, 1(12.5%) said adequate, and 3(37.5%) said highly adequate. And 2(25%) of the public hospitals have skilled eHMIS staffs in their institution but 6(75%) of public hospitals have lack of skilled eHMIS staffs in their institution.

Table 6The knowledge/skills of the eHMIS staffs in Public Hospitals of Addis Ababa, 2013

Variables	Number	%
Presenceof eHMIS Staffs with the basic knowledge of computer		
Yes	5	62.5
No	3	37.5
Lack of Adequate Skilled Staffs on eHMIS system		
Yes	6	75
No	2	25
Adequacy Rate of Skilled Staffs		
Highly inadequate	3	37.5
inadequate	0	0
Fairly adequate	1	12.5
Adequate	1	12.5
Highly adequate	3	37.5

Table 7 shows availability of material resources in the public hospitals of Addis Ababa; According to the eHMIS head of the public hospitals, 7 (87.5%) of the public hospitals have no adequate eHMIS material resources but 1 (12.5%) of the hospitals has adequate eHMIS material resource.

Table 7 Availability of Material Resource in the Public Hospitals of Addis Ababa. 2013

Variables	Number	%
Presence of Adequate eHMIS Materials		
Yes	1	12.5
No	7	87.5
Lack of Material Resources		
Yes	7	87.5
No	1	12.5

Table 8 Presents the health management information system of public hospitals of Addis Ababa, According to the respondents 5 (62.5%) of the public hospitals have suitable environment of

health management information system to implement the eHMIS, but 3(37.5%) of the public hospitals have no suitable environment of health management information system to implement the eHMIS. Among the 8 public hospitals 3(37.5%) of the public hospitals have lack of guideline on eHMIS system but 5(62.5%) have no lack of guideline on eHMIS system and from the eHMIS head of 8 public hospitals 5(62.5%) the eHMIS head of public hospitals agreed that health management information system has direct impact on the eHMIS implementation but 3(37.5%) of the eHMIS head of public hospitals disagreed that health management information system has direct impact on the eHMIS implementation system in their institutions.

Table 8 The Health Information Management System of Public Hospitals of Addis Ababa, 2013.

Variables	Number	%
Practicing of appropriate Health Management Information System		
Yes	5	62.5
No	3	37.5
Health Management Information System has Direct Impact on eHMIS implementation		
Strongly disagree	0	0
Disagree	0	0
Somewhat agree	0	0
Agree	5	62.5
Strongly Agree	3	37.5
Lack of Guideline on eHMIS System		
Yes	3	37.5
No	5	62.5

Table 9 Shows that, the attitude rate of health care workers toward the implementation of the eHMIS system in public hospitals of Addis Ababa. Based on the eHMIS head of 8 public hospitals respondents the majority (75%) of the health care workers has medium attitudes toward

the implementation of eHMIS system in public hospitals but 1(12.5%)of the health care workers has very low attitude. And 1(12.5%)of the health care workers have low attitudes toward the implementation of eHMIS system in public hospitals and 1(12.5%)of the health care workers have low attitudes toward the implementation of eHMIS system in public hospitals.

Table 9 The Attitude Rate of Health care Provider toward the Implementation of the eHMIS System in Public Hospitals of Addis Ababa, 2013.

Variables	Number	%
The Rate of Attitude towards the eHMIS implementation Among the Health Care Workers		
Very low	1	12.5
Low	1	12.5
Medium	6	75
High	0	0
Very low	0	0

Most of the eHMIS of the heads of the studied Hospitals said that the adequate eHMIS skilled professionals, adequate Training support, adequate IT infrastructure, adequate finance, adequate material resource and proper guideline on management system are very important to facilitate implementation of the eHMIS system in their institutions. But the eHMIS head of one hospital stated that the adequate eHMIS skilled professionals and adequate material resources are enough to facilitate the implementation of the eHMIS system in their institution.

Results of the Interview

A detailed interview was conducted with the planning, monitoring and evaluation heads of public hospitals. Out of ten public hospitals planning heads, seven were interviewed. The planning heads

among the three public hospitals couldn't to be interviewed because one was on an annual leave and the rest two public hospitals have not yet implemented the eHMIS system in their institutions. Almost all of the planning, monitoring and evaluation heads of the hospital stated that, "there is a planning framework concerning the eHMIS implementation in our institutions, to allow continuation of the eHMIS system in the future."

The majority of the planning heads of the hospitals stated that "their health workers are exercising the implementations of the eHMIS in their institution but, not Zewditu and Minilik-II hospitals because they believed that work over load may be created in addition to their routine job.

There are challenges that are affecting the implementation of the eHMIS system in the studied public hospitals in Addis Ababa. The challenges existing in the Gandhi hospital are computer maintenance problem and lack of regular training program on the eHMIS system for the new employers. In the Zewditu hospital there is a shortage of material resource and shortage of eHMIS skilled staffs. The challenges in the Yekatiti-12 hospital are the network problem, the lack of eHMIS trained professionals, the lack software maintenance, and resistance from the health workers to accept the use of eHMIS system. The challenges that are affecting the implementation of the eHMIS system in the Ras Desta hospital are low attitudes of clinical staffs toward the eHMIS system, lack of network and lack of electric power. The challenges on the side of St. Paulos hospital are lack of computer skill and resistance from the health workers to accept the use of eHMIS system in their institution, because, according to them, these would overburden them. The challenge that affects the implementation of the eHMIS system in the St. Peter hospital is workload. Because they said that their health workers are performing different activities in their institutions. Attitudes of the health workers toward the eHMIS system is the challenge that is affecting the implementation of the eHMIS system in the Minilik-II hospital.

All of the institutions expressed that "there is no on-the-job training program because it is the mandate of the FMOH to give such training program and there is no specifically assigned budget to the eHMIS departments, but they use by sharing of their hospitals budget." Gandhi, Zewditu, Ras Desta, and Minilik-II hospitals have budget specifically assigned for their eHMIS department. In St. Peter hospital, their budget allocation is divided in two parts i.e. medical services and administration service and the eHMIS departments is categorized under the

administration (non-medical part), as they said, it is difficult to get the budget from the medical side for the medical purpose. St. Paulos hospital stated that the role of eHMIS must be accepted by governmental health policy makers to get adequate budget for their institution.

The majority planning heads of the studied hospitals in Addis Ababa have adequate IT equipments except Ras Desta hospital which has a problem of lack of personal computer, lack of maintenance and a lack of IT professionals.

Except Gandhi and Minilik-II hospitals all the planning heads of the hospitals stated that there are eHMIS workers who have skill to operate eHMIS software. But in the Minilik-II hospital there is no adequate training program, and in the Gandhi hospital there is no adequate training program on eHMIS implementation and the eHMIS system is guided by other departments.

The majority of planning heads of those studied institutions said that there is an adequate guideline of health management planning system to implement eHMIS system in their institution. The planning heads of Zewditu hospital said it has no adequate guide line for health management planning system to implement the eHMIS system. The planning heads of all studied Public hospitals stated that the health management planning system has direct impacts on the implementation of improved eHMIS system in their institution. The planning heads of the St. Paulos hospital stated that, the health management planning system is monitor the implementation of the eHMIS system; check the fulfillment of necessary IT equipments and it is responsible for sustainable implementation of the eHMIS system. The planning heads of the Yekatit-12 hospital stated that due to the impacts of health management planning system on the eHMIS implementation in their institution; the over workload decrease and easy to search out the data.

Almost all of the planning heads of studied hospitals stated that special attention must be given to training, skill updating, and adjusting finance system to facilitate the eHMIS implementation in their institution. The Planning head of Zewditu said that staff commitment is very important to implement eHMIS. And the planning heads of St. Paulos stated that the resistances and responsibility of the health workers are the major factors to facilitate the eHMIS system in their institution. All of the studied institutions said that they have a plan to continue with the existing eHMIS system in the future.

Results of Observational Checklist

The observational check list was focused on the IT equipment and eHMIS unit. From the observational checklist, the researcher noted that:-

- ❖ St.Paulos hospital has eHMIS unit, eHMIS focal person, adequate staffs in the eHMIS department, adequate hardware, adequate software available, internet connectivity, phone and printer available.
- ❖ Gandhi and Zewditu hospital have eHMIS unit, eHMIS focal person, adequate staffs in the eHMIS department, adequate hardware, adequate software, adequate phone and adequate printer available. But there is lack of adequate internet connectivity.
- ❖ Ras Desta hospital has HMIS unit, eHMIS focal person, adequate staffs in the eHMIS department, adequate hardware, adequate software and adequate internet connectivity available. But have no adequate phone and printer.
- ❖ St.Peter hospital has eHMIS unit, eHMIS focal person, adequate staffs of eHMIS department and adequate hardware and adequate printer available but has no adequate software, adequate internet connectivity and adequate phone.
- ❖ Ykatit-12 hospital has eHMIS unit, eHMIS focal person, adequate hardware, adequate internet connectivity, adequate phone and adequate printer but has no adequate staffs in the eHMIS department and adequate software.
- ❖ Minilik-II hospital has adequate staffs in the eHMIS department (hardware, software, internet connectivity, and phone). But has no eHMIS focal person specifically assigned for the eHMIS system.
- ❖ Tikur Anbesa hospital has eHMIS unit, adequate (hardware, software, internet connectivity, phone, and printer). But have no eHMIS focal person and adequate staff in their eHMIS department.
- ❖ Observational results in the public hospitals that have been discussed above are also shown in the Table 10.

Table 10 The Observational Results for the studied Public Hospitals in Addis Ababa, 2013.

Variables	Number	%
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Adequate eHMIS Unit		
Yes	8	100
No	0	0
eHMIS Focal Person		
Yes	6	75
No	2	25
Adequate staff in eHMIS department		
Yes	6	75
No	2	25
Adequate hardware		
Yes	8	100
No	0	0
Adequate software		
Yes	7	87.5
No	1	12.5
Adequate Internet		
Yes	4	50
No	4	50
Adequate phone		
Yes	6	75
No	2	25
Adequate printer		
Yes	8	100
No	0	0

6. DISCUSSION OF THE FINDINGS

In this chapter, findings of the study are discussed by using the conceptual frameworks of the factors affecting the implementation of eHMIS. The factors assumed to be affecting the eHMIS implementations are; human resource, knowledge/skill, management system, training, IT infrastructure, finance, and the material resource.

6.1. General Status of the eHMIS System

Results in Table 1 indicated that most of the institutions have legislative, regulatory and planning frame work and adequate organized staffs for the eHMIS implementation in their institution. The HMIS was established to support informed strategic decision-making and it includes managerial aspects such as planning, organizing and controlling of health care facilities at the national state and institution levels and electronic based eHMIS had been implemented for the better way of decision making (11).

A study conducted on electronic health record system in Tororo District Hospital, Uganda, stated that the presence of clear leadership and commitment, management and organizational issues are needed for clear communication between management, users and implementers as well as social issues (19).

So, from this finding we can observe that the presence of legislatives, regulatory and planning frameworks and adequate organized staffs are important for decision making process during the eHMIS implementation of those institutions.

6.2. Factors that hinder implementation of the eHMIS

Presence of Training

From the findings it could be inferred that the majority (75%) of the studied public hospitals facelack of training and it is highly inadequate, but the remaining (25%) public hospitals provide on-the job trainings to all health workers concerning on the eHMIS system. All of the institutions have a need for further training program to use their eHMIS system effectively. A similar study had been conducted on the health information system in Taiwan to identify what the factors affecting the health information system. Among these identified factors, training was one of the factors (17). According East African Community eHMIS working report also, lack of training facilities with regard to ICT in health care were among the factor affecting the eHMIS implementation (22). Therefore, it is better to give adequate trainings to all health workers concerning on the eHMIS system in the public hospitals.

Financial System

e-HMIS encourages the optimal use of resources while making workplace tasks and the management of health information more efficient (15). Concerning the financial system the study showed that all of the institutions have lack of adequate finance. Among the 8 of institutions, the majority (62.5%) of the institutions have no assigned budget and it is highly inadequate and 3(37.5%) of the institutions have assigned budget. Related study carried out on the factors that affecting the implementation of information communication technology in Lough Borough University, UK, showed that lack of finance was one the factors hindering the implementation of the system (18). From this finding all of the institutions have the financial problem. Therefore adequate budget must be given to all the eHMIS departments in public hospitals.

Presence of Information Communication Technology Lab

The finding reveals that all of the sampled institutions have IT equipment but it is not adequate. Among those eight studied public hospitals, 5(62.5%) of them have no Internet connection and the remaining 3(37.5%) of the public hospitals have internet connections. Related study conducted on the factors affecting the implementation of information communication technology in Lough Borough University, UK, has shown that IT infrastructure was one factor which hinder the implementation the system (18). According East African Community eHMIS working report, the lack of IT infrastructure facilities with regard to ICT in health care were the factors which affecting the eHMIS implementation (22). Another similar study had been conducted on electronic health record system in Uganda Tororo District Hospital, from this study lack of IT infrastructure was one of problem which did not allow for the implementation of an integrated eHMIS linking all hospitals (21). However in this study analysis, it indicated that even though there are IT equipments in the wholes studied institutions but it is not adequate. So in this study the finding has showed that lack of adequate IT infrastructure is one the factor that hindering implementation of the eHMIS system.

Presence of Human Resource

This study has showed that 5(62.5%) of the public hospitals have adequate eHMIS staffs but the remaining 3(37.5%) of the public hospitals answered that they have no adequate eHMIS staffs in

their institutions. Also 3(37.5%) of the public hospitals have responsible person for the implementations of eHMIS system in their institution but 5(67.5%) of the public hospitals have no responsible person for the implementations of eHMIS system in their institution. Related research on HMIS implementation has been conducted in Tanzania and identified the limitation and challenges which were encountered during the design and the implementation was included low participation from the workers due to no understanding of the relevance (21). The result observed from this study indicated that, Even though there is an adequate eHMIS staffs in the majority of the studied public hospitals but they are not responsible to implement the eHMIS system in their institution. However in this research finding, human resource is not the factor that hindering the eHMIS implementation in the studied institutions.

Knowledge/Skills of the eHMIS Staffs

From the sampled public hospitals 5(62.5%) of the public hospitals have said that their eHMIS staffs have basic skills of computer knowledge but 3(37.5%) of the public hospitals said that their eHMIS staffs have no basic skills of computer knowledge. Among the eight public hospitals 6(75%) of the public hospitals have lack of adequate skilled staffs to implement eHMIS system but 2(25%) of the public hospitals have adequate skilled staffs. Despite a high demand, however, there is a lack of knowledge concerning how to effectively deploy eHMIS so that it meets the needs of a variety of users (16). An article that has studied the factors affecting nursing information systems, which is one type of health information system, stated that the computer knowledge is one of the main factors affecting the system (17). Also the result obtained from this study indicated that, the majority of public hospitals have lack of adequate knowledge/skills concerning on the eHMIS implementation.

Availability of Material Resources

The study found that, the majority 7(87.5%) of the studied public hospitals have lack of adequate material resource for their eHMIS department and the remaining 1(12.5%) of the public hospital have adequate material resource for their eHMIS department. The Study conducted on electronic health record system in Uganda Tororo District Hospital identified that lack of electric power is one of the material resource that affects the implementation of an integrated eHMIS linking in all

hospitals (21). This study found that the majority of public hospitals have lack material resource that affects the implementation of eHMIS system in their institution.

Practicing of Appropriate Health Management information System

The study have showed that the majority 5(62.5%) of the public hospitals have suitable environment of health management information system to implement the eHMIS system in their institution and the remaining 3(37.5%) of the public hospitals have Said that their health management information system environment is not suitable to implement the eHMIS system in their intuition and among the eight public hospitals 3(37.5%) of the public hospitals have lack of guideline on eHMIS system but 5(62.5%) of the public hospitals have guideline on eHMIS system and from the studied public hospitals 5(62.5%) of the eHMIS head of public hospitals agreed that health management information system has direct impact on the eHMIS implementation and the remaining 3(37.5%) of the eHMIS head of public hospitals disagreed that health management information system has no direct impact on the eHMIS implementation system in their institutions. In a study conducted in Lough borough University, UK on the factors affecting the implementation of information communication technology; the leader ship style was one of the factors hindering the implementation of the system (18). Another study conducted on electronic health record system in Uganda Tororo District Hospital identified that lack of technical issues greatly determine the successful implementation of eHMIS. These are clear leadership and commitment, management and organizational issues need for clear communication between management, users and implementers as well as social issues (21). However, in this study result indicated that the majority of public hospitals have suitable health management information system to improve the implementation of the eHMIS system in their institution. Also the majority of the public hospitals have agreed that their health management information system has a guideline to implement eHMIS system and it has direct impact on the eHMIS implementation in their institutions.

6.3.The Attitude of health workers toward the eHMIS implementation

The study showed that, the attitudes of the health worker staffs towards the eHMIS implementation is medium. From this finding, we can conclude that the lack of awareness about the eHMIS implementation is definitely the result of inadequate training and the commitment of

the staffs. A related research had been conducted on the HMIS implementation system in Tanzania and identified the limitation and challenges some of these challenges were low participation from the workers due to non-understanding of the relevance and usage of the system, insufficient computers systems, and computer illiteracy (20). The majorityeHMIS heads of public hospitals stated that if the health workers have adequate training on eHMIS implementation, their commitment and acceptance will be higher.

6.4. Factors which facilitate the implementation of eHMIS System

The Most eHMIS heads of thestudied public hospitals said that adequate eHMIS skilled staffs, adequate Training, adequate IT infrastructure, adequate finance, adequate material resource and proper guide lines of health management information system are very important to facilitate implementation of the eHMIS system in their institutions. But the eHMIS heads of Zewditu hospital stated that the adequate eHMIS skilled staffs and adequate material resources are well enough to facilitate the implementation of the eHMIS system in their institution. Study had been conducted in Lough borough university, UK, the factors affecting the implementation of information communication technology, some of these factors that affecting the implementation system were the lack of adequate infrastructure, finance, skilled personnel and the lack of leadership style (18).

Challenges

In this study, almost all of the eHMIS heads of the institutions stated that there are challenges that hinder the implementation of the eHMIS system in their institutions. These are the lack of adequate skilled staffs, lack of adequate training, lack of adequate IT infrastructure,lack of adequate finance, and lack adequate material resources. A related research had been conducted on the HMIS implementation system in Tanzania and identified the limitation and challenges some of these challenges were low participation from the health workers due to non-understanding of the relevance and usage of the system, insufficient computers systems, and computer illiteracy(20).

The majority of the studied institutions have no regular on-the- job training program because to give on-the- job training program is not the mandate of public hospitals; instead, it is the mandate of FMoH. Also the majority of the institutions have no adequate budget specifically assigned to their eHMIS department but they share with the budget of other departments in their institutions. There for, the lack of adequate budget is one of the problems which affect the implementations eHMIS system in their institutions.

Strength and Limitation of the Study

Strength

- ❖ The majority of the institutions were volunteers to study the status of their eHMIS implementation.
- ❖ Almost all of the institutions were interviewed, so that it was easy to explore the factors that are hindering or facilitating implementations of the eHMIS system in their institution.
- ❖ All of the population was taken during the study which makes the conclusion valid to all the institutions under the study.

Limitation

- ❖ In the some of the public hospitals one focal person working as the eHMIS officer and planning head so that it was difficult to ask those questions related to eHMIS and planning departments for one focal person.
- ❖ Two of the hospitals (Amanuel and ALERT) were out of the study because still there is no the implementation of eHMI system. So,during the interview they were not volunteers to give the full information about the eHMIS systembut they had trained that the courses of eHMIS implementation system.
- ❖ In-depth interview was not conducted in TikurAnbesa hospital because the planning head had been stopped his work and the others staffs were not volunteers to be interviewed.
- ❖ It was difficult to find out the eHMIS and planning heads of those institutions during the interview because they were preparing their third quarter of annual budget and they had been taking the training course on planning.

7. CONCLUSION

In general, the findings of the study answered the research objective i.e. it was able to identify the factors that affected the implementation of the eHMIS system in public hospitals in Addis Ababa that are involved in the implementation of the eHMIS system.

The study showed that those factors that are hindering the implementation of the eHMIS system. These are;lack of adequate training, adequate budget, adequate knowledge/skill, adequate material resource, awareness toward the implementation of eHMIS system.

Almost all the eHMISheads respondedthat there is lack of adequate budget for their department.

The study result indicated that all of the studied public hospitals required further training on the eHMIS implementation.

The study found that the attitudes of the health worker staffs toward the eHMIS implementation was medium, this was due to the lack of commitment and inadequate training.

The study found that there are factors that facilitate the implementations of the eHMIS system in those institutions. These are adequate (eHMIS skilled persons, training, IT infrastructure, finance and material resources).

In general, the e-HMIS-Developers and Decision makers at FMOHs/ higher officials must give special attention for the successful and sustainable implementation of the eHMIS system in those public hospitals.

8. RECOMMENDATIONS

Based on the finding of the study, the following recommendations are forwarded to avoid the possible factors that hinder the implementation the eHMIS system in public hospital in Addis Ababa.

- ❖ The FMOH must give frequent on-the- job training to upgrade the knowledge of the eHMIS staffs.
- ❖ The FMOH has to give a special attention to the eHMIS department to solve financial problems of the studied institutions.

- ❖ It is very important to make the concerned staffs aware of the importance of the eHMIS system.
- ❖ Finally, the FMOH have to assign the concerned eHMIS staffs for each public hospital.

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10. ANNEXES

Annex,1:- Consent Form

Dear Respondents

My name is ----- and I am conducting a study on ----- . The information collected will help the-----to improve the-----.

Currently I am a postgraduate student in Addis Abba University at Department of Health Informatics, and I'm carrying out a thesis research entitled“ **TheFactors Affecting the Implementation of eHMIS in Addis Ababa Governmental Hospitals**”. The objective of the

research is identifying the factors affecting the implementation of eHMIS and recommending possible solutions for improvement.

I'm going to ask you questions about the factors affecting the implementation of eHMIS.

Your name will not appear on this interview and all the information you provide to me will be strictly confidential. You are not obliged to answer any questions that you don't wish to answer, and you can put an end to the completion of this interview at any time, if you wish to do so. Your participation in this study does not involve any direct risk or benefit for you but it is very useful since your answers, as well as those of other participants will help to identify the factors affecting the implementation of eHMIS in Addis Ababa Governmental Hospitals and to give possible solution.

Thank you for sparing your precious time.

The study participant's signature-----.

Date -----

Annex, 2:- Self- Administer Questionnaire for eHMIS Head of the Public Hospitals.

Name of the Institution-----

Part- I:- General Information

1. Does your institution have legislative, regulatory and planning frameworks concerning the use of the eHMIS?

	Yes	No	If your answer is No (explain)
Legislative			

Regulatory			
Planning			

2. Do you believe that the eHMIS unit in your institution is adequately organized (staff, space, logistic)?

	Yes	No	If you say No (explain)
Staff			
Space			
Logistic			

Part- ii:- Training

3. Is there a regular on the job training program about the eHMIS in your institution?

	Yes	No	I don't know
On job training			

4. If your institution has a regular on the job training program, how do you rate the adequacy of this training program?

Highly inadequate	Inadequate	Fairly adequate	Adequate	Highly adequate

5. If your institution has regular on the job training program about the eHMIS implementation, for whom was the training given?

Head of hospitals	Head of eHMIS	All health worker	All interested staff	Others (specify)

6. Do you require further training on the eHMIS to enable you perform your job effectively?

	Yes	No	I don't Know
Further Training			

7. Do you think lack of adequate training given for the intended users of the eHMIS is affecting the implementation of the eHMIS in your institution?

Yes	No	I don't Know

Part-iii:-Finance

8. Does your institution have assign budget of the eHMIS?

Yes	No	I don't Know

9. If your institution has assigned budget of the eHMIS, how does you rate the adequacy of the budget for the eHMIS implantation?

Highly inadequate	Inadequate	Fairly adequate	Adequate	Highly adequate

10. Are there any kinds of incentives given to the eHMIS staffs during the implementation of the eHMIS system in your institution?

Yes	No	I don't Know

11. If there is an incentive in your institution, what kinds of incentive are given?

Money	Training	Recognition	Others (specify)

12. Do you think the lack of adequate finance affecting the implementation of the eHMIS system in your institution?

Yes	No	I don't Know

Part-iv:- Infrastructure

13. Are there the necessary IT equipments for the eHMIS available in your institution?

It equipments	Yes	No	I don't Know
software			
Hardware			
Printer			
Internet			
Network			

Telephone			
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14. If your institution has necessary IT equipment, how do you rate the adequacy of each?

It equipments	Highly Inadequate	Inadequate	Fairly adequate	Adequate	Highly adequate
Hard ware					
Software Printer					
Printer					
Internet					
Network					
Telephone					

15. Do you believe that lack of adequate IT infrastructure affects the implementation of the eHMIS system in your institution?

Yes	No	I don't Know

Part-v:- Human Resource

16. Does the institution have adequate of the eHMIS staffs to implement the eHMIS system in your institution?

Yes	No	I don't Know

17. If your institution has adequate of the eHMIS staffs, are they responsible for to implement the eHMIS system in your institution.

Yes	No	I don't Know

18. Do you think the lack of adequate human resource affecting the implementation of the eHMIS system in your institution?

Yes	No	I don't Know

Part-vi:- Knowledge/Skill

19. Do you think the intended users have a basic skill of computer knowledge to implement the eHMIS software in your institution?

Yes	No	I don't Know

20. If your institution eHMIS staffs has a basic skill of computer knowledge to implement the eHMIS software in your institution? How do you rate the adequacy of computer knowledge for the intended user in your institution?

Highly inadequate	Inadequate	Fairly adequate	Adequate	Highly adequate

21. Do you believe that lack of adequate skilled staffs affect the implementation the eHMIS system in your institution?

Yes	No	I don't Know

Part-vii:- Material Resource

22. Does the institution have adequate of the eHMIS materials resource to implement the eHMIS system in your institution?

Yes	No	I don't Know

23. Do you think lack of adequate eHMIS human resource affecting the implementation of the eHMIS system in your organization?

Yes	No	I don't Know

Part-viii:-Management

24. Does the health management information system is appropriate to implement the eHMIS system in your institution?

Yes	No	I don't Know

25. Do you believe that management system has a direct impact on improved implementation of the eHMIS in the health service in your institution?

Strongly Disagree	Disagree	Somewhat agree	Agree	Strongly agree

26. Is there lack of guide lines on management system to implement the eHMIS in your organization?

Yes	No	I don't Know

27. What are factors which facilitate or help to implement the eHMIS system in your organization?

Factors	Yes	No	I don't know
Adequate eHMIS skilled professional			
Adequate training support			
Adequate IT infrastructure			
Adequate finance system			
Adequate material resources			
Proper guide lines on management system to implement eHMIS			

28. How do you rate the attitude towards the eHMIS implemented among health care providers in your institution in general?

Very Low	Low	Medium	High	Very high

Annex, 3:-GuideLines for In-Depth Interview for Focal Persons of Planning, Monitoring and Evaluation

1. Does your institution have planning frameworks concerning the use of the eHMIS?
2. Do you think that the eHMIS health workers are accepting the implementation of the eHMIS system in your institution?
3. Are there challenges that are affecting the implementation of the eHMIS in your institution?
4. Is there a regular on the job training program about the eHMIS in your institutions?
5. Does your institution assign adequate budget for the eHMIS?

6. Are the IT equipmentsadequatefor the eHMIS implementation in your institution?

7. Do the eHMIS workers have skill in operating eHMISsoftware?

8. Is the guideline of management planning system adequateto implementeHMISin your institution?

9. Do you believe that management planning system has a direct impact on improved implementation of the eHMIS in the health service in your institution?

10. In your opinion what are the factors which facilitate or help to implement the eHMIS system in your institution?

11. Does your institution have a plan to continue the existing system of the eHMIS inthe future?

Name of chart	Hospital	
	Yes	No
eHMIS unit		
eHMIS focal person		
Adequate staffing in eHMIS department		
Adequate hardware available		
Adequate Software available		
Adequate Internet connectivity available		

Adequate phone available		
Adequate printer available		

**Annex
, 4:-
Obser**

ational Check list

Name of the Institution-----

CLOSING

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

Declaration

I, undersigned, declare that this thesis is my original work in partial fulfillment of the requirement for the Degree of Masters of Science in health informatics and has not been presented for a degree in this or any other university. All source of materials used for this thesis and all people and institutions who gave support for this work have been duly acknowledged.

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Signature _____

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Date of submission September 20/2013

This thesis has been submitted for examination with our approval as the university advisors.

Name of the advisors Signature

Dr. GashawKebede: _____

Dr. MesfinAddisse: _____