ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

UTILIZATION OF DISTRICT HEALTH INFORMATION FOR DECISION MAKING AND ITS ASSOCIATED FACTORS AMONG CASE TEAM HEADS IN SELECTED PUBLIC HEALTH INSTITUTIONS OF ADDIS ABABA CITY ADMINISTRATION, ETHIOPIA.

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ASSURANCE OF PRINCIPAL INVESTIGATOR

I, the undersigned MPH student declare that this thesis is my original work in fulfillment of the requirement for the master of General Public Health.

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This thesis work has been submitted with our approval as the university advisor.

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DEDICATION

This paper was dedicated to my beloved mother, Adde Chaltu Iddosa.

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Table of Contents

List of Table

List of Figures

List Abbreviations

AAU: Addis Ababa University.

AARHB: Addis Ababa Regional Health Beauro

DHI: District Health Information

DHIS2: District Health Information Software Version 2

E-HMIS: Electronic Health Management Information System

FMoH; Federal Ministry of Health

HIS: Health Information System

HISP: Health Information System Program.

HMIS: Health Management Information System

HMN: Health Metrics Network

HSTP: Health Sector Transformational Plan

HSDP: Health Sector Developmental Plan

HPPD: Head of Program & Planning Department

ICT: Information Communication Technology

OPD: Out Patient Department

PHC: Primary Health Care

PHCU: Primary Health Care Unit

PRISM: Performance of Routine Information System Management

RHIS: Routine Health Information System

WorHO: Woreda Health office.

WHO: World Health Organization.

Abstract

Background

The district health information system plays a critical role in supporting evidence-based decision-making for all system pillars. However, health workers do not fully utilize district health information for decision-making. Hence, to ensure the effective and efficient utilization of health information, periodic assessment becomes very crucial. The aim of the study was, therefore, to assess the utilization of district health information for decision making and its associated factors among case team heads in selected public health institutions of Addis Ababa City Administration, Ethiopia from February to April 2020.

Method: A cross-section study design was conducted using a quantitative approach. A pre-tested & standard PRISM tool was administered to collect quantitative data from 240 case team heads in 23 selected health institutions. Data were entered by Epi-data and were cleaned and analyzed by SPSS version 23.0. Descriptive statistics were used to summarize key findings. Logistic regression was used to assess factors associated with outcome variables and findings were reported using crud and adjusted odds ratio and corresponding 95% confidence interval.

Result: A total of 234 case team heads participated in the study with a response rate of 97%. Out of the total, 55.1% were females. About 164(70.1%) of them have less than 5 years' work experience and only 90(38.5%) participants attended training on DHIS2 software; Over all, the proportion of utilization of district health information among case team heads in health institutions was about 41.5%(95%CI: 35.09-47.81). Among other factors ICT infrastructure (AOR 5.03, 95% CI 4.02-9.67), financial support (AOR 5.68, 95% CI 9.84-15.39), access of training (AOR 3.64 95% CI 4.75-7.28), supportive supervision (AOR 2.50, 95% CI 1.23-3.16), were significantly associated utilization of DHIS2 data.

Conclusion and recommendation: Generally, this study revealed that poor utilization of district health information among the case team heads in health institutions. Inadequate ICT infrastructure, poor supportive supervision, shortage of financial support, training gaps of the users, were reduces the utilization of district health information s. It needs major improvement to avail ICT infrastructure; computer, internet connectivity, coordinated supervision and fill training gaps to enhance the confidence of the DHIS2 users.

Key Words: Health information systems, utilization of DHIS, DHIS2 software.

1. Introduction

1.1. Background

The district health information system plays a critical role in supporting evidence-based decision-making for all system pillars. Policy formulation, proper health management, evidence-based decision-making, prudent resource usage, and monitoring and assessment of the public health situation, health care delivery, and outcomes all need reliable and timely health information(1).

The District Health Information System Software2 is a free and open-source database and application for gathering, processing, and analyzing health data, which was developed and implemented by the Health Information System Program in South Africa beginning in 1998. More than 67 countries in Africa, Asia, and Latin America are currently using district health information system software to capture routine health data(2). The system generates customized reports for various health indicators from local, provincial, and national health departments. It has features for data entry at the facility level, user-defined dashboards, and a geographical information systems interface for both offline and online environments (3).

The aims of district health information system software are; to deliver complete data management results founded on data storage ideologies and a modular system that can simply be tailored to the diverse requirements of a management information system; support analysis at diverse levels of the organizational hierarchy; deliver tools for data entry that can be either in the form of lists or tables that are standard or can be tailored to replicate paper forms; deliver diverse types of tools for data authentication and enhancement of quality of data, and deliver one-click reports with charts and tables that are easy to use for preferred indicators or summation reports using the blueprint of the tools for data collection and flexible and dynamic data analysis in the analytics modules (4).

In 2017, Ethiopia initiated the process of customizing and adopting district health information system software. In January 2018 implementation of a web-based system started as a data center for the National Health Information System that is to be able to generate, analyze and disseminate health information to facilitate effective policy formulation, management, planning, budgeting implementation, monitoring, and evaluation of health services and program interventions in the health sector (5).

The use of the district health information system is to strengthen the health information pillar in Ethiopia and it is vital in the realization of the 2030 vision, where the overall intention is to have fair and affordable healthcare at the highest attainable standard to the citizen of the country. Data is routinely collected and uploaded to DHIS2 by health records and information officers from every lower tier of health facilities to a higher level which is later utilized by the county health managers and Ministry of Health in decision making. Besides, health information generated from DHIS2 is also used by researchers and health care providers in decision-making to support patient care (6).

Quality information is thus the foundation for health system improvements; however, health programs frequently fall short of the efficient use of data to inform decisions. Too often, data linger in reports and databases and are not sufficiently used to inform program development and improvement, policy development, strategic planning, or advocacy. Part of the reason for the breakdown in the process is that Health Information System (HIS) are fragmented, complex, and do not fully respond to information needs. As a result, decision-makers are often unable to access the data they need at a time to inform their upcoming decisions (7).

The majority of the studies in developing country especially in Africa have reported challenges on the use of DHIS data are lack of proper data gathering system, proper data processing and analyzing methods, appropriate methods of information presentation, proper interpretation of accumulated information, and lack of appropriate information-based decision making and policy development as a results inefficient provision of reliable information, incomplete, inconsistent, untimely, and due to these, it reduces the effectiveness of the health care services management process(8).

According to research done in Sri Lanka on information use, information systems of various vertical program is not integrated; a flow of information is mostly in the upward direction; and there is a very limited feedback system. Finally, they highlighted the need for clear policy framework on information systems; the need for comprehensive support of ICT; need to increase the sharing between public and private sectors and the need for an increase of trained human resources ” (9).

According to the assessment done by the Kenya Ministry of Health and Health Metric network data utilization was very weak especially for data that is routinely collected. It

indicated that only 51% of health workers use data. The factors highlighted were, lack and the varied human capacity to collect, analyze, and standardized database and printing resources, most reports are not printed in time and reports generated are a few years back (10).

A pilot Study on District health information software2 challenges & the lesson learned conducted in Ethiopia 2015, revealed that health information experts did some other tasks; such as service delivery to clients, high human resource turn over, not enough computers for health data management, inadequate access to DHIS skilled personnel, low health information knowledge, not enough attention paid to district information technology protection and infrastructure to ensure DHIS software maintenance, DHIS training infrastructures is undesirable, first-level data production and gathering is inefficient, there is no computerized report in urban and rural health facilities, and namely, there is not enough information for decision making in this level (11).

This study assessed the utilization of the district health information in facilitating decision-making and its associated factors among case team heads of public health facilities in Addis Ababa City Administration.

1.2. Statement of the problem

Health information is a powerful vehicle for improving the health of a community and it highlights both the existence of problems and opportunities for improvement. The district health information system should enable the health facility in-charges and the health care workers to easily access health information and make an informed decision, planning and coordinating health services to achieve quality health service delivery.

Usually, health facilities collect data about the communities they serve, their health needs, and the programs offered to meet those needs using district health information systems. Even though these data are entered into the health information system, they are not used by the health facility or their district or regional health care team to help them coordinate health services and enhance service quality.

Prior studies have indicated that in many developing countries most of the time, data is assembled in shelves, databases, or reports and they are not sufficiently used in advocacy, strategic planning, monitoring, evaluation, program development policy development, and improvement (12). According to the evidence shows in Kenya, data utilization was very weak especially for data that is routinely collected. It indicated that only 51% of health workers use data. The factors highlighted were, lack and the varied human capacity to collect, analyze, and standardized database (13). Generally, the implementation and effective use of HIS in developing countries is faced by a variety of organizational, technical, and behavioral factors.

In Ethiopia, the utilization of information at a local level is not satisfactory and still challenging. The 2019 annual report of the Ethiopian Ministry Of Health revealed that Poor utilization of data at the lower administrative level or peripheral levels of the woreda, and health facilities, which are the source for the majority of data used for decision making in the health sector remains a challenge (14). Another existing evidence shows in Ethiopia, the commitments to use DHIS2 data for decision making were 45.8% which was below national standards. This is due to many factors like lack of training, poor supportive supervision, poorly skilled manpower, weak motivations of health workers (15). The annual report of 2019 Addis Ababa City Administration Health Bearuo showed that there was a gap in the use of DHIS2 generated information to have the right reliable information, at the right time for the right person for effective evidence-based decision making (16). Even though, an improved and consistent health

reporting system is critical for health system strengthening since it can generate timely information for proper planning, monitoring, and evaluation of service delivery at all levels of the health system.

Yet, there have been limited studies done to find out the utilization status of district health information for decision-making and its associated factors across different levels of health service delivery points.

It is, therefore, important to assess whether this information is put into use in policy and advocacy, programmer design and improvement, program operations, and management. This indicated that the need to assess the utilization of district health information for decision making and its associated factors to improve decision making among the case team heads of public health institutions, Addis Ababa city administration.

1.3. Significance of the study

The finding obtained in this study would assist the Ethiopian Ministry of Health in understanding the extent and degree of the utilization status of district health information and emphasizing the gaps and determinants found during the study in the use of health information and insists more on availing ICT infrastructures, capacity building for health care providers and managers in providing health service in health facilities. It also helps be to remodel the implementation of district health information systems in facilities, update health policies and strategies to better health care where decisions are made through the use of reliable information.

Secondly, the findings of this study could help Addis Ababa City Administration Health Beuro to inform on the issues influencing the utilization of district health information systems at the health facilities. This would enable them to address these issues and possibly roll out the strategy to the rest of the health institutions.

Thirdly, the study would benefit the government and other implementing partners in learning what is ailing the successful utilization of district health information system. The information gained can in turn be used to improve on those areas to improve the overall quality of health. The findings would contribute to the body of knowledge of electronic health information systems to the health sector.

Fourthly, this study would also inform policy makers in the analysis of health policy and revision of health policy to improve the health and well-being of the citizens.

Moreover, the study benefit health institutions, by helping them to identify their weakness in utilizing the district health information and provide scientifically sound information and recommendation on determinant factors to use district health information system. And also provides valuable information on the current status, reasons, and challenges that hinders the utilization of district health information.

The study might also be used as a reference by others in future researches on the same or related topic.

2. Literature review

2.1. The historical development of the District Health Information system in Ethiopia.

The Ethiopian Health Management Information System has been implemented since 2008 to capture and provide core monitor-able indicators used to improve the provision of health services, ultimately to improve the health status of the population (17).

The Federal Ministry of Health is currently implementing the Health Sector Transformation Plan (HSTP), a five-year strategic plan from 2015/16-2019/20. Information Revolution is one of the four transformation agendas of HSTP to maximize the availability, accessibility, quality, and use of health information for decision-making processes through the appropriate use of ICTs to positively impact the access, quality, and equity of healthcare delivery at all levels (18).

In 2011, the MOH organized an eHealth workshop to begin developing appropriate health informatics standards. Revising key performance monitoring indicators, standardizing data recording and reporting tools, conducting capacity building training, implementing electronic Medical records (eMR), introducing District Health Information System (DHIS), and installing SMART care at health facility levels were some of the efforts exerted among others (6,19)

Health Information System Program (HISP) in Ethiopia was started with a team of Ethiopian and foreign experts by providing consultancy, coordinating HISP tasks including arranging and conducting training, meetings with the Ministry of Health, and developing tools that facilitate the use of DHIS at woreda level (5,6).

In Ethiopia, Health Information System Program was initiated in 2003 as a collaborative project between departments of Information Science, Addis Ababa University, and the University of Oslo, Informatics department. The Program initially targeted the implementation of DHIS in five regional states: Oromia, Amhara, Tigray, Benishangul-Gumuz, and Addis Ababa. The objective was to change the existing routine paper-based HIS by adapting and implementing DHIS software; collaborating on the development of standardized essential data sets, reporting formats and indicators; and in building capacity through training of health workers and managers at different levels of each region. As in many other developing countries (3,20).

By 2017, Ethiopia initiated the process of Customizing and adopting DHIS2. In January 2018 implementation of a web-based system (DHIS2) started as a data center for the National Health Information System that is to be able to generate, analyze and disseminate health information to facilitate effective policy formulation, management, planning, budgeting implementation, monitoring, and evaluation of health services and program interventions in the health sector (6).

DHIS is designed to support decentralized decision making and health service management by allowing health care workers to use their data to analyze their levels of service provision, predict service needs and assess performance in meeting health service targets (3)

2.2. Use of DHIS2 in Health Information System

Adoption of DHIS2 resulted in enhanced relevance and comprehensiveness in reporting of regular outpatient, inpatient, and health service utilization data at all levels (district and national). The system allows health care workers to analyze their levels of service provision, predict service needs, and assess performance in meeting health service targets, and thus has the potential to transform health facilities from the era of unreliable and fragmented HIS system to the more ideal situation of availability and use of quality health information for rational decision making. It has several characteristics that can assist in the work of increasing the quality of data; validation when entering data to ensure that data is obtained in the correct format and in the logical range, validation rules that are user-defined built on mathematical associations among the data being obtained, outlier analysis functions, as well as reports on data coverage and comprehensiveness (3,21).

DHIS2 facilitates the use of available information to support operational decision-making and planning. Accurate information assembled at District HIS Office are data mined, compiled, and made available regularly to DHMT and DHMB for planning, supervision, and impact evaluation(22).

The overall purpose of the DHIS2 application is to create, summarize, distribute information to facilitate proper policy development, budget allocation, manpower hiring, planning, implementation, monitoring and evaluation of health services and medical and supply distribution, program involvements in the health sector (3).

However, multiple challenges have been noted with the utilization of DHIS 2 data, particularly in the developing country context, including inadequate infrastructure support, poor workforce

capacity to manage the data, lack of awareness of data requirements, and uncoordinated data collection. Uncoordinated data collection, fragmented hierarchy, and lack of organizational structure, also play a role in a lack of coordination. These issues must be addressed for effective use of the software (3). Concerted efforts are required rightly from National Government to County Governments' Health Managers to build capacity among all health providers on the importance of DHIS2 information and its subsequent use to make informed health care decisions geared towards service improvement.

Quality data empowers informed healthcare decisions. For example, quality HIS metrics managed well can be used in the surveillance of diseases, to prevent outbreaks. Healthcare professionals can use data for training or research, and policy guidelines to inform national health policies and programs.

2.3. Utilization of District Health Information for decision making.

The main building block of the health system is health information that provides data required for human resources, financing, and service delivery, to execute their functions. It is also important for improving the quality and coverage of health services. Public health decision-making is critically dependent on the timely availability of sound data.

A study was done in Thailand shows; utilization of electronic health records was important to improve their country's health care system and helped health professionals in tracking and diagnosing the disease of patients (23).In Australia, health professionals (86.3%) used a computer for work-related activities and the RHIS process (24). The evidence showed in Tanzania, the District health information users and developers agreed that the ICTs fit in with the structure and content of the HMIS and RHIS (25).

The evidence showed that the proportion of district health information used for evidence-based decisions was demonstrated only in 21% and 26% of the health facilities in Botswana and Ghana, respectively (26,27). The study in Zanzibar showed that the utilization rate of district health information was 77% (28). The evidence in Kenya, Nyaruguru District revealed that utilization of district health information system data was 65.8 % (29). In another study conducted in Kenya, nyakach sub-county, Kenya there is good utilization of DHIS in many health facilities for decision making yet the managers have the inadequate capacity (30).

In Ethiopia, Information that was gathered and analyzed by the district public health office was mainly used to assess plans against accomplishments, used during the monthly review meetings between the health center and District Health Office, to give feedback and for decision-making (31). The evidence in Ilu Aba Bora Zone of Oromia, Ethiopia showed that the commitment to use DHIS2 data for decision making was 45.8% (15).

A study conducted in northwest Ethiopia showed that the Proportion of information use among department heads for decision making was estimated at 46%(32).A a study done in the Hadiya zone showed that the routine utilization of HIS was 69.3% (33). The cumulative utilization of routine health information in the Jimma zone was 32.9% only (34).

A study done on the Ethiopian health system reveals Appropriate and timely use of health and health-related information for decision-making was an essential element in the process of transforming the health sector. Information used was wrongly understood in the health system as only data reporting, aggregating numbers, and sending those to someone at a higher level, but health information used was the process whereby health-related information analysis, interpreting and elaborating information and synthesizes for decision-making of concerned bodies (31).

A study done in Addis Ababa revealed that only around 27.2% of health employees reported that they used generated information to give health information to the user, to compare it with the previous performance, for Monitoring/Evaluation of programs. Only11.2% of the respondents forwarded the generated information to the upper level, the good side was that 62% of the generated and analyzed information was also used by the health institution itself (35). Another evidence in AA showed that the general utilization of health management information rate was found to be 41.1% (36).

2.4. Organizational factors that influence district health information in Decision Making.

Organizations have to make complex choices amidst uncertainty, trade-offs, and broad consequences, but responding to such situations in rational ways can be hampered by individual decision-makers' cognitive limitations. Many organizational issues mediate in the decision-making process. These issues include policies and procedures, organizational hierarchy, and organizational politics. organizational determinants comprise of information culture, structure, resources, and roles and responsibilities of key contributors at each level of the health system (37)

Most reports and databases are not used when starting new programs or improvements, policy change, strategic planning, or promotion. Rolling out of parallel HISs which would not respond to information needs is the root cause. Consequently, management teams are unable to access the data they need on time manner to inform their future decisions (38)

According to Assessment of District health information system conducted in rural & Urban of Iran in 2013, lack of trained personnel, lack of data analysis among data managers, overly complex systems, lack of dissemination and feedback of information are problems identified to be hindering the implementation of DHIS2 (12).

Another Study conducted on Evaluation of factors influencing District Health information system success in Uganda revealed that lack of supplies Resource supply that involves the supply of computers and modems, electricity/source of power and internet, lack of Education and training involving training users on the computer and system use, continued mentorship and training poor Management support inform of continued monitoring and evaluation, low technical support during the implementation phase were identified by evaluation process (20)

Another study conducted in rural northern KwaZulu-Natal within a health sub-district done in Rural South Africa in 2008 showed the culture of information use essential to an information system having an impact at the local level is weak in the clinics or at the sub-district level. In the 10 clinics, 2.5% of data values were missing, and 25% of data were outside expected ranges without an explanation provided (39).

A Cross-sectional study conducted in Uasin Gishu County, Kenya 2018 showed the major challenges experienced in the use of DHIS2 for evidenced-based decision-making were the lack of management support (34.3%), poor skills among the users (48.6%), lack of adequate computers (36.7%), unreliable internet connectivity (47.1%), lack of power backup (27.6%), and resistance to change (21.0%) (40).

Furthermore, A pilot Study on District health information software2 challenges & a lesson learned conducted in Ethiopia 2015, revealed that Health Information experts did some other tasks; such as service delivery to clients, High human resource turn over, Not enough computers for health data management, Inadequate access to DHIS skilled personnel, Low health information knowledge, Not enough attention paid to district information technology protection and infrastructure to ensure DHIS software maintenance, DHIS training infrastructures is undesirable, first-level data production and gathering is inefficient, there is no computerized report in urban and rural health facilities, and namely, there is not enough information for decision making in this level. (11).

2.5. Technical Factors that influence district health information in decision making.

These are the factors related to the specialized know-how and technology to develop, manage, and improve HIS processes that affect RHIS performance both directly and through behavioral factors. It also looks at the availability and user-friendliness of data collection tools and procedures. Technical challenges related to lack of information technology, problems of data management software, inadequate ICT skills, poor disease identification and classification, high burden of data collection, lack of standardized indicators and procedures accompanied with limited technical know-how (37).

A study conducted in Uganda in 2012 showed that the use of DHIS2 hindered limited access to computers and the internet (34%), inadequate technical support (23%), and limited worker force (18%) (41). Another study conducted in Botswana in 2014 reviled that lack of computers (64%), training gap(20%), Poor access (21%) & Inadequate ICT infrastructure; limited human resources to undertake data management responsibilities; weak technical support, mentoring, monitoring and supervision are key factors hampering utilization of DHIS in Botswana (27).

On the other hand, a study done in South Africa on factors affecting utilization of DHIS2 reviled that, lack of knowledge on RHIS 22%, has data quality checking skills 36%. (42) A study conducted in Sierra Leone indicate that poor Internet connectivity, lack of security policies and guidelines, and shortage of qualified staff were identified as challenges affecting the effective use of DHIS2 (43).

2.6. Behavioral (Individual) Factors influencing district health information.

Individual factors are all those factors related to the educational level, confidence, motivation, and competence of staff in using the information in DHIS2 for decision making.

Performance of RHIS and processes such as data collection, data integration, capturing, transmission, processing, analysis, presentation, and feedback are directly affected by the gaps between real competencies and perceived competencies of health care professionals.

A study conducted in Tharaka Nithi, Kenya 97.6% indicated a lack of staff motivation mechanism to utilize district health information (44). Evidence showed in the Amahara region, Ethiopia 45.9% there is a motivation mechanism to improve the use of information for evidence-based decision making(45).

2.7. Summary of the literature review

District health information faces many challenges both at implementation and during

utilization. These challenges can be caused by health care workers, health facilities, technical, organizational, and individual factors. Some of the challenges have been identified as incomplete and inaccurate data and inadequate utilization of DHIS data for health management in health facilities. These challenges are mainly tied to the health facilities‘ capacity, which is categorized as individual, organizational and technical factors. Institutional capacity determines utilization of DHIS in decision making, planning, and coordination of health information in health facilities.

Institutional capacity is driven by factors such as inadequate infrastructure of ICT, lack of training, poor internet connectivity, inadequate staffing capacities, lack of coordinated leadership and information ownership at all levels, as well as limited skills in using the system and inadequate human resource capacity all of which determines the level of utilization of district health information in health facilities. Summary of the literature above indicates that poor utilization of district health information and there are many factors within the institutional capacity that affects utilization of district health information in a health facility. However, these factors can only be revealed through studies that look at the effects of institutional capacity on the utilization of health information systems such as DHIS. District health information system which is a new initiative for Ethiopia as well as due to limited literature and studies on the same, this study seeks to add to the literature by looking at the status of district health information and its associated factors in Addis Ababa city administration of public health institutions.

2.8. Conceptual Framework

The conceptual framework of this study was adopted from PRISM. The framework brings out the independent variables; factors affecting the use of district health information system and challenges experienced in the use of district health information for decision making in AARHB and dependent variable; use of district health information for decision making by health care providers and managers.

The use of the district health information system will be influenced by the use of DHIS information, data management, Staff performance, data quality, and dissemination. Besides, factors including organizational, technical, and behavioral affecting the use of DHIS information for decision-making at all levels of health care. Consequently, some challenges are experienced by health workers in the use of district health information.

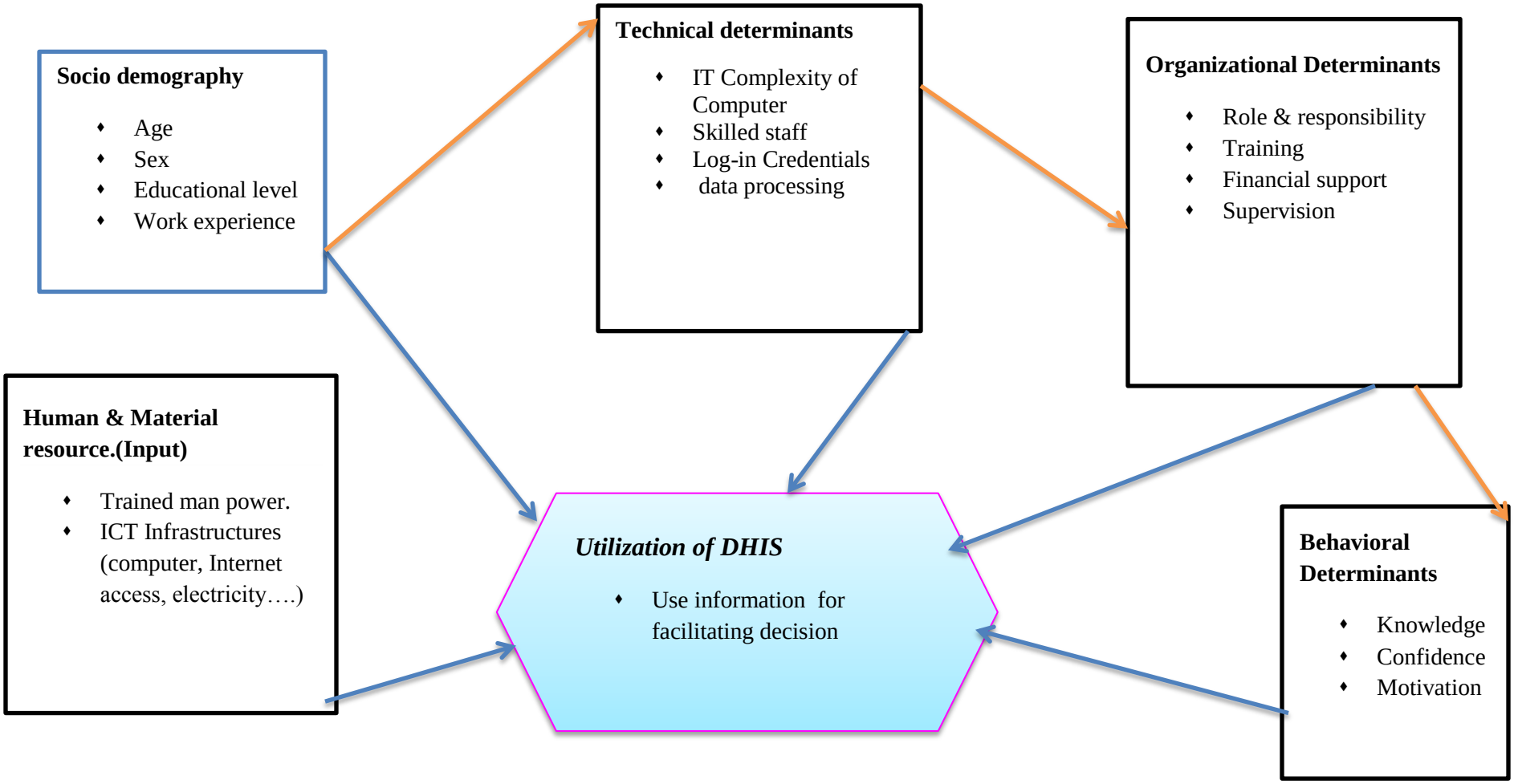

Figure 2. 1: Conceptual framework adopted from WHO PRISM, to assess utilization of DHIS in case teams of Public health institution AA 2020

3. Objectives of the study

3.1. General objective

The general objective of this study was to assess the utilization of the district health information for decision making and identify its associated factors among case team heads in selected public health institutions of Addis Ababa City Administration, Ethiopia from April to May 2020.

3.2. Specific objectives

- To assess the utilization of district health information for decision making among case team heads in public health institutions of Addis Ababa city administration, Ethiopia
- To identify factors that affect utilization of district health information for decision making among case team heads in public health institutions of Addis Ababa city administration.

Research Questions

1. Does case team heads of health institution utilize district health information for facilitating evidence-based decision making?
2. What are the main determinant factors for the utilization of district health information in health institutions?

4. Methods and materials

4.1. Study area and period

The study was conducted at Addis Ababa city administration, which is the capital city of the country of Ethiopia. With an average elevation of 2500m above sea level, the city administration has geographic and territorial possession with an area of 540 sq. kilometers and a total population of 3.6 million. The city of Addis Ababa has three administrative levels: 10 sub-cities, 99 kebeles, and 116 Woredas for administrative purposes. The city has 98 functional health centers of which 86 are governmental and the rest are owned by NGOs, 52 hospitals (13-governmental, 35-private, and 4 NGOs), and 534 clinics out of which 34 are owned by NGOs. There are around 12,104 identified health professionals in health centers of all sub-cities (46). All governmental public health centers, hospitals, and sub-city health offices have been implementing DHIS2 software for health data collection, validation, analysis, and presentation of aggregated and individual data, aiming to improve health service delivery.

The study was conducted between, April to May 2020. The data was collected through structured self-administered questionnaires.

4.2. Study Design

A facility-based cross-sectional study was conducted using quantitative approaches to assess the utilization of district health information and identify its associated factors among case team heads in public health facilities of Addis Ababa city administration, Ethiopia.

4.3. Target Population

All case teams of public health institutions in Addis Ababa City Administration have been implementing the district health information system.

4.4. Study Population

All eligible case team heads from 23 selected health institutions of Addis Ababa City Administration have been implementing the district health information system.

4.5. Study Unit (Sample)

The study units of this assessment were all case team heads from 23 selected public health institutions in Addis Ababa Health Bureau**.**

4.6. Eligibility Criteria

4.6.1. Inclusion criteria

- All case team heads of public health institutions that have been implementing the DHIS2 system from 2018- 2019 were included in the study.

4.7. Sample Size

Addis Ababa Administrative city has a total of ten sub-cities. 2019 annual reports of AARHB showed that all sub-cities have a similar status of performance in utilization of district health information systems. According to the World Health Organization(WHO) recommended for the assessment of health institutions, selecting 10%-50% of health institutions to have a representative sample by considering the available financial and human resources (47). Based on this assumption, among the total ten sub-cities in the city administration, 30% of health institutions were selected for the assessment of the utilization of district health information for evidence-based decision making. Therefore, three sub-cities, two hospitals, and 18 health centers were selected using simple random sampling techniques. From the selected 23 health institutions, Case team heads of health facilities were included in the study, which makes the total participants 240.

4.8. Sampling techniques and producers

A Simple random sampling technique was used to select samples for this study. Three sub-cities, two hospitals were selected using simple random sampling. The three sub-cities which were selected comprise a total of 30 health centers. The health centers were proportionally allocated to the selected sub-cities depending on the number of health centers found in each sub-cities. Thus, 18 health centers were randomly selected from a sampling frame of 30 health centers in the three sub-cities. To proportionate health centers selection under each sub-city, proportionate allocation sampling was used. That is by the formula;

Proportional allocation to each sub-city = (ni=Ni/N*n)

Where: - ni=number of health centers that are needed for the study in each sub-cities

Ni=total number of health centers in each sub-cities

N=total no of health centers in all (3) sub-cities.

n=calculated sample size

Among 23 selected health institutions, all 240 case team heads were included in the study.

Diagrammatically the sampling procedure can be shown as follow.

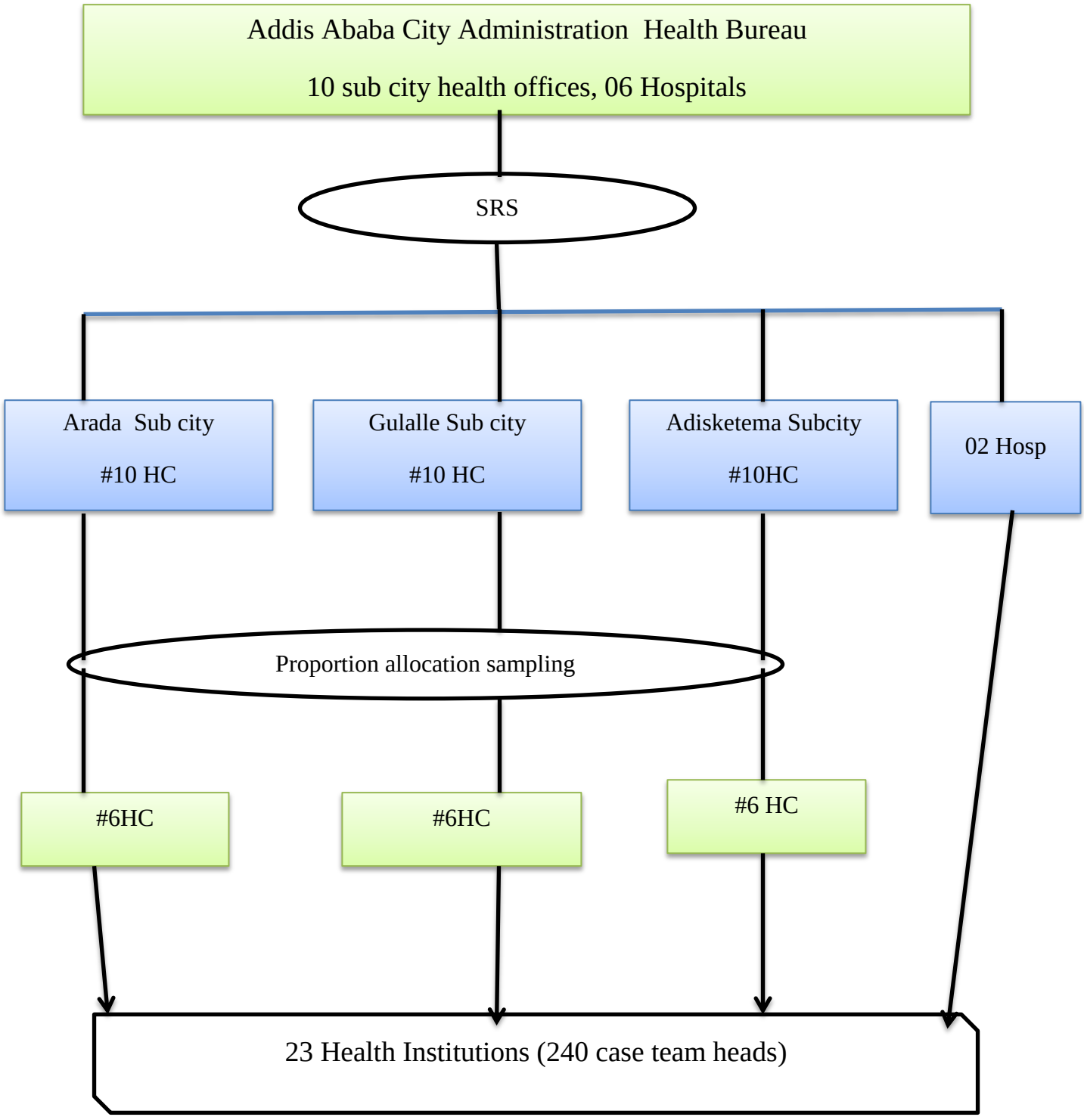

Figure 4. 1: Schematic presentation of sampling procedures for the selection of the study populations, Addis Ababa city administration, Ethiopia, October 2020

4.9. Variables of the study

4.9.1. Dependent Variable

- Utilization of District Health Information for decision making.

4.9.2. Independent Variables

- Socio-demographic:
  - Education status
  - work experience,
  - Age,
  - sex
- Human and Material Resources:
  - Availability of trained manpower,
  - ICT infrastructure
- Technical Factors:
  - IT complexity of computer
  - Skilled staff
  - Log-in credentials
  - Data processing
- Organizational Factors:
  - Supportive supervision
  - Training
  - Financial support
  - Role & responsibilities
- Individual Behavioral Factors
  - Motivation,
  - Confidence
  - Level of Knowledge

4.10. Data Collection methods, tools, and procedures

Data was collected with the standardized questionnaire that was adopted and contextualized for our study from the PRISM tool and similar literature (48). The questionnaire had seven main sections; sections A to G which consisted of demographic information, human & material resource, use of DHIS, and organizational, technical, individual influences for respondents to fill. The statements were rated on a five-point and four-point Scale and responses arranged from 5: Excellent, 4: Very Good, 3: Good, 2: Poor, 1: Very Poor or 5: Very Easy, 4: Easy, 3: Fairly Easy, 2: Difficult, 1: Very Difficult or 4: Strongly Agree, 3: Agree. 2: Disagree, 1: Strongly Disagree. And 1: Yes. 2: No.

4.11. Data Collection

A self-administered questionnaire having closed-ended questions was used to collect quantitative data because it provides direct response and feedback easily and time-saving. Structured questionnaires eased the process of data analysis due to their speed and accurate recording of information. Three HIT recruited for data collection and one Public Health officer was recruited to supervise the overall data collection processes.

4.12. Data processing and management

Collected data was organized and entered in Epi data version 3.1 and cleaning was done to avoid missing values, outliers, and other inconsistencies. For data cleaning, frequency, sort, and list were used. Data analysis was carried out by using SPSS version 23.

4.13. Data Analysis

Data was collected manually, cleaned for completeness, inconsistency, and missing value. Coded data were entered into Epi data version 3.1 and exported to SPSS version 23.0 Software for analysis. Data cleaning was performed by generating a frequency table to check, accuracy, consistencies, missed values, and variables. Errors identified during data entry were corrected after the revision of the originally completed questionnaire.

Binary logistic regression was carried out to identify factors associated with the utilization of the routine health information system. The Bivariable analysis was conducted and variables with $p < 0.2$ were selected as candidate variables for multivariate analysis. Finally, variables with $p<0.05$, during multivariable analysis were considered significant.

Model selection was done using a backward regression method. Multi-collinearity was tested to check whether two or more predictors in the model are correlated and provide redundant information about the response, VIFs were less than 5 (see Annex-01).

Descriptive statistics in the form of percentages, frequency distribution tables, charts, and graphs were used. Inferential statistics such as bivariate and multivariable logistic regression used to assess variables associated with the use of DHIS, the finding was reported using 95% confidence intervals (CI), Odds Ratio (OR), and Adjusted Odd Ratio (AOR).

4.14. Data quality assurance

To assure data quality standardized questionnaires and trained professionals were involved in data collection. The pre-test was done to confirm the degree to which the measuring tool produces consistency and reliability on 30 health facilities staff (10 staff members' respondents for health centers, hospitals, sub-cities health office) that possessed the same characteristics as study participants, this was done to ensure accuracy or precision of the measuring instrument in terms of clarity, suitability and flow of questions before the questionnaire was finally administered to participants. Reliability was established by using Cronbach's alpha calculated using SPSS Version 23 to determine the reliability of all items under the instrument used in this study. Coefficients of between 0.7 to 1.0 are considered good meaning that there is internal consistency (Donald and Delno, 2006). The Cronbach's alpha reliability coefficient for technical, organizational determinant variables were 0.65 and 0.76 respectively (see Annex-02). It was was within the acceptable reliability range.

4.15. Operational Definitions.

District Health Information System software version 2: free and open-source database application used for collection, validation, analysis, dissemination, and presentation of aggregate and patient-based statistical data, from lower tiers to higher tiers

Utilization of DHIS: represents or refers

1. DHIS used for planning health sector Activities
2. DHIS used for Budge allocation
3. Used for requisition of manpower
4. Used for Calculation of area coverage and trend analysis
5. Used for Monitoring and evaluation of a program to take immediate action.
6. Used Medical supplies management
7. Used for regular supportive supervision.
8. Used for Evidence-based decision-making, so that case team heads of health institutions were considered utilizing DHIS when they are practicing six and above the eight criteria listed above.

Good utilization DHIS: case team heads of health institutions that were score six and above of listed criteria.

Poor utilization of DHIS: case team heads of health institutions that score less than six of the listed criteria.

Level of knowledge: the head of the case team's perceptions, thinking towards performing a specific activity related to DHIS. Good level of knowledge; respondents mean score and above, poor level of knowledge; below mean score.

Confidence level: case team heads to perform a specific activity related to DHIS.

Health Institutions: - Includes governmental health centers, Hospitals, sub-cities health offices those service providers and administration level have recognition under MOH.

Decision making - is defined as the capacity to formulate alternatives, estimate effects, and make choices using the criteria listed above at all case team levels.

ICT infrastructure: Everything that supports the flow and processing of information that include network infrastructure, technology policy, computers, and ICT services in an organization.

Technical Factors: All the factors that are related to the specialized know-how on information technology, software development, and technology to develop, manage, and use DHIS2 for evidence-based decision making (49)

Organizational Factors: All the factors that are related to organizational structure, financial resources, supervision, training, and culture to develop, manage, and use information in DHIS2 for evidence-based decision making (49)

Behavioral Factors: All those factors related to confidence, motivation, and competence of staff in using the information in DHIS2 for decision making (49)

4.16. Ethical Considerations

The study was carried out after getting permission from the Research and Ethics Review Committee of Addis Ababa University, School of Public Health, and Addis Ababa public health emergency management directorate. Before performing the procedure consent was obtained after explaining the procedure, purpose, and the importance of the study to confirm willingness for participation. Due to the sensitivity of health issues, the ethical guidelines have been respected during the whole research process including keeping respondents anonymous and respect of confidentiality regarding all information given by participants. Participants have had the right of refusing or dropping out to participate in the research (voluntary participation) after explaining to them the relevance of the study and the contribution expected from them to refuse or discontinue participating at any point of the study.

4.17. Dissemination of results

The result of an assessment will be disseminated to Addis Ababa public health research and emergency management core process, sub-city health offices, and health centers. All of them would be provided with a clear, simple, and summarized soft copy of the report while SPH, AAU, and AARHB will be provided with both softcopy & hard copy of the report

5. Results

5.1. Socio-demographic characteristics of respondents

5.1.1. Questionnaire Response Rate

Two hundred forty case team heads were selected to participate in the study, of which 234 respondents were involved with a 97 % response rate (Table5.1).

Table 5. 1: The response rate of case team heads in Addis Ababa Health Institutions of AA city administration, Ethiopia, June 2020

Study units	Target	Response Rate	%
Sub-city health offices head of case teams	30	28	93
Hospital head of case teams	30	28	93
Health center head of case teams	180	178	98
Total	**240**	**234**	**97**

5.1.2. Demographic Characteristics of the Respondents

Out of 234 case team heads participants, 129(55.1%) were females. The age of the respondents ranges from 18 - 60 years and a majority of the respondents (51.7%) fall in the 25 - 30 years age group. Most of the respondents, 164(70.1%) have working experience of 0-5 years and only 3(1.3%) have working experience of more than 15 years. (Table 5.2).

Table 5. 2: Socio-demographic data for case team head respondents (n=234) in Addis Ababa Health Facilities, Addis Ababa, Ethiopia, June 2020

Variable		Frequency	Percent (%)
Sex	Male	105	44.9
	Female	129	55.1
Age	18-24 years	12	5.1
	25-30 years	121	51.7
	31-40 years	85	36.3
	41-60 years	16	6.8
Educational level	Certificates	2	0.9
	Diploma	56	23.9
	Bachelor of Degree	163	69.7
	Master's Degree	13	5.6
Year of experience	0-5 years	164	70.1
	6-10 Years	62	26.5
	11-15 Years	5	2.1
	>15 years	3	1.3

5.1.3. DHIS inputs

Among 234 participants, the majority, 167(71.4%) confirmed the presence of a responsible unit for HIS. About 163(69.7%) case team heads reported that HIS personnel assigned for DHIS activities; 86(36.8%) case team heads reported that budget is allocated for HIS activities; necessary ICT equipment is available in 167 (71.4%) case teams; basic computer training is offered in 95(40.6%), and DHIS2 training provided to 90(38.5%) of case team heads. (Table 5.3).

Table 5. 3: DHIS inputs by case team heads (n=234) in selected public health institutions of AA City Administration, Addis Ababa, Ethiopia, June 2020.

DHIS Input	N	%
Unit (Office) is assigned to HIS	167	71.4
Personnel assigned HIS	163	69.7
Budget assigned to HIS activities	86	36.8
Training given on basic computer	95	40.6
Training given on DHIS2	90	38.5
There are the necessary ICT equipment	167	71.4
Computer	120	71
Internet	102	60.7
Telephone	38	22.5
Electricity	152	89.2

5.2. Descriptive statistics on the utilization of district health information to facilitate decision making.

Out of 234 study participants, 133 (56.8%) of the case team heads reported that district health information was used for planning health sector activities; 101(43.6%) of them used for budget allocations; 124(53%) were used for Calculation of area coverage; 139(59.4%) of them used for monitoring of the program to take immediate action; 142(60.7%) used for medical supplies management; 150(64.1%) used for facilitating Evidence-based decision making in their case team of health institutions. (Table 5.4).

Table 5. 4: Utilization of district health information by participants (N=234) from health institutions' in AA City Administration, Addis Ababa, Ethiopia, June 2020

Variable	N	%
Used for planning health sector Activities :		
Yes	133	56.8
No	101	43.2
Used for Budge allocation**,** :		
Yes	102	43.6
No	132	56.4
Used to Requisition of manpower:		
Yes	144	61.5
No	90	38.5
Used for Calculation of area coverage and trend analysis:		
Yes	124	53
No	110	47
Used for Monitoring & evaluating programs output :		
Yes	139	59.4
No	95	40.6
Used for Medical supplies management :		
Yes	142	60.7
No	92	39.3
Used Regular supportive supervision:		
Yes	150	64.1
No	84	35.9
Used for Evidence based decision making :		
Yes	150	64.1
No	84	35.9

5.2.1. Status of case team heads of selected health institutions on the utilization of district health information for decision making.

Based on the operational criteria listed among 234 case team heads of selected health institutions, 41.5% of them were categorized under good utilization of district health information for decision making.

5.2.2. Cross- Tabulation of the utilization of district health information by selected predictors.

The DHIS2 system being user friendly, having login user name and password, training of DHIS2, Supportive supervision, availabilities of ICT infrastructure have a significant association with utilization of district health information (P< 0.05). (Table 5.5).

Table 5. 5: Cross- Tabulation of case team heads of health facilities utilizing district health information by selected predictors, AAHF, June 2020

Variable	utilization status of district health information		
	Poor utilizing case team heads (%)	Good utilizing case team heads (%)	Chi2(P-Value)
DHIS2 system user friendly(easy to use)			
Disagree	72(72)	28(28)	13.02(0.001)
Agree	65(48.5)	69(51.5)	
DHIS2 Users have login user name & Password			
Disagree	67(70.5)	28(29.5)	9.45(0.002)
Agree	70(50.4)	69(49.6)	
DHIS 2 includes the necessary features and functions			
Disagree	64(77.1)	19(22.9)	18.25(0.001)
Agree	73(48.3)	78(51.1)	
Training on the DHIS2 system			
Yes	45(50)	45(50)	4.40(0.036)
No	92(63.9)	52(36)	
IT Supportive Supervision			
No	66(77.6)	19(22.4)	20.06(0.001)
Yes	71(47.7)	78(52.3)	
Availability of ICT Infrastructure In Place			
Yes	14(13.6)	89(86.4)	15.32(0.001)
No	123(93.9)	8(6.1)	

5.3. Factors affecting utilization of district health information to Facilitate Decision Making.

5.3.1. Technical factors

Among 234 study participants, 134(57.2%) respondents were agreed or strongly agreed that DHIS2 software is easy to use; 139(59.4%) of the respondents agreed that they have login user name and password of DHIS2 software. On the other hand, 151(64.5%) of the participants reported that DHIS2 software included necessary features and functions to perform HIS activities. Only 82(35.1%) of the respondents reported that the level of DHIS2 training was poor and 22(9.4%) of them reported that the training received inadequate. About 172(73.5%) of the respondents were less satisfied with the IT Support they received. Out of all case teams, the respondents agreed or strongly agreed that the ICT infrastructure found for facilitating DHIS2 activities in their case teams were mainly the Power supply (65%), Computer hardware & software (51.3%), Network and internet connectivity (43.6%), Telephone (16.2%). ICT experts were available only in 69.7% of case teams of facilities. (Table: 5.6).

Table 5. 6: Technical determinants that affect the Utilization of DHIS in case teams of AAHF, June 2020

Variable	**N**	**%**
DHIS 2 is easy to use (User-friendly):		
Strongly Disagree	17	7.3
Disagree	83	35.5
Agree	96	41
Strongly Agree	38	16.2
All DHIS2 users have a login user name and password:		
Strongly Disagree	51	21.8
Disagree	81	34.6
Agree	88	37.6
Strongly Agree	14	6
DHIS 2 includes the necessary features and functions.		
Strongly Disagree	11	4.7
Disagree	72	30.8
Agree	110	47
Strongly Agree	41	17.5
Level of training in DHIS2:		
Very Poor	10	4.3
Poor	72	30.8
Good	121	51.7
Very Good	31	13.2
The training received in DHIS2 was adequate		
Strongly Disagree	6	2.6
Disagree	16	6.8
Agree	42	17.9
Strongly Agree	26	11.1
Level of satisfaction with the IT Support you receive		
Not satisfied	84	35.9
Less satisfied	88	37.6
Satisfied	52	22.2
Very satisfied	8	3.4
ICT infrastructure in place		
Power supply	152	65
Telephone	38	16.2
Computer hard ware & software	120	51.3
Network and internet connectivity	102	43.6
ICT experts	163	69.7

Generally, about 148(63.2%) of technical factors were favorable for utilization of district health information among case team heads of selected public health institutions. (Table: 5.7)

Table 5. 7: Summary of the level of technical factors that affect district health information among case team heads health of selected public health institutions, Addis Ababa, Ethiopia, 2020.

variable	N(=234)	%
Technical factors :		
Favorable for utilization of district health information	148	63.2
Unfavorable for utilization of district health information.	86	36.8

The Skills of case team heads to perform DHIS2 software

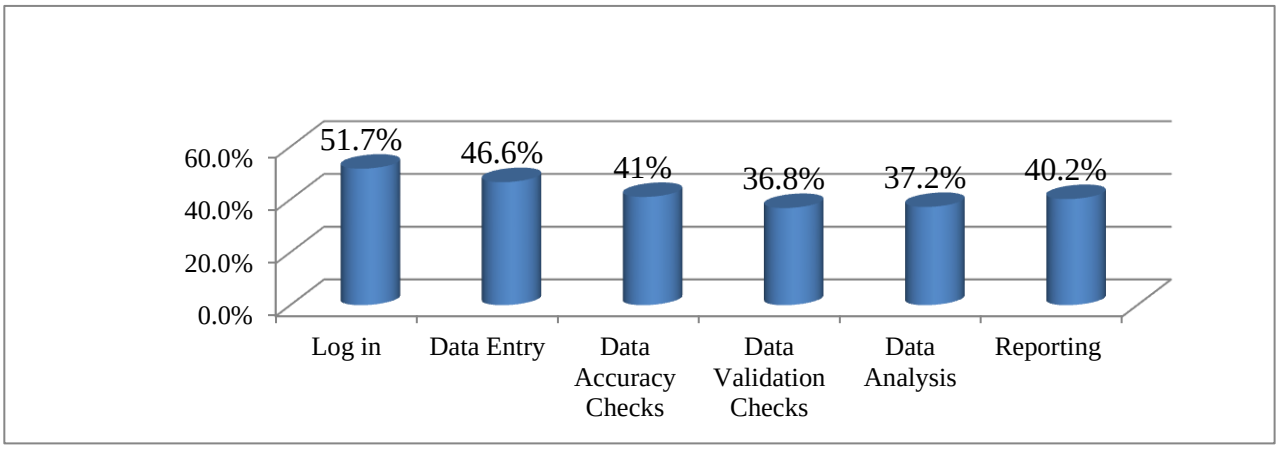

Figure5. 1: Ability to perform DHIS2 software task among case team heads in AAHF 2020

Out of all the case team heads, 121 (51.7%) could able to log in to the DHIS2 software system. But More than Half of the case team heads did not have a skill of performing DHIS2 tasks;125(53.4%)data entry; 148(63.2%) data validation checking; 147(62.8%) data analysis; 152(65%) data visualization and 140(59.8%) Reporting and dissemination of health information respectively.

5.3.2. Organizational factors

Among a total of 234 respondents, 120(51.2%) of them agreed or very agree that there is coordinated effort and leadership to strengthen DHIS2 activities in their facilities. Whereas 145(62%) of the respondents agreed that there are a clear role and responsibilities on DHIS2 data utilization. But 141(60.3%) respondents disagreed that is a shortage of skilled personnel responsible for DHIS activities in facilities. And about 149(63.7%) respondents disagreed that there is not scheduled supportive supervision to emphasize the use of DHIS2 in facilities. About 124(53%) of the respondents agreed on, there is a shortage of financial support for the running of DHIS2 functions. (Table: 5.8).

Table 5. 8: Possible organizational determinants that affect the utilization of district health information among case team heads of AA Public Health Institutions, June 2020.

Variable	N	%
Existence of coordinated effort and leadership (political commitment) :		
Strongly Disagree	34	14.5
Disagree	80	34.2
Agree	100	42.7
Strongly Agree	20	8.5
Existence of clear role and responsibilities		
Strongly Disagree	12	5.1
Disagree	77	32.9
Agree	113	48.3
Strongly Agree	32	13.7
Skilled human resource responsible for DHIS2 related task :		
Strongly Disagree	35	15
Disagree	106	45.3
Agree	83	35.5
Strongly Agree	10	4.3
Regular and scheduled supportive supervision:		
Strongly Disagree	33	14.1
Disagree	116	49.6
Agree	77	32.9
Strongly Agree	8	3.4
Adequate financial support for the running of DHIS2 functions		
Strongly Disagree	26	11.1
Disagree	98	41.9
Agree	84	35.9
Strongly Agree	26	11.1

Generally, 137(58.5%) of organizational factors were favorable for utilization of district health information among case team heads of selected public health institutions. (Table: 5.9)

Table 5. 9: Summary of the level of organizational factors that affect district health information among case team heads health of selected public health institutions, Addis Ababa, Ethiopia, 2020.

Variable	N(=234)	%
Organizational factors :		
Favorable for utilization of district health information	137	58.5
Unfavorable for utilization district health information	97	41.5

5.3.3. Behavioral factors

Individual behavior factors were assessed through individual perception (motivation) towards DHIS use, knowledge of respondents regarding DHIS, confidence level of respondents to do DHIS2 tasks. Of total case team heads of respondents, 195(83.3%) of the respondents reported that they have no confidence to perform DHIS2 software-related activities such as data entry, analysis & interpretation. About 123(53%) respondents reported that they have a poor level of knowledge of Competence in Data Management. The level of motivation to create and keep health information for use was either low, very low, or moderate for 159(67.9%). (Table: 5.10).

Table 5. 10: Possible behavioral determinants that affect the utilization of district health information among case team heads AA Public Health Institutions, June 2020.

Variables		N	%
Confidence to perform DHIS related activities such as data entry, analysis & interpretation			
	Strongly Disagree	49	20.9
	Disagree	146	62.4
	Agree	30	12.8
	Strongly Agree	9	3.8
level of motivation to create and keep health information for use			
	Very low	5	2.1
	Low	59	25.2
	Moderate	95	40.6
	High	51	21.8
	Very High	24	10.3
Level of Knowledge of Competence in data Management; data analysis, verification, validation, visualization & interpretation			
	Very poor	58	25.2
	Poor	65	27.8
	Good	30	12.8
	Very Good	57	24.4
	Excellent	23	9.8

5.3.4. Level of knowledge in the use of DHIS

Out of all the participants, 138(59.4%) revealed that they are reported good, Very good, or Excellent competence levels in data management using DHIS2, and 136 (58.1%) responded good, very good, or excellent verification and validation of using DHIS2. Up to 135 (58.1%) participants reported good, Very good, or Excellent Data visualizing & disseminating information using a dashboard. 145(61.9%)of respondents were good in Computing trends & interpretation for service and disease delivery systems respectively. (Table:5.11)

Table 5. 11: level of knowledge use of DHIS2 by respondents in AA Health Facilities, June 2020

	n(%)									
Variable	N	Very poor		Poor		Good		Very Good		Excellent	
Competence in datamanagement	234	30	(12.8%)	65	(27.8%)	58	(25.2%)	57	(24.4%)	23	(9.8%)
Verification and validation of data	234	29	(12.4%)	69	(29.5%)	60	(25.6%)	52	(22.2%)	24	(10.3%)
Data visualizing & disseminating	234	30	(12.8%)	67	(28.6%)	60	(25.6%)	53	(22.6%)	24	(10.3%)
Computing trends & interpretation	234	33	(14.1%)	56	(23.9%)	62	(26.5%)	52	(22.2%)	31	(13.2%)
Inform policy & operating decision	234	33	(14.1%)	59	(25.2%)	63	(26.9%)	52	(22.2%)	27	(11.5%)

Generally, 100(42.7%) behavioral factors were favorable for the utilization of district health information among case team heads of selected public health institutions. (Table: 5.12)

Table 5. 12:Summary of the level of behavioral factors that affect district health information among case team heads health of selected public health institutions, Addis Ababa, Ethiopia, 2020.

Variable	N(=234)	%
Behavioral factors :		
Favorable for utilization of district health information	100	42.7
Unfavorable for utilization district health information	134	57.3

5.4. Bi- variable and multivariable binary logistic regression analysis results.

5.4.1. Bi variable analysis

Cross-tabulation of each independent and dependent variable was done. The bi-variable analysis resulted in some dependent and explanatory variables. Independent variables such as gender, technological problems, Password issues, ICT infrastructure issues, human resource issues, financial issues, supportive supervision, training gap, level of motivation, and administrative problems were found to have significant associations with the outcome variable (Table: 5.13 and 5: 15).

5.4.1.1. Association between Socio-demographics and utilization of district health information.

The bivariate analysis shows that there was sufficient evidence from the data to demonstrate an association between gender and utilization of DHIS (p=0.045). While age and work experience had no significant association with utilization of district health information (p>0.05).

Table 5. 13: Relationship between socio-demographic variables and utilization of district health information, AA public health facilities, 2020

Variables	Utilization of DHIS		P-value	Crude OR With 95% CI
	Yes(%)	No(%)		
Age (Years)				
18-25	58(43.6)	75(56.4)	0.606	Reference
26-35	34(40)	51(60)	0.599	0.86(0.496,1.499)
36-60	5(31.2)	11(68.8)	0.349	0.58(0.193, 1.786)
Sex distribution				
Male	36(34.3)	69(65.7)		Reference
Female	61(47.3)	68(52.7)	0.045	1.71(1.011, 2.929)
Work experience(years)				
1-4	54(40.6)	79(59.4)	0.950	Reference
5-9	36(42.4)	49(57.6)	0.798	1.07(0.619, 1.867)
>10	7(43.8)	9(56.3)	0.809	1.13(0.400, 3.241)

5.4.1.2. Association between technical factors influencing the utilization of district health information.

The bivariate analysis shows that all the indicators of technical factors were significantly associated with the utilization of district health information ($p \leq 0.05$). (Table 5.14).

Table 5. 14: Possible technical determinants that affect the utilization of district health information among case team heads of AA Public Health Institutions, June 2020.

Determinants	Utilization of District Health Information		P-value	Crude OR With 95% CI
	Yes (%)	No (%)		
DHIS 2 is easy to use (User-friendly):				
Agree	69(51.5)	65(48.5)		1.00
Disagree	28(28)	72(72)	0.001	2.73(1.571, 4.743)
DHIS2 login user name and password:				
Agree	69(49.6)	70(50.4)		1.00
Disagree	28(29.5)	67(70.5)	0.002	2.35(1.359, 4.098)
The training received in DHIS2 was adequate:				
Agree	72(51.1)	69(48.9)		1.00
Disagree	25(26.9)	68(73.1)	0.001	2.83(1.613, 4.994)
Age influence the way health workers adopt and use DHIS2?				
Agree	66(52.4)	60(47.6)		1.00
Disagree	31(28.7)	77(71.3)	0.001	2.73(1.586, 4.708)
Availability of ICT infrastructure				
Yes	89(86.4)	14(13.6)		1.00
No	8(6.1)	123(93.9)	0.001	9.74(3.932, 15.242)

Reference = 1.00

5.4.1.3. Relationship between organizational, Behavioral factors influencing district health information.

The bivariate analysis shows that all the indicators of organizational, behavioral determinates factors were significantly associated with utilization of district health in ($p \leq 0.05$). (Table 5.15).

Table 5. 15: Possible organizational determinants that affect the utilization of district health information of case team heads of AA Public Health Institutions, June 2020.

Determinants	Utilization of District Health information		P-value	Crude OR With 95% CI
	Yes (%)	No (%)		
Clear roles and responsibilities:				
Agree	73(50.3)	72(49.7)		1.00
Disagree	24(27)	65(73)	0.001	2.746(1.553, 4.857)
Skilled human resource responsible for DHIS2 related task:				
Agree	72(51.1)	69(48.9)		1.00
Disagree	25(26.9)	68(73.1)	0.001	2.838(1.613,4.994)
Training on DHIS2				
Agree	61(51.7)	57(48.3)		1.00
Disagree	36(31)	80(69)	0.001	2.378(1.394,4.056)
Regular and scheduled supportive supervision:				
Agree	78(52.3)	71(47.7)		1.00
Disagree	19(22.4)	66(77.6)	0.001	3.816(2.088,6.975)
Financial support for the running of DHIS2 functions:				
Agree	95(83.3)	19(16.7)		1.00
Disagree	2(1.7)	118(98.3)	0.001	2.95(6.702, 12.980)
confidence to perform DHIS related task				
Agree	94(97.9)	2(2.1)		1.00
Disagree	3(2.2)	135(97.8)	0.001	2.11(3.46, 5.903)
level of motivation to create and keep health information for use				
High	33(73.3)	12(26.7)		1.00
Low	64(33.9)	125(66.1)	0.001	5.37(2.598,11.103)

5.4.2. Multi-variable analysis

Multivariable logistic regression analysis was carried out to determine factors that inhibit the proper utilization of district health information. Availability of ICT infrastructure was 5.036 (AOR=5.036, 95% CI=4.025- 9.670) times more likely to utilize district health information than those who had no ICT infrastructure. Case team heads that had financial support for running DHIS2 functions were 5.68 (AOR=5.682, 95% CI= 9.841- 15.396) times more likely to utilize DHIS than those who had no financial support. Besides, availability of training (AOR 3.642, 95% CI= 4.752- 7.286) and availability of regular and scheduled supportive supervision (AOR 2.50, 95% CI= 1.235- 3.167) were positively associated with the utilization of district health information. (Table 5.16).

Table 5. 16: Multivariable logistic regression result on utilization of district health information, among case team heads of Public Health facilities of AA City Administration, Addis Ababa, Ethiopia, June 2020

Variables	Utilization of DHIS		Crude OR With 95% CI	Adjusted OR with 95%CI	P-Value
	Yes(%)	No(%)			
Age (Years)					
18-25	58(43.6)	75(56.4)	1	1	
26-35	34(40)	51(60)	0.86(0.496,1.499)	0.84(0.464, 1.532)	0.582
36-60	5(31.2)	11(68.8)	0.58(0.193, 1.786)	0.42(0.116,1.555)	0.696
Sex distribution					
Male	36(34.3)	69(65.7)	1	1	
Female	61(47.3)	68(52.7)	1.71(1.011, 2.929)	1.75(1.018,2.993)	0.543
Work experience(years)					
1-4	54(40.6)	79(59.4)	1	1	
5-9	36(42.4)	49(57.6)	1.07(0.619, 1.867)	1.13(0.698,2.333)	0.528
>10	7(43.8)	9(56.3)	1.13(0.400, 3.241)	1.67(0.491,5.801)	0.506
DHIS 2 is easy to use (User-friendly):					
Agree	69(51.5)	65(48.5)	1	1	
Disagree	28(28)	72(72)	2.73(1.571, 4.743)	1.39(0.724,2.668)	0.623
DHIS2 login user name and password:					
Agree	69(49.6)	70(50.4)	1	1	
Disagree	28(29.5)	67(70.5)	2.35(1.359, 4.098)	1.03(0.505,2.113)	0.928
The training received in DHIS2 was adequate:					
Agree	72(51.1)	69(48.9)	1	1	
Disagree	25(26.9)	68(73.1)	2.83(1.613, 4.994)	1.96(0.912,4.112)	0.085
Age influence the way health workers adopt and use DHIS2?					
Agree	66(52.4)	60(47.6)	1	1	
Disagree	31(28.7)	77(71.3)	2.73(1.586, 4.708)	1.78(0.960,3.304)	0.067
Availability of ICT infrastructure					
Yes	89(86.4)	14(13.6)	1	1	
No	8(6.1)	123(93.9)	9.74(3.932, 15.242)	5.03(4.025,9.670)	0.002*

Reference = 1.00; COR=Crude Odds Ratio; AOR=Adjusted Odds Ratio

*Shows predictor variables for District health information utilization at $p<0.05$.

Variables	Utilization of DHIS		Crude OR With 95% CI	Adjusted OR with 95%CI	P-Value
	Yes(%)	No(%)			
Clear roles and responsibilities:					
Agree	73(50.3)	72(49.7)	1	1	
Disagree	24(27)	65(73)	2.74(1.553, 4.857)	2.49(0.036,8.425)	0.673
Skilled human resource responsible for DHIS2 related task:					
Agree	72(51.1)	69(48.9)	1	1	
Disagree	25(26.9)	68(73.1)	2.83(1.613,4.994)	10.49(0.117,9.458)	0.306
Training on DHIS2					
Agree	61(51.7)	57(48.3)	1	1	
Disagree	36(31)	80(69)	2.378(1.394,4.056)	3.64(4.752,7.286)	0.001*
Regular and scheduled supportive supervision:					
Agree	78(52.3)	71(47.7)	1	1	
Disagree	19(22.4)	66(77.6)	3.816(2.088,6.975)	2.50(1.235,3.167)	0.001*
Financial support for the running of DHIS2 functions:					
Agree	95(83.3)	19(16.7)	1.00	1	
Disagree	2(1.7)	118(98.3)	2.95(6.702, 12.980)	5.68(9.841,15.396)	0.001*
confidence to perform DHIS related task					
Agree	94(97.9)	2(2.1)	1.00	1	
Disagree	3(2.2)	135(97.8)	2.11(1.892, 5.903)	3.32(4.213,6.897)	0.062
level of motivation to create and keep health information for use					
High	33(73.3)	12(26.7)	1.00	1	
Low	64(33.9)	125(66.1)	5.37(2.598,11.103)	4.624(3.263,8.267)	0.001*

Reference = 1.00; COR=Crude Odds Ratio; AOR=Adjusted Odds Ratio

*Shows predictor variables for District health information utilization at $p<0.05$

6. Discussion

This study attempted to assess the utilization of district health information and its determinant factors among case team heads of selected health institutions in the AA city Administration. However, there is no scientific literature available at the local level in the utilization of district health information data for decision making to make a comparison of some of the factors.

6.1. Utilization of district health information among case team heads of public health institutions.

Accurate and high-quality data are important for improving program effectiveness and informing policy. A case team of facility-based information systems is necessary for the information revolution era. District Health Information system is used to strengthen health service utilization data at each health institution level (3).

In this study, the proportion of utilization of district health information among case team heads of health institutions was 41.5%. This information utilization is in line with study findings from Illu Aba Bora Zone, Ethiopia where utilization of district health information was 45.8% (15). The finding of this study is also lower than the national expectation target to use a health information system which is 85% (50). The possible explanation for this condition could be poor knowledge of DHIS2 data management and use, less attention from the management, lack of ICT infrastructures, skilled manpower, shortage of financial support, poor supportive supervision from higher officials. All these may affect the utilization of information of DHIS2 systems.

The finding of this study, the current utilization of district health information is much lower than the studies in Zanzibar, Kenya which is 77% and 65.8% respectively(30,51). The possible reason for their better performance was good skills and a better level of knowledge of the staff on data collection, data handling, information analysis, and presentation. Whereas better availability of ICT infrastructures, IT supportive supervision enhances the utilization of district health information.

Also, the finding was by far below the result reported from, North Gondar, Hadiya zone, Ethiopia where the level of information-use for evidence-based decision making was 78.5% and 69.3% respectively (32,33). The possible explanation for this difference could be, this study included only case team heads of health institutions whereas North Gonder and Hadiya zone studies include all health workers of health institutions. However, the finding was higher than the

study done in Jimma and Addis Ababa which reported the level of information used as 31% (34). This variation could be the result of differences in skill and level of knowledge on data management.

On the other hand, the finding of this study relatively slightly higher as compared to the study conducted in Botswana and Ghana, in which the utilization of DHIS2 data was 21% and 26% respectively (26,27). The possible reasons for this difference could be differences in the study period, and facility type/unit; district, sub-district health offices, and community health facilities were included in the case of Ghana but only district health offices were studied in the case of Botswana, but in our case, all case team heads of health institutions.

6.2. Factors Associated with the utilization of district health information.

The study also showed that the majority 58.5% of respondents affirmed that poor utilizing district health information among case team heads in their health facilities and can be influenced by technical, organizational, and behavioral factors. Based on the study finding the main determinants in the utilization of district health information for decision-making included the lack of availability of computers, weak networking and internet services, and shortage of trained staff, poor management support, and ICT supportive supervision. According to the study majority of 71.4% of respondents agreed that inexistence of appropriate technology, user-unfriendly, Security credential problem, poor skill to perform DHIS2 tasks, untrained staff, inadequate ICT infrastructures like a computer, poor network access were strongly affected utilization of DHIS2 data in health facilities.

Availability of ICT infrastructure, computers, and internet connectively were found one of the determinant factors of the utilization of district health information at case teams of health facilities. Case team heads that had availability of ICT infrastructure were five times more likely to have good utilize district health information for decision making than those who did not have ICT infrastructures (AOR 5.036 95% CI= 4.025- 9.670). It is known that if case teams of health facilities get the availability of basic computing equipment such as computers, internet connectivity, is very crucial to facilitate data capture, analyze and transfer in DHIS2 systems. This can improve the availability of reliable information for decision-making at each level. This factor was also mentioned as crucial to information utilization by various studies and guidelines: Bangladesh, Sierra Leone, and Ethiopian Information Revolution Road Map (6,52,53). In this

study out of all case team heads of facilities, 45% of the participants claimed for lack of computer and poor internet connection to perform DHIS2. This finding is supported by study findings from Kenya several challenges in utilization of district health information, including poor skills among the users(34.3%), lack of adequate computers(36.7%), unreliable internet connectivity (47.1%) (54).

Evidence revealed that in Africa ICT products and services are scarce and expensive; African countries share similar problems in the use of ICT for the improvement of health information systems: South Africa accounts for almost 90% of Internet hosts of the total in Africa, followed distantly by Egypt (3%), Botswana(1%) and Tanzania along with other 46 countries in Africa share only 2% of Internet hosts(55)

Availability of training was another determinant factor of the utilization of district health information among the case team heads of health facilities. Case team heads that had training on district health information were three times more likely good utilizing district health information than did not have training (AOR 3.642, 95% CI= 4.752- 7.286). According to this study, 38.5% of respondents reported they have training on DHIS2 software. The finding of this study relatively lower as compared to the study conducted in Kenya, in which trained staff on the DHIS2 system was 53% (40).whereas in contrary to a study conducted in Botswana which was 19% (27). The possible reason lower or higher of trained staff may be due to adequacy of financial to cascade training, high rate of turnover of trained staff.

Scheduled Supportive supervision and follow-up from concerning offices were found as another determinant factor of DHIS2 information use with case team heads at health facilities. Case team heads that had supportive supervision two times more likely to utilize district health information than did not conduct supportive supervision (AOR 2.50 95%= 1.235- 3.167). If case team heads receive more support and data management and usage, it is understood that they can strengthen their expertise and personal initiation for different purposes to handle and use their data at hand. This factor was also listed by different guidelines and studies as vital to the use of information: Ethiopian Information Revolution Road Map, and Shuma et al (5,6,15).

According to the study, 41.5% of respondents agreed that uncoordinated effort and leadership, lack of Clear roles and responsibilities, inadequate staff responsible for DHIS2 related task, lack of supportive supervision, poor financial support for the running of DHIS2 functions were

strongly affected utilization of district health information**.** The findings match with a study conducted in rural & Urban Iran in 2013 and Uganda (12,20). Shortage of trained manpower in the study areas might be due to the high turnover of trained staff and low replacement rate of trained manpower. It is known that if health institutions get clear roles and responsibilities, financial support, more support, and feedback on data management and use, they will improve their knowledge and skills to manage and use their data at hand for various purposes(56).

A motivational mechanism that can create ownership among stakeholders empowering them to actively participate in HIS decision-making activities should be encouraged. Most case team heads (83.3%) agree that they did not have the Confidence to perform DHIS related activities such as data entry, analysis & interpretation and 67.9% of the respondents have a low motivation mechanism that decreases the utilization of DHIS2 data. The finding was contrary to a study conducted in Southern Ethiopia, Iilu Abba Bora 47.8% had low motivation to perform DHIS2 activities (15). This may be due to skill gaps, poor level of knowledge on data management, and reluctant behavior of health workers to know and engaged in health information related activities because health professionals' intention is only to perform their clinical related activities. Continuous training on DHIS activities is very important to create awareness and to have trained staff and skilled human resources that are confident and motivated to perform HIS tasks.

7. Strength and Limitation of the Study

The research has the following limitations and strengths.

7.1. Strength

- The data was collected by trained data collectors who have exposure to DHIS2 systems
- The response rate was very high.

7.2. Limitation

- Lack of local and national reference materials to make a comparison.

8. Conclusion

In general, the findings of this study showed that there was poor utilization of district health information compared to the national expectation (85%). The study results showed that technical factors: availability of ICT infrastructure, access to training on DHIS; organizational factors: regular supportive supervision, financial support has a positive influence on the utilization of district health information. Also level of knowledge, skill, and confidence to perform DHIS2 tasks also influence the utilization of district health information.

Therefore, Improving, availability of computer access, boosting internet connectivity, employ skilled manpower, Sustainable financing, and provide supportive follow-up and training access is important to scale up the information use of DHIS at the case team heads of health institutions.

9. Recommendations

Based on the study the findings, the following recommendations were made to AA public Health institutions and concerned bodies:

Ministry of Health:

- There is a need for updated and revised policies and guidelines on how to use the DHIS2 system.
- Support Capacity building for the use of DHIS2
- Should ensure ample supply of computers, network, internet services to boost ICT infrastructure for the proper functioning of DHIS2.
- There is a need for more support and funding from the national government for DHIS2 activities.

Regional Health Bureau:

- Should have conduct Supportive supervision, Mentoring and technical assistants with periodic feedback should be delivered to monitor their progress towards HIS.
- Should facilitate DHIS2 training to facilities.
- Deploy skilled manpower.
- Should give recognition and awards for better-performing facilities.

Health Facilities:

- Refreshment training should be given to all individuals working and make the DHIS2 system more user-friendly.
- The system should be used in all case teams for better evidence-based decision-making.
- Efforts have to be made to improve the culture of information and the attitude of case team heads towards health information systems in the facilities both at the sub-cities as well as facility levels.

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Annex -01

Multi collinearity Test

Independent Variables	Collinearity Statistics	
	Tolerance	VIF
Age	.710	1.408
service year	.685	1.461
Education level	.877	1.141
User-friendly DHIS2	.679	1.472
password login	.614	1.630
feature of DHIS2	.534	1.872
IT supervision	.879	1.138
influence of age	.754	1.327
political Commitment	.346	2.887
role responsibility	.381	2.624
staff adequacy	.477	2.094
supportive supervision	.499	2.004
financial support	.424	2.359
culture to use information	.422	2.372
skill of DHIS_final	.486	2.060
Motivation Level	.556	1.799
staff straining	.431	2.319
ICT_infrast	.452	2.215

Annex-02

Reliability Test Results For technical and Organizational Factors

1. Technical determinant Variables

Inter-Item Covariance Matrix

	User-friendly DHIS2	password login	training adequacy	IT supervision	influence of age
User-friendly DHIS2	.246	.092	.070	.017	.085
password login	.092	.242	.044	.029	.086
training adequacy	.070	.044	.241	-.003	.039
IT supervision	.017	.029	-.003	.194	.001
influence of age	.085	.086	.039	.001	.250

Reliability Statistics for Technical determinant variables

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.650	0.650	5

2. Organizational determinant Variables

Inter-Item Covariance Matrix

	political Commitment	role responsibility	staff adequacy	supportive supervision	financial support	culture to use information
political Commitment	.251	.166	.106	.106	.110	.124
role responsibility	.166	.237	.119	.127	.119	.140
staff adequacy	.106	.119	.241	.108	.136	.120
supportive suppervision	.106	.127	.108	.232	.124	.143
financial support	.110	.119	.136	.124	.250	.152
culture to use information	.124	.140	.120	.143	.152	.246

Reliability Statistics for Organizational factors

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.767	.767	6

Annex-03

Information Sheet

I am BELAY **FANTA DURESSA** I came from Addis Ababa University, College of Health Science, School of Public Health to conduct research. The aim of the study is the assessment of the utilization of district health information for Decision Making and its Associated Factors among case teams in Public Health Facilities of Addis Ababa City Administration, Ethiopia. I kindly request you to give me your attention to explain to you about the study and study participant

THE STUDY TITLE: Assessment on utilization of district health information for decision making and its associated factors among case teams in Public Health Facilities of Addis Ababa City Administration, Ethiopia.

PURPOSE OF THE STUDY: The main aim of this study is to write a thesis as partial fulfillment of a Master's degree in General public health. After completion of this study, the results were used as evidence and input to assess and reduce poor data collection, handling, communicating, analyzing, interpreting & poor information use & practices for evidence decision making.

PROCEDURE AND DURATION: I will be assessing the Utilization of DHI by using Questionnaires, key informant interviews & observation checklists that need your full cooperation and this may take about 15 to 30 minutes

RISKS AND BENEFITS: The risk of participating in this study is nil since the study does not need collecting any samples. There would have no direct benefits for being a study participant but indirectly the findings from this research will important for giving advice, awareness, and information about the utilization of the DHIS2 problem on evidence-based decision making of the health system for study participants, Addis Ababa health bureau. And also give information for further scientific research.

CONFIDENTIALITY: All information forwarded is kept confidential and names will not be written.

RIGHTS: Permitting this study is voluntary. You have the right to permit or not for this study. If you decide to permit the study, you have the right to terminate the study at any time if you consider something related to the study is wrong.

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Respondents Questionnaire

The purpose of these questionnaires is to collect or assess data on the perception, views, experiences of case team heads on the utilization of district health information in Addis Ababa City Administration of Public Health Facilities.

- It will take approximately 10-15 minutes to complete the self-administering questionnaire.
- Please answer the questions truthfully. Remember there are no right or wrong answers.
- Please answer ALL questions.

INSTRUCTIONS

Please tick in the box provided, circle correct answers in the blank spaces provided.

Data collection date: _____

Sub-city/Hop. /HC Code: _____

SECTION A: Background Information

Sr. no.	Respondent No._____	**Response/ Answer**
1.	Name of the institution you are working in	
2.	Unit/ department you are working in	
3.	Your Position /occupation in the institution	
4.	Your sex	1) Male 2) Female
5.	Age in years	
6.	Your educational status	1) Certificates 2) Diploma 3) Bachelor of Degree 4) Master's Degree 5) Ph.D. 6) Others----------
7.	what is your field of specialization	1) Health Officer 2) Laboratory Technician 3) Environmental Health Technician 4) Pharmacist 5) Nurse 6) Pharmacy Technician 7) General Practitioner 8) Midwifery 9)HIT 10) Other ……..
8	How long have you employed in your current position?	**…….**

SECTION B: FACILITY'S DHIS INPUT

Sr. no.	Question	Response
	Human Resources	
9	Do you have a responsible unit for HIS at your bureau/office/ facility?	1) Yes 2) No
10	Does your office/facility have personnel specifically to HIS/DHIS2? (Note: the person could have duties directly to HIS)	1) Yes 2) No
	Training Status	
11	Is there training on basic computer literacy for the staff of your office/facility?	1) Yes 2) No
12	Have experience in the use of DHIS2 software?	1) Yes 2) No
13	Did you attend training on DHIS2?	1) Yes 2) No
14	If "Yes " For Question No. (**13)** For how many days training on DHIS2 were made?	1) 3-5 day 3) 8-10 day 2) 6-7 day 4) >10 day
15	In which form was the training taken?	1) Only theoretical 2) Both theoretical & Practical
16	How would you rate your level of training on DHIS2?	1) Very poor 2) Poor 3) Good 4) Very Good
17	The training you received was adequate?	1)Strongly agree 2) Agree 3) Disagree 4) Strongly disagree

FACILITY'S DHIS INPUT

	ICT Infrastructures,	**Response/ Answer**
18	Is there the necessary ICT equipment for DHIS2 implementation in your case team/offices/facility?	1. Yes 2. No
19	If " **yes** " for question number ICT 1, which of the following equipment are assigned to DHIS2? (Multiple answers are possible).	1) Power supply 2)Telephone 3)Computer hardware and software 4) Internet or any kind of network 5) printer
20	How satisfied are you with the IT Support you receive from different hierarchy health facilities?	Not satisfied 3)satisfied 2) less satisfied 4) Very satisfied
	Financial Support	
21	Does your facility assign a budget for HIS activities?	1. Yes 2. No
22	If yes for question number ICT 3, in your opinion How do you rate the adequacy of a budget for HIS?	1) Very Inadequate 2) Inadequate 3) Not sure 4) Adequate 5)Very adequate
	Access to the Internet and DHIS2 utilization	
23	Have you internet access in your case team/facilities?	1) Yes 2) No
24	How do you mostly access the internet for your work? Through:	1. Never use it for work. 2.Internet service provider network 3.Mobile provider's wireless modern 4. Cybercafé 5. Other……..
25	Currently, how would you rate the internet access provided at your work of place?	1. Very satisfied 3. Unsatisfied 2. Satisfied 4. Very unsatisfied
26	What factors favor the use of information in DHIS2 for decision-making? (**Multiple answers accepted**)	1. Availability of computers 2. Network and internet services 3. Power backup 4. ICT Support Supervision 5.Conducive Policy and Legal Framework 6. Trained staff 7. Management Support 8. Organizational politics 9.Others,……
27	What challenges are experienced in the use of information in DHIS2 for evidence-based decision-making?	1. Lack of management support 2. Poor skills sets amongst users 3. Lack of adequate computers 4. Unreliable internet services 5. Lack of power back up 6.Lack of antivirus software 7. Resistance to change 8. Lack of accurate and quality data

SECTION C: UTILIZATION OF DISTRICT HEALTH INFORMATION

	Question	Response/ Answer
28	What type of data do you generate in the course of your daily activities? (**Multiple responses** allowed Tick)	a) Outpatient data b) Inpatient data c) Clinical d) Diagnostic data e) Program data f) Health systems data (finances, infrastructure, Human resource) g) Others (specify)…
29	Have you ever used DHIS2 data in case team/facilities	1) yes 2) No
30	IS DHIS2 data important to you or your area of work?	1) Yes 2) No
31	If **YES** how do you use the DHIS2 information in your case team/ institution? (Tick what is applicable) **Multiple answers accepted**	1. Planning (Yes/ No) 2. Budget allocation(Yes/No) 3. Requisition of manpower. (Yes/No) 4. Calculation of area coverage. (Yes/No) 5. Monitoring & evaluation. (Yes/No) 6. Medical supplies management. (Yes/No) 7. Organize feedback. (Yes/No) 8. Evidence-based decision-making. (Yes/No)
32	What factors favor the use of information in DHIS2 for decision-making? (**Multiple answers accepted**)	1. Availability of computers 2. Network and internet services 3. Power backup 4. ICT Support Supervision 5.Conducive Policy and Legal Framework 6. Trained staff 7. Management Support 8. Organizational politics 9.Others,……
33	What challenges are experienced in the use of information in DHIS2 for evidence-based decision-making?	1. Lack of management support 2. Poor skills sets amongst users 3. Lack of adequate computers 4. Unreliable internet services 5. Lack of power back up 6.Lack of antivirus software 7. Resistance to change 8. Lack of accurate and quality data

SECTION D: TECHNICAL FACTORS INFLUENCING USE DHIS2 DATA

	Question	Response/ Answer
34	Do you agree that DHIS 2 is easy to use (User friendly)?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
35	Do you agree that There is trained staff able to use DHIS2 software?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
36	Do you agree All DHIS2 users have login user name and password?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
37	Do you agree DHIS 2 includes necessary features and functions?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
38	Do you agree DHIS 2 meets my department/organization/ facilities requirements	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
39	Do you agree DHIS 2 system responds quickly enough?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
40	Do you agree DHIS 2 can be easily modified, corrected, or improved?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
41	Do you agree with Age influence the way health workers adopt and use DHIS2	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
42	Do you have the skill to perform DHIS2 Software?	1. Yes 2. No
43	If **Yes** which function of DHIS2 do you mostly use? you can choose more than one answer.	1. Log in 2. Data Entry 3. Data Accuracy Checks 4. Data Validation Checks 5. Data Analysis 6. Reporting and dissemination

SECTION E: ORGANIZETONAL FACTORS INFLUENCING USE DHIS

	Question	Response/ Answer
44	How do you rate your agreement existence of coordinated effort and leadership regarding the (political commitment)	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
45	How do you rate your agreement on the existence of clear roles and responsibilities related to decision-making	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
46	How do you rate your agreement existence Adequate staffs responsible for DHIS2 related task?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
47	How do you rate your agreement on the existence of Sufficient trained Staff on DHIS2 utilization/implementation?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
48	How do you rate your agreement existence of Regular and scheduled supportive supervision?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
49	How do you rate your agreement concerning the existence of control of budget and allocation?	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
50	How do you rate your agreement on the existence of organizational culture (acceptance or resistance)	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree

SECTION F: BEHAVIORAL FACTORS INFLUENCING USE DHIS

	Question	Response/ Answer
51	How do you rate your agreement on **confidence** to perform DHIS related activities such as data entry, analysis & interpretation	1. Strongly Disagree 2. Disagree 3. Agree 4. Strongly Agree
52	How do you rate your agreement on the level of motivation to create and keep health information for use?	1. Very Low 2. Low 3. Moderate 4. High 5. Very High

SECTION G: LEVEL OF KNOWLEDGE IN THE USE OF DHIS2 DATA

Rate your level of knowledge on the use of DHIS2 data on a scale of 1-5 in the following areas?

1= Very Poor, 2= Poor, 3= Good, 4= Very Good, 5= Excellent

Sr. No.	**Function**	1	2	3	4	5
53	Operating DHIS2 database application					
54	Use of DHIS2 in data collection, data entry, and analysis i.e. competence in data management					
55	Use of DHIS2 to perform quality checks i.e. Verification and validation of data					
56	Use of DHIS2 Dashboard in data visualizing and disseminating information					
57	Use of DHIS2 in timely reporting and Dissemination of reports					
58	Use of DHIS2 in computing trends and interpretation for service delivery and disease delivery					
59	Use DHIS2 data for identifying gaps and setting targets					
60	Use of information in DHIS2 to inform policy and operational decision making					