ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

SCHOOL OF PUBLIC HEALTH

INTENTION TO USE DHIS2 FOR ANALYZING DATA AND PLANNING AND ITS DETERMINANAT AMONG HEALTH MANAGERS IN PUBLIC HEALTH FACILITIES OF ADDIS ABABA CITY: APPLICATION OF TPB

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Table of Contents

List of Table

List of Figure

Acronyms and Abbreviations

DHIS	District Health Information Software
E-Health	Electronic Health
EHR	Electronic Health Records
FMoH	Federal Ministry of Health
HIS	Health Information System
HMIS	Health Management Information System
HMN	Health Matrices Network
HSDP	Health Sector Development Plan
ICT	Information Communication Technology
LMIC	Low- and Middle-Income Countries
M-Health	Mobile Health
PPS	Probability Proportional to Size
TPB	Theory of Planned Behavior

Abstract

Background: District Health Information System 2(DHIS 2) is a web-based, integrated, open-source platform for collecting, validating, analyzing, and presenting aggregated and individual health data. While the DHIS2's analytic and visualization capabilities are constantly developing, evidence suggests that its users are not fully utilizing these new features. Their primary focus remains on data reporting, with less attention paid to data dissemination and analysis. Changing the behavior of thousands of health care employees and management is, of course, a difficult endeavor that cannot be accomplished just through technology. Therefore, this study aimed to show on which behavioral aspect we should work in order to activate utilization of DHIS 2 for data analysis and planning.

Objective: This study aims to measure the behavioral intention and to assess behavioral determinants towards DHIS2 utilization in data analysis and dissemination among health care management at Addis Ababa Public Health Facilities.

Method: A facility-based cross-sectional study involving a two-stage cluster sampling was conducted using quantitative approach. The sample units are health managers in the position of medical director, quality head, planning head, monitoring and evaluation and HIT in public health facilities found in Addis Ababa City Administration. To obtain quantitative data, I used a self-administered questionnaire that was adopted and contextualized for this study from the TPB manual and similar literatures with closed-ended questions were utilized. Collected data was organized and entered in Epi data version 4.6 and data analysis is carried out by using SPSS version 26. Descriptive statistics in the form of percentages and frequency distribution tables were used and multiple linear regression was also carried out to assess the association.

Result: The multiple linear regression analysis revealed attitude, subjective norm, training and access were statistically significant predictors; attitude ($B=0.17$, $t(248)=2.60$, $p<0.05$), subjective norm ($B=0.55$, $t(248)=10.59$, $p<0.01$), training of utilizing dhis2($B=0.37$, $t(248)=5.30$, $p<0.01$) and Access to dhis2($B=0.14$, $t(248)=2.13$, $p<0.05$). However, the test revealed that perceived behavioral control not to be statistically significant predictor ($B=0.04$, $t(248)=0.66$, $p>0.05$).

Conclusion: The behavioral determinants like attitude and subjective norm shown to significantly determine the behavioral intention of utilizing the software DHIS2 for data analysis.

Keywords: DHIS 2; Health Information System; Theory of Planned Behavior(TPB)

Chapter I

Introduction

Background

Information communication technology (ICT), as the name suggests, refers to all technology that facilitates the processing, transfer, and exchange of information and communication services(1). ICT is changing the practice of medicine as well as the roles and skills that healthcare professionals must possess.

A health information system (HIS) is any device that collects, stores, maintains, or transmits data on a person's health or the operations of organizations working in the healthcare industry(2). In general, a well-functioning HIS is a coordinated effort to gather, examine, report, and use health information and data to affect research, program implementation, policy, and decision-making. For sound decision-making at all levels of a health system, it is necessary to have access to reliable health statistics that are broken down by sex, age, and socioeconomic factors.

In addition to the paper forms and registers used in health facilities to record and report data, HIS also includes the staff's routines and practices for gathering and analyzing data, the computer systems that store that data, and the protocols that govern how information is used in decision-making.(3).

In contrast to a paper-based system, electronic health (e-health) collects health data in a fast and accurate manner, enabling better healthcare planning and diagnosis(4). The two primary types of electronic health records are individual (i.e., client) records and records used for information management and decision-making.

The latter category of e-health includes the District Health Information System (DHIS), which was first introduced by the University of Oslo in 1994(5). A web-based, integrated, open-source platform called DHIS2 is used to gather, verify, analyze, and show both aggregated and personal health data. Its objective is to improve health service delivery by fortifying the HMIS(5).

A generic tool rather than a prepackaged database application, an open metadata model, and a customizable user interface are all features of the open-source information system DHIS2, which has modest hardware requirements(6). Users can also contribute content without the use of scripts. As the national HIS, DHIS2 is frequently used for data management and analysis, mapping current services and recording facilities, logistical management, monitoring and evaluation of health programmes, and mobile tracking of expectant women in distant regions(6).

DHIS2 has been translated into several languages, and more than 70 countries now use it as their HMIS platform(7). The method is especially helpful for the health sector in poor nations since it enables them to make better use of their few resources by making evidence-based decisions. The straightforward collection of reproductive, maternal, newborn, child, and adolescent health (RMNCAH) data using DHIS2 has shown to be an invaluable tool in strategic planning, priority setting, and decision making in many developing countries. According to data, DHIS2 implementation in Uganda and Kenya has boosted reporting of immunization coverage, antenatal care (ANC) visits, and facility delivery rate (5).

Evidence suggests that nation MoH users are not fully utilizing these new features, despite the fact that the DHIS2's analytical and visualization capabilities are constantly expanding. They continue to place more emphasis on data reporting and pay less attention to data distribution and analysis. Of course, changing the behavior of thousands of management and healthcare workers is a challenging task that cannot be solved just by technology. In order to make it simpler to use data, DHIS2 has created features including dashboards, rapid visualization tools, GIS, and pivot tables(8).

A "data revolution" was called for in the Ethiopian Health Sector Transformation Plan (2015-2020) for the gathering, analysis, and dissemination of health data for decision-making. Since then, numerous initiatives have been started to raise the caliber of the Ethiopian HMIS(9).

The MOH has implemented different digital health initiatives, including District Health Information System version 2 (DHIS2), electronic community HIS, electronic medical record systems, electronic community-based health insurance, logistic management information system, human resource information system, master facility registries, and electronic public health emergency management system(10).

The use of DHIS 2 for data analysis, dissemination, and planning purposes is determined by behavioral aspects such motivation, attitude, feedback, supervision, performance expectancy, effort expectancy, competency, and computer anxiety, according to other studies(5,11).

However, which behavioral constructs can haveimpact in this problem and how can it impact is not well assessed particularly in DHIS2. This research will assess primarily the behavioral intention of the users towards DHIS 2 utilization in data analysis, dissemination and planning and again it will find out which determinants have strongrelationship in affecting the behavioral intention.

Statement of Problem

Although DHIS2's analytic and visualization capabilities are constantly developing, evidence suggests that developing country users are not fully utilizing these new features. Their primary focus remains on data reporting, with less attention paid to data dissemination and analysis(8) One of the issues that developing-country health systems face is a lack of information for decision-making(12).

Many studies done on the utilization determinants of DHIS2 specially in developing countries shown that there are three major factors and these are; Organizational, technical and behavioral factors. The organizational and technical infrastructure required to run ICT systems are hardly ever adequate in developing countries context(11).

Recent study shown implementation of DHIS2 in Ethiopia was found to be at "defined" stage where there are tailored guidelines to DHIS2 activities however its not controlled and feedback process not in place. It states the lack of workforce competency guidelines, the unavailability of the core competencies required to accomplish DHIS2 tasks at all levels of the health system, and ICT infrastructure challenges are the major hindrances to effectively implementing DHIS2(10).

Studydone on utilization of DHIS2 for decision making in Addis Ababa city public health facilities result shown confidence to perform data entry, analysis and interpretation and level of motivation to create and keep health information for use(12). Even though there is no study done to assess particularly the behavioral perspective of using DHIS2 for data analysis, in the study done in Illu Aba Bora Zone shows that motivation, feedback, supervision and competency have significant association with level of commitment to utilize DHIS2 (13).

As all the documents suggested even though the guidelines are putted in place for the DHIS2 activities, its implementation is poor. Therefore, it is important to determine the intentions of the health facility managers in utilizing the database to know the determinant factors affectting its implementation.

Significance of the Study

The study of the intention to use the District Health Information Software 2 (DHIS2) among health managers in Addis Ababa's public health facilities holds several significant implications. The adoption of DHIS2, a robust health information system, is crucial in enhancing data-driven decision-making processes among health managers. This is particularly essential in the context of Ethiopia, where the utilization of local data for planning and decision-making in health systems is often constrained by resource limitations (14).

Health managers play a pivotal role in the administration and improvement of health services within public health facilities. Their intention to use systems like DHIS2 indicates their readiness to incorporate technology-driven strategies for data analysis and planning, which can lead to improved service delivery and health outcomes. The implementation of systems such as DHIS2 can address existing gaps in data utilization for decision-making, as evidenced by similar initiatives in other Ethiopian regions aimed at enhancing maternal healthcare services (14).

Moreover, understanding the determinants that influence health managers' intention to adopt DHIS2 can inform tailored interventions and training programs that address specific barriers and leverage facilitators. This would not only enhance the proficiency and confidence of health managers in using DHIS2 but also promote a culture of data-driven decision-making in public health facilities. Adopting big data analytics systems in healthcare settings has been shown to improve decision-making processes and healthcare delivery by efficiently managing healthcare data (15).

Additionally, overcoming challenges related to data analytics adoption in healthcare, such as those faced in other parts of the world, could significantly improve the quality of healthcare services in Addis Ababa. Healthcare analytics can transform traditional policy-making into a more data-driven process, enhancing the accuracy and efficiency of health policies and interventions (16). Therefore, studying the intention to use DHIS2 and its determinants among health managers is vital for strategic planning and improving healthcare outcomes in Addis Ababa.

While I cannot generate a full study report, I hope this overview provides a comprehensive insight into the significance of this topic. For more detailed information or assistance, further exploration into this subject through specific research studies and data analysis could be beneficial.

Chapter II

Literature Review

The District Health Information Software 2 (DHIS2) is an open-source health management data platform widely used worldwide, especially in low- and middle-income countries (LMICs), for reporting, analysis, and dissemination of health information. Since its development by the Health Information Systems Programme (HISP) at the University of Oslo, Norway, DHIS2 adoption has grown exponentially, shaping health information systems globally(17)Its implementation has supported data-driven decision-making for health system strengthening, and its adoption provides insights into digital health transformation globally, regionally in Africa, and specifically in Ethiopia.

Global Use and Evolution of DHIS2

DHIS2 is one of the largest health information platforms globally (18). Supported by global and regional alliances, including WHO and UNICEF (19). It is implemented in over 75 countries, covering national health information management in Africa, Asia, Latin America, and Europe (17). Its adaptability and customizability make it a preferred choice for ministries of health and NGOs. For example, in West Africa, DHIS2 supported Ebola surveillance in Sierra Leone, enabling real-time data capture and outbreak management (20)**.**

Since its inception by the University of Oslo in the mid-2000s, DHIS2 has expanded to serve over 100 countries, including several national-scale rollouts (17) the flexible, modular architecture supports various health domains, from disease surveillance to routine health data reporting.

Studies demonstrate DHIS2's positive influence, such as improved data quality, visualization, and decision-making processes (18,21) It strengthens data-driven planning but challenges remain in translating data into actions due to capacity gaps.

Implementation and Challenges

DHIS2 utilization in developing countries faces constraints such as technical issues, poor internet connectivity, power outages, and inexperienced health professionals. Despite these challenges, it facilitates timely reporting, data management, and evidence-based decision-making when

adequately supported and trained.

Operational challenges include infrastructure deficits (e.g., unreliable internet), insufficient user training, and data security concerns (22). Additionally, context-specific customization needs often require substantial technical support and continuous funding.

A study identifies constraints in DHIS2 utilization in Bangladesh, including lack of awareness among health staff, inadequate training, poor data quality, and software limitations like absence of automatic summary reports, hindering effective decision-making in health service management(5).

Variability in training, system customization, and integration with legacy systems affect rollouts. Data quality and sustainability remain recurring concerns (17). Questions about data completeness, accuracy, and timeliness in DHIS2-based reporting remain contentious, especially in resource-limited settings (18).

DHIS2 in Africa: Regional Experiences

Africa is a major DHIS2 adopter, with countries including Kenya, Uganda, Nigeria, and Mozambique using DHIS2 for national health information management (18). Improving real-time access to data across different levels of health systems (22). Supporting malaria, HIV, and outbreak reporting (e.g., Ebola in West Africa)(19). Providing governments with data for decision-making and resource allocation.

Debates and Challenges

DHIS2 utilization in developing countries faces constraints such as poor Internet connectivity, lack of security policies, and shortage of qualified staff. However, factors like top management support, perceived benefits, and compatibility significantly influence its effective usage, particularly in Sierra Leone (23).

A study identifies sociotechnical challenges in DHIS2 utilization in Kenya, including limited technical capacity, inadequate analytical skills, and inconsistent data collection tools, which hinder data accuracy and reliance for decision-making in health services, particularly in developing countries (24).

In addition, other study highlights that while the DHIS2 platform is accepted by users in Botswana for malaria case surveillance, organizational issues may hinder its effective implementation, reflecting common constraints faced in developing countries regarding eHealth system adoption and utilization (25).

DHIS2 in Ethiopia: National Implementation and Experiences Utilization

Ethiopia adopted the District Health Information Software 2 (DHIS2), a web-based HMIS platform used in more than 70 LMICs, and started a national effort to increase internet access in healthcare facilities in 2018(9).

Multiple studies underscore its positive reception among health workers and policymakers (26,27). While implementation fidelity varies, successful sites often have robust local leadership and ongoing technical support.

DHIS2 has significantly improved data completeness, timeliness, and accessibility (28). Routine immunization, maternal health, and HIV/AIDS programs benefit particularly from more reliable data (27). Despite improvement, data accuracy and consistency at the lower health facility level remain questionable, with frequent problems of underreporting and data mismatch (26,27)

Ongoing training and supportive supervision are essential for sustained use of DHIS2 (26). Capacity building initiatives are often donor-driven and not fully institutionalized, leading to varying competencies across regions and frequent staff turnover.

Studies also shown that gaps in implementing and utilizing DHIS2 falls under the three categories, which are organizational, technical and behavioral factors. Technical factors like poor and inadequate trainings, limited or no IT expert support and poor infrastructure; Organizational factors such as lack of scheduled supportive supervision and lack of financial support; Behavioral factors like the low confidence and motivation are among the determinants (12). In addition, another study has shown that information use, motivation, competency in DHIS2 tasks, health need, supervision, and feedback were the most determinant factors for commitment level to use DHIS2 data for decision-making (13).

DHIS 2 Utilization Constraints With Regard To Behavioral Factors In Ethiopia

The utilization of the District Health Information System 2 (DHIS2) in Ethiopia faces several behavioral constraints that significantly affect its effectiveness. These constraints are primarily linked to the attitudes, knowledge, and commitment levels of health care providers, which are crucial for the successful implementation of DHIS2.

Knowledge and Attitudes

- Approximately 49.2% of health professionals possess good knowledge regarding DHIS2 data utilization, while 56.4% exhibit favorable attitudes towards its use (29)
- Factors influencing knowledge include skills, resources, and experience, while motivation, feedback, and health needs are critical for fostering positive attitudes (29)

Commitment Levels

- Only 45.8% of health care providers demonstrate high commitment to using DHIS2 data for decision-making(29)
- Key determinants of commitment include regular supervision, feedback provision, and a supportive information use culture(29)

Intention to Use

- A study found that only 39.3% of health extension workers intended to use the electronic community health information system, with effort expectancy and social influence being significant factors(30)
- Behavioral factors constraining DHIS 2 utilization in Ethiopia include low self-efficacy in data analysis, unfavorable attitudes towards data management, and insufficient training and mentorship, which hinder health workers' commitment to effectively using routine health information systems (31).

Theory of Planned Behavior and Its Application in Information Systems and Technology Acceptance

The Theory of Planned Behavior (TPB) was proposed by Ajzen (1991) as an extension of the Theory of Reasoned Action (TRA) to explain behaviors that are not entirely under volitional control. TPB posits that behavioral intention is the immediate determinant of actual behavior, and intention itself is influenced by three conceptually independent constructs: attitude toward the behavior, subjective norm, and perceived behavioral control (PBC)(32).

Applicability of TPB to Health Information Systems

Technology use in healthcare settings is rarely purely voluntary. Health workers operate within hierarchical systems where technology use is influenced by policies, resource availability, and managerial oversight. TPB is especially relevant in this context because it explicitly incorporates social influence and control constraints, which are prominent in HIS implementation(33)

Studies in health informatics suggest that HIS adoption is not solely determined by system functionality but also by users' beliefs, perceived expectations, and self-efficacy(34). TPB allows researchers to capture these behavioral determinants systematically, making it a widely adopted theory in HIS acceptance research.

In DHIS2 contexts, attitude is shaped by perceptions of data usefulness, accuracy, and relevance for local decision-making. Research from LMICs indicates that health workers are more likely to use DHIS2 when they perceive it as improving planning, monitoring, and accountability rather than merely serving reporting requirements (27,28). Positive attitudes are associated with greater engagement in data analysis and feedback processes.

Subjective norm plays a critical role in DHIS2 use due to strong institutional and managerial influences. Expectations from district health offices, facility managers, and national ministries significantly shape health workers' intention to use DHIS2 (27). Supportive leadership, performance review meetings, and data-use culture reinforce normative pressure, increasing intention to use DHIS2 beyond routine reporting.

Perceived behavioral control is consistently identified as a major barrier or facilitator of DHIS2 use. Factors such as inadequate training, limited computer skills, poor internet connectivity, high workload, and lack of technical support reduce health workers' perceived control and, consequently, their intention to use DHIS2 effectively (26,27). In TPB-based DHIS2 studies, PBC often emerges as the strongest predictor of intention and actual use.

Conceptual Framework

The study adopted TPB model(32) to DHIS 2 conceptual framework, which implies in assessing determinants of behavioral intention applying the theory of planned behavior the major constructs are attitude subjective norm and perceived control of the behavior. In addition, this study shows how demographic factors are also determinant factors for all the constructs. Therefore, the framework shows these multiple factors and it was used to review the literature, prepare study tools, and perform data analysis.

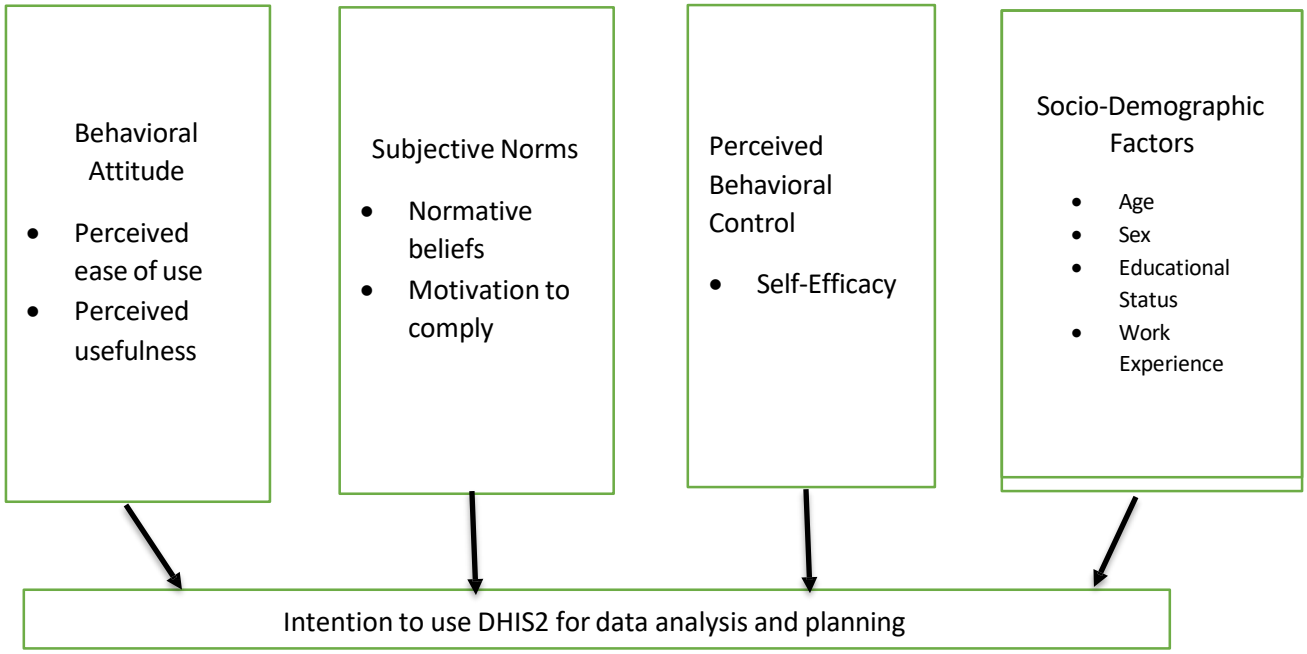

Figure 1: Conceptual frame adopted from Extending the Theory of Planned Behavior in the context of recycling: the role of moral norms and of demographic predictors, to assess the behavioral intention towards DHIS2 use for data analysis and planning

Chapter III

Objectives

General Objective

- To determine the behavioral intention and determinant behavioral factors towards DHIS2 use for data analysis and planning among health care management found in different public health facilities from the start of utilizing DHIS2 to 30/03/2022.

Specific Objectives

- To measure behavioral intention of the health care management towards DHIS2 use for data analysis and planning in their health facility.
- To assess determinants of behavioral intention towards DHIS2 utilization for data analysis and planning amonghealth care management at Addis Ababa Public Health Facilities.

Chapter IV

Methods and Materials

Study Area

The study was conducted inside the municipality of Addis Ababa, which is the capital city of Ethiopia. It is also the largest city in the country by population, with a total population of 3,384,569 according to the 2007 census. However, the population growth is estimated to be 5,006,000 in 2021. It holds 527 square kilometers of area in Ethiopia. The population density is estimated to be near 5,165 individuals per square kilometer available. The city has 101 functionalhealth centers, 13 government hospitals (6 Under A.A.City and 7 Federal), 35 private hospitals, 11 sub city health bureau. In every public health facility there are Medical Director, Quality Head, Planning Department Head, Pharmacy Head and HIT. To improve health care delivery, all governmental public health facilities, hospitals, and sub-city health offices have implemented DHIS2 software for health data collection, validation, analysis, and presentation of aggregated and individual data.

Study Design and Period

A facility-based cross-sectional study was conducted using quantitative approach to assess the behavioral intention of the managements of the health facilities towards DHIS2 use for data analysis and planning and also identify determinants of its use for data analysis and planning among the managements in public health facilities of Addis Ababa city administration, Ethiopia. The study was undertaken from February 20’2023 to April 14’2023.

Source Population

All the public health facilities found in Addis Ababa City Administration which have been implementing DHIS2.

Study Population

Medical Directors, Quality Management Heads, Monitoring and Evaluation Heads, Planning Department Head and HIT who works in public health facilities of Addis Ababa City Administration implementing DHIS2.

Study Unit (Sample)

Managements from each of the four positions that were taken from selected public health facilities of Addis Ababa City Administration implementing DHIS2.

Eligibility Criteria

Inclusion Criteria

- Managements only from the position of Medical Director, Quality Management Head, Maternal and Child Care Head and Out-Patient Department, Disease Prevention and Control Head, Monitoring and Evaluation Head and HIT's in a public health facility inAddis Ababa which has been implementing DHIS2 for at least two years will be included.

Sample Size

The sample size determined in two steps;

1. Calculate the sample size for infinite populations

2.Adjust sample size to required study population= $Z^2 P(1- P)/ d^2$

Where n - Sample size

Z - Z score which is 1.96 considering 95% confidence level

P – Population proportion which is assumed to be 50% (0.5),

d – Margin of error at 5% (Standard Value=0.05)

Then, n = 384

To adjust for the study population which is 585;

Adjusted sample size = (n)/1+[(n-1)/study population]

n = 232 and taking into consideration the 10% non-response rate, the **final sample size(n) = 255**

Sampling Techniques and Procedures

The study was conducted in health centers from the category of sub-cities which have geographical proximity where;

Category 1: Addis Ketema, Kolfe and Lideta

Category 2: Arada, Gulele and Kirkos

Category 3: Yeka, Bole and Lemikura and

Category 4: Akaki and NSL.

To determine how many health centers from which category enrolled allocated using Probability Proportionate to Size (PPS) technique. Proportionate allocation follows the below formula of PPS;

ni=Ni/N*n

Where: - ni is the number of health centers that are needed for the study in each category.

- Ni is total number of health centers in each category
- N is total number of health centers in all sub-cities
- n is calculated sample size in terms of health center

Then the specific health centers from each category is selected using lottery method. Among the 6 hospitals under the city administration all were selected, these are;

- Yekatit 12 Medical College
- RasDesta Damtew Memorial Hospital
- Minilik Comprehensive Specialized Hospital
- Gandi Memorial Hospital
- Zewditu Memorial Hospital
- Tirunesh Bejing General Hospital

And also, from the sub-cities health bureau six were selected;

- Yeka
- Arada
- Addis Ketema
- Akaki
- NSL and
- Gulele

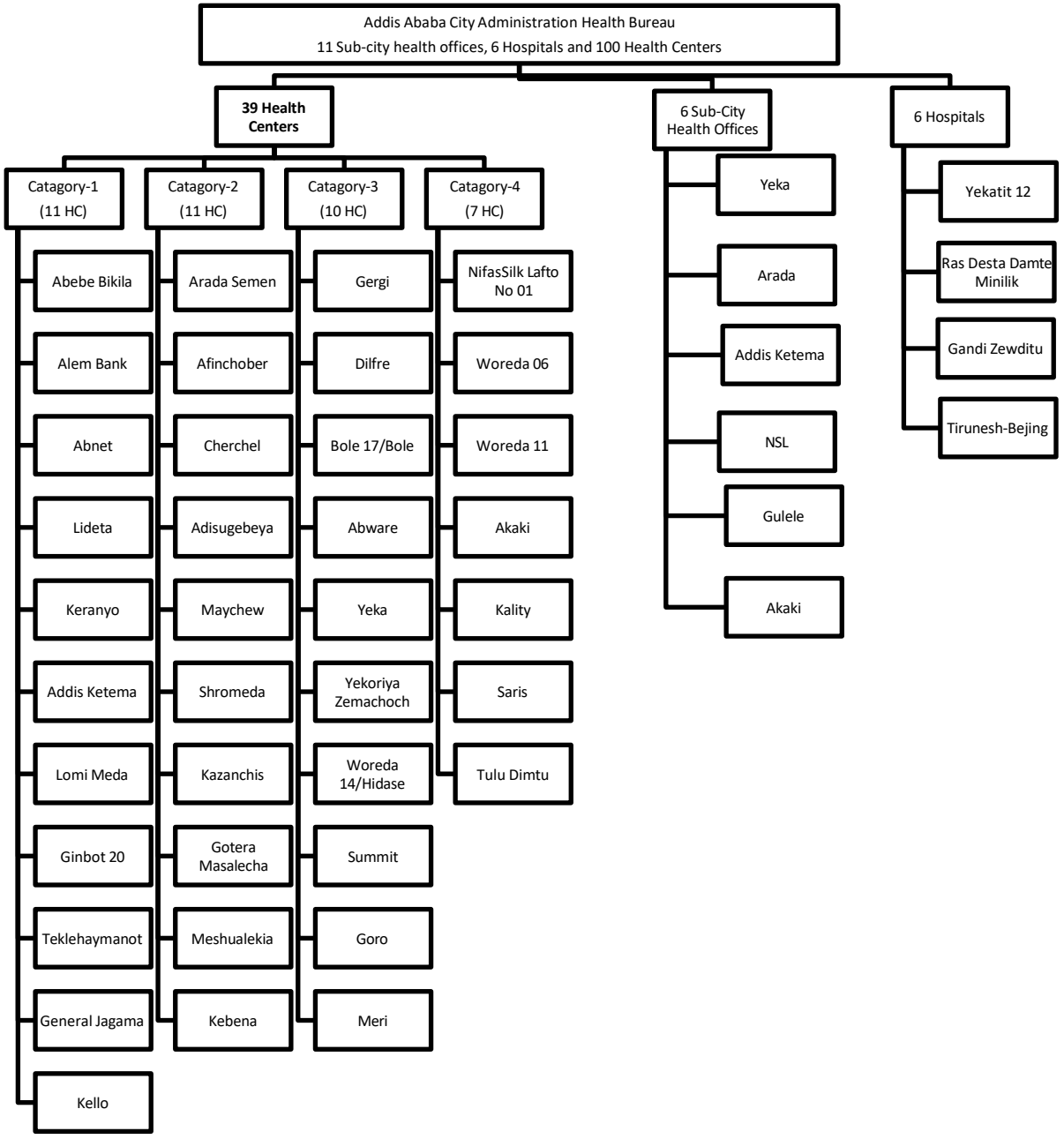

Figure 2: Sampling Diagram

Variables of the Study

Dependent Variable

- Behavioral Intention

Independent Variables

- Socio-demographic;
    - Education status
    - Work experience,
    - Age,
    - Sex
- Behavioral Attitude
- Perceived Behavior Control
- Subjective Norm

Data Collection Methods, Tools and Procedures

Data was collected with the standardized questionnaire that was adopted and contextualized forour study from the TPB manual and similar literatures. The questionnaire had different sections which consisted of demographic information, behavioral intention, attitude, perceived behavioral control and subjective norm for respondents to fill. The statements were rated on a four-point Likert scale, with responses arranged from 4: Strongly Agree, 3: Agree,2: Disagree, 1: Strongly Disagree.

Data Collection

To obtain quantitative data, a self-administered questionnaire with closed-ended questions was utilized since it allows for quick response and feedback. Because of their speed and accuracy in gathering information, structured questionnaires will make data analysis easier.

Data Processing and Management

Collected data was organized and entered in Epi data version 4.6 and cleaning was done to avoid missing values, outliers, and other inconsistencies. Data analysis is carried out by using SPSS version 26.

Data Analysis

Data was collected manually, cleaned for completeness, inconsistency, and missing value. Coded data was entered into Epi data version 4.6 and exported to SPSS version 26.0 Software for analysis. Data cleaning was performed by generating a frequency table to check, accuracy,consistencies, missed values, and variables. Errors that might be identified during data entry was corrected after the revision of the originally completed questionnaire.

Descriptive statistics in the form of percentages, frequency distribution tables were used. Multiple linear regression was administered to analyze the association between the independent variables and the dependent variable.

Data Quality Assurance

To assure data quality standardized questionnaires and trained professionals were involved in data collection. Pre-test was done to confirm the degree to which the measuring tool produces consistency and reliability on 5% of the sample, this was done to ensure accuracy or precision of the measuring instrument in terms of clarity, suitability and flow of questions before the questionnaire administered to participants. So, the psychometric properties of the study which are the reliability and validity checked using Cronbach Alpha value ≥ 0.7.

Operational Definitions

District Health Information System 2: A free and open source software platform that has been developed over the course of 20 years and consists of numerous different modules that may be coupled to construct data gathering and management systems.

Health Managements: The management bodies who work in public health facilities that have access to DHIS 2 soft-ware and those who can analyze data using the DHIS 2 soft-ware make decision.

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

Behavioral Intention: Behavioral intention refers to the extent to which health managers are willing and plan to use DHIS2 regularly for data analysis and planning in their health facilities where those who score 12 which is the highest value and implication for strong intention and as intention is stronger the behavior of using DHIS 2 for data analysis is more likely.

Attitude: Attitude toward using DHIS2 is defined as the degree to which health managers hold a favorable or unfavorable evaluation of using DHIS2 for routine data analysis and planning in Addis Ababa public health facilities. It scores from 4-16 where high score indicate positive attitude and low score indicate negative attitude.

Perceived Behavioral Control: Perceived behavioral control is defined as health managers' perceived ability and control to use DHIS2 effectively for data analysis and planning within their work environment. It scores from 4 – 16 where score 16 will be the highest forhaving stronger self-efficacy and the lower value 4 represents the weakest self-efficacy.

Subjective Norm: Subjective norm refers to the perceived social pressure on health managers to use DHIS2 for data analysis and planning, arising from supervisors, colleagues, and health authorities. 4-16 where 4 is the lowest value for influence of others on using DHIS 2 for data analysis and planning.

Ethical Considerations

The study was conducted after receiving approval from Addis Ababa University's School of Public Health's Research and Ethics Review Committee, as well as the Addis Ababa Health Bureau. To confirm willingness to participate in the study, consent was sought prior to executing the operation after explaining the technique, purpose, and importance of the study. Because health issues are sensitive, the ethical guidelines were followed throughout the research process, including keeping responders anonymous and maintaining confidentiality of all information provided by participants. Participants was given the option to decline or withdraw involvement in the study (voluntary participation) after being informed of the study's importance and the contribution anticipated by them.

Dissemination of Findings

The result of an assessment will be disseminated to 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, DDCF project management and AACAHB will be provided with both softcopy & hard copy of the report.

Chapter V

Results

Socio-Demographic Characteristics of Respondents

Questionnaire Response Rate

Two hundred fifty-five (255) managements were selected to participate in the study, of which 249 respondents were involved with a 97% response rate.

Demographic Characteristics of the Respondents

Out of 249 case team heads participants, 97(39%) were females. The age of the respondents ranges from 18 - 60 years and a majority of the respondents (73.1%) fall in the 26 - 37 years age group. Most of the respondents, 221(88.8%) have working experience of 1-5 years and 28(11.2%) have working experience of more than 5 years. (Table 5.2).

Table 1: *Socio-demographic data for health management respondents (n=249) in Addis Ababa Health Facilities, Addis Ababa, Ethiopia, June 2022*

Variable		Frequency	Percent
Sex	Male	152	61
	Female	97	39
Age	18-25	11	4.4
	26-35	182	73.1
	36-60	56	22.5
Educational Status	Certificate	1	4
	Diploma	46	19.3
	Bachelor Degree	164	65.9
	Master's Degree	36	14.5
Field of Specialization	Health Officer	98	39.4
	Laboratory Technician	7	2.8
	Nurse	51	20.5
	General Practitioner	7	2.8
	Midwifery	35	14.1
	HIT	51	20.5
Experience	1-5 Years	221	88.8
	6-10 Years	28	11.2

Status of the Health Care Management on Training, Access and Utilization of DHIS2

Out of 249 study participants, 130 (52.2%) of the managements reported that they have taken training on how to utilize DHIS2 for data reporting, data analysis, planning and tracking in different ways where some taken the training more than once particularly HIT's but the other management have taken the training once. 138(55.4%) of the study participants have access to the password specific to their facility and 111(44.6%) of them don't access it by themselves where 106(42.6%) only use DHIS2 to do data analysis. And there was no management who uses the software to design and make plans, on the reverse all the participants whether they take training or not and not have access to password, they use DHIS2 only to get baseline data with which they can do their analysis and make plan in a tool other than DHIS2. (Table 5.3).

Table 2: Utilization of district health information by participants (N=249) , public health facilities of Addis Ababa, Ethiopia June 2023

Variable		Frequency	Percent
Have you taken training on DHIS2?	Yes	130	52.2
	No	119	47.8
Do you have access to DHIS2 password?	Yes	138	55.4
	No	111	44.6
Do you currently use DHIS2 for data analysis?	Yes	106	42.6
	No	143	57.4
Do you currently use DHIS2 to design/make plan?	Yes	0	0
	No	249	100
I currently use DHIS2 only as source of baseline data	Yes	249	100
	No	0	0

Behavioral Determinants of Behavioral Intention to Use DHIS2 for Data Analysis

Attitudinal Factors

Among 249 study participants, 208(83.6%) respondents were agreed or strongly agreed that they believe DHIS2 allowed them to accomplish and view more information. However, they all don't prefer to use DHIS2 for data analysis over other tools, its only 130(52.2%) of the respondents agreed and strongly agreed DHIS2 software is preferable. On the other hand, 151(60.6%) of the participants reported that using DHIS2 software for data analysis enabled them to accomplish their management task more quickly whereas only 118(47.2%) of the respondents reported that they feel comfortable using DHIS2 for data analysis because it is user friendly. And about 160(64.2%) of the respondents believe that using DHIS2 for data analysis helps them ease their decision making. (Table 5.4)

Table 3: Attitude distribution among the health managements of public health facilities of Addis Ababa, Ethiopia June 2023

Code	Variable	N	%	Mean	SD
AT1	Using DHIS2 allowed me to accomplish or view more information				
	Strongly Disagree	6	2.4		
	Disagree	35	14.1	3.21	0.77
	Agree	108	43.4		
	Strongly Agree	100	40.2		
AT2	I prefer to use DHIS2 than other tools for data analysis				
	Strongly Disagree	6	2.4		
	Disagree	113	45.4	2.56	0.64
	Agree	115	46.2		
	Strongly Agree	15	6		
AT3	Using DHIS2 for data analysis enabled me to accomplish my management task more quickly				
	Strongly Disagree	3	1.2		
	Disagree	95	38.2	2.71	0.68
	Agree	121	48.6		
	Strongly Agree	30	12		
AT4	I feel comfortable using DHIS 2 for data analysis because it is user friendly.				
	Strongly Disagree	7	2.8		
	Disagree	124	49.8	2.52	0.67
	Agree	100	40.2		
	Strongly Agree	18	7.2		
AT5	Using DHIS2 when analyzing data made my decision making easier to do				
	Strongly Disagree	2	8		
	Disagree	87	34.9	2.72	0.628
	Agree	138	55.4		
	Strongly Agree	22	8.8		

Generally, 154(61.84%) of the health care managements of the selected public health institutions shown to have positive attitude towards the utilization of DHIS2 software for data analysis.

Perceived Behavior Control

Among a total of 249 respondents, 103(41.4%) of them agreed or strongly agreed that they perceive they can manage to solve difficult problems if they tried hard enough while using DHIS2 for data analysis. Whereas 102(41%) of the respondents agreed to believe that their ability to use all the DHIS2 functions for data analysis grow with effort. And also, its only 85(34%) and 82(32.9%) of the respondents believe that they can change their basic level of ability in using DHIS2 for data analysis considerably and they would be able to use DHIS2 for data analysis even if there is no one around to show them how to use it; respectively. (Table 5.5)

Table 4: Perceived Behavior Control distribution among health managements of public health facilities of Addis Ababa, Ethiopia June 2023

Code	Variable	N	%	Mean	SD
PBC1	I can always manage to solve difficult problems if I try hard enough while using DHIS2 in data analysis				
	Strongly Disagree	10	4	2.40	0.62
	Disagree	136	54.6		
	Agree	96	38.6		
	Strongly Agree	7	2.8		
PBC2	My ability to use all the DHIS2 functions for data analysis grow with effort				
	Strongly Disagree	10	4	2.38	0.58
	Disagree	137	55		
	Agree	99	39.8		
	Strongly Agree	3	1.2		
PBC3	I can change my basic level of ability in DHIS2 data analysis considerably				
	Strongly Disagree	9	3.6	2.33	0.57
	Disagree	155	62.2		
	Agree	80	32.1		
	Strongly Agree	5	2		
PBC4	I would be able to use DHIS2 for data analysis even if there is no one around to show me how to use it.				
	Strongly Disagree	10	4	2.30	0.55
	Disagree	157	63.1		
	Agree	80	32.1		
	Strongly Agree	2	0.8		

Subjective Norm

Of total managements of respondents, 134(53.8%) of the respondents reported that most health care personnel's specially those who are at higher hierarchy to them don't think that they should use DHIS2 in analyzing data. About 123(49.4%) respondents reported that it's not expected of them to use DHIS2 for data analysis. Only 111(44.57%) feel under institutional pressure to use DHIS2 for data analysis. The managements at higher hierarchy than 136(54.6%) of respondents, their approval on practice of using DHIS2 in data analysis is not as such important to the respondents. (Table 5.6)

Table 5: Subjective Norm distribution among health managements of public health facilities of Addis Ababa, Ethiopia June 2023

Code	Variable	N	%	Mean	SD
SN1	Most health care personnel's specially those who are at higher hierarchy to me think that I should use DHIS2 in analyzing data				
	Strongly Disagree	5	2.0	2.57	0.73
	Disagree	129	51.8		
	Agree	84	33.7		
	Strongly Agree	31	12.4		
SN2	It is expected of me that I use DHIS2 for data analysis				
	Strongly Disagree	4	1.6	2.59	0.71
	Disagree	122	49		
	Agree	94	37.8		
	Strongly Agree	29	11.6		
SN3	I feel under institutional pressure to use DHIS2 for data analysis				
	Strongly Disagree	4	1.6	2.54	0.71
	Disagree	134	53.8		
	Agree	83	33.3		
	Strongly Agree	28	11.2		
SN4	Managements at higher hierarchy than me, their approval of my practice of using DHIS2 in data analysis is important to me				
	Strongly Disagree	4	1.6	2.56	0.72
	Disagree	133	53.4		
	Agree	81	32.5		
	Strongly Agree	31	12.4		

Behavioral Intention

The behavioral intention is our dependent variable which was also assessed and resulted as follows; (Table 5.7)

Table 6: Behavioral Intention distribution among health managements of public health facilities of Addis Ababa, Ethiopia June 2023

Code	Variable	N	%	Mean	SD
BI1	Most health care personnel's specially those who are at higher hierarchy to me think that I should use DHIS2 in analyzing data				
	Strongly Disagree	3	1.2		
	Disagree	112	45.0	2.71	0.77
	Agree	89	35.7		
	Strongly Agree	45	18.1		
BI2	It is expected of me that I use DHIS2 for data analysis				
	Strongly Disagree	3	1.2		
	Disagree	112	45.0	2.71	0.77
	Agree	89	35.7		
	Strongly Agree	45	18.1		
BI3	I feel under institutional pressure to use DHIS2 for data analysis				
	Strongly Disagree	3	1.2		
	Disagree	119	47.8	2.67	0.76
	Agree	85	34.1		
	Strongly Agree	42	16.9		

Bi-variable and Multiple variable regression analysis result on socio-demographics and behavioral factors with behavioral intention towards utilization of DHIS2 for data analysis

This study was conducted if the various socio-demographic and behavioral factors can influence the managements behavioral intention to utilize DHIS2 for data analysis. Linear regression analysis was used to test the hypothesis that Behavioral Intention of the health managements towards utilizing the software DHIS2 for data analysis is predicted by the various socio-demographic, technical and behavioral factors. Table 5.8. shows simple linear regression results on socio-demographic factors where sex, age, and year of experience revealed not to be statistically significant to the model ($p>0.05$). However, diploma holders, bachelor holders, master holders and those variables of working specialization like nurse, midwife and HIT to be statistically significant to the model ($p<0.05$). But yet these statistically significant predictors have $R^2 < 35\%$.

Table 7 Association between demographic variables and behavioral intention as predictor variable to utilize DHIS2 analysis, public health facilities of Addis Ababa, Ethiopia June 2023

Variables	**β**	**p-value**	**95% CI**	
			Lower	**Upper**
Sex				
Female	1	1		
Male	0.159	0.106	-0.034	0.351
Age				
18-25	1	1		
26-35	-0.207	0.055	-0.418	0.005
36-60	0.033	0.775	-0.193	.259
Education				
Certificate	1	1		
Diploma	0.998	0.000	0.793	1.202
Bachelor Degree	-0.934	0.000	-1.095	-0.773
Master's Degree	0.465	0.001	0.203	0.727
Experience Year				
1-5	1	1		
6-10	-0.233	0.124	-0.530	0.064
Specialization				
Health Officer	1	1		

Lab Technician	-0.372	0.199	-0.941	0.197
Nurse	-0.554	0.000	-0.776	-0.332
GP	0.142	0.650	-0.473	0.757
Midwifes	-0.753	0.000	-1.008	-0.498
HIT	1.066	0.000	0.874	1.258

Technical factors were also assessed and as the result shown in the table 5.9 both training and access are statistically significant($p<0.01$) where training explained 64.7% ($R^2=0.647, F(1,247)= 452.53$) the change in the level of behavioral intention and access explained 58.2% ($R^2 =0.582, F(1,247)=344.06$).

Table 8: Association between technical variables and behavioral intention to utilize DHIS2 for data analysis, public health facilities of Addis Ababa, Ethiopia June 2023

Variables	**β**	**p-value**	**95% CI**	
			Lower	**Upper**
Received Training				
No	1	1		
Yes	1.213	0.000	1.100	1.325
Access DHIS2				
No	1	1		
Yes	1.156	0.000	1.033	1.279

The means of the behavioral variables measured in four Likert scale were entered into the regression equation as predictor variables, and then level of intention again measured in four Likert scale and its mean was entered into the regression equation as the outcome variable. As table 5.10 shows all the three predictor variables are statistically significant ($p<0.01$) where attitude explained 68.5% of the variance in the level of behavioral intention ($R^2 =0.685, F(1,247)=536.47$), perceived behavioral control explained 56.5% ($R^2 =0.565, F(1,247)=321.11$) and subjective norm explained 77% ($R^2 =0.770, F(1,247)=825.64$)

Table 9: Association between determinant behaviors and behavioral intention to utilize DHIS2 for data analysis, public health facilities of Addis Ababa, Ethiopia June 2023

Variables	β	p-value	95% CI	
			Lower	Upper
Attitude	1.079	0.000	0.987	1.171
Perceived Behavioral Control	1.060	0.000	0.944	1.177
Subjective Norm	0.957	0.000	0.891	1.022

Multiple variable regression was run to evaluate the prediction of behavioral intention from training, access, attitude, perceived behavioral control and subjective norm. The results of the multiple linear regression analysis revealed that the combination of the above mentioned predictor variables explained 84.8% of the variance in level of behavioral intention, $R^2 = 0.848, F(5,243) = 272.16, p<0.001$.

The multiple linear regression analysis revealed attitude, subjective norm, training and access were statistically significant predictors; attitude (B=0.17, t(248)=2.60, p<0.05), subjective norm (B=0.55, t(248)=10.59, p<0.01), training (B=0.37, t(248)=5.30, p<0.01) and Access (B=0.14, t(248)=2.13, p<0.05). This means with each increment of level of attitude on the scale, the level of behavioral intention increases by 0.17, with each increment in the level of subjective norm on the scale, the level of behavioral intention increases by 0.55, with each increment of provision of training, the level of behavioral intention increases by 0.37 and with each increment of those accessing the software username/password, the level of behavioral intention increases by 0.14. However, the test revealed that perceived behavioral control not to be statistically significant predictor (B=0.04, t(248)=0.66, p>0.05). This means change in the level of perceived behavioral control like self-efficacy will not significantly predict the level of behavioral intention.

Table 10: Multiple regression result on variables predicting level of intention, public health facilities of Addis Ababa, Ethiopia June 2023

Variables	B	β	p-value	95% CI	
				Lower	Upper
Attitude	0.172	0.132	0.010	0.042	0.302
Perceived Behavioral Control	0.040	0.028	0.508	-0.078	0.157
Subjective Norm	0.554	0.508	0.000	0.451	0.657
Training	0.376	0.249	0.000	0.236	0.515
Access	0.143	0.094	0.034	0.011	0.275

Chapter VI

Discussion

This study examined health care managements' behavioral intention to use DHIS2 for data analysis in public health facilities of Addis Ababa using the Theory of Planned Behavior (TPB). The discussion interprets the key findings in relation to socio-demographic characteristics and TPB constructs (attitude, subjective norm, and perceived behavioral control), and situates the results within existing literature and the Ethiopian DHIS2 implementation context.

Socio-demographic Characteristics and Behavioral Intention

The study found that most socio-demographic variables, including sex, age, and years of experience, were not statistically significant predictors of behavioral intention to use DHIS2 for data analysis. This suggests that intention to use DHIS2 is less influenced by inherent personal characteristics and more by contextual, organizational, and behavioral factors, a finding consistent with studies on DHIS2 and other health information systems in low- and middle-income countries (LMICs) which report minimal effects of age and sex once organizational and system-related factors are considered(27,28,35). Similar findings have been reported in studies on health information system adoption, where demographic variables often show limited explanatory power compared to system-related and psychosocial determinants.

However, educational status and professional specialization showed statistically significant associations with behavioral intention. Diploma and master's degree holders demonstrated higher behavioral intention compared to certificate holders, while bachelor's degree holders showed a negative association. This mixed pattern may reflect differences in role expectations, exposure to DHIS2 tasks, and practical engagement with routine data analysis across cadres. Health Information Technicians (HITs) showed a strong positive association with behavioral intention, which is expected given their technical role and frequent interaction with DHIS2. In contrast, nurses and midwives demonstrated lower intention, possibly due to heavier clinical workloads and limited institutional emphasis on analytical use of DHIS2 for these cadres. These findings highlight the importance of role-specific responsibilities in shaping intention to use health information systems, similar to findings from Ethiopia and other African settings where health information

technicians and data-focused cadres consistently demonstrate higher system use compared to primarily clinical staff (26,27).

Attitude toward Using DHIS2 for Data Analysis

Overall, a majority of respondents demonstrated a positive attitude toward using DHIS2 for data analysis. Many believed that DHIS2 helps them access more information, perform tasks more quickly, and supports decision-making. Despite this generally favorable perception, preference for DHIS2 over other analytical tools was relatively low, and less than half of the respondents felt comfortable using DHIS2 due to perceived user-friendliness issues.

Attitude was a significant predictor of behavioral intention in both bivariate and multivariable analyses, which is consistent with the Theory of Planned Behavior(32) and with prior empirical studies examining DHIS2, electronic medical records, and other digital health systems in LMIC settings(27,36). This finding implies that positive beliefs about the usefulness of DHIS2 can translate into stronger intention to use the system. However, the observed discomfort with system usability suggests that improving interface design, customization, and user support could further strengthen positive attitudes and promote sustained use.

Perceived Behavioral Control

Perceived behavioral control (PBC) was generally low among respondents. Many did not believe they could independently use DHIS2 for data analysis or solve problems without external support. Although PBC was statistically significant in bivariate analysis, it did not remain a significant predictor in the multivariable regression model.

This finding may indicate that, within this context, individual self-efficacy alone is insufficient to drive intention when organizational and social factors play a stronger role. Similar observations have been reported in studies where perceived behavioral control lost significance after adjusting for institutional support, leadership engagement, and system mandates (35). Limited hands-on practice, infrequent analytical use, and reliance on specific technical staff may undermine confidence in independent system use. It also suggests that structural barriers, such as limited

decision-making autonomy or lack of institutional encouragement, may overshadow individual control perceptions.

Subjective Norm and Organizational Influence

Subjective norm emerged as the strongest predictor of behavioral intention in both simple and multiple regression analyses, consistent with TPB-based studies conducted in hierarchical health systems where managerial expectation and peer influence strongly shape technology use behavior (27,28,32). Many respondents reported low expectations and limited pressure from higher-level management to use DHIS2 for data analysis. Nevertheless, when perceived, social and institutional expectations strongly influenced intention.

This finding highlights the decisive role of leadership, organizational culture, and institutional mandates in shaping DHIS2 use. In hierarchical health systems such as Ethiopia's public sector, directives and expectations from supervisors and higher authorities are particularly influential. The strong effect of subjective norm suggests that improving managerial support, setting clear expectations for analytical DHIS2 use, and linking DHIS2 outputs to performance review and planning processes could substantially increase intention and actual utilization.

Integrated Model and Implications

The combined model explained a very high proportion of variance in behavioral intention, indicating that training, access, attitude, and subjective norm together provide a robust explanation of intention to use DHIS2 for data analysis. The non-significance of perceived behavioral control in the final model further emphasizes that intention is primarily driven by organizational and normative factors rather than individual confidence alone.

The complete absence of DHIS2 use for planning, despite widespread recognition of its analytical value, signals a systemic issue. Similar gaps between data availability and data use for planning have been widely documented in Ethiopia and other LMICs, where DHIS2 is predominantly used for reporting upward rather than for local decision-making (26,35). It suggests that DHIS2 is still perceived mainly as a reporting tool rather than a decision-support system. Addressing this gap requires not only technical interventions but also policy-level actions to institutionalize data use

culture, align DHIS2 indicators with planning cycles, and empower managers to use DHIS2 outputs in routine decision-making.

Chapter VII

Strength and Limitation of the Study

Strength

Despite the identified methodological and analytical limitations, this study has several important strengths that contribute to the existing body of knowledge and provide a foundation for future research.

First, the study addresses a contextually relevant and under-researched problem, particularly within public health facilities in Addis Ababa. Limited empirical evidence exists on behavioral and organizational factors influencing the use of routine health information systems for data analysis and planning in this setting. By focusing on this gap, the study contributes context-specific insights that are valuable for policymakers, health managers, and researchers.

Second, the study applied a theory-driven approach by drawing on the Theory of Planned Behavior (TPB) to guide the identification of key constructs related to intention and system use. Even though not all TPB components were fully operationalized, the use of an established theoretical framework enhances the conceptual grounding of the research and supports comparability with similar studies conducted in other low- and middle-income countries.

Third, the study employed a structured and standardized data collection instrument, which allowed for systematic data capture across multiple facilities. This improved internal consistency and facilitated descriptive analysis of key variables related to system use, perceptions, and organizational context.

Finally, the study provides baseline empirical evidence on the current state of system use and perceived barriers. Although causal inference was not established, the findings offer an initial diagnostic overview that can inform more robust future studies and programmatic assessments.

Limitation

One major limitation of the study relates to face and construct validity. The research problem, while relevant, was not fully addressed through comprehensive operationalization of theoretical constructs. Specifically, the study did not include a formal elicitation study, which is a critical preliminary step in Theory of Planned Behavior–based research. As a result, some measurement items may not fully reflect the salient beliefs, normative pressures, and control factors specific to the study population.

In addition, the study primarily focused on direct measures of constructs such as attitude, subjective norm, and perceived behavioral control, while indirect belief-based measures were not assessed. This limits the depth of behavioral explanation and weakens the theoretical rigor of the model application.

Furthermore, the cross-sectional nature of the study restricts the ability to assess temporal relationships or changes in behavior over time. The reliance on self-reported data may have introduced social desirability and recall bias, potentially affecting the accuracy of responses.

From an analytical perspective, the study was limited by the lack of inferential and relational analysis. Correlation and regression analyses that could have examined relationships among TPB constructs and intention or behavior were not fully explored. Consequently, the study could not establish the strength or direction of associations between variables.

Moreover, because indirect belief measures were not included, it was not possible to identify specific underlying beliefs that could inform targeted behavioral interventions. As a result, the findings are primarily descriptive and diagnostic rather than explanatory or predictive.

Chapter VIII

Conclusion

In conclusion, this study demonstrates that behavioral intention to use DHIS2 for data analysis among health care managements in Addis Ababa is strongly influenced by training, access, positive attitudes, and especially subjective norms. These findings are in line with prior TPB- and technology-acceptance-based studies on DHIS2 and digital health tools in Ethiopia and comparable settings(28,37,38). Socio-demographic factors play a limited role, while perceived behavioral control alone is insufficient to predict intention. Strengthening leadership commitment, enhancing practical and role-specific training, improving system usability, and embedding DHIS2 into formal planning and accountability mechanisms are critical to translating intention into consistent and meaningful use.

Chapter XI

Recommendations

Due to the absence of indirect measurements and causal modeling, the evidence generated by this study is insufficient for direct intervention design. While the findings highlight general barriers and facilitators, they do not specify which beliefs or control factors should be prioritized for behavior change strategies. Therefore, the results should be interpreted as exploratory and foundational rather than prescriptive.

To address these limitations, future studies should incorporate a mixed-methods approach, beginning with a qualitative elicitation study to identify salient behavioral beliefs. Subsequent quantitative studies should include both direct and indirect TPB measures and apply advanced analytical techniques such as correlation, regression, or structural equation modeling.

Longitudinal or experimental designs would further strengthen causal inference and support the development and evaluation of evidence-based interventions aimed at improving health information system use.

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Annex 01: Reliability Test Results

1. Attitude determinant variables

Inter-Item Correlation Matrix					
	AT1	AT2	AT3	AT4	AT5
AT1	1.000	0.594	0.610	0.564	0.588
AT2	0.594	1.000	0.725	0.743	0.651
AT3	0.610	0.725	1.000	0.706	0.751
AT4	0.564	0.743	0.706	1.000	0.637
AT5	0.588	0.651	0.751	0.637	1.000

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.902	0.905	5

2. Perceived behavioral control determinant variables

Inter-Item Correlation Matrix				
	PBC1	PBC2	PBC3	PBC4
PBC1	1.000	0.850	0.755	0.773
PBC2	0.850	1.000	0.754	0.770
PBC3	0.755	0.754	1.000	0.844
PBC4	0.773	0.770	0.844	1.000

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.938	0.938	4

3. Subjective norm determinant variables

Inter-Item Correlation Matrix				
	SN1	SN2	SN3	SN4
SN1	1.000	0.874	0.870	0.887
SN2	0.874	1.000	0.903	0.897
SN3	0.870	0.903	1.000	0.930
SN4	0.887	0.897	0.930	1.000

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
0.971	0.971	4

Annex 02: Respondents Questionnaire?

The purpose of these questionnaires is to collect or assess data on the utilization, attitude, perceived behavioral control and subjective norm of health managements in public health facilities in Addis Ababa City Administration about DHIS 2.

- It will take approximately 10-15 minutes to complete the self-administeringquestionnaire.
- 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

No.	Respondent No._____	Response/ Answer
1.	Name of the institution you are working in	
2.	Your Position /occupation in the institution	
3.	Sex	Male Female
4.	Age in years	
5.	Your educational status	Certificates Diploma Bachelor of Degree Master's Degree Ph.D. Others.....
6.	What is your field of specialization	Health Officer Laboratory Technician Environmental Health Technician Pharmacist Nurse Pharmacy Technician General Practitioner Midwifery 10) Other ……..
7.	How long have you been employed in your current position?	
8.	Have you taken training on DHIS2?	Yes No
9.	Do you have access to DHIS2 password?	Yes No
10.	Do you currently use DHIS2 for data analysis?	Yes No
11.	Do you currently use DHIS2 to design/make plan?	Yes No
12.	I currently use DHIS2 only as source of baseline data	Yes No

No.	Questions	Responses			
		SD	D	A	SA
Section B: Attitude towards utilization of DHIS2					
13	Using DHIS2 for data analysis allowed me to accomplish or view more information				
14	I prefer to use DHIS2 than other tools for data analysis and planning				
15	Using DHIS2 for data analysis and planning enabled me to accomplish my management task more quickly				
16	I feel comfortable using DHIS 2 for data analysis and planning because it is user friendly.				
17	Using DHIS2 when analyzing data made my decision making easier to do				
Section C: Perceived Behavioral Control Questions					
18	I can always manage to solve difficult problems if I try hard enough while using DHIS2 in data analysis				
19	My ability to use all the DHIS2 functions for data analysis grow with effort				
20	I can change my basic level of ability in DHIS2 data analysis considerably				
21	I would be able to use DHIS2 for data analysis even if there is no one around to show me how to use it				
Section D: Subjective Norm Questions					
22	Most health care personnel's specially those who are at higher hierarchy to me think that I should use DHIS2 in analyzing data and planning				
23	It is expected of me that I use DHIS2 for data analysis and planning				
24	I feel under institutional pressure to use DHIS2 for data analysis and planning				
25	Managements at higher hierarchy than me, their approval of my practice of DHIS2 in data analysis and planning is important to me				
Section E: Behavioral Intention Question					
26	I intend to use DHIS2 for data analysis and planning				
27	I will use DHIS2 for data analysis and planning				
28	How likely are you to use DHIS 2 for data analysis and planning				

ANNEX 03: Participants Information Sheet

Behavioral Intention and Determinants Towards DHIS2 Use for Data Analysis and Planning Among Health Management in Public Health Facilities in Addis Ababa City Administration, Ethiopia

I would like to invite you to take part in a research study. Before you decide you need to understand why the research is being done and what it would involve for you. Please take time to read the following information carefully. Ask questions if anything you read is not clear or if you would like more information. Take time to decide whether or not to take part.

WHO I AM AND WHAT THIS STUDY IS ABOUT

My name is Selam Woldu, I'm Masters of Public Health graduating class student at the School of Public Health, Addis Ababa University. I am conducting this study for my thesis in partial fulfillment for the degree of Masters of Public Health in General specialty.

This study will assess the behavioral intention, attitude and determinant factors on the utilization of DHIS2 for data analysis and planning. As literatures show that there is limitation in using DHIS2 apart from data reporting specially for data analysis and planning, this study will try to assess behavioral factors among the three major factors (i.e. organizational factor, technical factor and behavioral factor).

WHAT WILL TAKING PART INVOLVE?

If your consent is received you will be required to fill out a questionnaire which includes topics on socio demographic aspect (age, sex, educational level, working position etc.), attitude, perceived behavioral control, subjective norm and behavioral intention towards DHIS 2 use in data analysis and planning.

The filling of questionnaire will be done in your working premise and it will take 10-15 minutes.

WHY HAVE YOU BEEN INVITED TO TAKE PART?

This study is done on public health facilities under the Addis Ababa City Administration which includes Health Centers, Hospitals and Sub-City Health Bureau. It is facility based cross sectional

study but study participants are only those who are in management level because they are the one who have access to the DHIS2 account of the health facility and they are the one whom are expected to do analysis and planning. Therefore, it is due to this methodology you are picked as study participant.

WHAT ARE THE POSSIBLE RISKS AND BENEFITS OF TAKING PART?

The research aims not only finding the baseline behavioral factors affecting the utilization of DHIS2 for data analysis and planning but also to give direction to the Addis Ababa Health Bureau, FMoH and program developers on where and how to find solution. Besides this is study will in no condition result in any harm to you.

WILL TAKING PART BE CONFIDENTIAL?

In this study your confidentiality and anonymity is ensured. This can be assured by your name and work place will not be stated in the questionnaire. And raw data or the questionnaire will not be disclosed or shared to another person.

WHAT WILL HAPPEN TO THE RESULTS OF THE STUDY?

The result of an assessment will be disseminated to 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, DDCF project management and AARHB will be provided with both softcopy & hard copy of the report.

WHO SHOULD YOU CONTACT FOR FURTHER INFORMATION?

Researcher Name: Selam WolduMobile Phone: +251944297695 Email: selinazwolu@gmail.com

THANK YOU!