HAWASSA UNIVERSITY COLLEGE OF MEDICINE AND HEALTH SCIENCE, SCHOOL OF PUBLIC HEALTH

UTILIZATION LEVEL OF ELECTRONIC COMMUNITY HEALTH INFORMATION SYSTEM AND ASSOCIATED FACTORS AMONG HEALTH EXTENSION WORKERS IN SIDAMA REGION, ETHIOPIA

BY: KIDEST FEKADU (BSc.)

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HAWASSA, ETHIOPIA

UTILIZATION LEVEL OF ELECTRONIC COMMUNITY HEALTH INFORMATION SYSTEM (eCHIS) AND ASSOCIATED FACTORS AMONG HEALTH EXTENSION WORKERS IN SIDAMA REGION, ETHIOPIA 2023.

A RESEARCH THESIS TO BE SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCES, SCHOOL OF GRADUATE STUDIES, HAWASSA UNIVERSITY IN PARTIAL FULFILLMENT OF MPH DEGREE IN REPRODUCTIVE HEALTH

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DECLARATION

I hereby declare that this thesis is my original work and has not been presented for a degree in any other university, and all sources of material used for this thesis have been duly acknowledged.

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ADVISORS' APPROVAL SHEET

This is to certify that the thesis entitled "Utilization of Electronic Community Health Information System and Associated Factors Among Health Extension Workers in Sidama Region, Ethiopia" Submitted in partial fulfillment of the requirements for the degree of Masters with specialization in Reproductive Health, the Graduate Program of the School of Public Health, and has been carried out by Kidest Fekadu, under our supervision. Therefore, we recommend that the student has fulfilled the requirements and hence hereby can submit the thesis to the department.

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EXAMINERS' APPROVAL SHEET

We, the undersigned, members of the Board of Examiners of the final open defense by Kidest Fekadu have read and evaluated her thesis entitled "Utilization of Electronic Community Health Information System and Associated Factors Among Health Extension Workers in Sidama Region, Ethiopia" and examined the candidate. This is, therefore, to certify that the thesis has been accepted in partial fulfillment of the requirements for the degree.

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Final approval and acceptance of the thesis is contingent upon the submission of the final copy of the thesis to the School of Graduate Studies (SGS) through the School Graduate Committee (SGC) of the candidate's department.

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Table of Contents

List of Tables

List of Figures

ACRONYMS AND ABBREVIATIONS

ANC	Antenatal Care
AOR	Adjusted Odds Ratio
CHIS	Community Health Information System
CI	Confidence Interval
CHWs	Community health workers
DHIS	District Health Information System (DHIS)
DHILC	Digital Health Innovation and Learning Center
DUP	Data Use Partnership
eCHIS	Electronic Community Health Information System
EHIR	Electronic health information resource
EMR	Electronic medical record
HEP	Health Extension Program
HEW	Health Extension Workers
HSDP	Health Sector Development Program
HH	House hold level
HIS	Health Information System
HMIS	Health management information system
HP	Health Post
HSTP	Health Sector Transformation Plan
ICT	Information Communication Technology
IRB	Institutional review board
LMICs	low- and middle-income countries
MOH	Ministry of Health
Ps	principal investigators
RMNCH	Reproductive, Maternal, Newborn, and Child Health
UHC	Universal Health Coverage
VIF	Variance inflation factor

ABSTRACT

Background: Effective community health management information systems are important in low-resource countries that rely heavily on community-based health care providers. However, there is no evidence of the level of utilization of electronic community health information systems. The aim of this study is to assess the utilization of electronic community health information systems and associated factors among health extension workers in the Sidama region of Ethiopia in 2023.

Methods: Concurrent mixed methods design was used: Quantitative cross-sectional studies and qualitative phenomenology designs among 402 health extension workers and 8 participants for qualitative study from April to June 2023. Multi-stage sampling techniques have been used. Data were extracted by interview methods using the Kobo toolbox and then exported to SPSS version 25 for analysis. Variables having P<0.25 in bivariate analysis were fitted for multivariable regression. Whereas, an explorative qualitative study was employed, involving key informant interviews and in-depth interviews with a purposefully chosen interviewee, and the data was analyzed using Atlas software.

Result: The study revealed the overall utilization level of the community health information system in Sidama was 40.3% (95% CI: 35.5%, 45.3%). Supportive supervision from primary health care units (AOR = 0.46, 95% CI = 0.28, 0.55), supportive supervision from Woreda Health Office (AOR = 0.51, 95% CI = 0.29, 0.91), connectivity (AOR = 0.55, 95% CI = 0.32, 0.94), receiving electronic community health information system guidelines (AOR = 0.45, 95% CI = 0.27, 0.75), and perceived competency **(**AOR **=** 0.54, 95% CI = 0.34, 0.86) were significant factors. The budget constraint, infrastructure, follow-up problem, technological problems, lack of commitment, and role confusion were challenges for the utilization of the system.

Conclusion and Recommendation: More than half of the health extension workers had no electronic health information system utilization . Supervision from primary health care units , Supervision fromworeda health offices, connectivity, guidelines and perceived competency were responsible for the result. Therefore, Improving, boosting internet connectivity, supportive follow-up, training access for their competency and fulfilling the guidelines are important to scale up the utilization. This finding is supported by qualitative study.

Keywords: Utilization, Factors, Challenges, Solution, eCHIS**,** Sidaama, Ethiopia

1. INTRODUCTION

1.1. Background

The electronic community health information (eCHIS) is a digital adaptation of the paper-based Community Health Information System (CHIS), which served as one of the corner stones of Ethiopia's highly effective health extension program (4, 5). It is a top-priority Information Revolution effort that shows the Ministry of Health (MOH's) aspirations to use data and technology even more to enhance the delivery of health services, starting at the local level (6, 7). Previously Health Extension Workers (HEWs) were using manual (paper-based) CHIS that were created to allow HEWs to record, monitor, and report data at the health post and community levels. HEWs use the system to identify pregnant women and children who need services, and they follow people's health using a family folder and the tickler file system to identify defaulters (8).

Global Organizations promote the use of Information Communication Technology (ICTs) to speed up progress on priorities like the Sustainable Development Goals, the roadmap for Measurement and Accountability, and the Global Strategy for Women's, Children's, and Adolescent Health. Particularly, the switch to digital systems from paper-based ones for managing service delivery and regular health information systems has garnered significant investment (9, 10). Making reports from paper-based data is not only labor-intensive and prone to error, but it also runs the danger of spreading these issues to various administrative levels and reducing the availability of real-time, data-driven decision-making (11, 12).

Currently the Federal MOH have planned to digitalize the Health Extension Program (HEP) and HEWs will use the mobile platform and the associated mobile clinical referral application to promote access to and utilization of data about community service delivery, assisting them in their duties and providing decision-makers with pertinent, high-quality data for improving the health system. The mobile platform and associated clinical, reporting, and system management tools are anticipated to facilitate use of and access to data about the provision of community services within the Health Extension Program, supporting HEW duties and providing decision-makers with pertinent, high-quality data to advance the Ethiopian health system (7).

The capture, storage, transmission, and retrieval of health data are made easier by the digitization of CHIS. Particularly in community settings with limited resources, eCHIS is a practical solution to save lives and enhance care (13). Community Health Workers (CHWs) improve the relevance, acceptability, and accessibility of health care in low resource contexts by bridging the gap between formal health systems and local populations. Many tasks are carried out by CHWs, including home visits, disease assessment and treatment, health education and counseling, referrals for additional care and treatment to higher-level medical facilities, data gathering and reporting, and home visits (14).

Ethiopia has been implementing a number of steps to strengthen the national Health Information System (HIS), like the 2017 modification of the national Health Management Information System (HMIS), which was made possible by the development of the roadmap for the information revolution, which served to direct the implementation of the information revolution. For instance, the Capacity Building and Mentorship Partnership Program was established by the MOH in collaboration with institutions of higher learning (15, 16). Particularly, eCHIS implementation commenced in September 2018. The manual family folder was digitalized using eCHIS, a mobile application that operates both online and offline. It helps HEWs track patient status and makes it easier for them to share household and personal information with other personnel (17). Currently, more than 4,000 rural health posts across six agrarian regions (Tigray, Amhara, Oromia, Sidama, Benishangul Gumuz, and SNNPR) use the eCHIS (6, 7).

In order to scale up, the eCHIS needs to be continuously monitored, learned from, and adjusted. Additionally, guaranteeing HEW adoption and use of eCHIS in their routine jobs is essential for its expansion. Although studies show that CHWs embrace digital health systems well, their implementation is very limited, and they prefer to use paper forms (18). Despite the numerous advantages of digitizing the health information system, there are numerous obstacles to deployment that prevent health workers from using the program to its full potential (19).

1.2. Statement of Problem

In underdeveloped nations, there is a lack of an efficient information system for health. According to a research done in South Africa, information was occasionally utilized to inform clinic health education sessions and as a gauge of staff workload which demonstrates a reporting culture rather than an information use culture (20).

According to a study conducted in western Kenya, health personnel faced difficulties (including a lack of understanding regarding data processing and interpretation) that were highlighted as obstacles to effective information use. A lack of timely information utilization may have resulted in haphazard planning and health interventions that had nothing to do with the needs of the household's health. Poor information utilization and information-seeking habits were displayed (21).

In Ethiopia, it is still difficult and not satisfactory to use information locally. Poor data utilization at the lower administrative level or peripheral levels of the woreda, and health facilities, remains an issue, according to the Ethiopian Ministry of Health's 2019 annual report (22). In addition, health extension worker using the family folders that is bulky and vulnerable to damage from rain when carried from house to house. Therefore, HEWs ended up recording in registers instead and transferring the data to the family folders later on which predisposed the system to error and poor data quality (23). Ethiopia's health information system faces difficulties due to poor data quality (24).

Low staff commitment, inadequate support, poor data analytics skills, restricted adoption of e-Health apps, and bad Health Information System (HIS) infrastructure, all of which have led to poor data quality and low information consumption, are just a few examples of the factors that lead to poor HIS infrastructure (25, 26). WHO lists the following reasons for poor digital health information utilization Lack of unified health care policy and governance models to support digital health information initiatives, inability to consistently measure clinical effectiveness, conflicting healthcare priorities, unmaintained operating costs, lack of understanding of the potential applications of District Health Information System DHIs and public health outcomes, absence of Information Technology (IT) infrastructure to support DHI programs, literacy, privacy concerns, and cultural issues (27, 28).

To assist the health management information system and modernize the healthcare system, the Ethiopian government is training health informatics specialists (32). The goal of the strategy is to

advance and encourage the use of digital techniques and tools for gathering, analyzing, presenting, and disseminating information on the health system. Ethiopia has started implementing eCHIS gradually. eCHIS was used to digitize the manual family folder. The eCHIS is mostly an offline mobile application made specifically for HEWs. To enable digital referral linkage and synchronize data with a backend server, however, connectivity is necessary (17). Despite early attempts to create a set of strategic goals, the overall programming aims of eCHIS remain unclear, and no measuring methods or indicators have been developed (7).

The system cannot be expanded until HEW accepts it and incorporates it into their daily operations. In a thorough analysis of CHWs' use of digital health, it was discovered that when they converted from paper-based forms to digital devices, their initial reactions were positive. But in reality, CHWs kept using and favoring paper forms. Resistance to the move was cited for a number of reasons, including the obligation to use paper-based forms simultaneously, a lack of device expertise, and a lack of application interface flexibility (18). There has been no study done on electronic health information systems, so it is difficult to know the current status of implementation. Therefore, the study aims to assess the level of utilization and associated factors of electronic community health information system in the Sidama region of Ethiopia.

1.3. Significance of the Study

The manual (paper-based) community health information system (CHIS) was designed for HEWs to capture, track, and report data at the health post and community levels. The health system has recently produced a number of revolutionary technologies; their quick uptake and acceptability may not be entirely guaranteed. The perception and willingness to use those technologies are more likely to be influenced by several contexts, including the sociocultural and economic environment as well as the nation's health care system and legislation. The availability of alternative options and prior experience with using such technology may also have an impact on acceptability.

eCHIS is one of the digital health systems that have been implemented in Ethiopia since September 2018. Sidama is one of the eCHIS-implementing regions, limited study has been conducted. Therefore, the findings of this study could be relevant input in addressing problems related to eCHIS utilization in the Sidama regional state. Secondly, it is believed that the study can help the government and other implementing partners understand factors hindering the utilization of electronic community health information systems. Furthermore, the findings of this study can be used as an additional source of evidence for researchers working on eCHIS.

2. LITERATURE REVIEWS

2.1. DEFINITION OF HEALTH INFORMATION SYSTEM

Health information system (HIS) is design to collect, process, use, and disseminate health-related data in order to improve healthcare outcomes (33). HIS is one of the fundamental components of a particular health system that aims to generate reliable health data to support managerial and clinical decision-making (34).

Information is a tool for better decision-making in the formulation of policies and in the management, monitoring, and evaluation of health services, including patient care. It improve overall health service performance and outcomes (35).

2.2. Evolution of Health Information System in Ethiopia

The Ethiopian government and its development partners' major priority now is to use health information systems to make evidence-based decisions. Ethiopia has a strong commitment to improving the national health information system (HIS) through HMIS and performance monitoring and evaluation (M&E). As a result, the policy has recognized the Health Management Information System (HMIS) as a crucial element for the strategic plan of the Health Sector Development Program (HSDP) to be implemented successfully. The Ministry of Health has developed capacity for health data with the installation of HMIS in 2008 and established standardized and integrated data collection and reporting formats. Additionally, it has been recognized that information use and the deployment of appropriate technology are essential components of a strengthened and improved health sector management information system (HMIS) (36).

Since 2008, the Ethiopian Health Management Information System has been in operation, capturing and providing key metrics that can be utilized to enhance the delivery of healthcare services and, ultimately, the population's health (37). The Health Sector Transformation Plan (HSTP), a five-year strategy plan from 2020/21 to 2024/25, is now being implemented by the Federal Ministry of Health. One of the five transformation agendas of HSTP is the Information Revolution, which aims to improve the availability, usability, quality, and use of health

information for decision-making processes through the appropriate application of ICTs (30). This will have a positive effect on the equity, quality, and accessibility of healthcare delivery at all levels (38).

The MOH hosted an eHealth workshop in 2011 to start creating suitable health informatics standards. The efforts made included, among others, revising key performance monitoring indicators, standardizing data recording and reporting tools, conducting capacity-building training, implementing electronic medical records (eMR), introducing the District Health Information System (DHIS), and implementing SMART care at the level of health facilities (39). eCHIS implementation in Ethiopia started in September 2018. The offline and internet mobile application eCHIS was used to digitize the manual family folder. It makes it simpler for HEWs to share household and personal information with other professionals and aids in tracking patient status (6).

2.3. Electronic Health Information System

The advent of technology has made the potential and financial advantages of health care management clear. Globally, it has been demonstrated that IT systems, such as electronic health information systems (EHIS), are a useful tool for enhancing disease diagnosis and treatment at the point of care (40). The primary goals of IT use in the healthcare industry include expanding geographic access to healthcare, improving patient-provider communication, improving illness diagnosis and treatment, improving data quality management, and preventing fraud and abuse of patient confidentiality(41).

2.4. Utilization level of Electronic Health Information System

The system's ability to scale up depends on HEW adoption and use of eCHIS in their everyday job. When transferring from paper-based forms to digital devices, CHWs first responded favorably, according to a systematic assessment of the usage of digital health among CHWs. However, in actuality, CHWs continued to use and preferred paper forms. Lack of experience with the device, the requirement to simultaneously use paper-based forms, and the application interface's restricted flexibility were a few of the reasons cited for the resistance to the move. Another study found that CHWs found eCHIS to be very acceptable, feasible, and usable (18). However, despite the availability of the existing options, nothing was actually used (42).

In a 2015 survey conducted in Jeddah, Saudi Arabia, the EMR components that were most frequently used were gathering and analyzing lab results and writing patient discharge instructions (86.5%), with no additional tools for team communication being used (43).

A national study of the District Health Information System shows that despite almost complete acceptance of eCHIS among HEWs, only 50% of HEWs use eCHIS regularly or always in their daily jobs. This finding shows that there is a significant difference between HEWs' intention to use and actual use of eCHIS (44).

2.4.1. **Utilization of electronic community health information system**

It is crucial to effectively analyze, interpret, and use data to make use of information at all levels of the health care system. The main issues, however, continue to be poor data quality (incompleteness and incorrectness), and limited utilization (45, 46). Findings from Africa show that regular use of health information is still low (26, 47). 59% in Uganda 42% in Tanzania (48). 58% in Liberia, and 65% of the health workers in South Africa (20). According to a Rwandan study, 80% of EHIRs are used to support clinical decision-making, and 92% of respondents thought accessing recent Internet-based information would help them provide their patients with better clinical care. Regarding frequently searched information, 34.8% looked for information on clinical procedures, and 24.8% looked for information on medicinal prescriptions (49).

According to various studies conducted across Ethiopia, between 22.5 and 69% of routine health information was used (25, 50-52). Cross-sectional studies conducted on electronic health information resource utilization and its associated factors among health professionals in Amhara Regional State Teaching Hospital show that 70.8% of study participants use electronic health information resources (53). According to a survey carried out in western Oromia, about 42% of medical professionals used EHIRs, 57.9% did so to obtain the most recent health information, and 11.2% did so for research (54).

2.5. Factors Associated with Utilization level of Electronic Health Information System

Factors that hinder the proper use of information technology and the interchange of electronic patient records include poor training. However, this is dependent on the training organization and institution.(55). Incentives for users to use electronic health information exchange more frequently have been the subject of several studies (56). An institution-based cross-sectional study conducted in Gonder shows that 67.5% of study participants reported having difficulty using EHIRs. The most common issue was a slow Internet connection (42.9%), followed by retrieving too much data (14.9%) and having trouble finding information (9.7%) (53). There are different factors associated with electronic health information system utilization.

2.5.1. Technical factors

Infrastructure

There is evidence that ICT goods and services are expensive and in short supply in Africa. Similar issues exist throughout nations when using ICT to improve health information systems: Out of the 46 nations in Africa, South Africa accounts for about 90% of all Internet hosts, followed distantly by Egypt (3%), Botswana (1%), and Tanzania. Other countries share only 2% of Internet hosts (57).

Infrastructure associated with information technology (IT), which by definition includes hardware, software, and networks. For the eCHIS implementation to operate at its best, IT infrastructure must be accessible and functional. The majority of HEWs indicated that infrastructure issues such faulty tablets, SIM cards, connectivity, servers, and power supplies hindered their use of eCHIS (44). Each of the Health Posts (HPs) considered in the study has a different level of IT infrastructure accessibility. Most HEWs identified many infrastructure issues. The majority of HEWs noted that inconsistent airtime replenishing interfered with their ability to send and receive referral data, sync information about the delivery of health services and household (HH) profile registration to servers, back up their data, and download version 20 updates (44).

Ethiopia does not have a policy on the safety and security of personally identifiable information (PII) which has led to some difficulties in the use of certain infrastructure, e.g., cloud hosting, to store individual level data. Even if a framework for mHealth in Ethiopia suggested mobile technologies can be used to address HEWs' critical needs (referral, training and education, supply chain management, data exchange and consultation (58). lack of infrastructure is still a challenge (59). Government-controlled Ethiopian telecom (Ethiotel) has just recently begun to show signs of opening up to the private sector. Around 85% of Ethiopians have access to at least 2G mobile coverage through Ethiotel, while 66% have 3G connectivity and only 4% have 4G (58).

Ethiotel recently began rolling out a 5G network. Connections are typically spotty or nonexistent in the rural areas where HEWs reside and work. The availability of power in Ethiopia's rural and urban areas differs significantly. Nearly all significant urban areas have access to electricity. Compared to 83% of people in small towns, 95% of people in major towns have access to power, even if blackouts are frequent. Rural locations have a significant difference from urban places. Only 9% of persons in rural areas (excluding small towns), as measured by the Living 5 Standards Measurement Study, have access to electricity (58). Many digital health technologies strongly depend on the uptake and appropriate use by health care professionals. This may lead to new health care professionals as well as existing health care professionals acquiring new skills and competencies (60).

Supportive supervision

Utilization of the community health information system in the Hadiya zone's health post was the subject of a facility-based cross-sectional study shows one of the factors that significantly correlated with using community health information was regular supportive supervision. When compared to those who were not monthly observed, health extension workers who received supportive supervision were 1.72 times more likely to use CHIS in a positive way. Utilization of community health information is significantly correlated with sending written feedback. Comparing those who received comments to those who did not, those who received input were 5.33 times more likely to use CHIs (43).

2.5.2. Organizational factors

Organizations must make complicated decisions in the face of uncertainty, trade-offs, and broad implications, yet doing so rationally might be hampered by the cognitive constraints of individual decision-makers. The decision-making process is mediated by numerous organizational concerns. Policies and procedures, organizational hierarchy, and organizational politics are some of these concerns. Information culture, structure, resources, and major contributors' roles and duties at each level of the health system are all organizational determinants (61). Only 63 (15.67%) of the participants own the EMR manual (62). Study participants who had access to the EMR manual were three times more likely to use the EMR system than those who had no EMR manual (62).

Availability of trained Manpower

A more compelling challenge in transitioning CHWs to digital data collection were the levels of training of CHWs and the sense of comfort that the data collectors felt about the technology (63). This indicates the huge gap laying ahead in building the capacity of CHWs to utilize digital tools. An evaluation of a community-based health information system in Kenya also highlights the need for intensive training with periodic refresher courses for CHWs involved in data collection for a smooth functioning of digital CHIS (35). The inadequate training and assistance that HEWs received from supervisors at the woreda and health center levels has made it difficult for them to use eCHIS.

The study identified many key issues, including insufficient training that included material skipping, a lack of sufficient demonstration and practical sessions, a lack of consistent post-training follow-up, and a lack of technical support from staff at the woreda and health center levels (5). Cross section study conducted in Hareri and Diredawa shows compared to individuals who did not receive training, health workers who did receive EMR training were more likely to use it and effective training and refresher training are proven methods for developing EMR-related skills and boosting user confidence (64). EMR use has been linked to higher levels of education, EMR training, managerial support, and computer literacy (65).

Availability of adequate budget

The major barriers to widespread electronic medical record implementation and utilization are both direct and indirect costs. Information systems and capabilities are constantly changing; ongoing and continued evaluation, education, and training are necessary to optimize clinician efficiency and effectiveness (66).

2.5.3. Behavioral factors

The discrepancies between actual competencies and perceived competences of healthcare professionals have a direct impact on the performance of RHIS and activities like data collection, integration, data capture, transmission, processing, analysis, display, and feedback.

In a 2015 study conducted on health workers' experiences, barriers, preferences, and motivating factors in using mHealth forms in Ethiopia, the majority of healthcare professionals (91.3%) have been using the smartphone we provided as their main phone. None of them were in favor of keeping a smartphone at a medical facility like other medical equipment; instead, they preferred to always have their smartphone with them (17).

A cross-sectional study conducted in 2021 on Electronic Health Information Resource Utilization and Its Associated Factors among Health Professionals in Amhara Regional State Teaching Hospitals shows lack of knowledge of how to access and use EHIR was the most frequently cited barrier to their use (42.22%) (53). Respondents with a work experience of 6 years or less were about two times more likely to use EMRs than those with a work experience of greater than 6 years (62).

2.6. Conceptual frameworks

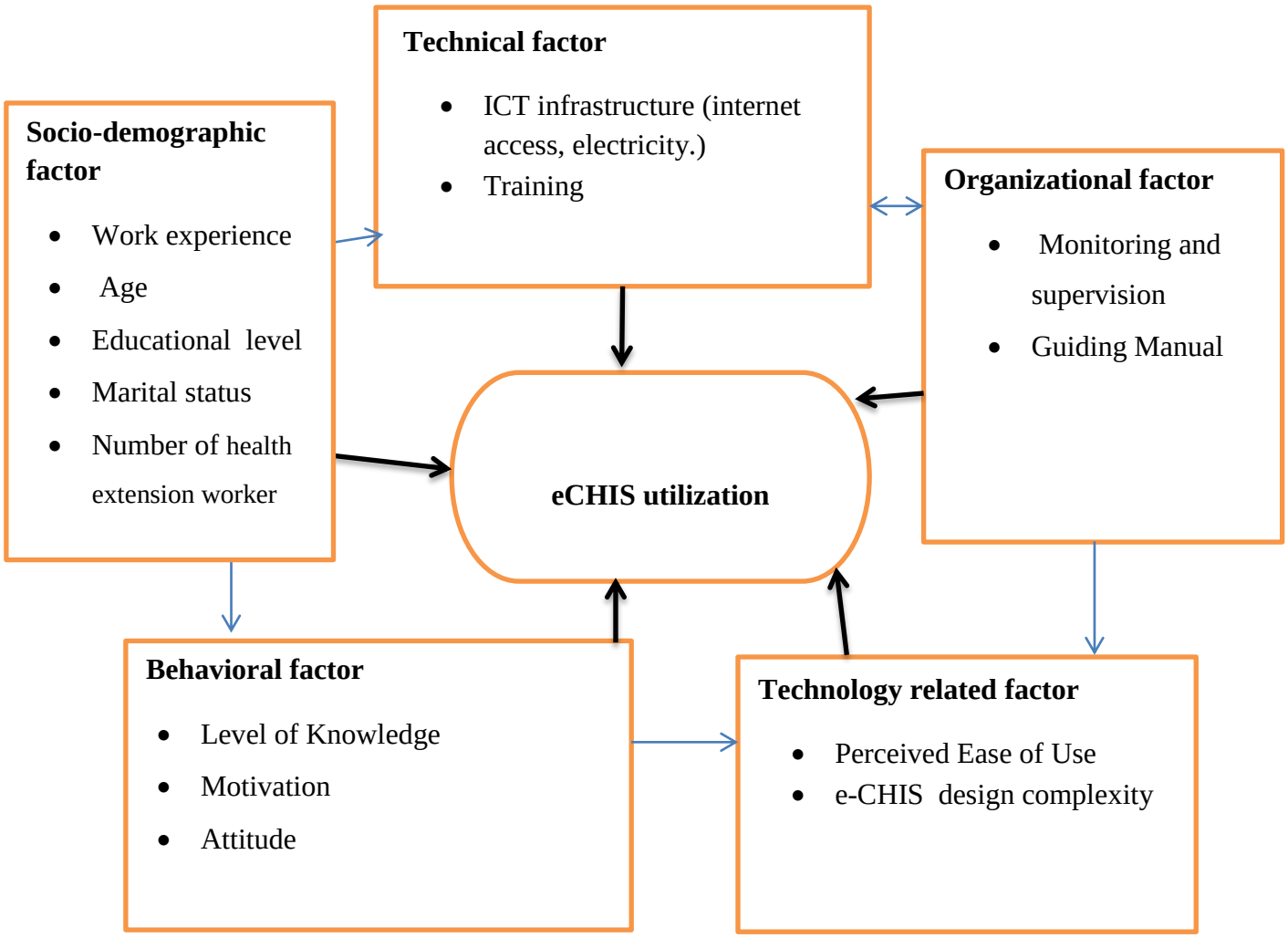

Figure 1: Conceptual framework showing factors associated with eCHIS utilization in Sidama region ,2023 developed by using different literature (1-3)

3. OBJECTIVES

3.1. General Objective

4. To assess the utilization of electronic community health information system (eCHIS), and associated factors among health extension workers in Sidama region, Ethiopia, 2023.

4.1. Specific Objective

- To determine eCHIS utilization level among health extension workers in Sidama region, Ethiopia, 2023.
- To identify associated factors of electronic community health information system utilization among health extension worker in Sidama region 2023.
- To explore challenges and solution for electronic community health information system utilization among health extension worker in Sidama region 2023.

5. METHOD AND MATERIALS

5.1. Study Area

The study has been conducted at health posts in Sidama regional state, located in the southern part of Ethiopia. The region has an area of 6,538 km^2 and is location between 3° 14’ N latitude and 33° 48’ E. The capital city of the region is Hawassa, located 275 km from Addis Ababa. The region is organized into 30 districts, one city administration, and six reform town administrations. Based on the Ethiopian Population Census Report 2007 estimates, the overall population of the region in 2020 it was 5,493,516 (66). The Sidama regional state has a total of 553 health posts, 134 health centers, one specialized hospital, three general hospitals, and 17 district hospitals. From the 30 districts found in Sidama, 84 health posts have implemented eCHIS. The total number of HEWs in 12 implementing woreda is 659.

5.2. Study Design and Period

Concurrent mixed methods design was used: Quantitative cross-sectional studies and qualitative phenomenology designs were employed from April to June, 2023.

5.3. Population

4.3.1. Source population

Quantitative study part

All health extension workers implementing electronic community health information system in 12 districts in Sidama region were considered as source population.

Qualitative study part

HEWs and HEW supervisors working on electronic community health information system in the Sidama region have been the source population.

4.3.2. Study population

Quantitative study part

All health extension workers implementing electronic community health information systems in selected health posts in the Sidama region were considered the study population.

Qualitative study part

Purposively selected HEWs and HEW supervisors working on electronic community health information system in selected heath posts in Sidama region were considered as study population.

5.4. Inclusion and Exclusion Criteria

4.4.1. Inclusion criteria

Quantitative study part

HEWs working in health posts who have implemented e-CHIS for at least 3 months have been included in the study.

Qualitative study part

Health extension workers and supervisors who have been working on eCHIS for at least six months have been included.

4.4.2. Exclusion criteria

Quantitative study part

HEWs that were on maternity leave, annual leave, and study leave were excluded from the study.

Qualitative study part

HEWs and supervisors that were on maternity leave, annual leave, and study leave were excluded from the study

.

5.5. Sample Size Determination

Sample size for objective one

Single population proportion formula was employed to calculate the sample size for this study with the following assumptions: 95% confidence level and margin of error 5%, p=50%.

$$n = \frac{(Z_{1-\frac{\alpha}{2}})^2 \mathrm{p}(1-\mathrm{p})}{d^2}$$

n= sample size

Z1-α⁄2= 1.96 (Z score corresponding to 95% confidence interval).

p= proportion of e-CHIS utilization among health posts which is conservatively taken as 50% (0.5)

d = the margin of error (5%) that can be accepted in this study = 0.05

$$n = \frac{(1.96)^2 0.5(0.5)}{0.05^2} \quad = 384$$

Since the study population is less than 10,000 sample size correction formula for finite population has been used to calculate the final sample size. Accordingly;

$$n = \frac{no}{1 + (\frac{no}{N})}$$

Where:

For infinite population n-----sample size for finite population

n_0-----sample size for infinite population (using the above formula

HEW who are working in the areas where eCHIS was implemented = 659

$= \mathrm{n} = \frac{384}{1+(\frac{384}{659})}$

= 243

By multiplying 1.5 design effect and by adding 10% none response rate, the final sample size for the first objective was 402 **HEWs.**

Sample size for objective two

Table 1: Sample size calculation for the second objective of the study, 2023

Factors	**Percent of Outcome in unexposed**	**AOR**	**CI**	**Power**	**Sample Size**	Reference
Attitude level	21.9%	2.14	95%	80%	218	(64)
Work experience) >6, ≤6 years	30.4%	2.13	95%	80%	225	(62)

The sample size for objective two has been calculated by using open epi version 3 software. The final sample size for this study was 402.

The participants of the qualitative study have been selected purposively. The sample size has been determined by saturation of information which is taken until redundancy of information.

5.6. Sampling Technique and Sampling Procedure

From 12 eCHIS implementing woreda. Then the total sample size was allocated to select the woreda proportionately. Finally, the study participants were randomly selected from the list of HEWs in the selected district by using a computer-generated method.

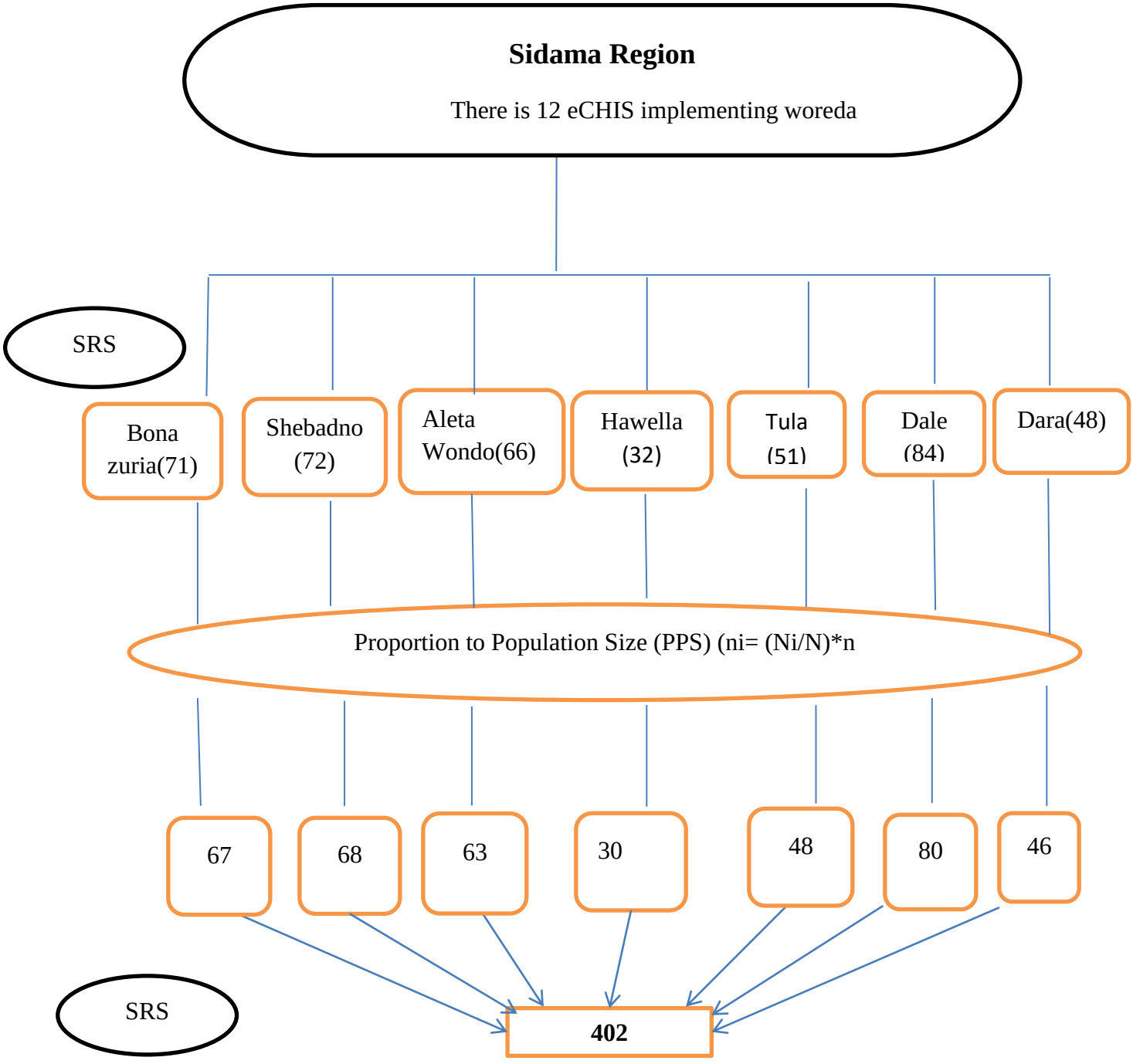

Figure 2: Schematic presentation of sampling techniques and procedure to select HEWs from sidama regional state, 2023

5.7. Variables

4.7.1. Dependent variable

eCHIS utilization (yes/no)

4.7.2. Independent variables

Socio-demographic factors: Education content on status, work experience, Age, Educational level, marital status, number of health extension worker

Technical factor: ICT infrastructure (internet access, electricity), Training gap,

Organizational factor: feedback, monitoring and supervision, guiding manual

Behavioral factor: Level of Knowledge, attitude, motivation

Technology related factor: perceived ease of use, eCHIS design complexity

5.8. Data collection procedures and Tool

4.8.1. Data collection procedure and method

The data collection tool was prepared in English and translated into Sidaama Afo languages before administration. The translated tools were back-translated by another independent translator to verify consistency. Kobo Collect was used for the quantitative data collection, and the data was collected using the interview method. Experienced data collectors and supervisors were recruited and trained for two days. The questionnaire was pretested on 5% (21 HEWs) of the total sample size from Hawassa zuria woreda (dore bafana), which was similar to the selected woreda. The pretest was conducted with randomly selected HEWs who work at health posts out of the selected woredas. Based on the pretest, appropriate modifications were made before actual data collection. Seven data collectors' and two supervisors were deployed during the entire data collection period. The questionnaire was checked for consistency and completeness every day during the data collection period.

4.8.2. Data collection tool

The structured questionnaire was prepared by reviewing different literature and adapted from the national eCHIS implementation guidelines. The questionnaire has five sections, including socio-demographic factors, technical factors, organizational factors, behavioral factors, and technology-related characteristics.

For the qualitative part:

Based on an open-ended, semi-structured questionnaire, information has been gathered through in-depth interviews. With a purposefully chosen eight interviewees, a roadmap to the interview has been created with adaptable probing strategies. On the same day as the interview, all Amharic-language interviews have been taped, transcribed, and translated. Participants are encouraged to freely express their opinions and share personal stories on the subject. The lead researcher conducts each interview alongside a capable research assistant.

5.9. Data Processing and Analysis

Quantitative part

The data has been collected by Kobo and exported to SPSS version 25 for analysis. Descriptive statistics such as mean and standard deviation have been calculated for continuous variables, and frequency or percentage has been used to describe the categorical variables. The data has been analyzed using binary logistic regression to see an association between independent variables and dependent variables. First, independent variables have been fitted into the bi-variable logistic regression model, and those variables with a p-value < 0.25 have been eligible for multivariable logistic regression analysis. Multi-collinearity has been checked to see if there is inter-correlatedness among independent variables by using the variance inflation factor (VIF). Accordingly, if the value of VIF is less than 10, then multi-collinearity has not been a problem.
A multivariable logistic regression analysis was carried out to eliminate confounders.

The Hosmer and Lemeshow goodness-of-fit tests have been used to assess model fitness, and a p-value > 0.05 has been considered a good fit model.

Crude and adjusted odds ratios with their 95% confidence intervals have been calculated, and variables having a p-value < 0.05 in the multivariable logistic regression have been considered significantly associated.

Qualitative part

The data from the interview was transcribed in Amharic verbatim. The transcribed data was reviewed and cross-checked with the recorded data to ensure the accuracy of the data, and then the transcribed data was translated into English. The transcription and translation of the qualitative data were done by the investigator. Data was coded to identify a theme, data was sorted into themes, thematic analysis was applied to ATLAS.ti version 7 to find the core meaning and interpret the finding, and finally, the result was interpreted, and then reported**.**

5.10. Data quality Assurance

Quantitative part

A pre-test has been done on 5% of the sample that was not included in the study. Appropriate modifications have been made after the pre-test result before the actual data collection. The data collection tool was prepared in English and was translated to Sidama Affo before administration. The translated tools were back-translated by another independent translator to verify consistency. The Kobo Collect tool was used for the quantitative data collection. Additionally, to maintain the quality of the data to be collected, data collectors and supervisors have been trained on the significance of the research, how to control the quality of data, the efficiency of data collectors, and the importance of confidentiality for two days. The supervision of data collectors includes observation of how the data collectors do data collection. The filled-out questionnaires have been checked for completeness by data collectors, supervisors, and PIs on a daily basis. Consequently, any problems encountered have been discussed among the team and solved immediately.

Qualitative part

A hand-interview guide has been created and used with care to maximize the study's validity and credibility. The qualitative, in-depth interview has then been tested as a pilot with three focal people for the health extension.

5.11. Ethical Considerations

Ethical clearance has been secured from the institutional review board (IRB) of Hawassa University, College of Medicine and Health Sciences. Permission letters have also been requested from the Sidama Region Public Health Institute and the Sidama Region Health Bureau before the beginning of the study. To ensure confidentiality, code numbers instead of names have been used to show results, and all formats have been kept locked.

5.12. Operational Definitions

Utilization of eCHIS

How do you use the eCHIS information?

1. Used for planning
2. Used for Budget allocation
3. Used for Requisition of manpower
4. Used for Calculation of area coverage
5. Used for Monitoring & evaluation
6. Used for Medical supplies management
7. Used for Organize feedback
8. Used for Evidence-based decision-making

Utilization(yes): The average score of respondents equal or more than the mean score was used to indicate as yes eCHIS Utilization (43).

Utilization(No): Average score of respondents below the mean score was considered as no eCHIS utilization (43).

Attitude: It is the perception, feeling, or thinking towards eCHIS. It was measured by asking 13 questions. The bases for the classification of favorable and unfavorable attitudes towards eCHIS were based on the mean of each score.

Favorable attitude: - attitude score that fell to the mean and above

Unfavorable attitude: - attitude score below the mean.

Perceived ease to use eCHIS: The respondents were asked to rate their self-competency for performing eCHIS measured using 1-5 Likert assessment question.

High perceived self-competency:- self competency score that fell to mean and above.

Low perceived self-competency:-self competency score below the mean.

Level of knowledge: Awareness or understanding to undertake eCHIS task such as managing the device and using the eCHIS applicant.

Good knowledge: The respondents answer at least three questions out of four.

Poor knowledge: The respondents answered less than three of the four questions.

6. RESULTS

6.1. Quantitative

5.1.1. Socio- demographic Characteristics of the Respondents

A total of 402 respondents participated in the study, for a response rate of 100%. Most of the respondents were between the ages of 22 and 27 and were 45% years old, with a mean age of 29.7 years and an SD of ±3.93 years. More than three-fourths (92.5%) of the study participants were married. Among the total participants, 73.6% were level IV in educational status. Regarding the work experience of respondents, 339, or 84.3% of them, had work experience of 5–10 years, and more than half of health posts had 3 and above health extension workers (59.7%).

Table 2: Socio-Demographic Characteristics of Health Extension Workers in Health post Sidama region Ethiopia, 2023

Variable	Categories	Frequency	Percent%
Age	22-27 year	181	45.0
	28-33	125	31.1
	34-39	69	17.2
	40 and above	27	6.7
Educational level	level III (10+3)	106	26.4
	level IV (10+4)	296	73.6
Work experience	<5	27	6.7
	5-10	339	84.3
	>10	36	9.0
Number of health extension workers	2	162	40.3
	3 and above	240	59.7
Marital status	Married	372	92.5
	Single	19	4.7
	Widowed/divorced	11	2.7

5.1.2. Technical characteristics

From a total of 402, all attended training. According to the assessment of the studies, participants tablet time and date set correctly were 59.0%, all participants had SIM cards, and 21.4% had not active air time. More than half of the respondent's tablets had connectivity. 67.9% and 89.3% of respondents do not adequately support data synchronization. All respondents had no primary power backup.

Table 3: Training of Health Extension Workers in Health post Sidama region Ethiopia, 2023

Variable	Categories	Frequency	Percent%
Attend training	Yes	402	100
	No	0	0
Are time and date of the tablet's set correct	Yes	237	59.0
	No	165	41.0
Does the tablet have SIM card	Yes	402	100.0
If yes, does the tablet have active air time	Yes	316	78.6
	No	86	21.4
Currently have connectivity	Yes	273	67.9
	No	129	32.1
If yes, can it adequately support data synchronization	Yes	43	10.7
	No	359	89.3
Do you have primary power back	Yes	402	100.0
	No	0	00.0

5.1.3. Utilization of Electronic community health information system

All variables that indicate utilization of electronic community health information system were recoded and after that one outcome variable was created. Then average score of respondents equal or more than the mean score was used to indicate as yes health information utilization and average score of respondents below the mean score was considered as no utilization. Based on

this, yes utilization of the electronic community health information system was 40.3% (95% CI: 35.5%, 45.3%).

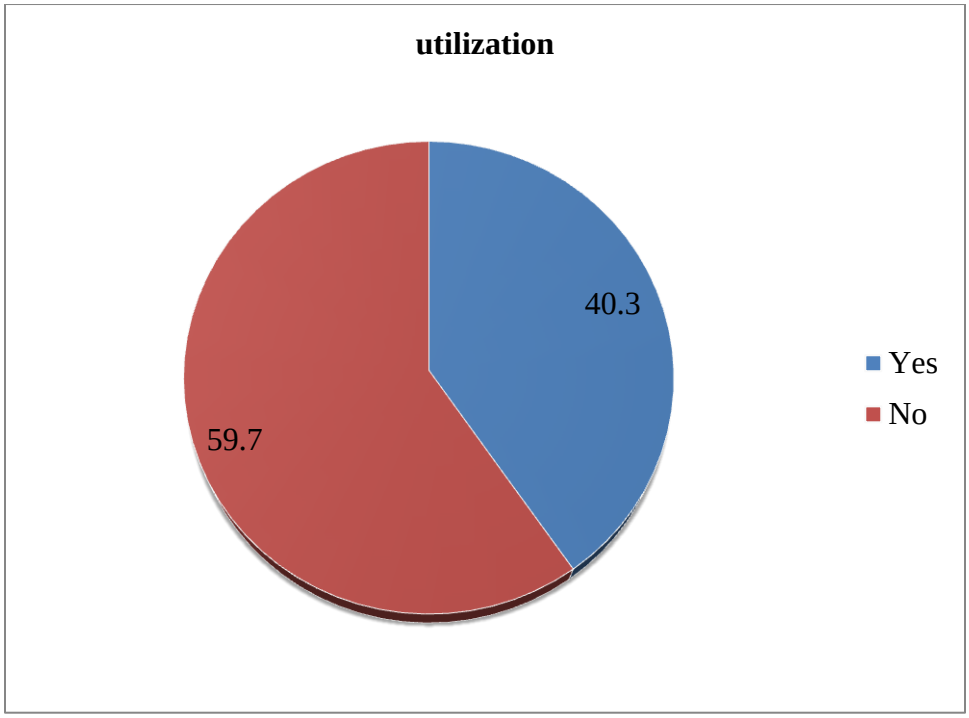

Figure 3: Utilizations of Health Extension Workers in Health post Sidama region Ethiopia, 2023

5.1.4. Organizational characteristics

Regarding organizational factors, according to their responses, 37.1% of the participants had no supportive supervision from PHCU in the last quarter; 81.1% did not get support from the woreda health office; 73.4% did not get support from the regional health office; and 90% of participants had not received support from others on eCHIS supporting organizations in the last quarter. Regarding written feedback, 58.7% had not received feedback and the availability of different reference materials and manuals that help guide eCHIS, and among the total participants, 47.1% did not have manuals on eCHIS.

Table 4: Organizational factors of Health Extension Workers in Health post Sidama region Ethiopia, 2023

Variable	Categories	Frequency	Percent%
Received support from PHCU in the last quarter	Yes	253	62.9
	No	149	37.1
Received support from WorHO in the last quarter	Yes	76	18.9
	No	326	81.1
Received support from Regional health office in the last quarter	Yes	107	26.6
	No	295	73.4
Received support from others on eCHIS supporting organizations in the last quarter	Yes	40	10.0
	No	362	90.0
Received written feedback	Yes	166	41.3
	No	236	58.7
Received support eCHIS manual/guideline	Yes	191	47.5
	No	211	52.5
If yes do you use the manual or guideline	Yes	189	47.1
	No	213	52.9

5.1.5. Behavioral characteristics

Attitudes

The attitudes of health extension workers towards eCHIS were measured using a Likert scale. In this study, HEWs whose score was greater than the mean score were considered to have a favorable attitude. The mean value of health extension workers attitude towards the design of

CHIS was 39.69 (SD±13.1). 36.1% of the health extension workers had a favorable attitude towards the electronic community health information system.

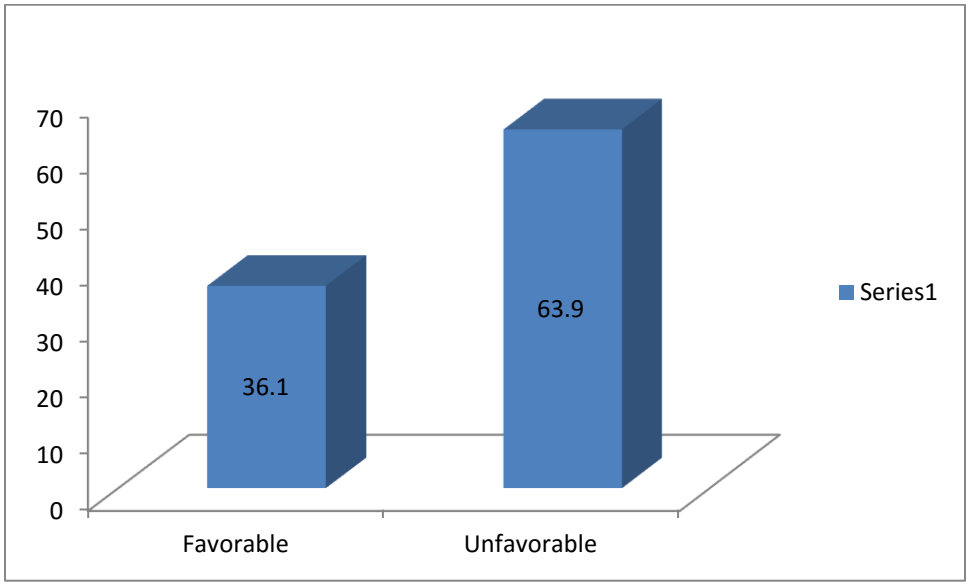

Figure 4: Attitudes of health extension worker in Health post Sidama region Ethiopia, 2023

5.1.6. Level of knowledge

Individual knowledge of HEWs to undertake the eCHIS task, among the total of respondents, 1.5% had difficulty managing the device date and time, 1.2% had difficulty with language change, and all of the respondents knew how to assign the head of household and change.

Table 5: Knowledge of health extension worker in Health post Sidama region Ethiopia, 2023

Variable	Categories	Frequency	Percent%
Any difficulties on how to manage the device	Yes	6	1.5
	No	396	98.5
change language and how to check app version	Yes	397	98.8
	No	5	1.2
how to register new household using the app	Yes	402	100%
How to assign head of household and change	Yes	402	100%

5.1.7. Technology related factors

The respondents were asked to rate their self-competency for performing eCHIS, measured using a Likert scale. For this study, the average score of respondents equal to or more than the mean score of questions was considered to have "high perceived self-competency". The mean value of health extension workers perceived self-competency toward eCHIS activities was 17.68. Among the total respondents, 52.7% of them had high perceived self-competency to perform eCHIS.

Table 6: Technology related factor extension worker in Health post Sidama region Ethiopia, 2023

Variable	Categories	Frequency	Percent%
Perceived ease to use	high perceived self-competency	212	52.7
	low perceived self-competency	190	47.3

6.2. Bi-Variable and Multivariable Logistic Regression Analysis

In the bi-variable and multivariable logistic regression analysis of the utilization of eCHIS among health extension workers in the Sidama region in 2023, first a bi-variable analysis was done for all independent variables with separately the outcome variables to identify candidate variables for multi-variable analysis. Variables with $p < 0.25$ during bi-variable analysis were selected as candidates for multi-variable analysis. Based on this, age, work experience, number of health extension workers who received tablets, current connectivity, data synchronization, support from PHCU, support from WoHo, received written feedback, received support from the eCHIS manual or guideline, attitude, and perceived competency towards the eCHIS task were variables selected for multivariable analysis. Multivariable logistic regression was used to identify factors independently associated with the utilization of eCHIS by controlling the confounders.

Accordingly, connectivity, support from PHCU in the last quarter, support from WoHo in the last quarter, received eCHIS manual/guideline, and perceived competency were found to be independent contributors to the utilization of eCHIS.

Those health posts with no current connectivity were 45% less likely to utilize eCHIS as compared to health posts with current connectivity (AOR = 0.55, 95% CI 0.32, 0.94).

HEWs who had no supportive supervision from PHCU in the last quarter were 54% less likely to utilize eCHIS as compared to HEWs who had supportive supervision from PHCU (AOR = 0.46, 95% CI = 0.28, 0.55). Similarly, HEWs who had no supportive supervision from WoHO in the last quarter were 49% less likely to utilize eCHIS as compared to HEWs who had supportive supervision from WoHO (AOR = 0.51; 95% CI = 0.29; 0.91).

Health posts that did not receive an eCHIS manual or guideline were 55% less likely to utilize eCHIS as compared to health posts that received an eCHIS manual or guideline (AOR = 0.45, 95% CI = 0.27–0.75)

Another important predictor was perceived competency. HEWs who had no perceived competency were 46% less likely to utilize eCHIS as compared to HEWS who had perceived competency (AOR = 0.54, 95% CI = 0.34–0.86).

Table 7: Bi-variable and multivariable logistic regression analysis

Variable	Category	Utilization of eCHIS		COR 95% CI	P-value(AOR)	AOR 95%CI
		Good	Poor			
Age of the respondents	22-27 years	76	105	0.58(0.26, 1.31)*	0.123	0.49(0.19,1.21)
	28-33 years	41	84	0.39(0.17,0 .91)*	0.050	0.39(0.15,0.99)
	34-39 years	30	39	0.62(0.25, 1.51)	0.442	0.68(0.25,1.83)
	≥40 years	15	12	1	1	1
How long employed current position	<5 years	10	17	0.26(0.09,0.74)*	0.490	0.66(0.20,2.14)
	5-10 years	127	212	0.26(0.13,0.55)*	0.106	0.52(.23,1.15)
	>10 years	25	11	1	1	1
How many health extension work	2	53	95	0.74(0.27,1.13)*	0.665	0.89 (0.56,1.45)
	≥3	109	145	1	1	1
Currently connectivity	No	35	94	0.43 (27,0.68)*	0.029	0.55 (0.32,0.94)*
	Yes	127	146	1	1	1
Data synchronization	No	144	200	1.60(0.88, 2.90)*	0.800	1.09(0.56, 2.13)
	Yes	18	40	1	1	1
support from PHCU last quarter	No	40	109	0.39(0.25,0.61)*	0.002	0.46 (0.28,0.55)*
	Yes	122	131	1	1	1
support from WorHO last quarter	No	121	205	0.50(0.30,8.34)*	0.022	0.51 (0.29,0.91)*
	Yes	41	35	1	1	1
Have you received written feedback	No	88	148	0.74(0.49,1.11)*	0.758	0.93 (0.58, 1.48)
	Yes	74	92	1	1	1
Received eCHIS manual/guideline	No	78	133	0.75(0.50,1.11)*	0.002	0.45 (0.27,0.75)*
	Yes	84	107	1	1	1
Attitudeof respondents	Unfavorable	47	91	0.67(0.44,1.03)*	0.054	0.62 (0.38,1.01)
	Favorable	115	149	1	1	1
Perceived competency	Low	72	140	0.57(0.38,0.85)*	0.010	0.54(0.34,0.86)*
	High	90	100	1	1	1

6.3. Qualitative part

Socio demographic Characteristics of the participants

The total number of participants in the study was eight. Among these four were supervisors (two diplomas and two degrees) and four-level HEWs. The mean age was 26.13, with a standard deviation of 4.02.

Theme 1: Challenges or gaps during eCHIS utilization.

The qualitative findings were organized under two emerging themes: [theme 1: Challenges or gaps during electronic community health information system utilization and workable solutions to solve problems during utilization] in theme 1, budget constraints, infrastructure, follow-up problems, and technological problems were explored, whereas in theme 2, commitment to roles and responsibilities, facilitation of infrastructure, budget allocation, and familiarization with technology through training were documented.

Table 8: Theme 1: Challenges or gaps during eCHIS utilization.

Theme	category	subcategory
Theme 1 Challenges/gaps	5.3.1.Budget constrain	5.3.1.1 Transportation cost
	5.3.2 Infrastructure	5.3.1.2 Connectivity problem 5.4.1.3 Electricity 5.5.1.4 Tablet
	5.3.3 Follow up	5.3.3.1 Supervision
	5.3.4 Technology	5.3.4.1 Training

5.3.1. Budget

5.3.1.1 Transportation cost

Some participants stated that they were unable to provide sufficient funding for frequent supportive supervision, identify needs, have review meetings, monitor, develop the capacity of HEWs, or enable HEWs to share experiences with one another.

"Budget constraints and a lack of commitment are the main issues preventing the usage of eCHIS"

(woreda health office from shebedino)

5.3.2. Infrastructure

The majority of HEWs stated that inadequate infrastructure, including broken tablets, poor connectivity, and low power supplies, interferes with their usage of eCHIS.

5.3.2.1 Connectivity

Some HEWs had to travel to Wi-Fi hotspots or woreda health offices to obtain connectivity so they could sync their data. Some health posts experienced service outages as a result. Travel expenses for the HEWs are also incurred. There are locations where HEWs reported a long synchronization time and poor mobile network strength. This makes it less likely for HEWs to use eCHIS.

5.3.2.2 Electricity

Some of these HPs are found in rural locations with extremely limited access to energy. Some eCHIS users stated that using the system was difficult due to a scarcity of power banks and frequent power outages. This has proven to be a significant obstacle, especially in rural areas where the national electricity grid has limited coverage.

"There is no electricity in our area. In some Kebeles, there is no electricity at all so that I travel to electric available area or nearby town to charge my tablet"

*(*HEW from bona woreda)

5.3.2.3 Tablet

Almost all HEWs included in the study had tablets for eCHIS. But the majority of them complained about the tablets' sluggish processing speed. Use eCHIS effectively. Infrastructure-related barriers, including lack of or improperly functioning tablets, including low processing speed and storage capacity, are is very critical barrier for eCHIS usability.

"The problem we encountered during use was the capacity of the phone or tablet. The RAM is very small. It takes 15 minutes to open and close itself."

(HEW supervisier)

5.3.3 Follow up

5.3.3.1 Supportive supervision

Most health extension workers reported that a lack of supportive supervision from WoHo and PHCU limits their utilization. Lack of supportive supervision was a barrier to proper utilization (68).

5.3.4 Technology

Limited exposure to tablets and software, and navigating through the different pages of the eCHIS application and adjusting screen settings have been major problems, especially during service delivery. This is complicated by application-related challenges such as being stuck on a page and involuntarily restarting the application without saving data.

5.3.4.1 Training

Most HEWs and other health workers included in the study reported a lack of refreshing eCHIS training. Most HEWs expressed a lack of confidence and competence in the use of the eCHIS application due to their lack of knowledge. Most eCHIS users, particularly HEWs, associate it with the poor quality of eCHIS training and the absence of regular post-training follow-up

Theme 2: workable solutions or recommendations to solve problems during utilization

To ensure the utilization of eCHIS workable solution were recommended from key informants. The theme consisted of four category and nine subcategories as shown

Table 9: Theme 2: workable solutions or recommendations to solve problems during utilization

Theme	category	subcategory
Theme 2 Workable solutions or recommendations solve problems during utilization	5.3.5 Infrastructure	5.3.5.1 Boosting Connectivity 5.3.5.2 Electricity or power bank 5.3.5.3 New tablet
	5.3.6 Follow up	5.3.6.1 Regular supervision
	5.3.7 Budget	5.3.7.1 Resources allocation
	5.3.8 Technology	5.3.7.2Training
	5.3.9 Role and responsibilities	5.3.9.1 RHB Role and responsibilities 5.3.9.2 WORHO Role and responsibilities 5.3.9.3 PHCU Role and responsibilities

5.3.5. Infrastructure

5.3.5.1 Boosting Connectivity

Most health extension worker and supervisor reported that boasting connectivity is essential to good utilization.

5.3.5.2 Electric Power bank

Most of the study participants mentioned that power banks are a reliable option for places where the national electric system has limited access and for frequent electricity usage.

The majority of HPs are found in rural locations with extremely limited access to electricity. Just 27% of Ethiopia's rural Kebeles have access to power, according to data from the Ethiopian Electric Power Authority. In some places, eCHIS users reported a lack of power banks and frequent interruptions of electricity as a hindrance to eCHIS use. This has been a major challenge, particularly in remote areas where the reach of the national electric grid is limited *(3).*

Most of the HPs are located, is very limited. In some places, eCHIS users reported lack of power banks and frequent interruption of electricity as a hindrance to eCHIS use .

"If we have power bank it is good for our work"

(HEW from bona woreda)

5.3.5.3 Tablets

Almost all HEWs included in the study had tablets for eCHIS. However, most of them reported slow processing capacity of tablets. As a result, the use of eCHIS is delaying.

"It is good to be changed higher storage tablets"

(Bona woerda HEW)

5.3.6. Follow-up

Most study participants report that supportive supervision creates a more supportive, caring, and positive work environment as it provides a space for regular communication, problem solving, enhanced accountability, an increased sense of being supported, the development of professional skills, and increased teamwork. Some HEWs reported that supervision and feedback encouraged them to continue using eCHIS in their work.

"We need regular suportive supervesion to feel the gap"

(HEW from wondogenet woreda)

5.3.7. Budget

5.3.7.1 Resources allocation

Most of study participants mentioned that resource allocation is important for better utilization of eCHIS. The implementation and utilization of eCHIS requires financial, time, human resource, space, infrastructure and other material resources .

"In my opinion budget should be allocated to good utilization of eCHIS"
(Tulla sucity health extension supervisor)

5.3.8. Technology

The majority of HEWs reported that update training's essential for proper utilization of technology and it increases confidence and competence in use of the eCHIS application.
"Update training is necessary for better outcome"

(health extension supervisor from wendogent woreda)

5.3.9. Role and responsibilities

The majority of research participants state that now that health professionals and other authorized individuals are aware of their responsibilities, there will be better use of the electronic health information system.

"All responsible body like WoHo, RHB and others now their role and responsibility better result will achieve"

(from Gordoma health center HEWs supervisor)

5.3.9.1 RHB Role and responsibilities

Lead the eCHIS implementation and utilization in the region, establish a technical working group at the regional level that can follow the implementation of eCHIS, translate contents of the eCHIS application, training materials and user guides, implementation manual and other relevant documents to the regional working language provide Training of Trainers (ToT) to Zone, woreda and implementing partners, support and follow up the cascading training to the end users assign regional focal persons to follow and take responsibility towards eCHIS implementation conduct advocacy and sensitization to RHB and ZHD health managers .

5.3.9.2 WORHO Role and responsibilities

Some of Wereda health office roles and responsibilities are to assign focal persons to facilitate and coordinate the eCHIS implementation process, Distribute and manage inputs and other resources to all health centers and health posts, and document the distribution list, Ensure eCHIS activities are integrated with the WorHO supportive supervision checklist. Conduct supportive supervision, mentorship and provide feedback to the health centers and health posts and Document and share best practices and lessons learned within the Woreda .

5.3.9.3 PHCU Role and responsibilities

Ensure data quality of CHIS and eCHIS, compile data and generate periodic reports using eCHIS, Ensure synchronization of the data as per the standard (at least twice a day), Manage eCHIS hardware including tablet computers, charger, solar charger, power bank, and SIM cards and properly utilize the resources .

7. DISCUSSION

This study attempted to assess the utilization of electronic community health information systems and its associated factors among health extension workers of Sidama region, Ethiopia. The overall utilization of electronic community health information systems was 40.3% (95% CI: 35.5%, 45.3%). Based on the study, the main determinants of the utilization of electronic community health information systems include availability, connectivity, support from PHCU last quarter, support from WorHO last quarter, receiving eCHIS manuals or guidelines, and perceived competency.

Utilization of electronic community health information systems was 40.3% (95% CI: 35.5%, 45.3%).This result was in lines with studies conducted in Tanzania 42% (48), in Health posts of Hadiya zone, where utilization of community health information was 41%(67), in Western Oromia region 42% (54), and study conducted in Dire Dawa on routine health information utilization in administration health facilities in health posts showed that 39.3% (68).But the result of this study was lower than studies conducted in Uganda 59% (48), in Liberia 58% (20), in South Africa 62% (20) and in Amhara region 70.8% (69) . The discrepancy might be due to their better performance, which could have resulted from good skills and a better level of knowledge of the staff on data collection, data handling, information analysis, and presentation. The availability of ICT infrastructure and supportive supervision enhance eCHIS utilization.

Currently, connectivity was significantly associated with increased utilization of eCHIS as compared to without connectivity. This result was supported by studies conducted in Gonder (69). This might be due to the availability of internet connectivity and the ability to data synchronize, which are crucial to data transfer in eCHIS systems. This can improve the availability of reliable information for decision-making at each level. this finding supported by qualitative study . Poor network coverage and limited connectivity were the main infrastructure-related obstacles. Some of the health extension staff visit areas with wifi. These results align with the obstacles that were identified and reported in Ethiopia, African, Asian, and South American countries (3, 17, 70).

"I travel to wifi available area to sync data there is no network in our area"

*(*HEW from bona woreda)

Scheduled follow-up and supportive supervision from concerning offices were found to be another determinant factor of eCHIS information use with health extension workers. Health extension workers who had no supportive supervision from PHCU were 54% less likely to utilize eCHIS compared to HEWs who had supportive supervision. And HEWs that had no supportive supervision from WoHo were also 49% less likely compared to HEWs that had supportive supervision. The result was supported by a study conducted in Gamo Gofa Zone, which found that health facilities that were supervised regularly were four times more likely to have health information utilization (71). This might be because of frequent supportive supervision has a significant role in identifying the gaps and increase the capacity of health extension workers.

This finding supported by qualitative study. In this study lack of supervision from WoHo and PHCU were one of the challenges on eCHIS utilization.

"There is no regular supportive supervision from the WHO, zone, or regional health office. No one follows us."

(Health extension worker from tulla subcity)

Health extension workers reported that supervisors' encouragement and follow up served as a motivator for them to employ technology in their daily job this study in line with study done in Diredawa, Ethiopia and South Africa with (3, 62, 72).

In addition, HEWs who received eCHIS Manual/Guidelines had associated significantly to utilize eCHIS compared to HEWs who had no received eCHIS Manual/Guidelines. This study comparable with a mixed study conducted in Dire Dawa (73). This might be due to the knowledge gap and skills to utilize eCHIS, which were minimized by fulfilling and reading the Manual/guidelines.

In this study, perceived self-competency was significantly associated with the utilization of electronic community health information systems as compared with low perceived self-competency. This finding is similar to the studies conducted in WHO measure evaluation: self-competency is one of the determinants of routine health information utilization (74), in Dire Dawa 2.5 times higher among health worker who

had high self-competency (75),study done in southern Ethiopia; health information data quality was higher among health workers having good self-efficacy enough to perform HMIS activities compared to their counterpart (76),and study conducted in Ethiopia; health workers who were confident enough to perform HMIS activities were more likely to use routine health information than their counterpart (77, 78). This finding is supported by qualitative study.

Due to their lack of understanding of how to use eCHIS apps, the majority of HEWs expressed a lack of competence and confidence in using the software. The majority of eCHIS users, especially HEWs, attribute it to the poor quality of eCHIS training and the absence of regular post-training follow-up.the finding is supported by qualitative study.

"I am fears of this technology in some way. I am not comfortable using this technology"

(HEW from leku woreda)

Health extension workers become less interested in using technology when they receive inadequate training or no refresher training. This leads to a sense of unease errors pertaining to the technology will result in a decrease in the quality of data and care. using eCHIS is hampered by inadequate training and refresher courses. This in line with study done in Ghana and Rwanda health personnel who receive inadequate training, no refresher training, and no technical assistance or follow-up are less likely to use technology and feel insecure (3, 79, 80).

The effective use of digital tools in the healthcare system depends on factors including technology literacy, application simplicity, and friendliness. To encourage the usage of eCHIS, refreshing training, an integrated and coordinated approach that includes breaking down barriers and reiterating facilitators and motivators are needed.

8. STRENGTH AND LIMITATION OF THE STUDY

The first strength of the study was mixed method study and the second strength was absence of non-responses. And also this study was one of a few study‘s conducted in the country on this topic and using direct primary data by interviewing the respondents to address all the variable of interests. But the limitation of this study was lack of local and national reference materials to make a comparison

9. CONCLUSION

More than half of the health extension workers had no electronic health information system utilization. Supervision from primary health care units , Supervision fromworeda health offices, connectivity, guidelines and perceived competency were responsible for the result. Therefore, Improving, boosting internet connectivity, supportive follow-up, training access for their competency and fulfilling the guidelines are important to scale up the utilization. This finding is supported by qualitative study.

Availability of currently connectivity, regular supportive supervision from WoHo and PHCU and perceived competency are associated variable in qualitative study that influences the utilization of electronic health information system.

10. RECOMMENDATION

The following recommendations are made in light of the study's findings:

The MOH and woreda health offices have to improve, boosting internet connectivity for HEWs to sync their data.

Supportive follow-up from PHCU, WoHo, and others in eCHIS-supporting organizations is important to scale up the utilization of electronic health information systems by health extension workers.

MOH and regional structures have to ensure the availability of uninterrupted electric power for health posts for eCHIS utilization.

The MOH should ensure other issues like guidelines, updated training, and high-capacity tablets.

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12. ANNEX

Annex III: English version questionnaire

Study Information Sheet and Consent Form

Name of Principal Investigator: kidest fekadu

Name of Organization: - hawassa University

Name of Sponsor: ----------

My name is kidest fekadu. I am a second-year Master of Public Health student at hawassa a University, School of medicine. I am doing my master's thesis on eCHIS utilization and associated factor among health extension worker in sidam region, ethiopia . As you know, the eCHIS has been implemented in the country since 2018. However, it is not progressing as expected. To address such a gap, I am highly interested to conduct this research to identify associated factors to use the electronic medical record in selected health post. This research will help the health post, health bureau at large to identify major barriers to use eCHIS, which will help to address and implement this program at large at the national level. Your name will never be mentioned, and the information provided here will not be disclosed to anyone unless it is for its intended purpose and there is no any harm introduced to you. If you went to stop the interview, you can stop at any time. The purpose of the study, ethical issues and its significance has been approved by the college of health science ethical review board. You are being invited to take part in this research because we feel that your experience as a senior professional can contribute much to our understanding and knowledge of eCHIS. For any question, please call. Kidest fekadu- Phone number-0927146731 Email- kidestf84@gmail.com .

If you are volunteer to take part in my study, please put your signature here.

1. Date ……signature ……

2. Data collector name …… signature…… Thank you for participating in my survey

SECTION I: Background Information

Sr. no		**Response/ Answer**	**Skip**
101	Name of the institution you are working in	_____	
102	Your Position /occupation in the institution	_____	
103	Age in years	_____	
104	Your highest educational level	1. Level I (10+1) 2. Level II (10+2) 3. Level III (10+3) 4. Level IV (10+4)	
105	How long have you employed in your current position?	_____	
106	How many health extension workers work at this health post?	_____	
107	What is your marital status?	Married Single Widowed Divorced	

SECTION II: Technical

	Training status		Skip
201	Did you attend training on eCHIS?	1) Yes 2) No	
	ICT Infrastructures,	Response/ Answer	
202	Are time and date of the tablet's set correct? (Check)	1.Yes 2.No	
203	Does the tablet have SIM card? (Check) specify the Type (M2M or standard SIM)	1.Yes 2.No	
204	If yes, does the tablet have active air time?	1.Yes 2.No	
205	Does the tablet currently have connectivity?	1.Yes 2.No	
206	If yes, can it adequately support data	1.Yes	

	synchronization?	2.No	

SECTION III: UTILIZATION OF eCHIS

	Question	Response/ Answer	Skip
301	If YES how do you use the eCHIS information in your case team/ institution	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	

SECTION IV: ORGANIZETONAL FACTORS INFLUENCING USE eCHIS

	Question	Response/ Answer	Skip
	Supervision ,feedback and guideline		
401	Have you received support from PHCU in the last quarter?	1. No 2. Yes	
402	Have you received support from WorHO in the last quarter?	1. No 2. Yes	
403	Have you received support from Regional health office in the last quarter?	1. No 2. Yes	
404	Have you received support from others on eCHIS supporting organizations in the last quarter?	1. No 2. Yes	
405	If yes to Q401 have you received written feedback?(see Document)	1. No 2. Yes	

406	Have you received support eCHIS manual/guideline	1.yes 2. no	
407	If yes do you use the manual or guideline	1.yes 2.use	

SECTION V: BEHAVIORAL FACTORS INFLUENCING USE eCHIS

	Question	**Response/ Answer**	
	Attitude, perception of quality of system and benefit towards e-CHIS		
504	eCHIS increase practice productivity (i.e. Patients/ day)	1. Strongly Disagree 2. Disagree 3. Nautral 4. Agree 5. Strongly Agree	
505	eCHIS improve quality of work practice (i.e., work-life)	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
506	eCHIS improve quality of care	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
507	eCHIS reduces hard work	1. Strongly Disagree 2. Disagree 3.Nueutal 4. Agree 5. Strongly Agree	
508	eCHIS need more time for training	1. Strongly Disagree 2. Disagree	

		3. Neutral 5. Strongly Agree	
509	eCHIS benefits outweigh the cost	1. Strongly Disagree 2. Disagree 3. Neutal 4. Agree 5.Strongly Agree	
510	eCHIS impacts the cost of service	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
511	eCHIS improve the confidentiality of patient information	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
512	eCHIS is more complex than paper-based record	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
513	eCHIS helps in avoiding errors	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
514	eCHIS should be implemented at large	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree	

		5. Strongly Agree	
515	CHIS enables me to accomplish tasks more quickly	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
516	eCHIS has made it easier to provide health extension services	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	
517	I find eCHIS to be useful for my job	1. Strongly Disagree 2. Disagree 3. Neutral 4. Agree 5. Strongly Agree	

LEVEL OF KNOWLEDGE IN THE USE OF eCHIS

S.no	Question	Response	Mark
602	Does the HEW have any difficulties on how to manage the device (Date and time setting and other (specify)?	Yes/no	
603	Does she know how to change language and how to check app version? (ask her to demonstrate) Does the HEW know all modules on the START button on the eCHIS app home screen? (Please ask the function of each module	Yes/no	
604	Does the HEW know how to register new household using the app?	Yes/no	
605	Does the HEW know how to assign head of household and change	Yes/no	

SECTION VI: Technology related factor

S.no	Question	Response	Mark
Perceived Ease of Use and eCHIS design complexity			
701	My interaction with eCHIS in doing my task is clear and understandable	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	
702	Overall, eCHIS is easy to use	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	
703	Work with eCHIS was easy for me	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	
704	The use of eCHIS for my daily duty does not confuse me	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	

705	eCHIS is easy to navigate	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	
706	Using eCHIS enables me to have more accurate information	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	
707	e-CHIS design is easy to use	1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree	

Qualitative part

1. Has the eCHIS project been a success or a failure or some combination? Describe where you have realized success and where it is deemed a failure.

_____

2. Challenges/Gaps faced during utilization

_____

_____

3. Describe any Lesson learnt during the utilization

_____

4. Does the organization have an adequate budget for eCHIS

_____

5. What do you suggest workable solutions or recommendations solve the above problems?

_____

6. Describe additional support you require

_____

_____

13. Bitima

Gola III: Sidaamu afii xa'mo

Buuxote mashalaqqe qoolanna sumimmete forme

Qara buuxote investigeetere/Principal Investigator/ su'ma: Kidest Fekadu

Uurrinshate su'ma: - Hawassa University

Sponsorete su'ma: ----------

Su'maya Kidest Fewkadu yaamameemma. Hawaasi yuniversite Mediisinete kolleejjera layiinki diri 'Master of Public Health' rosaanchooti. Xaa yannara Maasterse'ya thesis Sidaamu Qoqqowira Tophiyaho 'eCHIS' appe horoonsi'nanni garanna amadisiisamino qarra(master's thesis on eCHIS utilization and associated factor among health extension worker) lainohunni Xeena extenshiinete loosaasine/HEW/ aana loosanni afameemma. Anfummonte gede, 'eCHIS' appe gobboomu deerrinni hananfoonnihu 2018 kayiseeti. Ikkollana kayiinni, hendoonni garinni agarroonni garinni diharinsoonni. Elekitroonik meedikaali rikerde/Electronic Medical Record(EMR) horoonsire dooramino fayyimmate xaawira konne qarra/ foonqe tirate anera lowo hasatto nooe. Tini buuxo gobboomu deerrinni 'eCHIS' progiraame horoonsirate aana noo qarra tiratenna 'eCHIS' progiraame halashshatenna faajje assate fayyimmate xaawira ikko hattono fayyimmate biirora lowohunni horo uyiitanno yine hendanni. Su'makki diegensiinsanni, hattono aattonke mashalaqqe baalate wolu hajo la'annonsakki bissara sayiinse uyiinannikki daafira umokki egensiisatenni ate miicannori nookki gede buuxa hasiissanno. Tenne buuxote xa'mora fajjamaancho ikka hoogittoro aye yannarano agura dandaatto. Tenne buuxoti qara hajo, akatu soorronna iillishshanno guma(ethical issues and its significance) yitannotenni kolleejjete fayyimmate sayiinse 'Ethical Review Board' kaajjinshoonni. Ate tenne buuxote beeqqora koyiisa dandiinoonnihe korkaati 'eCHIS' egennora lowo rosichi heerannohe yine hendoonnihe daafiraati. Roore mashalaqqera/xa'mora bilbili. Kidest Fekadu- Bilbilu kiiro- 0927146731 Email- kidestf84@gmail.com.

Tenne buuxora beeqqaancho ikkate fajjamaancho/volunteer ikkittoro woroonni malaatekki wori.

1. Barra …… Malaate …….
2. Mashalaqqe gamba assinohu su'ma …… Malaate …… Beeqqaancho ikkakkira galateeffateemma.

GOLA I: Umosi egensiissanno mashalaqqe

Aantet ekiiro		**Dawaro/qolo**	**Agure sa"a/skip**
101	Loossanni afamatto uurrinsha su'ma		
102	Uurrinshate giddo nooheha Loosikki qeecha		
103	Diro		
104	Ateha rosikki deera	1. Deerra I(10+1) 2. Deerra II (10+2) 3. Deerra III (10+3) 4. Deerra IV (10+4)	
107	Ateti adhammete danikki?	1. Adhewooho(adhaminoho)/Married 2. Diadhinoho/Single 3. Gashshaanni lubbaminote/Widowed 4. Adhe tirinoho(adhametiraminoho/Divorced	

GOLA II: UURRINASHANNITA eCHIS KEENO

	Qajeelshudeerra		**Agure sa"a/s kip**
201	eCHIS qajeelsha adhite egennootto/ta?	1) Ee 2) Dee'ni	
	ICT loosuxinta/ICT Infrastructures,	Dawaro /qolo	
202	Yannanna barra taabileetekki aana taashshinooni?(Buuxiri)	Ee Dee'ni	
203	Taabileetekkira SIM kaarde no?(Buuxiri) danasexawisi(M2M or standard SIM)	1.Ee 2.Dee'ni	
204	Dawarokki "Ee" ikkituro, taabileetekkira bilchaata ikkitino kaarde noose?/ If yes, does the tablet have active air time?	1.Ee 2.Dee'ni	
205	Taabilettkkira xaa yannara xaadooshshu buusi noose?/ Does the tablet currently have connectivity?	1.Ee 2.Dee'ni	
206	Dawarokki "Ee" ikkituro, data danchu garinni loossanno?/If yes, can it adequately support data synchronization?	1.Ee 2.Dee'ni	

GOLA III: eCHIS HOROONSIRATE DEERRA

	Xa'mo	**Dawaro/qolo**	**Agure sa"a**
301	Dawarokki "Ee" ikkituro eCHIS mashalaqqe ate keesitiiimera/uurrinsharahiittoonnihoroonsirat to?(faajjeikkinohadoori)/ If YES how do you use the eCHIS information in your case team/ institution? (Tick what is applicable) / **Duucha dawaro doora dandiinanni**	1. Mixote golira/Planning 2. Baajeettete tuqishshira/Budget allocation 3. Mannu wolqa hasiissanno basera/Requisition of manpower. 4. Amadote bikka shalago loosate/Calculation of area coverage. 5. Keenotenna Qorqorate golira/Monitoring & evaluation. 6. Medical supplies management. 7.Qolo gamba assate/ Organize feedback. 8. Evidence-based decision-making.	

GOLA IV: eCHIS HOROONSIRATE UURRINSHATE QARA QARRA IKKINORI

	Xa'mo	Dawaro/qolo	Aguresa"a
	Kaa'lo		
401	Sa'u sasu agannara PHCU widoonni kaa'lo/irko assine egenninoonnihe/kaa'lo afidhe egennootto?	1. Dee'ni 2. Ee	
402	Sa'u sasu agannara WorHO(Woradu fayyimmate ofiisere) widoonni kaa'lo/irko assine egenninoonnihe/kaa'lo afidhe egennootto?	1. Dee'ni 2. Ee	
403	Sa'u sasu agannara Qoqqowu fayyimmate Ofiisere(Regional Health Office) widoonni kaa'lo/irko assine egenninoonnihe/kaa'lo afidhe egennootto?	1. Dee'ni 2. Ee	
404	Sa'u sasu agannara 'eCHIS' irkissanno uurrinshate bissawiinni(eCHIS supporting organizations) kaa'lo/irko afidhe egennootto?	1. Dee'ni 2. Ee	
405	Dawarokki xa'mo 401 "Ee" ikkituro, borrote qolo/written feedback/ adhite egennootto? (see Document)	1. Dee'ni 2. Ee	
406	Maanuwaale/guideline kaa'lo adhite egennootto?	1 .Ee 2 Dee'ni	
407	Dawarokki "Ee" ikkituro, maanuwaale/guideline horoonsiratto?	1.Ee 2.Dee'ni	

GOLA V: eCHIS HOROONSIRATE QARA KORA IKKITINOTI AKATU SOORRO

	Xa'mo	Dawaro/qolo	
501	eCHIS horoonsidhe Daata eessatenna analiisise loosate aana noohe dandoo hiittoonni bikkatto?/perform e-CHIS related activities such as data entry, analysis	1. lowontanni sumuu diyeemmo 2. sumuudiyeemmo 3. sumuuyeemmo 4. lowontanni sumuuyeemmo	

502	eCHIS horoonsidhe tiro aanno garinni loosate aana noohe dandoo hiittoonni bikkatto?/perform e-CHIS related activities such as interpretation	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
503	Fayyimmate mashalaqqe agarate aana noohe kakka"ooshshe hiittoonni bikkatto?/ How do you rate your agreement on the level of motivation to create and keep health information for use?	1. lowontaani diduushshinoho 2. diduushshinoho 3. Mereerimaho 4. Lowoho 5. Addintanni lowoho	
Fayyimmate ogeeyye loosaasine eCHIS la"ooshshenna akata/ Attitude and perception of health care providers towards Echis			
504	eCHISloosuguma loose leellishatedandooleddanno/ eCHIS increase practice productivity (i.e. Patients/ day)	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
505	eCHIS loosu isilanchimma leddanno/eCHIS improve quality of work practice (i.e., work-life)	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
506	eCHIS xissamaanote mashalaqqe amadate isilanchimma leddanno/eCHIS improve quality of care	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuuyeemmo	
507	eCHIS lowo wolqa xa'manno loosinni harancho yanna giddo gumulate kaa'litanno/eCHIS reduces hard work	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuuyeemmo	
508	eCHIS qajeelsha adhate yanna adhitanno/eCHIS need more time for training	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	

509	eCHIS fultanno fulonni horaameeyye assitanno/ eCHIS benefits outweigh the cost	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
510	eCHIS horoonsira woxu fulo aana soorro abbitanno/ eCHIS impacts the cost of service	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
511	eCHIS xiwamaanote/xissamaanote mashalaqqe danchu garinni amadate lowo irko uyiitanno/EMR woraqatu loosinni shiimare kaajjitanno	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
512	Woraqatu aana loonse maareekkinanni loosinni roore ‘eCHIS’ kaajitanno/eCHIS is more complex than paper-based record	1. Lowontanni sumuu diyeemmo 2. Sumuu diyeemmo 3. Sumuu yeemmo 4. Lowontanni sumuu yeemmo	
513	eCHIS soro ajishate kaa’litanno/eCHIS helps in avoiding errors	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
514	eCHIS hala’ladunni faajje assinoonni/ eCHIS should be implemented at large	1. lowontanni sumuu diyeemmo 2. sumuu diyeemmo 3. sumuu yeemmo 4. lowontanni sumuu yeemmo	
515	‘eCHIS’ babbaxitino keeno shotu garinni horoonsireemmo gede fa’laasho uyiitannoe/eCHIS enables me to accomplish tasks more quickly	1. Lowontanni sumuu diyeemmo 2. Sumuu diyeemmo 3. Sumuu yeemmo 4. Lowontanni sumuu yeemmo	

516	‘eCHIS’ fayyimmate ekstenshiine looso shotu garinni harissanno/eCHIS has made it easier to provide health extension services	1. Lowontanni sumuu diyeemmo 2. Sumuu diyeemmo 3. Sumuu yeemmo 4. Lowontanni sumuu yeemmo	
517	‘eCHIS’ loosi’yara lowo horo/kaa’lo uyiitannoe gede afoommo/I find eCHIS to be useful for my job	1. Lowontanni sumuu diyeemmo 2. Sumuu diyeemmo 3. Sumuu yeemmo 4. Lowontanni sumuu yeemmo	

GOLA VI: Tekinolloje la”inohunni xaadanno qarra/Technology related factor

Aantete kiiro	**Xa’mo**	**Qolo/dawaro/response**	**Guma/Mark**
Horaammeette ikkitinota ‘eCHIS’ Buuxonna kalaqo/ Perceived Ease of Use and eCHIS design complexity			
701	Looso’ya keenate ‘eCHIS’ ledo noo”e xaadooshshi xawashshohonna shotu garinni leellannoho/My interaction with eCHIS in doing my task is clear and understandable	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
702	Konni baalunkura, horoonsirate ‘eCHIS’ shotate/Overall, eCHIS is easy to use	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
703	Ani ‘eCHIS’ horoonsire shotu garinni horoonsira dandeemmo/Work with	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral	

	eCHIS was easy for me	4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
704	‘eCHIS’ horoonsire barri’ya looso loosate soro diabbitannoe(dieessitannoe)/ The use of eCHIS for my daily duty does not confuse me	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
705	‘eCHIS’ Daassesaho(navigate) shotu garinni horoonsira dandiinanni/eCHIS is easy to navigate	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
706	‘eCHIS’ horoonsira’ya anera taalo ikkitino mashalaqqe heedhannoe gede fa’laasho uyiitannoe(kaa’litannoe)/Using eCHIS enables me to have more accurate information	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	
707	‘eCHIS’ kalaqo shotu garinni horoonsi’nannite/e-CHIS design is easy to use	1=Lowontanni sumuu diyeemmo 2=Sumuu diyeemmo 3=Hedo beeqqannokkiho/aannokkiho/Neutral 4=Sumuu yeemmo 5=Lowontanni sumuu yeemmo	

Isilanchimmate paarte/gaamo

1. eCHIS uyiitanno horo maati?

_____

2. Horoonsirate aana xaaddanno qarranna foonqe/Challenges or Gaps faced during utilization

_____

_____

3. Horoon sidhanni rosoottoha rosicho xawisi/Describe any Lesson learnt during the utilization

_____

4. Ikkado ikkitinoti eCHIS baajeette uurrinshate noose/Does the organization have an adequate budget for eCHIS

_____

5. Aliidi qarra tirate ikkannoha woyi woyyitanno hedo maati?/What do you suggest workable solutions or recommendations solve the above problems?

_____

6. Ledote kaa'lo hasirattoha ikkiro xawisi

_____

_____