Status and Barriers of the Community Health Information System (CHIS) Implementation in Tiro Afata Woreda, Southwest Ethiopia

Muluemebet Abera Wordofa[1,3], Dawit Wolde Daka[2,3*], Ketema Lemma Abdi[3], Woinshet Nigatu[4], Netsanet Animut[4,5], Loko Abraham[4], and Asaye Birhanu Senay[2,3]

Abstract

Background: Quality data and appropriate information utilization are vital for the effective management of community-level health programs and interventions. In Ethiopia, the Community Health Information System (CHIS) has been implemented since 2012. However, little evidence exists regarding its implementation status. In Tiro Afata Woreda, southwest Ethiopia, this study sought to examine the factors that contribute to and hinder the adoption of a community health information system.

Methods: A mixed-methods design was used to conduct the study from March to April 2021 in 19 health posts (HPs), where key informant interviews were undertaken with 21 purposefully selected health extension workers. Based on the Performance of Routine Information System Management (PRISM) concept, a quantitative questionnaire was created. Descriptive statistics were used to analyze quantitative data, and an index was computed for the implementation status of CHIS. Thematic analysis was performed on qualitative data.

Results: A family folder was available in 13/19 HPs, integrated maternal and child health care in 15/19 HPs, and a family health card in 14/19 HPs. Overall, 6/19 HPs had folders, health cards, a field book, and a master family index, and 3/19 HPs had all the recommended tally sheets and CHIS tools. Fifteen out of nineteen HPs had shelves, 16/19 had tickler file boxes, and 14/19 had at least one trained health worker on data management and use. One out of nineteen HPs had properly practiced data quality reviews, and only two of the examined indicators (measles <1 year's coverage and under-five pneumonia cases diagnosed) out of five have met an accuracy target (verification factor: 0.9–1.1). Sixteen out of nineteen HPs have submitted reports on time. None of the HPs has practiced performance reviews, and only three out of the 19 HPs have prepared recommended data visualizations. Moreover, only 6/19 HPs have used routine data for planning. A shortage of health workers, overburdened tasks, a lack of supportive supervision and supply of tools, and language barriers (English) in completing tools are hurdles in implementing CHIS.

Conclusions: The performance of the CHIS was generally low. Data quality and information utilization were below the national target. Therefore, it is required that data management tools be supplied, supportive supervision must be strengthened, and data management tools must be produced in local languages for user convenience. [*Ethiop. J. Health Dev.* 2022;36 (SI-2)]

Keywords: Implementation, Barriers, Community Health Information System, District, Ethiopia.

Introduction

A strong health information system is vital for the proper management of community health programs. Key information is needed by community health workers (CHWs) to perform their duties, and managers need information to track their performance. Governments and donors also need the information to properly develop community health programs and track results in comparison to goals (1, 2). The purpose of Community Health Information Systems (CHIS) is to gather data about the delivery of health services and activities at the community level and to disseminate that data to CHWs, supervisors, program managers, monitors, and planners within the health system as well as to the communities they serve.

The community health information system is usually part of the health management information systems (HMIS) that collect data about services delivered at health facilities (2).

Globally, efforts have been made to strengthen community health information systems. However, in the majority of low- and middle-income settings, the quality of health data and information use remained inadequate. (3) The factors that affect data quality and information use in routine health information systems include technical, organizational, and behavioral factors (4). The challenges related to CHIS were the low technical capacity of the staff who manage CHIS, the burden of new data collection responsibilities on CHWs, redundant data collection, and cumbersome paper-based data (5, 6).

The government of Ethiopia introduced CHIS in 2010 as part of HMIS and rolled it out in 2012 (7). A study conducted in Ethiopia revealed that data quality and information use remained low among healthcare providers and healthcare managers. Likewise, at the community level, information consumption and data

[1] Department of Population and Family Health, Public Health Faculty, Institute of Health, Jimma University, Ethiopia
[2] Department of Health Policy and Management, Public Health Faculty, Institute of Health, Jimma University, Ethiopia
[3] Capacity Building and Mentorship Program (CBMP), Jimma University, Jimma Ethiopia
[4] Digital Health Activity(DHA), Addis Ababa, Ethiopia
[5] The Palladium Group, Washington DC 20004, USA
*Corresponding Author: dawit.daka86520@gmail.com; https://orcid.org/0000-0001-5465-6345

quality were also subpar. It also falls short of the national goals (7–9).

Assessing the implementation status and factors affecting implementation has paramount importance to improving and strengthening the community health information system, and the health system in general. Therefore, the purpose of this study was to evaluate the availability of CHIS technologies and infrastructure, data quality and information usage patterns, and implementation challenges for community health information systems.

Methods

Study Setting and Period

The study was conducted in Tiro Afata Woreda, one of the 21 Woredas in the Jimma zone, which is located 330 kilometers southwest of Addis Ababa. As of 2013 E.C., the woreda has a total population of 170,641 with a male population of 83,614. The woreda has five health centers, 25 HPs (23 rural and 2 urban), and one primary hospital that serve the catchment population by offering services for health promotion, illness prevention, and curative care. The study was conducted from March to April 2021. Figure 1 shows a map of the research area.

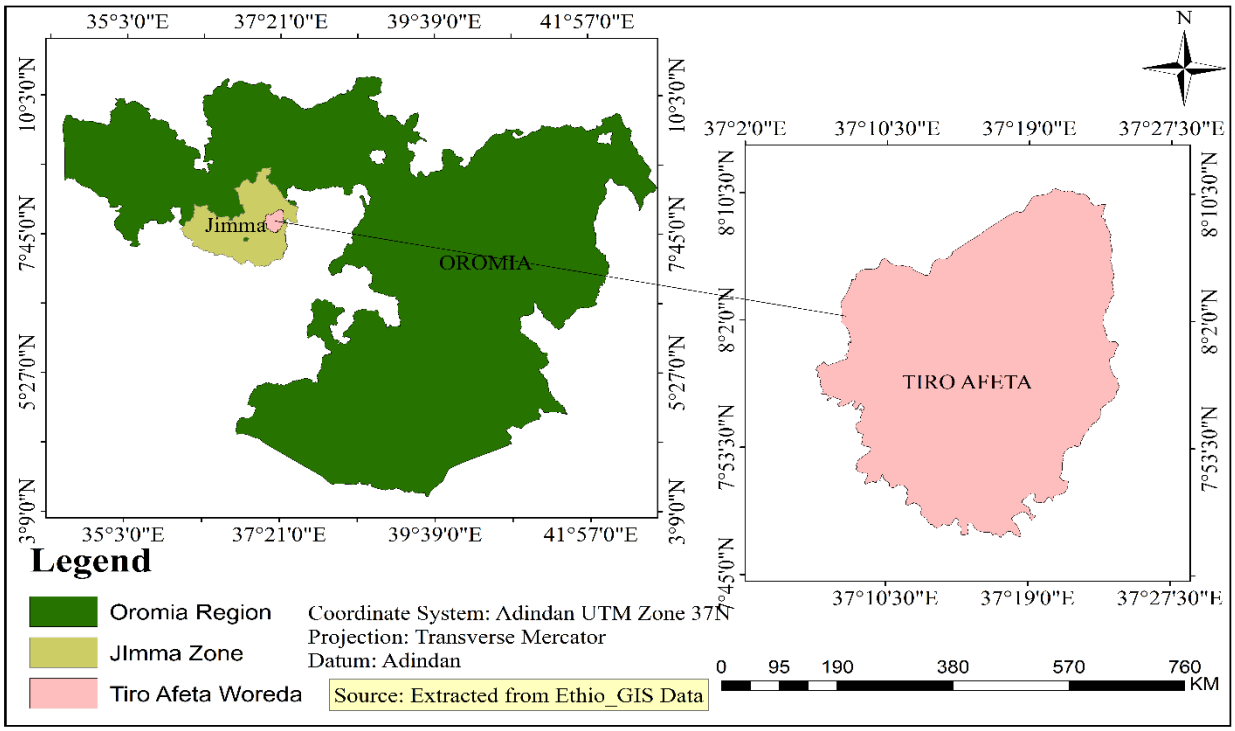

Figure 1. Map of the study area

Study Design and Participants

For this study, a mixed-methods design was used. All health posts in the woreda and health extension workers who presented at health posts on the date of the survey were included in the study. In each health post, one purposefully selected health extension worker participated in key informant interviews. The health extension workers were selected based on their service experience at the study health post and the position they hold.

Data collection

Structured questionnaires for quantitative studies and unstructured questionnaires for qualitative research were used. The quantitative questionnaire was developed based on the Performance of the Routine Information System Management (PRISM) framework and consisted of modules on the Routine Health Information System (RHIS) Diagnostic Tool, the Health Facility Office Checklist, and the Organizational and Behavioral Assessment Tool (OBAT) (10). The overall CHIS implementation status was measured using the Information Revolution (IR) criteria and checklist developed by the Ministry of Health of Ethiopia. The criteria comprised CHIS structure (30%), data quality (30%), and information use (40%) (11). The qualitative questionnaire was developed based on the aim of the study.

A quantitative questionnaire was uploaded into the Open Data Kit (ODK), and data collection was assisted by tablets. The qualitative questionnaire was translated into Afan Oromo by an expert translator and back-translated to English by an independent expert for consistency. To gather qualitative data, data collectors used a tape recorder and also recorded field notes.

Data collectors were health informatics technicians with a diploma or above. Supervisors were public health professionals with Master's degrees or above. The questionnaire, data collection methods, and research ethics were covered in a three-day training session for data collectors and supervisors. Supervisors have monitored the overall data collection process and provided feedback daily.

Data processing and analysis

Visual scanning and running frequencies were used to verify the completeness and consistency of the data values.

Quantitative data were analyzed using SPSS version 21. The characteristics of health posts and health extension workers were described. Following it, the main outcome variables (availability of CHIS tools and infrastructure, data quality, and information use) were analyzed.

The qualitative data were transcribed into the original language and then translated into English. Coding was done to highlight specific themes or categories as a preliminary analysis. Cross-checks were made on the topics that arose from the analysis. Finally, a rich description of the barriers and facilitators of CHIS was written. The validity of the results and the triangulation was checked using several data sources.

Results

Four of the total 23 rural HPs in the woreda (n = 4) were closed since they had no HEWs on the assessment day because of other commitments. Thus, a total of 19 HPs were included in the study. Furthermore, a total of 21 HEWs were interviewed. The mean age of HEWs was 26 years (SD 2.7), with a minimum age of 21 years and a maximum age of 35 years. Twenty of the twenty-one HEWs had completed the 10th grade, and one had finished the 12th. Eighteen HEWs had level-3 education (a certificate), and three HEWs had level-4 education (a diploma). The service experience of HEWs ranged from 1.5 years to 17 years. Seventeen HEWs have received CHIS training, and of these, 7 HEWs were trained in the last 12 months of the survey period.

Availability of CHIS Resources

Health Extension Workers(HEWs) availability and Community Health Information System (CHIS) Training

Five of the nineteen health posts had one health extension worker (HEW), nine had two (9/19), four had three (4/19), and one had four (1/19). Seven of the total visited HPs had at least one HEW with a level four education, whereas 14 of the total visited HPs had at least one HEW with a level three education.

Fourteen HPs had at least one trained HEW on CHIS in the last 12 months of the survey date on any of the following topics: data recording, folder maintenance, reporting, eCHIS, data quality, data analysis, and information use. In 4/19 HPs, at least one HEW was trained on the National Classification of Diseases (NCOD), and in 7/19 HPs, at least one HEW was trained on Community-Based Surveillance (CBS) of COVID-19 using eCHIS.

Infrastructure

Eighteen out of 19 HPs had separate HP structures built for HP services, and the remaining HPs provided services at kebele offices. One out of every 19 HPs had access to electricity, while fifteen of them had enough shelves for family files, sixteen had tickler file boxes, one had communication equipment (a landline phone), fourteen had coverage for mobile networks, and thirteen had access to the internet.

The family folder was available in 13/19 HPs; integrated maternal and child health cards were available in 15/19 HPs; family health cards were available in 14/19 HPs; hygiene and sanitation cards were available in 10/19 HPs; nutrition cards were available in 10/19 HPs; integrated communicable and tropical disease cards were available in 11/19 HPs; TB treatment follow-up cards were available in 10/19 HPs; and the field book and master family index were available in 10/19 HPs. From the additional registers required at the HP level, 13/19 HPs had CBNC registers and 15/19 HPs had iCCM registers. Overall, 6/19 HPs had the family folder, cards, field book, and master family index.

Service delivery tally sheets were available in 12/19 HPs, disease information tally sheets in 10/19 HPs, tracer drug availability tally sheets in 7/19 HPs, and family planning methods dispense tally sheets in 9/19 HPs. Only 3/19 HPs had all of the recommended tally sheets.

In total, 12/19 HPs had the necessary quarterly, annual, and monthly reporting formats, and 3/19 HPs had all of the CHIS tools that were required.

Availability of CHIS designated staff and training status

In 18/19 HPs, all HEWs were involved in reviewing the quality of compiled data before submission to the next level. In one HP, the data quality was examined, although not all HEWs were involved. In 13/19 HPs, all HEWs were trained on CHIS data compilation and entry, and in 9/19 HPs, all HEWs were trained on CHIS data review and quality control in the last 12 months before the survey period (Table 1).

Table 1. Availability of designated staff and training status at HPs of Tiro Afata Woreda, April to March 2021

Indicators	Frequency
Number of HPs with all HEWs trained on-	
CHIS data compilation and entry in the last 12 months	13
CHIS data review and quality control in the last 12 months	9
Number of HPs with some HEWs trained on-	
CHIS data compilation and entry in the last 12 months	1
CHIS data review and quality control in the last 12 months	1
Number of HPs with all HEWs trained on-	
CHIS data compilation and entry before the last 12 months	2
CHIS data review and quality control before the last 12 months	2
Number of HPs with some HEWs trained on-	
CHIS data compilation and entry before the last 12 months	2
CHIS data review and quality control before the last 12 months	1
Number of HPs with no trained staff on-	
CHIS data compilation and entry	1
CHIS data review and quality control	3

Availability of standard written definitions for indicators

Only 1/19 HPs had access to the CHIS users' guidelines, and none of the HPs had a definition guideline for the indicators.

Data quality

Data Accuracy

Eighteen out of 19 HPs provided and reported penta3 immunization services. Source documents were available and completed only in 13/18 HPs, and reports were available and completed in 16/18 HPs.

Sixteen out of nineteen HPs provided and reported measles (<1) immunization services. Source documents were available and completed only in 10/16 HPs, and reports were available and completed in 13/16 HPs.

All of the HPs provided family planning (FP) services. Source documents and reports were available and completed in 14/19 HPs.

Sixteen out of 19 HPs provided and reported malaria diagnosis and treatment services for children under five. On 11/16 HPs, source documents and reports were available and complete.

Seventeen out of 19 HPs provided and reported pneumonia diagnosis and treatment services. In 13/17, HP's source documents and reports were available and complete.

The major reasons for the unavailability of source documents were storage or archiving problems and a stockout of cards and tally sheets. Whereas incompleteness of CHIS tools was caused by workload or data burden, shortage of staff, inappropriate use of CHIS tools (cards and tally sheets), lack of knowledge regarding data elements, and user unfriendliness of the recording tools. The reporting of services without recording (documentation) was caused by staff shortages and the data burden. The HEWs did not effectively use the disease tally sheets that were accessible at the HPs. The main reasons for the reports' unavailability were storage or archiving problems (lack of proper filing), the absence of designated staff, and a stockout of reporting forms. Whereas, the incompleteness of reports was caused by the presence of other vertical reporting requirements, data burden (too much data being recorded by HEWs), shortage of staff or workload, inappropriate use of CHIS tools (documentation was not done according to the recommendations), user unfriendliness of reporting tools, and the HEWs lack of knowledge of the reported data elements.

The data accuracy score (verification factor) of the HPs was in the acceptable range ($0.9<VF<1.1$) in the two examined indicators (measles <1 year's coverage and under 5 years' pneumonia diagnosis). In the remaining indicators, a data quality problem (over-reporting) was observed (Figure 2).

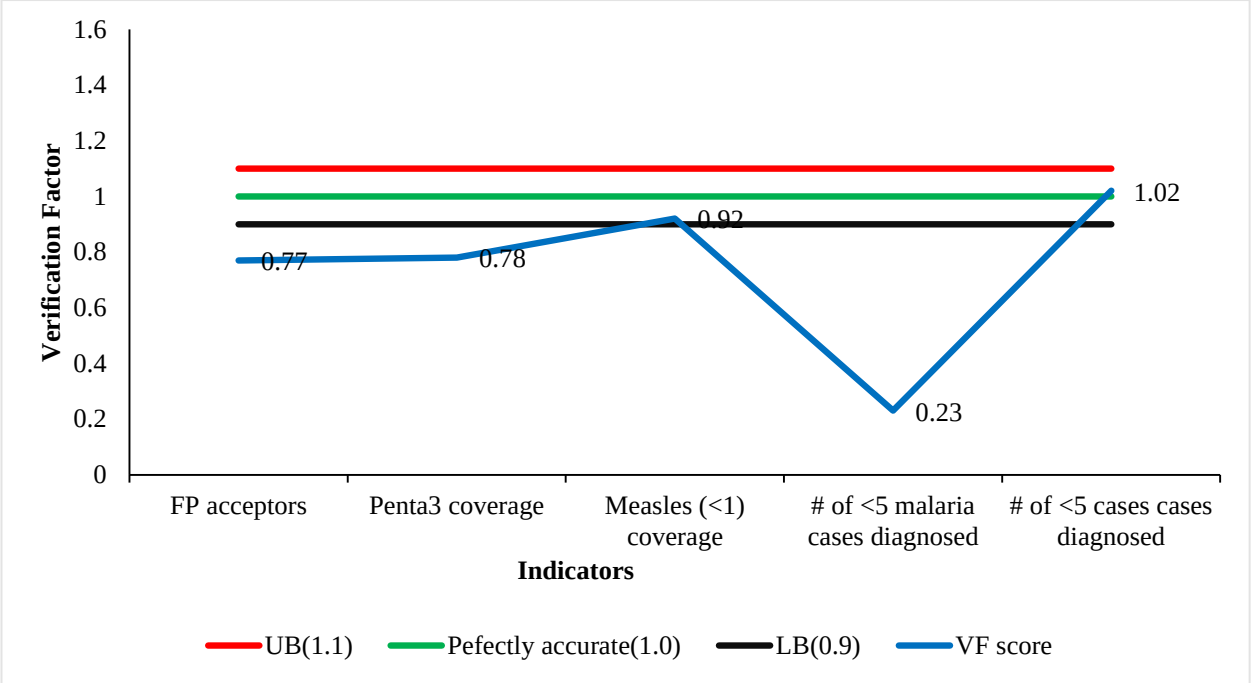

Figure 2. Level of data accuracy at HPs of Tiro Afata Woreda, April to March 2021
Abbreviations: UB, upper bound (110% or 1.1); LB, lower bound (90% or 0.9); VF, verification factor; FP, family planning.

The main reasons for the discrepancy between a source document and reports were the lack of emphasis given to data accuracy by HEWs, the inability to correctly compile information from all source documents, illegible writing on the source document by service providers (not readable), data burden (too much data being reported), a shortage of HEWs, data entry, and arithmetic errors, and the unavailability of CHIS tools., In HPs with a single HEW, not all services were fully documented or properly converted to reporting formats. Due to the unavailability of CHIS tools (cards and field books), the HEWs were sometimes forced to use blank A4-size paper to record services provided and were unable to record services provided during home-to-home visits and outreach-based services.

Report timeliness

Out of the 19 HPs, 16 HPs have submitted the last three-month reports (Tikimt to Tahisas 2013 E.C. or October to December 2021) of the survey period to the next supervisory level (health center) on time.

Data quality assessment

Only 2/19 HPs had access to the CHIS user manual that explains data quality check protocols, and 10/19 HPs had access to a paper-based data quality self-assessment tool or sheet.

Eleven out of 19 HPs have conducted at least one of the expected monthly data quality assessments (LQAS) in the last 3 months of the survey period. In October, 9/19 HPs conducted service report LQAS only, and 2/19 HPs conducted both service report and disease report LQAS.

In November, service LQAS was conducted in 9/19 HPs, and each disease LQAS and both reports LQAS were conducted in 1/19 HPs. Whereas, in December, 10/19 HPs conducted service LQAS, and 1/19 HPs conducted both service and disease LQAS. Only 1/19 HPs have performed both of the recommended LQAS in all three months (Figure 3).

Ten of the 19 HPs kept track of facility data accuracy self-assessments completed within the last three months of the survey's start date, and four of the 19 HPs kept track of staff feedback on data quality evaluation results.

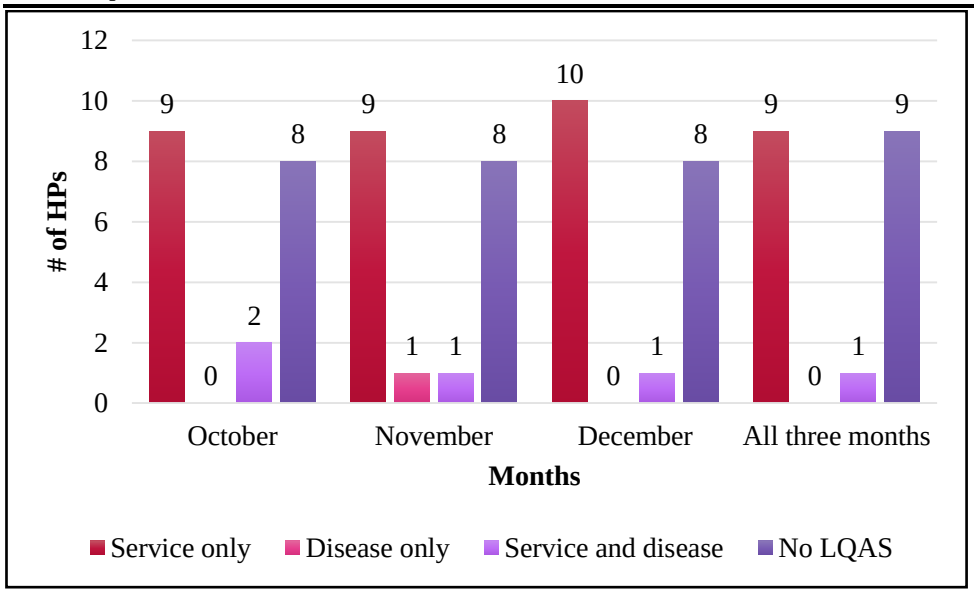

Figure 3. Data Quality Assessment Practices of HPs in Tiro Afata Woreda, April to March 2021

Information Use

Regarding the electronic health information system (eHIS) for data entry and analysis, none of the HPs uses an electronic database or system to enter and analyze routine health data (eCHIS).

Two out of 19 HPs had up-to-date aggregated or summary RHIS reports for the last 3 months of the survey date, and 10/19 HPs had up-to-date demographic data on the catchment population of the health facility to calculate coverage. Similarly, ten out of 19 HPs had up-to-date indicators (e.g., Penta3 coverage) calculated for the health facility catchment area for the last three months of the survey date.

Seven out of 19 HPs had information related to comparisons between health posts and district or national targets and information related to comparisons of data over time, i.e., monitoring trends (e.g., for ANC, Penta3).

Six of the 19 HPs contained information relating to sex-disaggregated data comparisons (e.g., an OPD visit), and eight of the 19 HPs contained information relating to service coverage comparisons between related services (e.g., Penta1 vs. OPV1, Penta3 vs. OPV3).

Only 3 out of 19 HPs have prepared data visuals (graphs, tables, maps, etc.) showing achievement towards targets. An up-to-date map of the catchment area was available in 3/19 HPs; an up-to-date catchment population profile was available in 1/19 HPs; up-to-date staffing information was available in 1/19 HPs; up-to-date calculated ANC, penta3, and measles coverage information were available in 1/19 HPs; and up-to-date calculated malaria (all ages) and pneumonia (<5) information was available in 2/19 HPs.

Only 1 out of 19 HPs has produced a report (quarterly or annual report) other than routine reports produced and submitted to higher levels based on analysis of CHIS data.

Only one respondent from one HP out of 19 knew about Performance Monitoring Team (PMT) and none of the HPs conveyed PMT meetings in the last 3 months of the survey period. Eighteen out of 19 HPs had annual plans for the current year and in 9/19 HPs HEWs reported that they have used CHIS data for annual planning. However, only the 6/19 HPs plan has reflected the use of CHIS data for target setting.

Fourteen out of 19 HPs have submitted or presented their performance report to the Kebele administration in the last 12 months of the survey date. But only 5/14 HPs have used CHIS data to show HP progress and only 1/14 HP shared reports with the community. Twelve out of 19 HPs have held performance review meetings with community representatives in the last 6 months of the survey date (e.g., with the kebele council, health development army leaders, etc.)

CHIS supportive supervision and mentorships

Sixteen out of 19 HPs were visited or supervised by staff from the Health center or WorHO at least once in the last 3 months of the survey date. Out of these, 8/16 HPs were supervised four and more times, and 4/16 HPs were supervised two times and one time, each.

Supervisors have used integrated supportive supervision or CHIS checklist in their most recent supervisions provided to 11/16 HPs, and supervisors checked data quality and discussed HP performance based on CHIS information in their most recent supervisions provided to 7/16 HPs.

Supervisors helped HEWs to take corrective actions based on the discussion in the most recent supervisions given to 6 out of 7 HPs and they send reports or written feedback on the last supervisory visit in the supervision given to 7/16 HPs.

Woreda health office (WorHO) gave CHIS mentorship to 4/19 HPs in the last 3 months of the survey date, and of these, written mentorship feedback was provided to 1/4 HP.

CHIS status of HPs based on Information Revolution (IR) criteria

Health posts assessment was conducted using the HIS connected woreda checklist and IR criteria developed by the Ministry of Health of Ethiopia. Accordingly, 16/19 HPs were in the 'emerging category (HIS score <65%)' and 3/19 HPs were categorized as 'candidate (65-<90%)'. The HIS Scores of emerging HPs ranged from 25% (Rega Siba HP and Awano HP) to 61% (Kejelo HP and Medale HP). The candidate HPs were Omo Chala (HIS Score=75%), Micha (HIS score=71%), and Tiyo (HIS score=66%) (Table 2).

Table 2. HIS status of HPs at Tiro Afata Woreda, March to April 2021

Health Center	Health Post	HIS Structure (30%)	HIS DQ (30%)	HIS IU (40%)	Overall HIS Score (100%)	HIS Ranking
Raga Siba HC	Rega Siba	14	6	5	25	Emerging
	Micha	17	16	38	71	Candidate
	Tubena	14	16	19	49	Emerging
	Tiyo	17	26	23	66	Candidate
	Lelisa	14	14	9	37	Emerging
Dimtu HC	Decha Nedi	19	20	11	50	Emerging
	Koticha Gibe	20	16	0	36	Emerging
	Kejelo	20	17	24	61	Emerging
	Afeta	20	22	11	53	Emerging
Ako HC	Keneni	14	20	14	48	Emerging
	Kitinble	25	20	14	59	Emerging
	Ako Badiya	25	20	18	63	Emerging
	Medale	25	22	14	61	Emerging
	Bidaru	14	16	9	39	Emerging
Busa HC	Omo chala	25	22	28	75	Candidate
	Babo	17	22	20	59	Emerging
	Busaa	20	24	13	57	Emerging
Decha Gibe HC	Awano	15	5	5	25	Emerging
	Boneya	14	1	14	29	Emerging

Abbreviations: HC, health center; HIS, health information system; DQ, data quality; IU, information use

Drivers and barriers to CHIS implementation

Theme 1: CHIS implementation: benefits, barriers, and facilitators

In the district, CHIS implementation was started following the training given by WorHO. Previously HEWs have been using registration books to record services provided. But following the introduction of CHIS, they started to use CHIS tools to record households' and members' information as well as provide health services.

P_2: A 27 years old, Level-4 HEW said that:

"We have been using CHIS tools since it was introduced in the Woreda. Initially training was given to us and we have started to register households and their members".

"Previously we have been using registers to record services provided. Registers couldn't give us comprehensive information as CHIS does. On CHIS we can get information on all populations, number of death and birth, number of children, and total population in the Kebele". [$P_{1:}$ A 24-year-old HEW]

The HEWs reported that the implementation status of CHIS ranged from partial implementation to very good implementation. The barriers to implementing CHIS were high workload due to overburdened tasks beyond routine HEP, inadequate HEWs at HPs, absence of refresher training on CHIS, inadequate supply of CHIS tools, and absence of regular supportive supervision. Most of the HEWs agreed that they were responsible for many activities other than routine HEP tasks.

$P_{17:}$ A 24 years old Level-3 HEW said that:

"To implement CHIS presence of trained HEW on CHIS and an adequate supply of CHIS tools can be considered as facilitators. High workload, especially unexpected campaigns, lack of human resource (HEW), and absence of supportive supervision from the

higher body (health center and woreda health office) at our health post are barriers to implement CHIS".

"The barriers to CHIS implementation were scarcity of resources and workload. We have workload as a big challenge. We are doing a work which cannot be implemented by one or two persons, we are doing a lot of things. We are two in number at this HP, we have a large population in the kebele. By now, the HEP [health extension program] has 18 components, and in addition, there are a lot of activities we have to do including cleaning the rooms. Therefore, there is a huge workload on us. The other is lack of training or refresher training. Some activities need to be reported, but we couldn't do it because of a lack of training on how to report. The activities we do and the things that appear in the reporting format did not match all the time. But above all, what challenges us is lack of reporting format whenever required". [P_{11}: A 30 years old Level-3 HEW]

"To mention the challenges, sometimes there is a lack of some cards, particularly cards for FP [family planning] service. During this time, when we lack the cards, we borrow from neighboring kebeles or wait until the card is printed and sent to us from the district or the zone. CHIS has seven different cards, but only some of them are available here. Therefore, cards are scarce". [P_{12}: 23 year old level-3 HEW]

As a result of overburdened activities and a lack of support from supervisors, HEWs believe that they didn't successfully implement CHIS.

"The challenge for implementing CHIS is the lack of sufficient time for registering households and updating information. Whenever we plan to register and update information, other tasks are provided by Woreda and Kebele. We have been called for review meetings. ……. kebele call us for council meetings. Besides, there were routine services such as immunization, family planning, and other activities. There are also campaign activities. For example, we spent the last three months on the work of insurance. We have been visiting home-to-home to discuss communities about membership of insurance. We are occupied and have no free time for CHIS registering". [P_6: A 25 year old Level-3 HEW]

In support of this idea, another HEW said that:

"*It was too hard to register all households and family members by going from home to home. To update household information, we must go home to home and ask for each piece of information or we should have this information at hand. It is very difficult to reach every HH [household] and update because we are overburdened by many obligations. No one understands this but requested us to update CHIS within a short time. Once registration is completed, it is easy to provide services using CHIS tools. The other challenge is the lack of support from the health center and the Woreda health office. No one guides us".* [P_4: A 25 years old Level-3 HEW]

"It is difficult to register and update household and member information. To get the information you must go home to home. To go home to home, you must have sufficient time. We don't have time because we are overburdened by many obligations. We work as a cadre for the Kebele, there are routine works, campaigns, and other additional responsibilities from the Woreda health offices". [P8: A 23-year-old Level-3 HEW]

Whereas, the facilitators of CHIS implementation were the existence of partner support on data quality, and the presence of trained HEW.

"Presence of partners support on data quality, especially incentive support from CORDAID [Partner] and presence of trained health extension worker on CHIS can be considered as facilitators to implement CHIS". [P_{16}: 23 years old Level-3 HEW]

Theme 2: Acceptability and User Friendliness of CHIS

Most of the HEWs agreed that CHIS was user-friendly to complete. The tools were friendly and comfortable to take to outreach areas or home-to-home during service provision. However, the HEWs reported that the language barrier has challenged them to properly understand and record some important information on the tools. They also mentioned that tally sheets were difficult to complete though it improves the quality of reporting. The reason for this was the HEWs are required to use household numbers rather than sticks to record services provided on tally sheets.

P_1: A 24-year-old Level-3 HEW said that:

"CHIS tools are acceptable and easy to complete. All cards, tally sheets, report formats, and registers are friendly. The tools are understandable and easy to complete and use. Of the tools, the tally sheet is partly difficult as we document household numbers".

HEWs mentioned that CHIS was partly understandable because it is not prepared in the local language (that is in Afan Oromo). As a result, there were times in which HEWs consult others to complete registrations.

"CHIS tool is partially understandable because available tools are prepared in the English language. There was no card in the Afan Oromo language. All are available in English. I ask support from other individuals and try to use the cards as much as possible" [P_{10}: A 30 years old Level-3 HEW]

"CHIS tools are not simple to understand and complete. Because of a language barrier (English), it is not simple to understand the tools". [P_{14}: A 25 years old Level-3 HEW]

Discussion

The main aim of the study was to assess the implementation status and explore drivers and barriers to CHIS implementation. Though the existence of a trained health workforce and CHIS tools is critical to the effective implementation of CHIS, variations were observed in the availability of trained HEWs, CHIS tools, and CHIS infrastructure across the assessed HPs of the district. The use of CHIS cards varied as well, with some cards being used by the majority of HPs and others being used by only a small percentage of HPs. There was a major data quality problem in terms of

data accuracy at HPs, and the data timeliness rate of HPs in the district was less than the national target. Data quality assessments were conducted less frequently and varied among HPs. While none of the HPs have held Performance Monitoring Team meetings in the past three months since the survey date.

The majority of HPs had at least one trained HEW on CHIS, and 75% of these HEWs were trained in the last 12 months of the survey date. In greater than two-thirds of the HPs, all HEWs have been trained on CHIS data compilation and entry, and in less than half of the surveyed HPs, all HEWs were trained on CHIS data review and quality control. Though training of health workers is associated with proper data management and use in the HMIS (12, 13), CHIS training had low coverage in the studied HPs. In addition to training, the effectiveness of the health extension staff at HPs has an impact on CHIS implementation. There were typically one to four health extension professionals available at each HPs in the district. A shortage of health extension workers coupled with overburdened activities beyond the HEP component of services were the major barriers to the effective implementation of CHIS at HPs in the district. This consequently affects data quality, information use, and the performance of health services.

Infrastructure for CHIS, including shelves and tickler file boxes, was available in more than three-fourths of the HPs. While internet coverage was available in slightly more than two-thirds of HPs, only one HP had access to electricity. There were differences in how CHIS cards were used by HPs; the integrated maternal and child card was the most frequently used, followed by cards for family health, sanitation, and hygiene. Less than one-fifth of the HPs have properly implemented the newly introduced CHIS tools. None of the HPs had CHIS indicator definition guidelines. One of the issues influencing proper routine data management and usage in healthcare facilities is the accessibility of data management tools (14). The lack of CHIS tools was identified as the major reason for low CHIS implementation at HPs in the district.

Though most of the HPs provide and report immunization, family planning, and sick child services, only some of the HPs have source documents and reports related to these services. The data accuracy score of HPs was in the acceptable range in only two of the five examined indicators (measles <1 year's coverage and <5 pneumonia cases diagnosed), and the remaining indicators (FP acceptors, penta 3 immunization, and <5 malaria cases diagnosed) showed a data quality problem. In that CHIS had poor data accuracy, this discovery was similar to one made in the Guraghe Zone in southern Ethiopia (7). Data load, lack of HEWs, lack of training and supervision, data entry and arithmetic errors, incomprehensible writing on source documents, and a lack of recording and reporting tools were the main causes of data inaccuracy in the investigated HPs. A similar finding was reported among community health workers in Kenya and Malawi, where the unavailability of data collection and reporting tools, inadequate training and supervision, a lack of quality control mechanisms, and inadequate register completion were causing data inconsistency (15).

The present study also revealed that the majority of HPs have submitted reports on time; however, an unacceptably significant proportion of HPs didn't meet the national target. Slightly more than half of the HPs have conducted at least one of the expected monthly data quality reviews (LQAS), and only a fraction of the HPs have performed both of the required LQAS. In Ethiopia, the level of routine health data quality at health facilities remained below the standard (8, 12, 13, 16, 17). Health facility data quality can be improved through training, supervision, and feedback (18), but the HEWs in the investigated HPs reported that refresher training and monitoring were frequently lacking. Decision-making is influenced by inaccurate and outdated data, which leads to poor program management and outcomes.

The national HMIS guideline recommends regular performance and data quality monitoring and reviews in a team (11). Despite this, none of the HPs have attended PMT meetings in the last three months since the survey date. Only a few HPs have created the aggregated or summary quarterly CHIS reports advised by the recommendation, and little over half of them have created recent demographic data and examined indicator data (such as penta3 coverage). Whereas slightly more than one-third of HPs have compared their performance with national targets and analyzed performance over time. Less than one-fifth of HPs have prepared the minimum display charts recommended by the guideline. Displaying demographic information and performance data for monitoring are factors associated with the use of health information for decision-making (19).

Analysis, evidence production based on existing CHIS data, and subsequent utilization of information were less practiced at HPs in the study area. Only a third of HP's plan has taken into account the usage of CHIS data for setting targets. Similarly, studies done in Hadiya and Guraghe zones have revealed low information utilization among health extension workers (7, 9). Another study done in Ethiopia also revealed that the utilization of health information was more likely among health workers at health centers compared with health posts (20). Lack of training in data analysis and interpretation, inadequate health data understanding, a lack of guidelines or manuals, and a lack of supervision and mentoring may all contribute to the low practice of data utilization.

On the other hand, the information generated at HPs is expected to be shared with other sectors and the community to enhance wider access and utilization. About three-quarters of HPs have produced and shared performance reports with the Kebele administration in the last 12 months since the survey date. The challenges in translating existing data into evidence and practice are attributed to the low data analysis and interpretation skills of health workers, a lack of motivating incentives, and the irregularity of supportive supervision (21). In the studied health posts,

there was a shortage of training and supervision, and this might have resulted in low data analysis and interpretation skills among HEWs. Generally, information utilization among health workers in Ethiopia remained low and below the national target, and this was attributed to a lack of supportive supervision and feedback, the unavailability of standard guidelines, a shortage of training, and low data management knowledge (22).

In the present study, staff from the health center and Woreda health offices supervised the majority of the HPs (84%). The frequency of supervision ranged from one time to four times. Half of the HPs were supervised four and more times, and the remained HPs were visited two or fewer times. The supervisors used a checklist only for two-thirds of HP visits and checked data quality and discussed HP's performance in less than half of their visits. Similarly, written feedback was sent from supervisors for less than half of supervised HPs. A qualitative finding supported this that health posts often lack supervision. This practice has a huge impact on CHIS implementation and its outcomes (including data quality and information use) at HPs (9). As in the case of other health workers in Ethiopia (14, 23), behavioral, organizational, and technical factors affect health extension workers' data management practices (24). This is shown in the studied health posts in that the recommended CHIS inputs, training, and supervision were lacking. This necessitates that interventions that aimed to improve community health information systems need to focus on these areas.

The community health information system is user-friendly in many aspects; however, the current study revealed that language barriers and difficulty in completing tally sheets were the major barriers to its proper implementation. Effective data administration and utilization are influenced by the usability of cards and reporting formats (25, 26). The identification of training of health workers, regular provision of CHIS tools, and supportive supervision with prompt feedback as facilitators of CHIS implementation.

The study examined CHIS implementation status, drivers, and barriers to implementation using mixed research methods and a validated framework (PRISM). The study was conducted in one district, and the findings may not be generalizable. However, the findings have relevance to improving CHIS in similar contexts.

Conclusions

Proper data management and use are critical for the effective management of community-level health programs and interventions, however, the community health information system at the studied HPs in the district has low performance in terms of data management inputs, data management practices, and information use. CHIS tools were frequently missing in HPs, and data quality assurance practices were less practiced. As a consequence, the level of data quality and information utilization remained below the national target. Language barriers, a shortage of HEWs, a scarcity of CHIS tools, and irregular supportive supervision were the major reasons for low CHIS implementation. Therefore, CHIS inputs should be supplied as needed, and HEWs should receive regular supportive supervisions. The standard of supervision needs to be raised, and prompt feedback must be offered. The quality of supervision should be improved, and timely feedback needs to be given. Moreover, CHIS tools (cards, tally sheets, and, and reporting formats) should be prepared in the local language for ease of use by HEWs.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Jimma University Ethics Review Board(Reference no. IHRPGD/561/22; 26th April 2021). Permission for record review was sought from the health institution and informed written consent was obtained from study participants. All computer-based data is password-secured. Data will not be shared with a third party.

Consent for publication

Not applicable

Availability of data and materials

The dataset used and/or analyzed during the current study is not openly available because it is part of an ongoing study or research project and is available from the corresponding author in SPSS on reasonable request. The data will be accessible openly when the research is completed.

Competing interest

The authors declared that they have no competing interests.

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