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Data Quality and Associated factors of Routine Health Information System at Public Health Centers of East Gojjam Zone, Northwest Ethiopia

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COLLEGE OF MEDICINE AND HEALTH SCIENCES

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DATA QUALITY AND ASSOCIATED FACTORS OF ROUTINE HEALTH INFORMATION SYSTEM AT PUBLIC HEALTH CENTERS OF EAST GOJJAM ZONE, NORTHWEST ETHIOPIA

PREPARED BY DEMEKE KASSA (BSC PH)

A THESIS RESEARCH SUBMITTED TO DEPARTMENT OF HEALTH SYSTEM MANAGEMENT AND HEALTH ECONOMICS, SCHOOL OF PUBLIC HEALTH, COLLEGE OF MEDICINE AND HEALTH SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIRMENTS FOR THE DEGREE OF MASTER IN GENERAL PUBLIC HEALTH

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Approval of Thesis for Defense

I hereby certify that I have supervised, read, and evaluated this thesis titled "data quality and associated factors of routine health information system at public health centers of East Gojjam zone, Northwest Ethiopia" by Demeke Kassa Mekonnen prepared under my guidance. I recommend the thesis be submitted for oral defense.

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Department Head	Signature	Date

Declaration

This is to certify that the thesis entitled "data quality and associated factors of routine health information system at public health centers of East Gojjam zone, Northwest Ethiopia", submitted to department of health system management and health economics, school of public health, college of medicine and health sciences, Bahir Dar university in partial fulfillment of the requirements for master's degree in General public health is a record of original work carried out by me and has never been submitted to this or any other institution to get any other degree or certificates. The assistance and help I received during the course of this investigation have been duly acknowledged.

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Approval of thesis for defense result

As members of the board of examiners**,** we examined **t**his thesis entitled "data quality and associated factors of routine health information system at public health centers of East Gojjam zone" by **Demeke Kassa Mekonnen**. We hereby certify that the thesis is accepted for fulfilling the requirements for the award of the degree of **"**master's in general public health".

Board of Examiners

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ABSTRACT

Background: -Good data quality from all relevant sources at district level play a major role to strengthen health system including health services, workforce, supplies, financing, and governance. However, evidences show that data quality is poor in Ethiopia especially at lower levels of the health care facility and it remains as a major challenge.

Objective: The objective of this study was to assess data quality and associated factors of the routine health information system at public Health Centers of East Gojjam Zone.

Method: A facility based cross sectional study was conducted from March 01-21/2020 among a total of 21 health centers and 350 health professionals. Data was collected by health professionals who were experienced and had training on HIS tasks after the tools were pretested. Data were analyzed by SPSS version 23. A multivariable logistic regression analysis was used to identify associated factors. Variables with p-value of less than 0.25 entered into multi-variable analysis. Then p-value of less than 0.05 at 95% CI was taken as significant.

Result: - A total of 336 health professionals were participated in the study with response rate of 96%.Completeness, timeliness and accuracy were 86.4 %, 85.7%, and 76.2% respectively. The overall data quality was 82.76%. Conducting accuracy test [AOR = 2.217, 95% CI: 1.122, 4.378], presence of standard indicators with their definition [AOR =2.154, 95% CI: 1.036, 4.477], Data management support [AOR = 2.013, 95% CI: 1.045, 3.877], get regular feedback based on evidence [AOR = 0.397, 95% CI: 0.185, 0.853] and training [AOR =0.469, 95% CI: 0.244, 0.904] were significantly associated factors with data quality.

Conclusion:-In this study, the overall data quality of East Gojjam zone public health centers was 82.7%. Training, strengthening data management support, avail standard indicators and regular feedback at health facilities are highly recommended. In addition continuous testing of data accuracy should to be provided to health care providers.

Key words: Data quality, RHIS, Health professional workers, East Gojjam zone.

ACRONYMS

ANC4	Antenatal fourth visit
CAR	Contraceptive acceptor rate
DHIS 2	District Health Information Systems version 2
E.C	Ethiopian Calendar
FMOH	Federal Ministry of Health
HC	Health Centers
HIS	Health Information Systems
HP	Health Professional
HSTP	Health Sector Transformation Plan
ICT	Information Communication Technology
PI	Principal Investigator
PMTCT	Prevention of Maternal To Child Transmission
PRISM	Performance Routine Information System Management
RHIS	Routine Health Information Systems
WHO	World Health Organization

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1. INTRODUCTION

1.1 BACKGROUND

World health organization (WHO) defines health information system (HIS) is a system that integrates data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services. It is one of the six building block that ensures the production, analysis, dissemination and use of reliable and timely information on health determinants, health system performance and health status [1, 2].

Since 1978 the Alma-Ata conference declared to develop and implement primary health care particularly in developing countries. The focus on primary care encouraged decentralization and the creation of health districts in developing countries. This set away leading to the development of the health information systems [3, 4].There is clear value in defining what constitutes a health information system and how its components interact with each other to produce better information for better decisions and better health [5, 6].

A well-functioning routine health information systems (RHIS) is an integrated effort to collect, process, report and use health information and knowledge to influence policy and decision-making, Programme action, individual and public health outcomes, and research [7, 8].
WHO describes data quality as a vital component of health information systems and the importance of the availability of health information is central to the use of the information for planning and decision making. Information must be reliable, up-to-date, independent and trustworthy [9, 10].Quality of data refers to the degree to which the data or statistics measure what was intended to be measured when the data collection system was designed. Data quality is a condition which results from the effectiveness of the data collection, data transmission, and data processing components .The idea with data quality is to ensure not that the data are perfect, but that they are accurate enough, timely enough, and consistent enough for the organization to make appropriate and reliable decisions [11, 12].

Good quality data from all relevant sources at district level play a major role to strengthen health system including health services, workforce, supplies, financing, governance and health information. Reliable and timely health information is an essential foundation of public health action and health systems strengthening, both nationally and internationally. This is particularly so when resources are limited and funding-allocation decisions can mean the difference between life and death. The need for sound information is especially urgent in the case of emergent diseases and other acute health threats, where rapid awareness, investigation and response can save lives and prevent broader national outbreaks and even global pandemics [13, 14].

The need for organized, accessible, timely, and accurate data for health decision making has become a growing concern. In response to this, the Ethiopian FMOH has undertaken an extensive reform and redesign of the national HIS. The reform has taken the major steps to respond to the deficiency of routine health data that limited the quality of care, planning and management systems, as well as decision making by managers at all levels in the health care system [12]. Therefore the health sector transformation plan (HSTP) considered a need for information revolution as one of the four transformation agendas which involves advancement on the methods starting from data collection to the use of information for decision. The focus of information revolution is not only on the method of advancement but also on the changes of culture and attitude toward information use. Improving health system efficiency and effectiveness through the guiding principles of standardizing, recording and reporting forms, integration, simplification, human resource development and ICT applications [1, 15].

Measuring the quality of health care has become a major concern for funders and providers of health services in recent decades. One of the ways in which quality of care currently assessed is by taking routinely collected data and analyzing them quantitatively [16, 4, 11].

Data that are accurate, complete and delivered on time to users is an important aspect in health care planning, management and decision making but quality of data is frequently assessed as a component of the effectiveness or performance of the HIS; however data quality assessment is not well consider at lower levels . This may lead to ignorance of data management and there by the unawareness of data quality problem [17, 18].

1.2 STATEMENT OF THE PROBLEM

A health information system is a system which expected to produce quality information in support of health system performance. In low- and middle-income countries, data are not optimally used for routine planning, monitoring and evaluation by the private or public sectors [7, 19].This is due to the lack of sharing of complete, accurate and timely data for decision-making [20].

In Ethiopia, data quality and reliability issues are not well guiding program decisions in all aspects [16]. Poor data quality at the lower administrative level or peripheral levels of woreda and health facilities, which are the source for majority of data used for decision making in the health sector remains a challenge as reported in 2016 annual reports of health sector transformation plan [21]. The performance of current health facilities highly depends on data quality. As a result, the poor quality of data can lead to customer dissatisfaction, increase in costs, and reduction in the effectiveness of decision-making [4] .

The need for organized, accessible, timely, and accurate data for health decision making has become a growing concern at national and international levels. In response to this, the FMoH has undertaken an extensive reform and redesign of the national HIS. The reform has taken major steps to respond to the deficiency of routine health data that limited the quality of care, planning, and management systems, as well as decision-making by managers at all levels in the health care system [12, 22].

However, study conducted in Eastern Ethiopia indicated that completeness, timeliness and the overall quality of data reporting were below national targets, with rates of 82%, 77% and 75.3%, respectively and Trained staff to fill format, decision based on supervisor directives and department heads seek feedback were the major factors that affect data quality. [23]. In the same study, 65% and 42% of health facilities used the information gathered for decision-making and for observing trends in service delivery, respectively [23].

In another study conducted in Jimma Zone, timeliness was determined to be poor with fewer than 50% of health posts, health centers and district health offices reporting within their given deadline. Thirty-eight percent of health workers recognized that their reports and registration books may contain inconsistencies [24] .

The study done in Amhara region showed that data accuracy level for health centers was 36.22% which was much lower than the national target and low level of data quality was reported as a gap which was below the national standard. This is due to many factors like lack of Training, lack of decision based on supervision, lack of feedback, data quality assurances are done less frequently ,limited skills of the health professionals [25, 26].

The study conducted in East Gojjam zone, showed that the overall data use, data for planning, data for feedback, data for only reporting and data for research was 38.4%, 52%, 24%, 80% and 6% respectively [27].

Even though, as reported on the 2011E.c annual HSTP performance report of Amhara national regional state and East Gojjam zone, improvements have been seen in data quality performance in the region, However , there is still a challenge in data quality and the report showed that there was a gap in completeness and timeliness of reports.

Therefore, this study aims in assessing the current status of data quality and associated factors of the RHIS at public health centers of East Gojjam zonal administration to improve the data quality and its use in decision making.

1.3 SIGNIFICANCE OF THE STUDY

To ensure high data quality of RHIS, the main causes of poor data quality and the factors that affect data quality has to be identified so this assessment was help to determine the current status of the data quality of RHIS according to accuracy, completeness and timeliness and shows are as that needs special attention and further follow up. This study contributed to identify factors associated with data quality for policy and program managers to take necessary intervention. It also informs for East Gojjam zone health department and facility managers on area of improvement and enhances the evidence based decision making. It was also help to improve the quality of health care delivery by enhancing decision making in East Gojjam zone.

2. LITERATURE REVIEW

2.1 RHIS data quality in developing countries

In most of developing countries, RHIS data is not well validated and analyzed; therefore, leading to poor data quality, which makes data incomplete, inconsistent, and inaccurate which results the RHIS do not provide the necessary information support for decision-making. Similarly a survey conducted in Nigeria showed poor data quality was one of the main challenge which is insufficient to support decision making [8, 28].

More over decision makers are searching for reliable data and evidence of best practices to guide the adaptation, implementation and scale up of many successful programs, the approach of establishing, strengthening, generating and using good quality of routine data in reporting system, for decision making is critical and considered as a key priority for program improvements [13, 19].

Most routine data are collected for immediate action. RHIS requires daily compilation of data on key elements which should be complete and immediate reporting of notifiable cases [16, 4, 2]. However, the study done in Malawi revealed that a number of facilities were not sending reports at all and some other facilities were not sending reports regularly .The facilities that were regularly sending reports were not reporting data on each element every month, and those sending reports regularly on each data element were still failing to capture all the records and completeness of routine data was a big problem [18, 7].

In addition a cross sectional study conducted in Kenya showed that level of data quality based on data availability, completeness, and accuracy and timeliness dimensions the overall data quality was 58% [29].

On the other hand, another study conducted in Rwanda showed good quality of data. Majority of the health facilities in all the districts accurately transmitted data from registers to health facility monthly reports and electronic databases (73.3%).complete reporting was seen with average percentage of 98% and 93.8% of timeliness [17].

Similarly the Study conducted in Malawi showed that the availability and completeness was 92% and 88% respectively. On contrary only 40% of the health facilities performed routine data quality checks [18]. In the same study the consistency checks of collected data routinely conducted data, regular use of data to calculate indicators, regular supervision visit from district and availability of reporting guide line were 41%, 53%, 52% and 34 [18] % respectively.

2.3. RHIS data quality in Ethiopia

Managing a health information system is about managing resources and functions to produce better outcomes. However, the study done in Southern regional state, Ethiopia showed that on average, close to two-thirds of the criteria for HIS governance and supervision were met. While those criteria were well managed, HIS procedural guidelines for quality standards were not available in 53% of the district health office, indicating inadequate directives to improving quality and performance. Only close to 45% of the planning and training criteria were met and only 10% reported presence of on-the-job trainings at district health office level [30, 31].

Similarly data quality assessment review in Ethiopia at health facility level showed that 38%, 34%, and 41% of facilities had trained staff on data collection and compilation, written guideline on reporting, and routine process for checking quality of reports, respectively and 91% of facilities report to government system and 65 % documented supervisory visit in the last six months. Only Fifty percent of facilities had clear instructions on how to complete reporting forms [16].

The study conducted in Dire Dawa, eastern Ethiopia showed the overall data quality was 75.3% which is below the national expectation level (85%) and the health centers data quality was 77%. 57.7% of feedback reports were available, 77.4% of department heads submitted reports on time and 68.6% also reported that they received directives to check data accuracy and fill formats completely [23].

A data quality assessment in Jimma zone, Ethiopia showed that the completeness and timeliness of facility reporting were highest 75% and 70%, respectively and lowest 34% and 32%, respectively [24] and other the study conducted in Hadiya Zone showed that accuracy, completeness and timeliness were 76 %, 83.3% and 88.4% respectively. Over reporting was

observed in all facilities and on all used indicators and in the same study only 52.2%,62.5%,55.3%and 11% respondents were trained on RHIS, had supervisory visits as per standard , got written feedback and assigned health information technicians respectively [32].

On the other hand the study conducted in Southern region state, Ethiopia showed that the data were not analyzed about 6% Zonal health department, 25% woreda health office and 61% health facilities. Sixty five percent (65%) of health facilities had one or more supervisory visits in the past 3months. The levels of confidence among respondents in woreda health office and health center were73% and 66% respectively [30].

The study conducted in Mekelle at Ayder referral hospital showed that Data consistency between register and the tally sheets was 72.2% even though the value difference was not largely seen the average data completeness and accuracy was 78.6% and 62.9% respectively [33].

Another study conducted in East Gojjam zone, showed that the overall data use, data for planning, data for feedback, data for only reporting and data for research was 38.4%, 52%, 24%, 80% and 6% respectively [25].

2.4. Factors associated with RHIS data quality

A study done in Kenya revealed that data quality is influenced by technical, organizational, and individual /behavioral factors and there were strong relationship between quality of data and lack of technique for carrying data quality check and lack of data quality protocol place [14].

A study in Benin showed management and planning capacity as well as the state of infrastructure was also factors that influence quality of RHIS. Human resource plays a major role in determining the quality of data and health workers competence within the scope of their training. Health facilities with well-trained staff and management capacity were found to have better quality health information systems. Large amount of data required in tools, format of data collection forms, demotivation of staff in RHIS activities and poor capacity [34].

On the other hand the study in Pakistan and south Africa on culture of reporting among nurses affecting data quality revealed that all six categories of organizational culture, including: nurse manager ability, leadership and support, nurse participation in hospital affairs, nurse participation in governance, nurse foundations of quality care, nurse-coworkers relations, and nurse staffing and resource adequacy, were positively associated with higher odds of error reporting culture. In addition, it was found that married nurses and nurses on permanent contract were more likely to report errors at the workplace [35, 36].

The study conducted in South Africa showed that 64% of the respondents had poor numerical skills and limited statistical and data quality checking skills, the average confidence levels at performing HIS tasks was 69%, 22% actually displayed competence above 50% personnel appear to be reasonably motivated but there is considerable deficiency in their competency to interpret and use data [36].

Furthermore the quasi-experimental study conducted in Nigeria showed that training was a statistically significant to increase in completeness of reporting ($p = 0.02$), overall accuracy rate ($p < 0.001$), timeliness rate of reporting ($p = <0.001$) and feedback [34].

Generally, the reviewed literatures suggest data quality is low in developing countries and affected by different factors. The studies identified the status of data quality which results from the process of data collection, data transmission and data processing and that result in low data quality in decision making. The studies also identified associated factors that affect the quality of RHIS data. Therefore, data quality is vital in facilitating evidence based decision making and promotion of culture of information use.

3. CONCEPTUAL FRAMEWORK

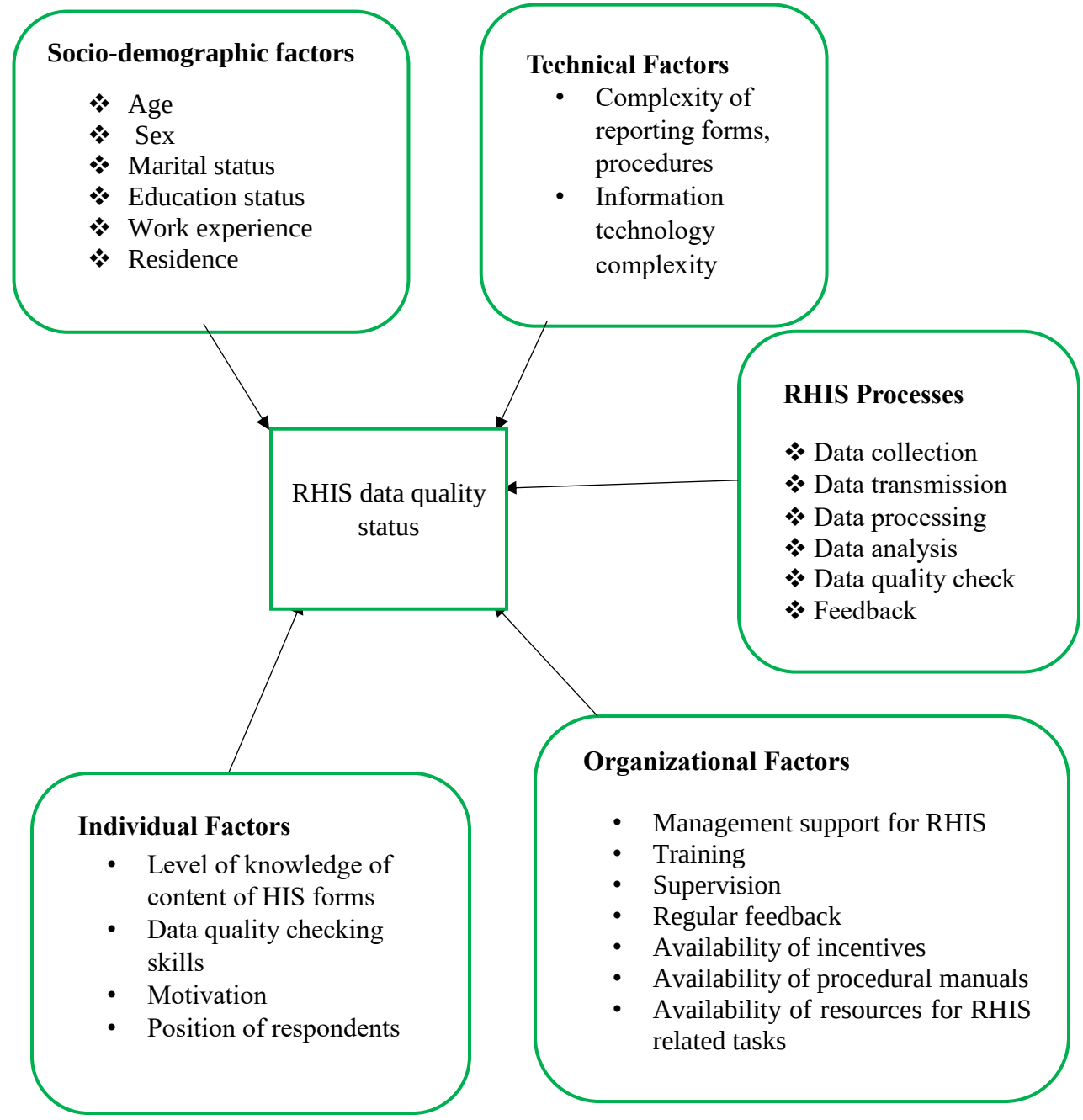


Figure 1:- Performance of routine Information System Management conceptual framework for RHIS data quality 2020. Adapted from W HO PRISM framework 2008.

4. OBJECTIVES

4.1 GENERAL OBJECTIVE

- To assess data quality and associated factors of routine health information system at public health centers of East Gojjam Zone, Northwest Ethiopia, 2020.

4.2 SPECIFIC OBJECTIVES

- To determine the status of data quality at public health centers of East Gojjam Zone.
- To identify associated factors of data quality of routine health information system at health centers of East Gojjam zone.

5. METHODS AND MATRIALS

5.1 Study area

The study was conducted at public health centers of East Gojjam Zone, North West Ethiopia which comprises of 19 woredas, 6 town administration, and 441 kebeles. The capital city of East Gojjam zone, Debre Markos is located 300 kilometers away from Addis Ababa. ,the capital city of Ethiopia and 255 Kilo meters from Bahir Dar, the capital city of Amhara Regional State. There is one referral hospital, 9 primary hospitals, and 102 functional health centers (HCs) using DHIS 2 as routine data management tool [37]. There are 3032 health professionals from different disciplines in the health centers of East Gojjam zonal administration [38].

5.2 Study design and period

A facility based cross sectional study was conducted from March 01-21/2020 to assess data quality and associated factors of routine health information system at public health centers of East Gojjam zonal administration.

5.3 Population

5.3.1 Source population

The source population was all professional health workers and all health centers of East Gojjam Zonal administration.

5.3.2 Study population

The study population was all professional health workers in randomly selected health centers and all health centers.

5.4 Sample size determinations for first objective

For accuracy, timeliness and completeness dimensions

WHO recommended for assessment of health facilities by considering the available funds and human resources, selecting 10%-50% facilities to have representative sample.

Among the total 102 health centers in the zone 20% of 21 health centers were randomly selected to assess data quality based on the suggestion [2]. Based on the national DHIS 2 information use and data quality manual, seven to nine data elements from each health center is satisfactory to assess data accuracy [16, 11].Data elements was selected randomly from top priority indicators at national level. Therefore, seven data elements from the 21 health centers was verified. Three months (September, November and February) documents was reviewed to check consistence of selected data elements of by random selection of the months from February 29/2019 to march 01/2020.

Sample size for the respondents self-administered questionnaires for second objective

Sample size was calculated using single population proportion formula based on the following assumption:82.5% of the Overall data quality from the study in the Hadiya zone southern Ethiopia [32],desired degree of precision will be 5% ,95% level of confidence interval, design effect 1.5 and a contingency of 5% for non-respondents.

These results final sample size of 350 and Out of the total 21 health centers was selected by the simple random sampling technique.

Sample size determination will be as follows;-

$$n= (Z^2\alpha/2 *p (1-p))/d^2$$

Z=the standard score corresponding 95% confidence level

p=proportion of the overall data quality in a study done in Addis Ababa university at the Hadiya zone southern Ethiopia.

d=margin of sampling error

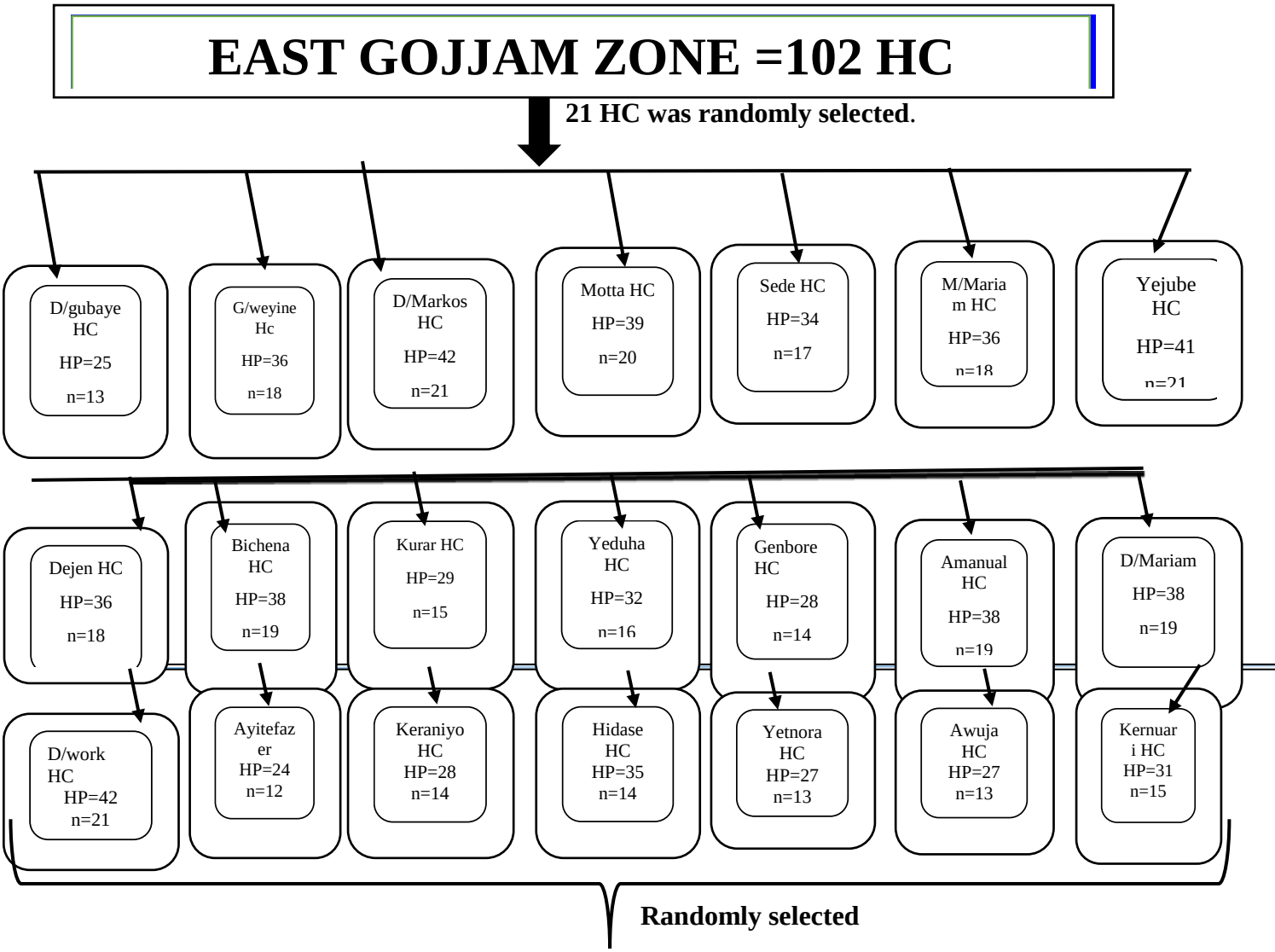
n=number of sample size

Table 1:- sample size determination for the study of data quality and associated factors in RHIS at public health centers of East Gojjam Zone North West Ethiopia from February 20/2020-March 20/2020.

S.no	Factors		Data quality	AOR(95%CI)	P-value	Sample size using Epi –info
1	Supervision	Yes	182(62.5%)	1.71*(1.00,2.95)	0.037	133
		No	109(37.5%)			
2	Confident level	Confident	183(63%)	1.75*(1.29,3.11)	0.047	123
		Not confident	108(37%)			
3	Data quality check	Yes	188(64.6%)	1.82*(1.49,3.09)	0.032	
		No	103(35.4%)			98
4	Filling registration or Tally completely	Yes	253(87%)	3.41*(1.3,8.7)	0.043	
		No	38(13%)			16

5.5 sampling procedures

Health professionals for self-administered questionnaire was selected by using simple random sampling technique specifically lottery method from 21 randomly selected health centers. The calculated sample size was proportionally allocated to each health center, then health professionals was selected randomly from their monthly payment list (payroll) who were involved in RHIS activities, from daily register of the source documents to the final report was included.



Proportional allocation to each HC= $(ni = (Ni \div N) \times n$

Where: - ni =number of health professionals who are needed for the study in each HC

Ni=total number of health professionals in each health centers.

N=total number of health professionals (709) in all (21) HCs.

n=calculated sample size

Figure 2:- Schematic presentation of sampling for assessment of data quality in East Gojjam zone, 2020.

5.6 Exclusion and inclusion criteria

Inclusion criteria

Health centers that were functional for at least one year

Health professional workers who were involved in RHIS activities.

Exclusion criteria

Newly appointed health professional workers within the last 12 months.

Health professional workers who were in annual leave period.

5.7 Data collection instrument and procedures

Data collection tools was adapting questionnaires from Standard tools, then translated by legal translators into Amharic from the PRISM assessment tools version 3.1 and DHIS2 user's guideline. The tool was prepared to fit with local context and it mainly contains questions to assess accuracy, completeness and timeliness of DHIS2 data. Self-administered structured questionnaire was containing sociodemographic information of the respondents' organizational, behavioral and technical determinants of data quality in health centers. The tool was pretested prior to actual data collection period on 5% of the sampled health professionals and **at Enema health center** found Hulet Ejju enesie woreda that was not included in the actual data collection to check reliability. Based on the pretest modification on logical sequence, simplicity, and clarity of questionnaire was not done since there was not any finding.

5.7.1 Data collectors

One public health officer professional as supervisor and two level four diploma HIT professionals was recruited for data collection, who was experienced and had training on RHIS related tasks. Training was given for the data collectors on the questionnaires, data collection method and procedures by the principal investigator for two days. During data collection period supervision of data collection procedures was conducted by principal investigator and supervisor and onsite technical assistance was given to data collectors. The data was checked for completeness and consistency on daily base. Appropriate correction was given by principal investigator and supervisor at any time during data collection.

5.8 Study variables

Dependent variables

RHIS data quality status

Independent variables

Socio-demographic factors

- Age
- Sex
- Education status
- Marital status
- Work experience
- Residence

Individual behavioral factors:-

- Knowledge of content of DHIS2 form
- Confidence levels for RHIS tasks
- Data quality check practice
- Motivation
- Position of respondents

Technical factors;-

- Complexity of the reporting formats and procedures,
- Availability of standard set of indicators with definition

Organizational factors;-

- Management support for RHIS
- Training
- Supervision
- Regular feedback
- Availability of incentives
- Availability of procedural manuals
- Availability of resources for RHIS related tasks

5.9 Operational definition

«Data quality» is further described in three dimensions: - completeness, timeliness, and accuracy. The overall data quality was calculated by taking the data report completeness, timeliness and accuracy scores. The overall data quality ≥ 85% was considered to be quality data based on the national standard [17].

«Data accuracy » was measured by calculating the number from source document over the number from report submitted to the woreda health office[9] .

Based on 10% tolerance for data accuracy will be classified as follows;-

Over reporting (<0.90or90%),

Acceptable limit (0.90-1.10 or90%-110%)

Under reporting (>1.10or110%)

«Content completeness» was measured by the number of cells of report form which are left blank without indicating "zero". If greater than or equal to 90% of cells of the report filled will be considered as complete [20]. Completeness is measured not only as filling in all data elements in the facility report form, but also as the proportion of facilities reporting in an administrative area (district). For grading health centers completeness the average of all departments were undertaken. A tolerance level of 10 percent was used in grading health centers, which meant that each health center was expected to complete at least 90 percent of data elements on report formats. All data elements of 3 months DHIS 2 reports was reviewed to assess content completeness of reports.

«Report timeliness» was measured by proportion of facilities with number of reports delivered up to deadline come for the selected three months. A tolerance of 90% was used in grading health centers.

«Level of knowledge»: A health professional was considered to knowledgeable if they responds the seven knowledge questions above respondent mean score.

«Health worker professionals»: any health professionals (health officers, nurses, Lab technician/ Technologist, Midwifery, Pharmacy technician /Pharmacist. Health information technician) involved in recording and reporting of health information

5.10 Data processing and analysis

After data collection, each questionnaire was checked for completeness, missings and edited for other errors. Data was entered into Epi-data version 3.1 and exported to SPSS version 23 for further analysis. Before analysis data was cleaned and checked for outliers and missings.

Descriptive analysis like frequency tables, graphs, means and standard deviations was computed. Binary and multiple variable logistic regressions were performed to examine the presences of association between variables. Data were presented using Odds ratios (OR) and their 95% confidence intervals (CIs). Variables with P-value less than 0.25 at bivariate logistic regression model was entered into multiple variable logistic regression model. Finally, multiple variable logistic regression model was carried out to identify predictors of data quality in the HIS. Variables with P value < 0.05 was considered as independent predictors of data quality. The overall data quality were calculated by taking the data report that was all complete, timeliness and accuracy scores.

5.11 Ethical consideration

The ethical clearance was granted from Bahir Dar University, College of medicine and health sciences Institutional Ethical Review Board (IRB) after reviewing the technical proposal. A supporting letter was taken from East Gojjam Health Department. Informed consent was obtained from health center administrators and study participants after clear explanation on study objectives, data collection procedures, data confidentiality and their rights. Participation was fully voluntary based. No one was able to access data other than the investigator.

6. RESULT

6.1 Socio-demographic characteristics

A total of 336 health worker professionals were participated in the study with response rate of 96%. Out of the total 336 respondents 18 health center heads (5.4%), 93 department and /service unit heads (27.7%), 17 RHIS focal (5.1%) and 208 health care service providers (61.9%) were participated in the study. The majority 212(63.1%) were male respondents. Almost two third 206(61.3%) of the respondents belonged to the age group of 20-29 years with the mean age of the respondents were 29.67 ± 4.54 and 241 (71.7%) respondents were married. More than two thirds of respondents 246(73.2%) hold level four diplomas and rest 90(26.8%) hold bachelor degrees. More than half 198(58.9%) of the respondents had ≥6 years working experience and 153(45.5%) were nurses. Only 116 (34.5%) of the respondents included were from urban place of residence. (Table 2).

Table 2: Socio-demographic characteristics of respondents in health centers of East Gojjam zone, Northwest Ethiopia, 2020 [n=336].

Variables	Category	Frequency	Percent %)
Sex of respondents	Male	212	63.1
	Female	124	36.9
Age of respondents	20-29	206	61.3
	31-40	112	33.3
	>=41	18	5.4
Marital status	Married	241	71.7
	Unmarried	95	28.3
Position of the respondents	Service providers	208	61.9
	Department/service unit heads	93	27.7
	Health center heads	18	5.4
	RHIS focal persons	17	5.1

Level of education	Level IV diploma	246	73.2
	First degree	90	26.8
Highest field of study	Nursing	153	45.5
	Midwife nursing	44	13.1
	Health Officer	56	16.7
	Laboratory	26	7.7
	HIT	18	5.4
	Pharmacy	39	11.6
Work experience	< 6years	138	41.1
	>= 6years	198	58.9
Place of residence	Rural	220	65.5
	Urban	116	34.5

6.2 Accuracy of data

A total of 21 health centers studied for data quality by accuracy, completeness and timeliness dimensions. Seven data items or indicators used for data accuracy. Service delivery reports and registration books were checked for the month September, November and February by random selection of the months. Seven indicators verified were Antenatal care fourth visit (ANC4), Contraceptive acceptance rate, Institutional delivery ,Pentavalent third doses(Penta3), PMTCT, Tuberculosis cure rate and confirmed malaria cases from top priority indicators at national level. From 21 health centers observed 14(66.7%) of health centers were within acceptable level of accuracy.ANC4, skilled delivery and PMTCT data was over reported by 4 health centers (19%). About 2(9.5%) of health centers were under reported tuberculosis cure rate and 3(14.3%) of confirmed malaria cases. Only three out of seven (42.8%) indicators were within 10% acceptable level. About 23.8% of births attended by skilled personnel were over reported (>10% tolerance level) followed by 19%, and 14.3% ANC4 data and PMTCT data were over reported (>10%). The overall accuracy of data was 76.2%.

Table 3: Accuracy of health centers in East Gojjam zone, Northwest, Ethiopia, 2020.

Variables	Matched report (%)	Over report (%)	Under report (%)
ANC4	17(81)	4(19)	0
Total number of births attended by skilled personnel	16(76.2)	5(23.8)	0
Under one year Penta valent third doses (check EPI records)	19(90.5)	2(9.5)	0
PMTCT	18(85.7)	3(14.3)	0
Tuberculosis cure rate	19(90.5)	0	2(9.5)
Total Contraceptive accepters(repeat and new)	20(95.2)	1(4.8)	0
Confirmed malaria cases	18(85.7)	0	3(14.3)

6.3 Completeness of data

Content completeness was measured by the number of cells of report form which are left blank without indicating "zero". If greater than or equal to 90% of cells of the report filled will be considered as complete [20]. Completeness is measured not only as filling in all data elements in the facility report form, but also as the proportion of facilities reporting in an administrative area (district). For grading health centers completeness the average of all departments were undertaken. A tolerance level of 10 percent was used in grading health centers, which meant that each health center was expected to complete at least 90 percent of data elements on report formats. All data elements of 3 months DHIS 2 reports was reviewed to assess content completeness of reports. Content completeness was assessed by checking three months service delivery report whether the required data elements in a report form are filled or data are complete. Based on this the overall content completeness was scored 86.4%.

6.4 Timeliness reports

Timeliness of the RHIS reports were assessed by checking whether RHIS data reporting by the health centers met the predetermined deadline of reporting period received by the facility head. Report timeliness was measured by proportion of facilities with number of reports delivered up to deadline come for the selected three months. A tolerance of 90% was used in grading health centers.

In this study the records of report receipt showed that 85.7% of the RHIS reports were submitted to district office according to the schedule, (between the 20th to 24th of the month for health centers). Based on the three dimensions of data quality which are the average of accuracy, completeness and timeliness the overall data quality of the health centers was 82.76%.

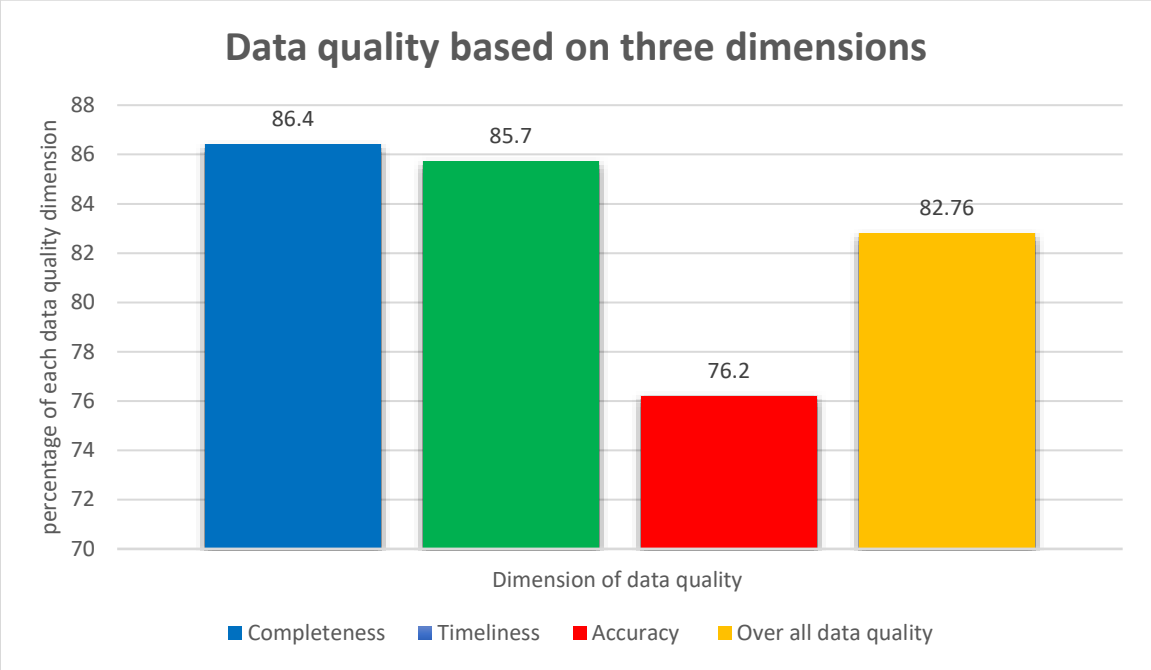


Figure 3:-Quality of data in health centers of East Gojjam zone, Northwest, Ethiopia, 2020.

In this study the cross tabulation of data quality shows that, completeness was associated with training and urban place residence .The timeliness of the report was associated with training, presence of standard indicators and urban place residence .The data accuracy was also associated with place of residence.

Table 4: Cross tabulation of data quality dimensions among health centers of East Gojjam Zone, Northwest Ethiopia, 2020.

Dimension of data quality	Response	Conduct accuracy test		X^2	COR(95% CI	p-value
		Yes (%)	No (%)			
Completeness	Filled	199(85.4)	91(14.6)	0.304	1.296(0.641,2.618)	0.582
	No filed	34(23.2)	12(7.4)			
Timeliness	On time	198	90	0.169	1.224(0.618,2.424)	0.681
	Not on time	35	13			
Accuracy	accurate	175(45.2)	58(13.4)	0.316	1.22(0.699,2.130)	0.574
	Not accurate	81(36)	22(5.4)			
Dimension of data quality	Response	management support		X^2	COR(95%CI)	p-value
		Yes (%)	No (%)			
Completeness	Filled	165(85.4)	27(14.6)	0.005	1,077(0.573,2.024)	0.945
	No filed	125(23.2)	19(7.4)			
Timeliness	On time	165	123	0	0.964(0.569,1.635)	1
	Not on time	27	21			
Accuracy	accurate	149(45.2)	107(13.4)	0.328	0.835(0.504,1.383)	0.567
	Not accurate	43(36)	37(5.4)			
Dimension of data quality	Response	Regular feedback		X^2	COR(95%CI)	p-value
		Yes (%)	No (%)			
Completeness	Filled	175(58)	115(11.3)	2.075	0.602(0.323,1.125)	0.15
	No filed	22(23.2)	24(7.4)			
Timeliness	On time	175	113	3.191	0.597(0.353,1.009)	0.74
	Not on time	27	26			
Accuracy	Accurate	197	40	2.778	0.631(0.381,1.045)	0.096
	Not accurate	139	40			
Dimension of data quality	Response	Presence of standard indicators		X^2	COR(95%CI)	p-value
		Yes (%)	No (%)			

Completeness	Filled	190(58)	23(11.3)	3.478	0.526(0.281,0.985)	0.062
	No filed	100(23.2)	23(7.4)			
Timeliness	On time	190	98	5.028	0.531(0.316,0.894)	0.025
	Not on time	23	25			
Accuracy	accurate	169	87	2.73	0.629(0.37,1.049)	0.098
	Not accurate	44	36			
Dimension of data quality	Response	Training		X^2	COR(95%CI)	p-value
		Yes (%)	No (%)			
Completeness	Filled	97(58)	193(11.3)	10.42	0.189(0.66,0.544)	0.001
	No filed	4(23.2)	25(7.4)			-
Timeliness	On time	97	191	11.39	0.212(0.078,0.573)	0.001
	Not on time	4	44			
Accuracy	accurate	84	172	3.346	0.553(0.305,1.003)	0.067
	Not accurate	17	63			
Dimension of data quality	Response	Place of residence		X^2	COR(95%CI)	p-value
		Rural (%)	Urban (%)			
Completeness	Filled	174(58)	116(11.3)	26.36	0.791(0.739,0.847)	0.0001
	No filed	46(23.2)	0			
Timeliness	On time	172	116	22.77	0.782(0.729,0.839)	0.001
	Not on time	48	0			
Accuracy	accurate	150	106	21.27	3.691(1.979,6.884)	<0.001
	Not accurate	70	10			

6.5 Participation in data quality process

Concerning participation of respondents in RHIS activities among 336 respondents 243(72.3%) participate in aggregation or compilation of data from registration. More than half of the respondents 233(69.3%) reported that they conducted data quality check but frequency of

conducting data quality varied among respondents about 84.5% them conduct data quality test on monthly basis. Overall 295(87.8%) of the respondents reported that they filled registration or tally sheet completely and 310(92.3 %) of the respondents registered all their activities on daily bases. Regarding feedback 197(58.6%) of respondents received feedback from next higher officials among those 94(47.7%) get feedback every three month. From total respondents 59.1% of respondents supervised once in last three months from higher officials regarding data quality.

Table 5: Participation in data quality process and behavioral factors among health professionals in health centers of East Gojjam Zone, Northwest Ethiopia, 2020.

Participation in data quality process		YES (%)	NO (%)
Received in-service training in last six months		53(15.8)	283(84.2)
Receive pre-service training on RHIS		72(21.4)	264(78.6)
Participated in aggregation or compilation of data		243(72.3)	93(27.7)
user friendliness of formats/easily understandable		285(84.8)	51(15.2)
Register all your activity on daily basis		310(92.3)	26(7.7)
Fill the register/tally sheet completely		295(87.8)	41(12.2)
Conduct data accuracy test		233(69.3)	103(30.7)
Frequently of accuracy test	Time	No	%
	Monthly	197	84.5
	Quarterly	26	11.2
	Semi-annually	10	4.3
Got supervision from higher officials		232(69)	104(31)
Number of supervision obtained	Numbers	frequency	%
	Once	137	59.1
	Twice	78	36.6
	Three times and more	17	7.3
Get regular Feedback		197(58.6%)	139(41.4%)
Frequency of regular Feedback	Time	frequency	%
	Monthly	82	41.6
	Quarterly	94	47.7
	Semi-annually	21	10.7
Presence of standard set of indicators with their definition		213(63.4)	113(34.6)
Kind of incentives	Type	frequency	%

	Recognition	86	83.4
	Training	11	10.7
	Money	6	5.8
Skilled human resource able to fill formats		257(76.5)	59(23.5)
Knowledge on RHIS		269(80)	67(20)

6.6 .Factors associated with data quality

6.6.1 Technical factors

From total 336 respondents 213(63.4%) of respondents had standard set of indicators with case definitions in their departments. Among the respondents 257(76.5%) reported that there were skilled staff able to aggregate data and to fill out formats and 285(84.8%) reported that RHIS is user friendly format.

6.6.1 Behavioral factors

Individual behavioral factors were assessed through individual perception (motivation) towards RHIS use, knowledge of respondents regarding RHIS, confidence level of respondents to do RHIS tasks and availability of incentives for RHIS for RHIS activities.

About 103(30.7%) of respondents reported that availability of incentives for RHIS activity which were 86(83.4%) recognition and 11(10.7%) training opportunity. About 269(80%) of respondents had knowledge towards RHIS. The result showed that about 233(69.3%) had data quality checking skill and average confidence level of respondents was 212(63.1%). Average perception (motivation) of individuals towards RHIS use and meaning was 57.7%.

6.7. Self-efficacy

Confidence level to perform RHIS tasks for health professionals were assessed on a scale of 0 to 100%. The average score obtained for the seven questions expressed as a percentage. Higher confidence level was observed in calculating percentages (78%) and checking data accuracy (72% and lower confidence was observed in using data for various types of decisions (56%) and in explaining findings from bar charts (57%) relatively. The average confidence level to perform RHIS activities of respondents were 65.8%.

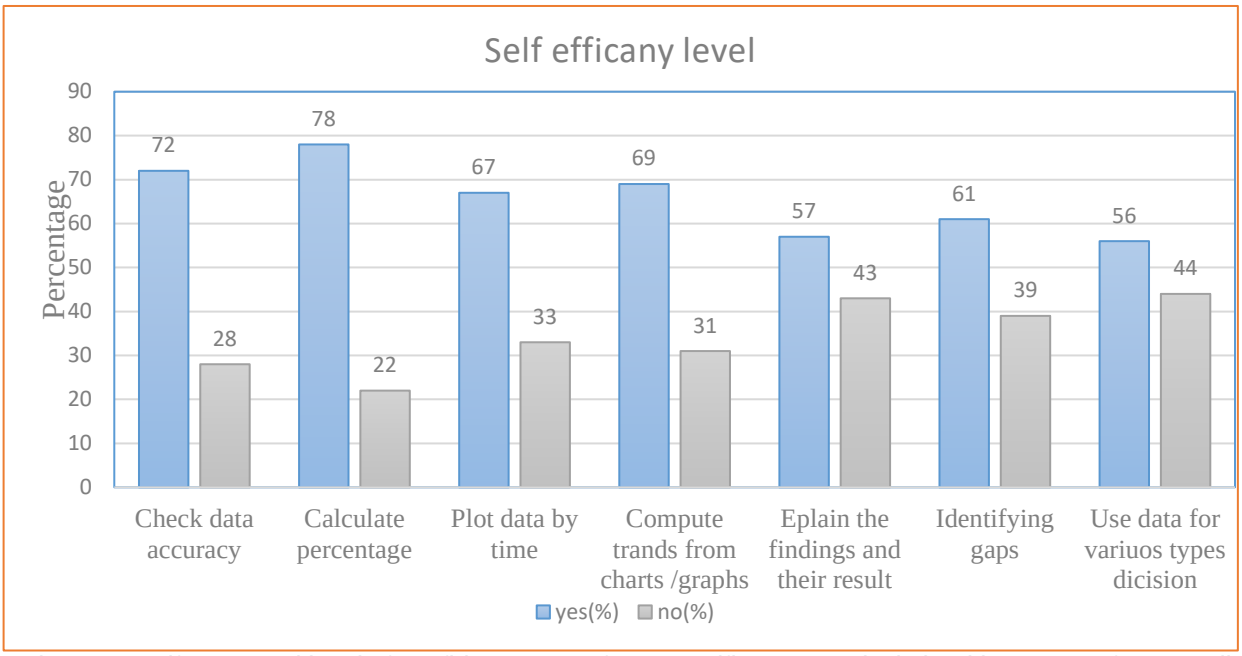


Figure 4:-Self –reported level of confidence to perform specific RHIS tasks in health centers of East Gojjam zone, Northwest, Ethiopia, 2020.

6.8 Organizational factors

Regarding training status, from the total 336 respondents 37.2% reported that they had received training on RHIS activities.

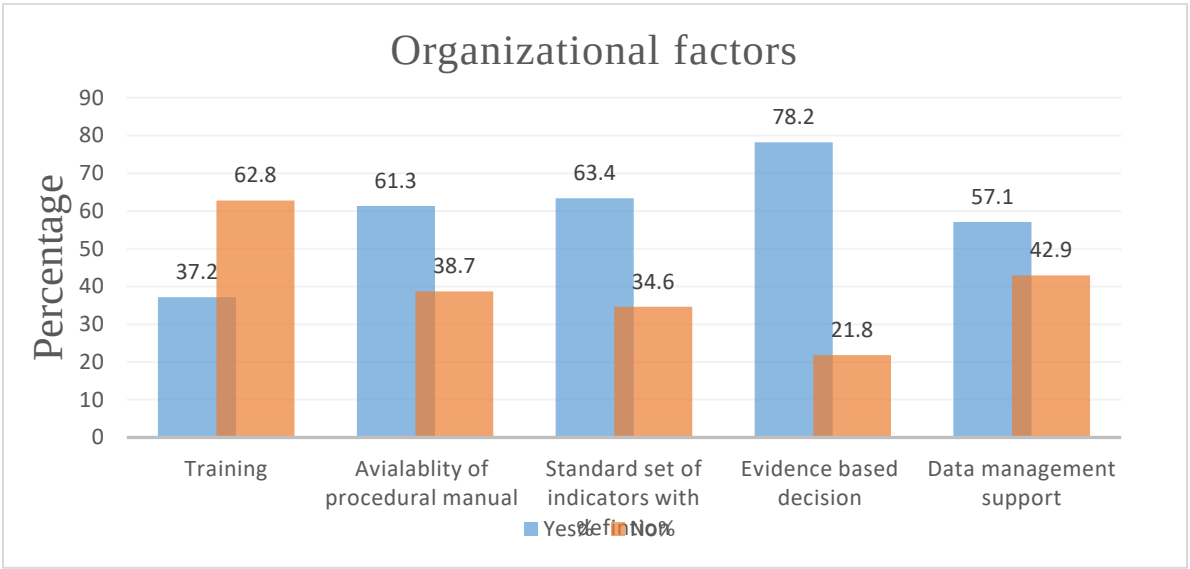


Figure 5: Organizational factors to RHIS at health centers of East Gojjam Zone. Northwest, Ethiopia, 2020.

6.9 Bi-variable and multi-variable analysis

6.9.1 Bi-variable analysis

Variables with p<0.25 were data quality check practice, conduct accuracy test, data management support, availability of procedural manuals, get regular feedback based on evidence ,having standard indicators with their definitions , incentives, training ,educational status, knowledge on RHIS, residence, filling registration or tally completely and registering all daily activities.

6.9.2 Multiple-variable analysis

Candidate variables during bi-variable logistic regression were subjected to multi-variable logistic regression analysis. Conduct accuracy test has significant relationship with data quality [AOR= 2.217, 95% CI (1.122, 4.378)]. Those health professionals who conducting accuracy test were 2.217 times more likely to report quality data compared to who did not conduct accuracy test. Having standard indicators with their definition has significant relationship with data quality [AOR=2.154, 95% CI (1.036, 4.477)]. Those health professionals who had standard indicators were 2.154 times more likely to report quality data compared to who had not standard indicators with their definitions. Data management support for RHIS has significant relationship with data quality [AOR=2.013, 95% CI (1.045, 3.877)]. Those health professionals who had gotten data management support were 2.013 times more likely to report quality data compared to who had not management support from higher officials. Regular feedback based on evidence has also significant relationship with data quality [AOR=0.397, 95% CI (0.185, 0.853)].Those who got feedback based on evidence were 0.397 times more likely to report quality data than who did not provided feedback based on evidence. Training has significant relationship with data quality [AOR=0.469 (0.244, 0.904)]. Those health professionals who received training were 0.469 times more likely to report quality data than compared to who were not trained.

Table 5: Multivariable logistic regression of data quality at health centers of East Gojjam Zone Northwest Ethiopia, 2020.

Variables	Response	Data quality		COR(95%CI)	AOR(95%CI)	p-value
		Yes (%)	No (%)			
Data quality check	YES	200(59.5)	42(12.5)	1.370(0.761,2.467)	0.979(0.482,1.988)	0.953
	NO	73(21.7)	21(6.25)	1.0	1.0	-
Conduct accuracy test	YES	195(58)	38(11.3)	**1.645(0.931,2.905)**	**2.217*(1.122,4.378)**	**0.022**
	NO	78(23.2)	25(7.4)	1.0	1.0	-
Management support for RHIS	YES	167(49.7)	25(7.4)	**2.395(1.367,4.194)**	**2.013*(1.045,3.877)**	**0.036**
	NO	106(31.5)	38(11.3)	1.0	1.0	-
Availability of procedural manuals	Present	177(52.7)	29(8.6)	2.162(1.242,3.763)	1.323(0.653,2.682)	0.438
	Absent	96(28.6)	34(10.1)	1.0	1.0	-
Get regular feedback based on evidence	YES	152(45.2)	45(13.4)	**0.502(0.277,0.912)**	**0.397*(0.185,0.853)**	**0.018**
	NO	121(36)	18(5.4)	1.0	1.0	-
Having standard indicators with definition	YES	179(53.3)	34(10.1)	**1.624(0.933,2.829)**	**2.154*(1.036,4.477)**	**0.040**
	NO	94(28)	29(8.6)	1.0	1.0	-
Incentives	YES	75(22.3)	28(8.3)	0.473(0.270,0.832)	0.596(0.301,1.180)	0.137
	NO	198(59)	35(10.4)	1.0	1.0	-
Training	YES	72(21.4)	29(8.6)	**0.420(0.239,0.738)**	**0.469*(0.244,0.904)**	**0.024**
	NO	201(59.8)	34(10.1)	1.0	1.0	-
Educational status	Diploma	204(60.7)	42(12.5)	1.478(0.819,2.669)	1.071(0.528,2.173)	0.849
	Degree	69(20.5)	21(6.3)	1.0	1.0	-
Knowledge on RHIS	YES	218(64.9)	52(15.5)	0.838(0.410,1.713)	0.766(0.350,1.678)	0.506
	NO	55(16.4)	11(3.2)	1.0	1.0	-
Residence	Rural	188(56)	32(9.5)	2.143(1.228,3.738)	1.890(0.985,3.627)	0.056
	Urban	85(25.3)	31(9.2)	1.0	1.0	-
Fill completely	YES	243(72.3)	52(15.5)	1.713(0.870,3.638)	1.416(0.521,3.847)	0.496
	NO	30(8.9)	11(3.3)	1.0	1.0	-
Register all your activity on daily basis	YES	254(75.6)	56(16.7)	1.671(0.670,4.166)	1.084(0.330,3.558)	0.894
	NO	19(5.6)	7(2.1)	1.0	1.0	-

*shows predictor variables for data quality at $p<0.05$

7. DISCUSSION

This study tried to assess the data quality by reviewing documents based on accuracy, completeness and timeliness dimensions measured by selected data elements and associated factors affecting data quality by self-administered questionnaires.

Quality of data is a key factor in generating reliable health information that enables monitoring progress and making decisions for continuous improvement [16]. Accurate, complete, and timely information is essential for public health decision-making and action-taking such as policymaking, planning, programming, and monitoring. All decision of the health system depends on the availability of timely, accurate, and complete information.

In this study findings showed that the quality of data in the East Gojjam zone based on accuracy, completeness and timeliness were 76.2%, 86.4% and 85.7% respectively. The overall data quality of the zone scored 82.76% which was below the national target 85 % [1].The finding was comparable, with the study conducted in Hadiya Zone showed that accuracy, completeness , timeliness and over all were 76 %, 83.3% , 88.4% and 82.5% respectively [32].In contrast, the findings lower than another study conducted in Rwanda showed 98% completeness, and 93.8% of timeliness [17] and the Study conducted in Malawi showed that completeness 92% and timeliness 88%. The possible explanation may be due system variation of RHIS, indicator variations and under estimation in this study. Out of 21 health centers 42.8% of health centers report were in acceptable level of data tolerance. This finding was supported by the study done in India, 37% facilities were in acceptable limit of data accuracy [6]. Discrepancy of data was observed in all facilities, what was on register and on report formats. Tendencies of over reporting in majority indicators and under reporting of one indicators were observed. The finding was similar with an evaluation done in Tigray region [33]. This may be due to incompleteness of data, not understanding the definition of cases or data elements, or data might not fall within the reporting period. Data were over reported in all facilities. ANC4, personnel skilled delivery, Penta three vaccination and PMTCT data was over reported by 18 health centers (85.7%). This is supported by a national assessment done by EPHI and study in Hadiya zone, Ethiopia [16, 32].The study

showed only 30 % of ANC data reported was matched with source document but in this study about 81% of ANC4 data was matched. This improvement may be due to the study was nationwide so that including many institutions probably increase inclusion of those facilities with low data quality.

Delivery data were over reported about 23.8% which was higher than EPHI data over reporting >10 % and study in Hadiya zone over reporting 8%. The possible explanation to this condition could be poor knowledge on RHIS data management and use, less attention from the management, absence of RHIS formats and guidelines, poor supportive supervision from higher officials, and being geographically isolated. All these may affect communication, supervision, RHIS formats access and other services which are important to data management and information. About 9.5% of health centers under reported TB cases. From the indicators assessed, only three out of seven (42.8%) indicators were within 10% acceptable level. About 23.8% skilled birth attendant data were over reported (>10% tolerance level) followed by19%, 14.3%, 14.3% ANC4, confirmed malaria cases and PMTCT data were over reported (>10%).Penta3.CAR and Tuberculosis cases were best matched data than all indicators. This was also comparable with study done at Hadiya zone where Proportions of public facilities made greater than 10 percent over (19%) of skilled birth attendant data, 86% PMTCT, 84% CAR and 97% $Penta_3$ data was the best-matched data among all indicators. This may be due to the fact that the indicators are from the top priority indicators at national level and needed to be performed well which might lead the facilities to over report and it may also be due to incompetent supervision from top level. According to the new information revolution every facility expected to use electronic DHIS 2 but in the studied facilities only 18 health centers use functional electronic DHIS 2 software (database).

Regarding content completeness the result found that 86.4% of completeness based on 90% tolerance, which was slightly higher than a study conducted in Ayder referral hospital 78.6%, study conducted at Hadiya zone 83.3% and a systematic review conducted in Ethiopia [33, 32].In contrast ,completeness and timeliness dimensions showed less achievement from a study done in Tigray region and India where 100 percent facilities met 90% data tolerance [33, 15]. Possible reasons may be due to lack of knowledge of respondents about the implications of an incomplete

data on a report formats and to send reports on timely manner among the health workers and it may also be less emphasis was given for data quality during supervision. Generally Low level of training, supervision with written feedback availability of procedural manual to perform RHIS activities and paper based or manual entry of data among the health workers could be a possible reason for the low data quality observed in the study below the national standard. This can be improved by working on capacity of health workers continuously and emphasis should be given for data quality during supervision.

Concerning supervision, regular Supportive supervision with feedback is a key in addressing quality issues by helping to improve overall performance of RHIS especially for better achievement of data quality [16]. More than half (58.6%), health centers participated in this study supervised by their respective higher level as per standard in the last the six month. The result was supported by studies conducted previously in Dire Dawa, Southern regional state and Hadiya zone [30, 23, 32]. Even though the result was comparable with other studies conducted earlier, about 41.4% health centers were not supervised regularly. One of the most important mechanisms to improve quality of data is regular supervision. Lack of regular systems on supportive supervision affects the importance and quality of data collection. Therefore without regular and program specific supportive supervision it is difficult to achieve information transformation.

Regarding training, continuous training on RHIS activity is important to create awareness and to have trained staff and skilled human resources that are confident and motivated to perform RHIS tasks [34, 8].This study found about 37.2% of health workers trained regarding RHIS activities. This finding was lower than other studies done in Dire Dawa 52.7%, Hadiya zone 52% and South Africa 58% were not trained related with RHIS activities [23, 19, 32]. This may due to Geographical variation and 65% of the study facilities were rural residence.

All health workers who participate in the collection at various sections of health facility, need continuous capacity building to conduct quality review of RHIS at every stage for in-depth understanding of the stages where quality of data can occur [6, 28]. In this study all focal persons trained regarding RHIS activities but others, service providers and department heads who were not trained were involved in the process of RHIS. This may affect the quality of data. The result was

supported by studies conducted in SNNPR and five African countries [30, 19] . This factor also suggested by WHO measure evaluation as one determinant of data quality [2]. This is may be due to complexity of the formats/tools. If data collection forms are complex to fill in, it affects confidence levels and motivation of data collector [7].

Concerning data quality checking, good data management require data quality check at all stages. The checking of data quality is the responsibility of all health workers participating in the data management [14]. In this study about 69.3% of health workers checks data quality with a frequency of 58.6% on monthly basis. This is supported by different literatures done by WHO measure evaluation and a study done in Kenya. From a study done in Kenya about 63% of respondents check data quality but the frequency of carrying out the checks was varying from one respondent to another with majority indicating every quarterly 22% [32, 29, 20].

In order to checking the accuracy of the data collected and report at the origin of data source, patient registrations and copies of RHIS monthly reports should be kept. According to this study 92.3% of departments collect health data on daily activity and 90.5% keep patient registration and RHIS monthly reports. The result was supported by study done in Dire Dewa, Ethiopia, reported that 90% of the health departments collect data on daily activity and 82% keep their registration and monthly reports [23]. Similarly another the study conducted in Mekelle, Ethiopia, revealed that all the health department heads/service units collect data on daily activity [33].

8. STRENGTH OF STUDY

The study used standardized tool adapted from WHO PRISM frame work.

The study was conducted in different health centers which makes the study representative of health centers in East Gojjam zone.

9. LIMITATION OF A STUDY

- Content completeness was assessed only for reporting formats, so it couldn't represent completeness of registration and tally sheets.
- Using self-administered questionnaires may affect the validity of the responses. To minimize this effect two RHIS trained data collectors were assigned in order to assist any confusion among respondents.
- Using secondary data may underestimate the finding. To minimize this effect data from randomly selected recent months were used.
- Due to budget constraint this study didn't include health posts this may overestimate the finding. To minimize these effect facilities were selected by lottery method.

10. CONCLUSION

In this study, the overall data quality in East Gojjam government health centers was 82.76%. Lack of training, lack of data management support, absence of standard indicators with their definition, lack of conducting accuracy test and lack of regular feedback based on evidence were found to have significant associations with data quality of RHIS.

11. Recommendations

From the findings of the study the following recommendations are given below.

TO East Gojjam zone health department

- Should strengthen regular feedback based on evidence to the all health centers.
- Should strengthen regular data management support and should be performed based on evidence and separately from other supervisory activities in order to give more emphasis.
- Distribute a standard indicators with definition for RHIS data collection
- Training should be provided to all health professionals
- Should emphasis on continuous conducting of data accuracy test.

TO Woreda health offices

- Distribute a RHIS standard indicators with their definition.
- Should strengthen regular feedback based on evidence to the health centers.
- Should emphasis data accuracy testing, data management support.

To Health Facilities

- Should assist the health professionals to conduct data accuracy test.

TO Researchers

- Further research is suggested for assessing health workers' culture of data quality at the lower health facilities where data are generated.

11. REFERENCES

[1] FMOH, Ethiopian national health care quality strategy: transforming the quality health care in Ethiopia, Ethiopian federal democratic republic of Ethiopia, 2016-2020.

[2] WHO, "Data quality review: a toolkit for facility data quality assessment," *Framework and metrics,* Vols. module 1-3, 2017.

[3] L.G. Sambo, R.R. Chatora, E.S.M. Goosen, GUIDE LINE Tools for Assessing the Operationality of District Health Systems, WHO Regional Office for Africa , 2003.

[4] F. Landgren, A guide to using data for health care quality improvement, Melbourne, Victoria: The Rural and Regional Health and Aged Care Services Division,Victorian Government Department of Human Services, june 2018.

[5] Bloland and MacNeil, "Defining & assessing the quality, usability, and utilization of immunization data," *BMC Public Health,* 2019.

[6] Chen H et al., "Review of Data Quality Assessment Methods for Public Health Information Systems," *International Journal of Environmental Research and PublicHealth,* p. 5170–207, 2014.

[7] Fetene N, Canavan ME, MegenttaA, Linnander E, Tan AX, Nadew K, et al., "District-level health management and health system performance," *PLOS ONE,* vol. 14(2), 1 February 2019.

[8] Bhattacharya AA, Umar N, Audu A, Felix H, Allen E, Schellenberg JRM, et al., "Quality of routinefacility data for monitoring priority maternal and newborn indicatorsin DHIS2:A case study from Gombe State,Nigeria. PLoS ONE," vol. 14(1), 25 January 2019.

[9] WHO, "Guide to the health facility data quality report card," WHO, Genva.

[10] WHO, Improving Data Quality, a guide for developing countries, Geneva: WHO, 2010.

[11] Measure evaluation ,USAID, "Routine Data Quality Assessment Tool User Manual," *–Strategic Information for South Africa (MEval-SIFSA) Project,* January 2017.

[12] FMoH., Information Revolution Road map, April,2016.

[13] Elesban Kihuba et al., "(Assessing the ability of health information systems in hospitals to support evidence-informed decisions," *Global Health Action,* vol. 7, no. 24859, 31 July 2014.

[14] Samuel et al., "Organizational factors affecting data quality of routine health management information system quality : Case of Uasin Gishu County Referral Hospital," *International Research Journal of Public and Enviromental health,* 2016.

[15] Sanghita et al., "District decision-making for health in low-income settings: a case study of the potential of public and private sector data in India and Ethiopia," *Health Policy and Planning,* 31 February 2016.

[16] Ethiopian Public Health Institute ,FMOH, "Ethiopia Health Data Quality Review," *System Assessment and Data Verification,* 2018.

[17] Jahanpour Alipour, Maryam Ahmadi, "Dimensions and assessment methods of data quality in health information systems," *Acta medica mediterranea,* 02 January 2017.

[18] RichaelO Hagan et al., "National Assessment of Data Quality and Associated Systems-LevelFactors," *Global Health science and practice,* vol. 5, July, 2016.

[19] Jennifer Yourkavitch et al., "Data quality assessments stimulate improvements to health management information systems:evidence from five African countries," vol. 9, June 2019.

[20] Measure evaluation USAID, " Performance of Routine Information System Management (PRISM)," *PRISM Training kit,* 2018.

[21] FMoH, "Health sector transformation plan-I annual performance report," 2016.

[22] F. Health Sector Transformation Plan, 2015/16 - 2019/20 (2008-2012 EFY), August 2015.

[23] Kidist Teklegiorigis et al., "Level of data quality from Health Management Information Systems in a resources limited setting and its associated factors, eastern Ethiopia," *South African Journal of Information Management,* Vols. 17(1), a612, 10 Augest 2016.

[24] Mariame Ouedraogo et al., "A quality assessment of Health Management Information System (HMIS) data for maternal and child health in Jimma Zone, Ethiopia," *Data quality for maternal and child health, Jimma Zone, Ethiopia,* March 11, 2019.

[25] Shiferaw et al., "Routine health information system utilization and factors associated thereof among health workers at government health institutions in East Gojjam Zone, Northwest Ethiopia," *BMC Medical Informatics and Decision Making,* 2017.

[26] Dagnew et al., "Routine health information utilization and associated factors among health care professionals working at public health institution," *BMC Health Services Research,* 2018.

[27] M. A. Asemahagn, "Determinants of routine health information utilization at primary healthcare facilities in Western Amhara, Ethiopia," *Cogent Medicine,* 2017.

[28] Florence M Nyangara et al ., "Assessment of data quality and reporting systems for underserved populations: the case of integrated community case management programs in Nigeria," *Health Policy and Planning,* 3 January 2018.

[29] Yolaine Glele et al., Data quality assessment in the routine health information system :An application of the Lot Quality Assurance Sampling,, vol. 30, Benin: London school of hygiene and tropical medicine, Health Policy and Planning, 2015, p. 837–843.

[30] Hiwot Belay et al., "Assessment of Health Management Information System (HMIS) Performance in SNNPR, Ethiopia," pp. 14-87, April 2013.

[31] Amhara Reginal Health buruea, "health sector transformation plan annual performance report," Bahir Dar, 2018/2019.

[32] Mastewal solomon, "Assessment of quality of data and associated factors in the health management information system among health centersof Hadiya zone, Southern Ethiopia," pp. 20-32, 2018.

[33] Kidane Tadesse et al., "Assessment of Health Management Information System Implementation in Ayder Referral Hospital," *International Journal of Intelligent Information Systems,* vol. 3, pp. 34-39, 20 October 2014.

[34] Bilkisu Nwankwo &, Mohammed Nasir Sambo., "an training of health care workers improve data management practice in health management information systems: a case study of primary health care facilities," *The Pan African Medical Journal,* 2018.

[35] Sara Rizvi Jafree et al., "Nurse perceptions of organizational culture and its association with the culture of error reporting: a case of public sector hospitals," *BMC Health Services Researh,* vol. 16, 2016.

[36] NicolE et al., "Human Factors Affecting the Quality of Routinely Collected Data," 2013 ;(August).

[37] East Gojjam Zone health department, "East Gojjam zone annual service delivery Aggregate report," Debre Markos, 2018/2019.

[38] E. g. z. A. "East Gojjam zone annual human resource report," Debre Markos, 2018/2019.

[39] FMoH, Health SectorTransformationPlan, 2015.

[40] Mounkaila Abdou et al., "PRISM Tools for Assessing, Monitoring, and Evaluating RHIS Performance," *Health Policy and Planning,* version 3.1 March, 2010.

[41] Chen Hang et al., "A review of data quality assessment methods for public health information systems," *International Journal of Environmental Research and Public Health,* vol. 11(5), p. 5170–207, 2014.

[42] Hiwot Belay, Theo Lippeveld, .Inventory of PRISM Framework and Tools: Application of PRISM Tools and Interventions for Strengthening Routine Health Information System, 2013.

12. APPENDIXES

Appendix 1:- Consent form

Bahir Dar University

School of public health

Consent form

Hello, My name is ……I am here to have an interview with you on behalf of **Demeke Kassa Mekonnen** . He is a student of Bahir Dar University, School of public health conducting a research to assess the routine health information system data quality and associated factors for partial fulfilment of degree master of public health. He will received permission from Bahir Dar university school of public health and Amhara regional health bureau to conduct this study. The information that you provide will be kept confidential by using only code numbers and locking the data. Only the principal investigator will have the access to the non-coded data and the data will not be used for purposes other than the study. Your willingness and active participation is very important for the success of this study. The results of the study will hopefully serve as an important input for intervention programs that aims at improving RHIS data quality at local level to understand major factors of the problems of RHIS data quality in your health center.

If you will not be willing to participate in the study you have the right to discontinue at any time in the process. If you need any further information or explanation regarding to the study, you can have this address to contact the responsible person regarding to the study.

Name- Demeke Kassa Mekonnen

Tel.no–0921438621/0945566987

E-mail–demekekassa82@gmail.com

Do you have any questions? Based on the information provided.

Are you willing to participate in the study? Yes____ No_____

If Yes-read the consent form to the participant, sign it and continue the interview

If No- thank and find extra participant.

Appendix 2: Informed consent

Informed consent Certified by:
Respondent's signature----------Date----------
Interviewer name……Signature……
Questionnaire code/number----------date of interview----------
Time started----------Time completed----------
Result of interview: 1.Completed 2. Respondent not available
3. Refused 4. Partially completed
Checked by: Supervisor: Name_____Signature_____

Appendix 3: Part one: Routine Data quality Assessment: Health Facility tool

Woreda				
Name of Health center				
Department/ service unit				
Telephone Number(Office				
1		1.YES	2.No	skip to
	Is there designated staff (RHIS focal person)responsible			
2	The responsibility for recording the delivery of services on source documents is clearly assigned (have written job descriptions)to the relevant staff			
3	Does the health center have electronic data base(computer DHIS 2 software)?(If no, skip to 6)			6
4	Is the electronic database (computer software) currently functional?			
5	Is there any system in place to prevent unauthorized changes to data?			
6	The service delivery point establish performance monitoring Team			
7	Does this Health center keep copies of the RHIS monthly reports which are sent to the district office?	1.Yes	2.No	
8	Count the number of RHIS monthly reports that have been kept at the facility for the randomly selected three months			

Item	Data element	# from registers	#from report	# from registers	#from report	# from registers

9.1	ANC4					
9.2	Total no of skilled births					
9.3	Penta valent third doses					
9.4	PMTCT					
9.5	Tuberculosis cure rate					
9.6	Total CAR					
9.7	Confirmed malaria cases					

Record review tool to assess content Completeness from 3 months Report					Remark
10	How many data items does the health center need to report on in the DHIS 2 monthly report? This number does not include data items for services not provided by this health center)				
11	Count the number of data items that are supposed to be filled in by this facility but left blank without indicating "0" in the selected month's report.				

Appendix 4:-Part two, Sociodemographic, organizational and behavioral assessment tool

Self-administered questionnaire for health professional workers

For the interviewer;-give information about the study and ask for consent to participate in the study	
01	_____/_____/_____ DD / MM / YYY
Facility Identification	
Woreda/ district	
Name of Health center	
Department	
Telephone Number(Office	

S.no	List of Question	Choose	Skip to
101	Age of the respondents in years.	------	
102	Sex	1. Female 2. male	

103	What is your marital status?	1. Married 2. Single 3.Divorced 4.Widowed	
104	Position of person interviewed	1.Head of institution 2.Department Head 3.RHIS Focal Person 4.Other (specify) ------	
105	The highest level of Educational status?	1.Level3/Certificate 2.Level4/Diploma 3.Bachelor Degree 4.Master Degree 5. Other(specify)_____	
106	Field of study for the highest level of education	1.Nurse2.Health information &technology(HIT) 3. Midwife Nurse 4.Pharmacist 5. Health Officer 6. Laboratory Technology 7.Other(specify--------	
107	Years of experience (completed year)	----------	
108	Have you ever received in-service training on RHIS related activities in last six months?	1.Yes 2No	
109	Did you receive pre-service training on RHIS?	1.Yes 2No	
110	Have you been participated in aggregation or compilation of data from tally Sheet/registration?	1.Yes 2No	
111	Do you think that registrations and report formats are user friendly/easily understandable?	1.Yes 2No	
112	Do you register all your activity on daily basis?	1.Yes 2No	
113	Do you fill the register/tally sheet completely?	1.Yes 2.No	
114	Did you conduct data accuracy test?	1.Yes 2.No	116
115	If yes to q.114, how frequently?	1.Monthly 2.Quarterly 3.Semi-annually 4.annually	
116	In the past 3 months did you get supervision from higher officials?	1.Yes 2.No	118

117	If yes for Question 116, how many times the unit/department supervised	1.One time 2.Two times 3. Three times	
118	Did you get regular Feedback from top level organization through regular report based on evidence?	1.Yes 2.NO	120
119	If yes to 118, how often?	1. Monthly 2. Quarterly 3. Semi-annually 4. Annually	
120	Do you have standard set of indicators with their definition?	1.Yes 2.No	
121	Do you have procedural manual in your department?	1.Yes 2No	
122	Are there any incentives for RHIS process?	1.Yes 2No	124
123	If yes to question 122 , what kind of incentives	1.Training 2.Money 3.Recognition4.Other (specify)	
124	Is there skilled human resource able to fill formats?	1.Yes 2No	

Appendix 5:- Instructions

I would like to know your opinion about how **strongly you agree** with certain activities. There are no right or wrong answers, but only expression of your opinion on a scale. The scale is about assessing the intensity of your belief and ranges from **strongly disagree (1) to strongly agree (5)**. You have to determine first whether you agree or disagree with the statement. Second decide about the intensity of agreement or disagreement. If you disagree with statement then use left side of the scale and determine how much disagreement that is strongly disagree (1) or disagree (2) and circle the appropriate answer. If you are not sure of your belief or think that you neither disagree nor agree, then circle 3. If you agree with the statement, then use right side of the scale and determine how much agreement that is agree(4)or strongly agree(5)and circle the appropriate answer. Please note that you might agree or disagree with all the statements and similarly you might not have the same intensity of agreement or disagreement and thus variations are expected in expressing your agreement or disagreement. We encourage you to express those variations. This information will remain confidential and would not be shared with any one, except presented as an aggregated data report. Please be frank and choose your answer honestly.

To what extent, do you agree with the following on a scale of 1-5?

	Knowledge of RHIs	1	2	3	4	5
1	RHIS Collects data from service and administrative records					
2	RHIS Provides signals that can be reviewed frequently to monitor program implementation					
3	RHIS is Used for decision making					
4	RHIS is important for policy Making and management decisions					
5	RHIS is important for Monitoring and Evaluation of performance					
6	RHIS data can be presented by using Charts, graphs and tables					
7	RHIS is an integral part of Health Information System					
Questions to assess supervision quality		1	2	3	4	5
1	Seek feedback from concerned persons					
2	Emphasize data quality in monthly reports					
3	Discuss conflicts openly to resolve them					
4	Seek feedback from concerned community					
5	Use RHIS data for setting targets and Monitoring					
6	Check data quality regularly					
7	Provide regular feedback to their staff through regular report based on evidence					
8	Report on data accuracy regularly (Talk to higher level staff about accuracy of data)					
9	Encourage their supervisees to over report (false report)their performance					
I n your health center, staffs		1	2	3	4	5
1	Document their activities and keep records					
2	Feel committed in improving health status of the target population					

3	Set appropriate and double target of their performance					
4	Feel guilty for not accomplishing the set target/performance					
5	Are rewarded for good work					
6	Staffs are empowered to make decisions					
7	Able to say no to supervisors and colleagues for demands/ decisions not supported by evidence					
8	Are made accountable for poor performance					
9	Use RHIS data for community education and mobilization					
10	Admit mistakes for taking corrective action					
Data management support		1	2	3	4	5
1	health department Use RHIS data for day to day management of the health center					
2	Health department encourages to display data for monitoring their set target					
3	Health department encourages to gather data to find the root cause(s)of the problem					
4	Health department encourages to develop appropriate criteria for selecting interventions for a given problem					
5	Health department encourages to develop appropriate out comes for a particular intervention					
6	Health department encourages to evaluate whether the targets or outcomes have been achieved					
Motivation of health workers		1	2	3	4	5
1	Collecting information which is not used for decision making discourages me					
2	Collecting information makes me feel bored					
3	Collecting information is meaning full for me					

4	Collecting information gives me the feeling that data is needed for monitoring facility performance					
5	Collecting information give me the Feeling that it is forced me					
6	Collecting information is appreciated by Coworkers and supervisors					

Part three;-self-efficacy

This part of the questionnaire is about your perceived confidence in performing tasks related to health information systems. High Confidence indicates that person could perform the task, while low confidence means room for improvement. We are interested in knowing how confident you feel in performing RHIS related tasks. Please be frank and rate your confidence honestly. Please rate your confidence in percentages that you can accomplish the RHIS activities. Rate your confidence for each situation with a percentage from the following scale

0 10 20 30 40 50 60 70 80 90 100

S.no	**Self-Efficacy**	No						Yes				
		0	10	20	30	40	50	60	70	80	90	100
1	I can check data accuracy											
2	I can calculate percentages											
3	I can plot data											
4	I can compute trend											
5	I can explain findings											
6	I can use data for identifying gaps and setting targets											
7	I can use data for making various types of decisions and providing feedback											

THANK YOU FOR YOUR RESPOSE AND TIME!!!

Appendix 6 Translated Amharic Questionnaire

(በአማርኛ የተዘጋጀ የመረጃ መሰብሰቢያ ቃለ-መጠይቅ)

ባህርዳር ዩኒቨርሲቲ
የህብረተሰብ ጤና ትምህርት ክፍል
ፈቃድ መጠየቂያ ቅፅ
ጤና ይስጥልኝ!

ስሜ.....ይባላል፡፡የመጣሁት የባህር ዳር ዩኒቨርስቲ ህብረተሰብ ጤና ሳይንስ ተማሪ የሆኑትን ደመቀ ካሳ መኮንንን ወክዬ ነው፡፡የሁለተኛ ድግሪ መመረቂያ ጥናቱን የሚሰራው የመረጃ አያያዝ ስረአት ጥራት እና ተያያዥ ጉዳዮችን በተመለከተ ነው፡፡ ይህንን ጥናት ለማድረግ ከባህርዳር ዩኒቨርሲቲና ከአማራ ክልል ጤና ቢሮ ፈቃድ ተወጥቶታል፡፡እርስዎ የተመረጡት በመረጃ አያያዝ ስርአት ላይ ስለሚሰሩ ነው፡፡በጥናቱ ላይ መሳተፍ ሙሉ በሙሉ በርሰዎ ፈቃድ ላይ የተመሰረተ ሲሆን በጥናቱ የመሳተፍ ወይም አለመሳተፍ ሙሉ መብት አለዎት አንዲሁም ለመሳተፍ ፈቃደኛ ከሆኑ በኃላ በፈለጉት ጊዜ ማቋረጥ ወይ ማቆም ይችላሉ፡፡በጥናቱ በመሳተፍዎ የሚያደርስቦት ጉዳት የለም፡፡ከዚህ ጥናት የተሰበሰበው መረጃ ሙሉ ሚስጥራዊነቱ የተጠበቀ ይሆናል፡፡ ከጥናት አጥኝዉ ውጪ ማንም የተሰበሰበውን መረጃ ማግኘት አይችልም፡፡እንዲሁም መረጃው ከጥናቱ አላማ ውጪ ለምንም አንጠቀምበትም፡፡በጥናቱ በመሳተፍዎ ለሚሰሩበት ጤና ተቋም የመረጃ አያያዝ ስረዓት ጥራትን ለማማሻሻል ይረዳል፡፡የእርስዎ ፈቃደኝነትና የነቃ ተሳትፎ ለዚህ ጥናት ስኬታማነት አስፈላጊ ነው፡፡
ስለጥናቱ ጥያቄ ወይም ተጨማሪ መረጃ ከፈለጉ በዚህ አድራሻ መጠየቅ ይችላሉ፡፡
ስም፡- ደመቀ ካሳ መኮንን
ስልክ ቁጥር፡-0921438621/0945566987 ኢሜል፡-demekekassa82@gmail.com

በዚህ ጥናት ለመሳተፍ ፈቃደኛ ኖት

1 አዎ(ቃለመጠይቁ ይቀጥል) 2 አይደለሁም (አመስግነህ ወደሚቀጥለው ተሳታፊ እለፍ)

ቃለ መጠይቅ አድራጊው ስም .....ፊርማ ቁጥር.....
ቃለ መጠይቅ የተካሄደበት ቀን .....የተጀመረበት ሰዓት .....ያለቀበት ሰዓት.....
መጠይቁ ታይቷል/ ተፈትሿል

የቃለ መጠይቁ ውጤት፡ 1. ሙሉ በሙሉ የተሟላ 2. ያልተገኘ3.ፍቃደኛ ያልሆነ 4. በከፊል የተሟላ ያረጋገጠዉ ተቆጣጣሪ ስም .....ፊርማ.....

ክፍል አንድ :-በአስተዳዳሪዎችና በሰራተኞች የሚሞላ

የጤና ጣቢያ መግለጫ			
ተ.ቁጥር	ቀን	ቀን ..../ወር....ዓ.ም.....	
01	የጤና ጣቢያው ስም		
	ወረዳ		
	የስራ ክፍል		
	ስልክ ቁጥር		
ተ.ቁጥር	የተዘጋጁ መጠይቆች	የተሰጠ መልስ	ምርመራ
101	ዕታ	1.ወንድ 2.ሴት	
102	እድሜ	.....	
103	ማእረግ/የስራ ሃላፊነት	1.የጤና ጣቢያ ሀላፊ 2. የክፍሉ ሀላፊ 3.የመረጃ ክፍል ተጠሪ 4. አገልግሎት ሰጪ	

104	የትምህርት ደረጃ	1.ሌቭል4/ዲፕሎማ 2. የመጀመሪያ ዲግሪ 3. ሁለተኛ ዲግሪ 4.ሌላ(ይጠቀስ)_____	
105	የተማሩበት የትምህርት መስክ	1. ነርስ 2. አዋላጅ ነርስ 3. ጤና መኮንን 4. የላብራቶሪ ባለሙያ5. የጤና መረጃ አያያዝ ባለሙያ 6. የፋርማሲ ባለሙያ 7. ሌላ (ይጠቀስ)-	
106	የስራ ልምድ በዓመት	----------	
107	ባለፉት ስድስት ወራት ውስጥ ከመረጃ አያያዝ ጋር በተያያዘ ስልጠና ወስደው ያውቃሉ?	1.አዎ2.አልወሰድኩም	
108	ወደ ስራ ከመግባትዎ አስቀድመው በመረጃ አያያዝ ላይ ስልጠና ወስደዋል?	1. አዎ 2..አልወሰድኩም	
109	ከወርሃዊ/ከአለት መዝገብ ላይ መረጃን በመሰብሰብ ወይም በማጠናቀር ተሳትፈው ያውቃሉ?	1. አዎ 2..አልወሰድኩም	
110	የመረጃ አያያዝ መዝገቦችና የሪፖርት ፎርማቶች ቀላልና መረዳት የሚቻሉ ናቸው ?	1. አዎ 2..አይደሉም	
111	ሁሉንም ስራዎችዎን በየለቱ ይመዘግባሉ	1. አዎ2..አልመዘግብም	
112	ወርሃዊ/አለት መዝገቦችን ጨርሰው/አማልተው ይመዘግባሉ	1. አዎ 2.. አልመዘግብም	
113	የመረጃን ትክክለኛነት አረጋግጠው(LQAS) ያውቃሉ?	1. አዎ2..የለም	115
114	መልስዎ አዎ ከሆነ በምን ያህል ጊዜ ?	1. በየወሩ2. በየሶስት ወር 3. በየስድስት ወር 4.በየአመቱ	
115	ባለፉት ሶስት ወራት ውስጥ ከበላይ አለቆች ድጋፋዊ ክትትል አግኝተው ያውቃሉ ?	1.አዎ 2. የለም	117
116	መልስዎ አዎ ከሆነ በምን ያህል ጊዜ ?	1. አንድ ጊዜ2. ሁለት ጊዜ3.ሶስት ጊዜ ና በላይ	
117	ባለፉት ሶስት ወራት ከበላይ አለቆች በጽሁፍ የተደገፈ ግብረ-መልስ አግኝተው ያውቃሉ ?	1.አዎ 2. የለም	119
118	የተሰጠዎት ግብረ-መልስ መረጃን መሰረት ያደረገ ነበር	1.አዎ 2. የለም	
119	መልስዎ አዎ ከሆነ በምን ያህል ጊዜ ?	1.በየወሩ2. በየሶስት ወር 3. በየስድስት ወር 4.በየአመቱ	
120	በሚሰሩበት ጤና ጣቢያ የመረጃ አያያዝ ጠቀሚዎችን የያዙ ስብስቦች አሉ	1.አዎ2. የለም	
121	በሚሰሩበት ጤና ጣቢያ የመረጃ አሰባሰብ ስርዓት ማኑዋሎች አሉ ?	1.አዎ 2. የለም	
122	በሚሰሩበት ጤና ጣቢያ ከየመረጃ አያያዝ ጋር በተያያዘ የሚሰጥ ማበረታቻ አለ?	1.አዎ2. የለም	
123	መልስዎ አዎ ከሆነ በምን አይነት?	1.ገንዘብ 2.ስልጠና 3.እውቅና 4.ሌላ(ይጠቀስ)--------	

124	በሚሰሩበት ጤና ጣቢያ መዝገቦችን ና ፎርማቶችን ለመመላት የሚችሉ የሰለጠኑ ባለሙያዎች አሉ ?	1.አዎ2. የለም	

<u>በጤና ተቋሙ ከተሰሩት ስራዎች ጋር የርስዎን አመለካከት ማወቅ እንፈልጋለን</u>፡፡ በመለኪያው የርስዎን አመለካከት ከመግለጽ በዘለለ ትክክልና ትክክል ያልሆኑ መልሶች የሉም፡፡መለኪያው የርስዎን የአመለካከት ጥንካሬ የሚመዝን ሲሆን ከፍፁም አልስማማም(1) እሰከ ፍፁም እስማማለሁ(5) ምርጫዎች ይሰጣል፡፡ አመለካከትዎን በበለጠ ይገልፃል የሚሉትን ምርጫ በማክበብ እንዲያመለክቱ እንጠይቃለን፡ምንም እንክዋን ከሁሉም ሃሳቦች ጋር ሊስማሙ ወይም ላይስማሙ ቢችሉም ለሁሉም አንድ አይነት የመስማማትና ያለማስማማት ጥንካሬ እንደማይኖርዎትና ልዩነቶች ሊኖሩ እንደሚችሉ ይጠበቃል፡፡እነዚህ ልዩነቶች ጎልተው እንዲወጡ እንፈለጋለን፡፡የሚሰጡንን መረጃዎች በሚስጥር የሚያዙና ለሶስተኛ ወገን ተላልፈው እንደማይሰጡ ልንገልፅልዎ እንወዳለን፡፡መልስዎን በሀቀኝነት እንደሚሰጡን እምነታችን ነው፡፡

ከሚከተሉት ነጥቦች ጋር ከ 1-5 ባለው መለኪያ መሰረት ምን ያህል ይስማማሉ

ክፍል 2. የመረጃ አያያዝ እና አስተዳደር ያሎትን እውቀት በተመለከተ

ተ.ቁ	**የመረጃ አያያዝ እና አስተዳደር ያሎትን እውቀት በተመለከተ**	1	2	3	4	5
201	**የመረጃ አያያዝ ስርዓት** ከአገልግሉትና አስተዳደራዊ መዛግብት መረጃዎችን ይሰበስባሉ፡፡					
202	**የመረጃ አያያዝ ስርዓት** ተግባራዊ የሆኑ ፕሮግራሞችን ለመከታተል ጥቆማ ይሰጣል					
203	የመረጃ አያያዝ ስርዓት ውሳኔዎችን ለመወሰን ይጠቅማል					
204	የመረጃ አያያዝ ስርዓት ፖሊሲዎችን ለማውጣትና ለአስተዳደራዊ ውሳኔዎች ይጠቅማል					
205	የመረጃ አያያዝ ስርዓት ለስራ ለክትትልና ምዘና ይጠቅማል					
206	መረጃን በቻርቶች፤በግራፍ እና በሰንጠረዥ ማሳየት ይቻላል					
207	**የመረጃ አያያዝ ስርዓት** የጤና መረጃ ስርዓት አካል ነው					

ስለመረጃ አያያዝ ጥራት በጤና ጣቢያዎ ተቆጣጣሪዎች(የበላይ አለቆች) የሚደረግልዎትን ድገፍ በተመለከተ		1	2	3	4	5
1	ከሚመለከተዉ ከፊል ግበረ መለስ ተሰጥተዎታል፡፡					
2	በወርሀዊ ሪፖርቶች በመረጃ ጥራት ያተኩራሉ					
3	ግጭቶችን ለመፍታት በግልፅ ይወያያሉ					
4	. ከሚመለከታቸው ማህበረሰቦች ምላሽ ይጠይቃሉ					
5	የ RHIS መረጃዎችን ግቦችን ለማቀመጥና ለቁጥጥር ይጠቀሙባቸዋል					
6	የመረጃዎችን ጥራት በየጊዜው ያረጋግጣሉ					
7	በሪፖርት አመካይነት ለሰራተኞቻቸው በመረጃ ላይ የተመሰረተ ግብረ መልስ በየጊዜው ይሰጣሉ					
8	የመረጃዎችን ትክክለኛነት በየጊዜው ሪፖርት ያደርጋሉ					
9	ከስራቸው ያሉትን ሰራተኞች ሪፖርቶችን ጨምረው(የውሸት ሪፖርት) እንዲያቀርቡ ያበረታታሉ					
የጤና ጣቢያው የስራ አመራር		1	2	3	4	5
1	ለቀን ተቀን የጤና ጣቢያው የስራ አመራር የ RHIS መረጃዎችን ይጠቀማሉ					

2	ያስቀመጡትን ግቦች ለመቆጣጠር መረጃዎችን በግልፅ ያሳያሉ					
3	የችግሮችን መነሻ ለማወቅ የሚያስችሉ መረጃዎችን እንዲሰበሰብ ያበረታታሉ					
4	የችግሮችን መፍትሄ ለመምረጥ የሚያስችሉ መለኪያ ነጥቦችን ማስቀመጥ ይችላሉ					
5	ከተቀመጡት መፍትሄዎች ሊገኙ የሚችሉትን ውጤቶች ይለያሉ					
6	የታቀዱት ግቦች(ውጤቶች) መሳካታቸውን መገምገም ይችላሉ					
በጤና ጣቢያዎ ሰራተኞ		1	2	3	4	5
1	የሰሩትን ስራ ሁልጊዜ ይመዘግባሉ					
2	የተጠቃሚውን ህዝብ ጤና ለማረጋገጥ ቁርጠኞች ናቸው					
3	ተገቢና ሊሰሩ የሚችሉ ግቦችን አስቀምጠው ይሰራሉ					
4	የተቀመጡት ግቦች ሳይሳኩ ሲቀሩ የጥፋተኝነት ስሜት ይሰማቸዋል					
5	ለተሰሩት ጥሩ ስራዎች ይሸለማሉ					
6	ውሳኔዎችን መወሰን እንዲችሉ ተፈቀዶላቸዋል					
7	ከበላዮቻቸው ሆነ ከስራ ባልደረቦቻቸው ለሚመጡ ማናቸውም በመረጃ ያልተደገፉ ውሳኔዎችና ፍላጎቶች መቃወም ይችላሉ					
8	ለሚከሰቱት ደካማ የስራ አፈፃፀሞች ተጠያቂ ናቸው					
9	ህብረተሰብን ለማስተማርና ለማነቃቃት የRHIS መረጃዎችን ይጠቀማሉ					
10	ስህተቶችን በማረም የማስተካከያ እርምጃዎችን ይወስዳ					
የግል አመለካከት		1	2	3	4	5
1	ለውሳኔ የማይጠቅም መረጃ መሰብሰብ ይደብረኛል					
2	መረጃን መሰብሰብ ደስ አይለኝም					
3	መረጃን መሰብሰብ ለኔ ትርጉም ያለው ስራ ነው					
4	መረጃን ስሰበስብ የአንድን ተቋም የስራ አፈፃፀም ለመከታተል መረጃው ጠቃሚ እንደሆነ ይሰማኛል፡፡					
5	መረጃን ስሰበስብ በግዳጅ እየሰራሁ እንዳለ ይሰማኛል፡፡					
6	መረጃን መሰብሰብ በአለቆችና ሰራተኞቻቸው የተወደደ ነው፡፡					

ክፍል ሶስት ;-የራስን ብቃት መመዘኛ

የሚከተለው መጠይቅ እርስዎ የጤና ነክ መረጃዎችን በብቃት በመጠቀም ረገድ ያሎትን በራስ መተማመን ለመመዘን ይረዳል፡፡ከፍተኛ በራስ መተማመን አንድን ስራ በብቃት የመከወን ችሎታን ሲያሳይ ዝቅተኛ በራስ መተማመን ደግሞለመሻሻልና ለስልጠና እድል ይከፍታል፡፡ስለዚህ ከHMIS ጋር የተያያዙ ስራዎችን ለመከወን ያልዎትን በራስ መተማመን ማወቅ እንፈልጋለን፡፡እባክዎትን በግልፅነትና በሀቀኝነት በራስ

መተማመንዎን ይለኩልን፡፡በራስ መተማመንዎን ለእያንዳንዱ ከታች ለተዘረዘሩት የጤና ነክ መረጃን የተመለከቱ ሁኔታዎች(መገለጫ) በሚከተለው መለኪያ በመቶኛ ይለኩልን፡፡

0 10 20 30 40 50 60 70 80 90 100

ተ.ቁ	መገለጫ	No						Yes				
		0	10	20	30	40	50	60	70	80	90	100
1	የመረጃን ትክክለኛነት ማረጋገጥ እችላለሁ											
2	መቶኛዎችንማስላት እችላለሁ											
3	መረጃዎችንበወራትናአመታትማስቀመጥ እችላለሁ											
4	ከባር ግራፎች የአከሳሰት ሂደቶችን መገለፅ እችላለሁ											
5	ግኝቶች ና ውጤቶቻቸውን መግለፅ እችላለሁ											
6	መረጃን ክፍተቶችን ለመለየትና ግቦችን ለማስቀመጥ መጠቀም እችላለሁ											
7	መረጃን የተለያዩ ውሳኔዎችን ለመወሰንና ምላሽ ለመስጠት መጠቀም እችላለሁ											

ለትብብረዎ እናመሰግናለን፡፡