Health Management Information System Data Quality, Utilization and Associated Factors at Governmental Hospitals and Public Health Management System in Sidama Regional State

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Abstract

Background: A health information system is a tool used to gather, organize, transmit, analyze, store, and utilize health system data to help decision-makers and stakeholders allocate resources at every level of the healthcare system. Health information system activities are not well integrated at the district and facility levels, where the majority of the data is being generated. **Objective**: the aim of this study was to assess the utilization of the health information system data, its quality and influencing factors in the public health facilities residing in Sidama regional state. **Methods** An institution-based cross-sectional study using a mixed (quantitative and qualitative) approach was conducted. The sample size for quantitative data estimated was 422, and two months' documents were checked for accuracy and completeness for data quality. Twenty-five Key informants for qualitative data were chosen purposively. Quantitative data was analyzed using SPSS version 23. The variables having a p-value of less than 0.25 were added to the multivariable analysis using binary logistic regression. Lastly, variables with p-value of less than 0.05 at the multivariable analysis were taken as significant. Manual transcription, coding, and thematic analysis of qualitative data were done.

Result: out of 422 participants 407 healthcare professionals responded, 96.5% response rate. Majority 288 (69.5%) were younger age less than 30 years old, 173(42.5%) were male, 331 (81.3%) were degree holders, 219 (53.8%) married, 221(54.3%) were protestant. More than half (52.1%) had poor utilization of HMIS data for decision-making. participant's knowledge on HMIS, the extent of participant confidence to complete HMIS tasks, and the level of management support for staff were found to be significantly associated with utilization of HMIS data to the evidence based decision making for health care. Through qualitative study we identified five themes. These included Theme 1: awareness, knowledge and expertise gap on HMIS, Theme 2: Perception on Significance of HMIS data, Theme 3: data quality and information use challenges, fourth theme: Facilitator characteristics and Theme five: perceptions on data quality and usage.

Keywords: Health information system, Data quality, Health management information system

Background

Health information system is the processes and mechanisms through which health-related data is produced and made accessible to users, through networking within and outside the Health Sector (WHO, 2010). It includes health information and provides information on routine facility-based care delivery(WHO, 2021). It is a System that used for data collection, storage, compilation, transmission, analysis and usage of health system that support decision makers and stakeholders manage and plan resources at every level of health service. It also used to improve patient satisfaction with health services by tracking certain dimensions of service quality(Tadesse *et al.*, 2014)).

HIS is one of the six building blocks essential for health system strengthening and Ministry of Health (WHO, 2010) The mission of HIS is to support continuous improvement of health services and the health status of the population through action-oriented, evidence-based decision making, based on quality information((MOH, 2016)).

Reliable and timely health information is one of the foundations of effective health service management and public health action. Well designed and managed health information systems can generate quality health information which is crucial for monitoring and evaluation (M&E) of health program performance and for developing appropriate policies, plans, and strategies to ensure sound health care system(MOH, 2016).

However ,many developing countries struggle with incomplete, inaccurate and untimely information which is not useful for health decision-making (Hambili *et al.*, 2022). This is due to Shortage of resources needed to implement HIS and lack of compliance to implementation guideline like insufficiency of assigned HIS personnel, absence of separate HIS offices, inadequate budgets allocation for HIS, inadequate data quality assurance,

shortage of supervisory support, shortage of infrastructure in respect to information and communications technology utilization in different levels of health institution (Bogale, 2021).

Data revolution can be achieved if human resources, with all the required skills and competency, are available and allocating budget specifically to accomplish tasks related to HIS. However, study revealed that about 22% health facilities didn't assign HIS focal person and of those facilities assigned focal persons around 72% didn't have information technology training. Concerning to budget about 78% health facilities, 70% districts and 66% region didn't allocate budget for HIS. Furthermore, there was limited culture of using information for decision-making in planning and management of programs. Around 73% of the facilities didn't exercise discussion and make decisions using findings from routine health information (Mesfin G, etal, 2010)

HIS is a major source of information for monitoring and adjusting policy implementation and resource use. During conducting routine data quality assurance in 2014, on average, 28% of source documents weren't available and from available source documents, about 60% completely recorded. Around 39% facilities didn't assign fulltime HIS focal person. Of them 74% were not health information technology (HIT) graduates (Ministry of Health, 2010).

According to health sector transformation plan (HSTP) and information road map, in Ethiopia the major problem of HIS implementation status are data quality and information use at all levels. This is due to many factors like lack of attention given to HIS, shortage of resource and lack of strategic plan as well as lack of integration, absence of standards and guidelines ,inadequate staffing and poor ownership(*FMOH*.2012). In addition to these, HIS Activities are weakly coordinated at the districts and facilities level where data was produced primarily (MOH, 2016).

HIS implementation is at its immature age in developing countries due to resource constraint. Many of health professionals focus on treatment due to lack of training, there is no awareness on the importance of patient record. Consequently, decision-makers cannot identify problems and needs, track progress, evaluate the impact of interventions and make evidence-based decisions on health policy, program design and resource allocation (Tadesse K etal, 2014).

Despite this fact studies on HIS implementation status in Ethiopia as well as in current study area is generally limited. Therefore this evaluation tries to assess the implementation status of HIS program in public Health Sidama regional state.

Objectives: To assess the level of data quality, utilization, and associated factors at governmental public hospitals in

Materials and Methods
Study Design:
An institution-based cross-sectional study using a mixed (quantitative and qualitative) approach was used.
Study are:
The study was conducted at selected study hospitals of Sidama Regional State. The region located in the southern part of the country and bounded by Oromia in the North, East and South East, with Gedeo Zone in the South, and Wolaita Zone in the West. There are 12 primary hospitals with its {147 health centers and 533 health posts (Primary health care units), four regional hospitals and one referral hospital. current study was conducted at five selected hospitals namely Hawassa university comprehensive specialized hospital, adare General hospital, Leku General hospital, Yiragalem General hospital and Bona General hospital.
Study period:
A study was conducted from December 1 to October 30, 2021
Source population
The source populations included all operational public health hospitals, for the quality of the HMIS data as well as all health care professionals employed and working at these hospitals.
Study population
Government hospitals and administrative offices, healthcare professionals engaged in HMIS processes, and HMIS records were used as study units. Data were gathered from HMIS documents, head of institutions, HMIS focal persons, and health workers participating in recording HIS data and administrative units.
Operational definition
HMIS data Utilization**:** The Level of HMIS data utilization was obtained from individual health workers structured interview. An 8-item HMIS data usage scale was employed in the current study. We added up all of the scores and divided them into two categories: adequate utilization, which is above the median score, and inadequate utilization, which is below the median level. The score ranged from a minimum of 8 to a maximum of 40.
Knowledge on HMIS: Using the mean of the participant's knowledge scores for an 8-item knowledge measure; we may determine their level of understanding of HMIS. We divided participant knowledge scores into two categories based on the mean: poor, which scored below the mean, and good, which scored above the mean.

HMIS Data quality: We calculated utilizing four components, the reported data's consistency, accuracy, completeness, and timeliness. Completeness: It was measured by of number of reports observed in each hospital divided by number of reports expected in the last 12 months. Those hospitals scored greater than 90 % were considered as hospitals that fulfilled completeness criteria. Content completeness was assessed by proportion of filled data elements of reporting formats pertaining to selected months. A tolerance level of 90 percent was used in grading hospitals, which meant that each hospital expected to complete at least 90 percent of data elements on report formats. All data elements of two months (July 2020 and June 2020) monthly service reports from five hospitals were reviewed to assess content completeness of reports (Ababa A, 2016).

Dependent Variables

Health information utilization and data quality

Independent variables

Technical factors (such as format complexity and the presence of standard indicators), behavioral factors (such as knowledge on HMIS and data quality checking skills), organizational factors (such as training, supervision, resource availability, regular feedback, management support, and a performance evaluation plan), and HMIS processes (Aggregation of data and Completeness), Socio-demographic Factors (such as Age, Sex and Education level) were all factors that we measured as Independent variables.

Sample size and Sampling procedure/technique

Five hospitals were randomly selected to represent hospitals in the Region and from each hospital Sample for document review were randomly selected. Document sample selection and analysis were done in order to measure the data quality. The sample size for health professionals was calculated using single population proportion with the following assumptions, P=0.5 , marginal error (d) of 5%, confidence interval of 95% and Zα/2 is the value of the standard normal distribution corresponding to a significant level of alpha (α) of 0.05, which is 1.96.

$$n = \frac{(z_{\alpha/2})^2 p(1 - P)}{d^2} = 384$$

A final sample size of 422 was obtained after accounting for the 10% non-response rate. To get a representative sample, it was proportionately allocated to each hospital. Samples of 25 key informants were interviewed for qualitative data and the interview was ended after reaching information saturation. A key informant was purposefully selected from among the five hospitals.

Inclusion and exclusion criteria: nurses, health officers, and HIT officers working in the outpatient maternal and child health clinic. The study eliminated health facilities that were no longer in use, facilities that had been open for less than a year and health professionals who had been employed there for less than six months.

Data collection tools: Following a review of relevant literature, researchers produced data collection tools. For quantitative data, a self-administered structured questionnaire is created containing background data about the respondents. It included inquiries regarding the accessibility of resources, the observance of national standards by medical professionals, the use of HIS data for decision-making, and variables influencing usage. Using a self-efficacy exam to measure staff confidence in their duties related to HIS, as well as a template for document reviews that checks for timeliness, accuracy, and completeness A resource record checklist, details on the resources' accessibility, conformity with national guidelines, and use of HIS data in decision-making are all included in a key informant's interview guide for qualitative data.

Data collectors: Five B.Sc. nurses who were trained in and skilled at working in HIS were employed to gather data, and two B.Sc. health professionals were chosen as supervisors. The principal investigator spent one day orientation of the supervisors and data collectors on the proper completion of the questionnaire, data collection, and protocol compliance. For data quality during the data collection period, the supervisors and the principal investigator closely monitored the data collection procedures, carefully reviewed each completed questionnaire, and offered on-site technical help to the data collectors.

Data Quality: In order to acquaint data collectors and supervisors with the data collecting process, a pretest was administered before to the actual data gathering. The data collection method was closely monitored. The group members evaluated the data gathering method' effectiveness and made necessary corrections for the next day. The self-administered structured questionnaire and document review checklist were used to gather quantitative data; the key informant's interview guide was used to obtain qualitative data. Every day, the data was examined for consistency and completeness.

Data management and analysis: Following data collection, the principal investigator verified the data daily with the help of the data collectors and supervisors to ensure its accuracy. Any issues were then discussed and swiftly resolved by the researchers. The data was finally coded, loaded into Epi Data 3.1 for additional processing, and exported to SPSS for analysis.

Key informant responses were coded, categorized, and thematically analyzed. After data cleaning; analysis was conducted by using SPSS version 23.0 through descriptive and analytic statistics. The results were displayed in tables, graphs, and figures. Binary logistic regression was used to analyze the associations between the

dependent and independent variables, and variables that had a bivariate p-value of less than 0.25 were added to the multivariable analysis. For the purpose of displaying the strength of associations, the odds ratio with a 95% confidence interval was computed. Finally, variables that are significantly associated with the use of a regular health information system were identified using the multivariable analysis and a p-value of less than 0.05. The results of the theme and content analysis of the qualitative data was presented in narrative form after analysis.

Result

Socio-Demographic characteristics

Out of 422 health workers invited, 407 health workers were participated in the study, with 96.5% response rate. Majority 288 (69.5%) of respondents age was less than 30 years and 173(42.5%) participants were male. Majority 331 (81.3%) of respondents were degree holders. Majority 219 (53.8%) of respondents who participated in this study were service married followed by 187(45.9%) single. Majority of participants, 221(54.3%) were protestant followed by orthodox 158(38.8%), Muslim, 17(4.2%) and others 11(2.7%). (Table 1)

Participant's Knowledge on HIS/HMIS

The overall participant's knowledge scores ranged from a minimum 8 to a maximum of 40 score. We computed the mean of participant's knowledge score by summing together all the knowledge scores for an 8 item knowledge scale. Based on this classification, 158(38.8%) scored below the mean score while 249(61.2%) scored above the mean score.(*Table 2*)

Level of HMIS data utilization:

The Level of HMIS data utilization was obtained from individual health workers structured interview. An 8-item HMIS data usage scale was employed in the current study. We added up all of the scores and divided them into two categories: adequate utilization, which is above the median score, and inadequate utilization, which is below the median level. The score ranged from a minimum of 8 to a maximum of 40 with median and mean score 30 and 29.27 respectively. More than half, 212(52.1%) were inadequately utilized HMIS data for decision making while those 195(47.9%) participants adequately utilized. (Figure 1)

According to key informant interview findings, there have been issues with the use of health information, particularly at the facility level.

HMIS data quality reported by hospitals:

The dataset reported in the previous year by hospitals was evaluated for completeness, accuracy, timeliness, and consistency. All institutions fulfilled content as well as report completeness, four out of five hospitals (80%) fulfilled data accuracy and 3 out of five (60%) hospitals fulfilled report timeliness criteria. Seven data items (indicators), including institutional delivery, PMTCT, TB cure rate, and confirmed malaria cases, were chosen from a list of national priority indicators that should be tracked at each hospital in order to evaluate data accuracy. Four out of the five administrative units, 80% conducted review meetings to assure overall quality throughout the course of the previous two quarters. Finding from key informant interview showed that most of hospitals get quarterly supervision with written feedback. Most of respondents said they carried out LQAS on monthly basis.

For example A 37 years old male who was one of administrative units HMIS focal said,

"... *Performance review team meeting held monthly and feedback given monthly on core indicators based on HMIS reports to be improved. Not only that there is review meeting quarterly after this meeting oral as well as written feedback given for facilities based on the gaps identified, supportive supervision held quarterly for all hospitals . Based on finding observed feedback given on site as well as organized feedback sent to respective hospitals after incorporating all comments, There is no specific supervision for HMIS only but integrated with other programs .Important point is, there is specific checklist for HMIS program"*

Another 29 years old male from Adare Hospital added,

 "...Well, I haven't taken training on HMIS but since I have worked on the area I believe that I have a good experience. Regarding on data quality we cross check the register and the report, we will check for the presence of fallacy, we look for correspondence between the tally, the register and the report at department level. Through this way we check for the quality of the data and solve problems together. On the other hand at quality assurance office of the hospital using the HMIS report format we randomize and through decision rule tables we check for the quality of the data and give feedback to departments"

Additionally, a 32-year-old manager from Adare Hospital added,

"..... *Hospitals may conduct LQAS for data accuracy monthly and may report that data accuracy but, if we see in detail there is problem in the procedure as well as they may not follow standard way of conducting LQAS. You may get monthly LQAS report when you go to hospitals but they do not know what is the meaning of that their facility and data quality. The problem is all about attitude towards HMIS data quality"*

The indicators used to determine the data accuracy showed a tendency to over report on two of the seven data items that were chosen. ANC4 and CAR were reported 1.2% and 1.5% data (more than 10% tolerance level) respectively. The other indicators were within acceptable level of accuracy (10% tolerance level). (Figure 2)

The percentages of over-reported data for each indicator chosen, taking 100% accuracy into account, are shown

below. Contraceptive acceptance rate (11.5%) was shown to be a highly over-reported indication, followed by ANC4 (11.18%) and PMTCT (10%). There was a great deal of evidence of confirmed malaria cases. (Figure 3)

Levels of management support for the use and quality of HMIS data

In this study, participant opinions regarding how strongly they concur with statements about management support for HMIS data quality and utilization were examined using an 8-item motivation measure with a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5). Participants were given a score of 3 if they were uncertain about the strength of their beliefs or believed they were indifferent. The participant's overall score was determined based on the outcome. The minimum, maximum, mean and median were 9, 45, 29.38 and 30 respectively. Based on participant's median score we classified the overall Management support score into two: poor management support that is below median score and good management support that is above median score. Accordingly, more than half of the participants scored below median score, 209(51.4%) which poor management support while 198(48.6%) scored above the median score.

Levels of participant's Motivation for HMIS utilization

In this study Participant's opinion about how strongly they approve with statements about their Motivation for HMIS data quality and utilization were studied using an 8 item motivation scale with five point likert scale ranging from strongly disagree(1) to strongly agree(5). If participant were not sure of the strength of belief or think that they neither disagree nor agree that point was given the score of 3. Based on that result, participant's total score was calculated. The minimum, maximum, mean and median were 8, 40, 25.59 and 26 respectively. Based on participant's median score we classified the overall motivation score into two: low motivation that is below median score and high motivation that is above median score. Accordingly, 227 (55.8%) participants scored above the median score, indicating high motivation, whereas 180 (44.2%) participants scored below the median level, indicating low motivation.

Levels of Self-efficacy of participant on HMIS Tasks

Using a 6-point self-efficacy measure with a range of 0 to 100 was used to measure participants' perceptions of their level of confidence in handling tasks connected to health information systems (HMIS). The results showed that respondents' average levels of confidence in verifying the data's accuracy, computing percentages, charting, computing trends, interpreting findings, and utilizing the data were (61.70 %), (59.75 %),, (57.20 %), (57.20 %), (57.67 %), and (59.78 %), respectively. Based on the total score participants were further classified into less confident, those scored below the mean score, and confident those scored above the mean score. As a result, more than half 210(51.6%) were less confident to perform HMIS Tasks. (Figure 4)

Factors associated with HMIS data utilization

Current study identified that the extent of participant confidence in completing HMIS activities, management support for staff, and knowledge on HMIS were the variables identified as being significantly associated with HMIS data utilization. The odds of HMIS data utilization were 3.72 times more likely among Health care workers who had good knowledge of HMIS than those who had poor knowledge[AOR=3.72, 95% CI (2.29, 6.04)]. (Table 3)

Some of the key informants reported that there is a knowledge gap regarding the availability of HMIS evidence for decision-making. The majority of the participants also mentioned the need for training, For instance.

For example, a 32 years old male from Adare Hospital said,

"… Actually here there are HMIS focal who have taken trainings. On the other hand as a quality officer I work with HMIS focal persons on data feeding and reporting but I haven't taken training on HMIS, data quality and related issues. Regarding the data quality being produced in our institution, as a quality officer we work with every department discuss on and try to solve challenging issues like timeliness and accuracy"

The odds of HMIS data utilization was 2.8 time more likely among Professionals with high confidence to perform HMIS activities compared to professionals who were not [AOR=2.81, 95% CI (1.75-4.44)].

The odds of HMIS data utilizing among Health care workers who had good Management support were 1.9 times more likely than those who had not [AOR(95% CI)= 1.90(1.17-3.09). (Table 8)

Some of the participants indicated the enablers, such as the existence of a data evaluation program run by a hospital monitoring team and the availability of an HMIS log book, were all considered as a tool which allows the use of HMIS evidence for decision-making.

The incentive of the employees and the monthly salary, according to some participants, hindered the use of HMIS data for decision-making.

For instance, a male who is 29 years old planning officer from Adare Hospital said,

"…ok the other important thing in this work is motivation of the workers in this area. So this motivation is associated with monthly salary. People working in this area have a salary lower than other health workers and

because it affects the motivation of the workers and the data quality it should be seen by the government for possible correction"

Also 35 years old male Head of OPD from Adare Hospital said,

"… well, all supports from the government are so far are good. But what I would like to add is through the recent salary arrangements the salary of the data workers has been set low. This has affected our motivation and I would like to suggest the government to review it"

The existence of PRT meetings every month, feedback meetings every three months, supportive supervision sessions every three months, and a specific checklist for the HMIS program are just a few of the facilitating factors that a small number of participants mentioned. Although HMIS is linked to other programs, it is not monitored separately. For example 31 Years old said,

"....... PRT meeting held monthly and feedback given monthly on core indicators based on HMIS reports to be improved. Not only that there is review meeting quarterly after this meeting oral as well as written feedback given for facilities based on the gaps identified supportive supervision held quarterly for all selected hospital"

A 29 years old female from Leku Hospital said:

"...Currently it is considered that there is no awareness problem on HMIS b/c there is partner collaborator, that work on HMIS. These partners performed much capacity building in collaboration with regional health bureau"

A 30 years old male, HMIS focal person from Yirgalem Hospital said:

".....Supportive supervision is conducted quarterly at all healthcare facilities; HMIS is not the only program under supervision; it is connected with other initiatives. A key feature is that the HMIS program has a specified checklist"

Discussion

In this study, the level of data quality, the use of HMIS data, and the associated variable were all investigated.

When compared to employees with inadequate knowledge about HMIS, health care workers with good knowledge were 3.72 times more likely to use HMIS data. The result was supported by studies conducted elsewhere(Asemahagn MA, 2017). Similarly this result was supported by WHO, PRISM assessment done by Lippeveld T ,Belay H. at 2013, stated that Limited knowledge about usefulness of data has been the primary factor linked to lack of demand for data quality and use of information(Belay H., 2013;).

Also this study identified those Professionals who were highly confident in their ability to do HMIS tasks were 2.8 times more likely to use HMIS data than those who were not. This result is similar with the research done in SNNPR and Uganda, which (Hotchkiss DR etal, 2010). Also

This characteristic was also identified as one of the factors of the use of health information in a WHO measure evaluation(PRISM, 2010). Self-efficacy among health professionals most likely resulted from knowledge and comprehension of HMIS. A good understanding of the HMIS tasks will lead to a good use of health information in decision-making.

The current study also found that healthcare workers were 1.9 times more likely to use HMIS data than those who did not have proper managerial assistance.

Within bivariate analysis Health workers were 1.8 times more likely to use information than non-participants in data aggregation from registration or tally sheets during the reporting period. But this association was not significant I multivariable analysis. Findings from the analysis of WHO measures and evidence from the formulation of HMIS use recommendations supported this conclusion (PrIsM, 2010). This may be a positive attitude toward HMIS and increased knowledge of HMIS activities may result from repeated exposure to data collecting and aggregation. Professionals may make judgments using HMIS data more effectively if they have a good attitude and are knowledgeable about HMIS.

Bivariate study revealed that compared to their counterparts, health workers who believed HMIS formats were not difficult had higher odds of using health information. Data collection, analysis, and interpretation simplification is one of the guiding ideas for the redesign of HMIS (Cheburet SK, 2016). The result was supported by WHO measure evaluation which listed complexity of formats as one of impediments for health information utilization and other assessments done elsewhere (Belay H., 2013). This may be because it is challenging to accurately record pertinent information when formats are difficult to comprehend, and it is also challenging to retrieve these data when formats are difficult to understand. Therefore, this can make the situation harder for using data.

Conclusion

This study found that more than half (52.1%) of participants did not use HMIS data adequately when making decisions. As a result, there was inadequate use of HMIS data for making evidence-based decisions about health care. This demonstrated that decision-making processes did not effectively use information HMIS system adequately. This study also identified that participant's knowledge on HMIS, the extent of participant confidence to complete HMIS tasks, and the level of management support for staff were found to be significantly associated

to the use of HMIS data to the evidence based decision making for health care.

Recommendations

The following recommendations were given for respective hospitals based on study finding:

- ✓ To fill the knowledge gap in HMIS, hospitals should set aside funds from their total health budget for training. They should also collaborate with the regional health bureau. Hospitals are required to conduct individual and group evaluations of their
- ✓ performance in light of the standards. Hospitals should regularly conduct LQAS using standardized procedures, and they should plan orientation sessions for medical professionals to increase their proficiency with HMIS activities.
- ✓ Sidama regional health bureau should emphasize the recruiting of HIT specialists and make sure that they are placed in the proper location. Every hospital under the regional health bureau's jurisdiction should be required to conduct routine PRT meetings, self-evaluations, and reviews. Regional Health Bureau Ensure that all hospitals base their decisions on the facts at their disposal by requiring Sidama Health professionals to record patient data each day and as soon as patient treatment is completed in registration books and tally sheets.
- ✓ Health professionals should show up to staff meetings and take part in them.
- ✓ Finally, it is important that the FMOH, Hawassa University, and Sidama Regional Health Bureau collaborate to support funding allocations made specifically for HMIS training, involve service providers in tool development, and facilitate ICT access to facilities for improved data quality and information usage.

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Annexes

Questionnaire

Instruction

Dear respondent, this questionnaire is designed to collect data for a evaluation entitled "level of health information system utilization for decision making and its determinants among public health facilities at health hospitals residing of in Sidama regional state", We humbly ask for your involvement in completing this questionnaire because it is essential to the success of this study that you provide clear and correct responses. Please be assured that all of the information you provide will only be used for research purposes and will be handled with the utmost confidentially. You are not required to answer any questions on the questionnaire that you choose not to. Your participation in this study carries no direct risks or benefits for you, but it is nevertheless very beneficial because your answers and those of the other participants will help to solve the HIS-related issues in the healthcare industry.

If you accept to take part in this circle, say "yes," otherwise, say "no."

Name and Signature of the data collector who sought the consent_____

Date of interview_____ Name and signature of the supervisor _____

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Part I-Socio-demographic characterstics

S. No-	Questions	Answer
11	Age	_____years
12	Sex	1.Male 2.Female
13	Educational status	1.Certificate 2.Diploma 3. Degree 4. Masters and above
14	Marital status	1. Married 2. Not married 3.divorsed 4.widowed
15	Religion	1.orthodox 2.Muslim 3.Protestant 4 .others

Part II. Behavioral and organizational characteristics

I would like to know your opinion about how strongly you agree with certain statements. There are no right or wrong answers, only expressions of your opinion on a scale from 1 (strongly disagree) to 5 (strongly agree). 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 the intensity of 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 be frank and choose your answer honestly.

Questions to assess providers knowledge of HMIS	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
HMIS Collects data from service and administrative records	1	2	3	4	5
HMIS Provides signals that can be reviewed frequently to monitor program implementation	1	2	3	4	5
HMIS is Used for decision making	1	2	3	4	5
HMIS is important for policy Making and management decisions	1	2	3	4	5
HMIS is important for Monitoring and Evaluation of performance	1	2	3	4	5
HMIS data can be presented by using Charts, graphs and tables	1	2	3	4	5
HMIS is an integral part of Health Information System	1	2	3	4	5
HMIS data can be utilized at providers ,facilities and administrative level	1	2	3	4	5

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Management support					
Hospital management encourages staff to check data quality	1	2	3	4	5
Health department encourages staff to check evidence before making decisions	1	2	3	4	5
Hospital management inculcates value in staff that their efforts could change things for better	1	2	3	4	5
Hospital management makes staff accountable for their decisions and actions	1	2	3	4	5
Hospital management encourages supervisors to reward good work	1	2	3	4	5
Hospital management makes staff feel important by recognizing their work	1	2	3	4	5
Hospital management encourages staff to use data to monitor changes in health service indicators	1	2	3	4	5
Hospital management encourages staff to use data monitor changes in health service indicators	1	2	3	4	5
Hospital management encourages staff to use data for developing future action plan	1	2	3	4	5
Motivation					
Collecting information not used for decision making discourages me	1	2	3	4	5
Collecting information makes me feel bored	1	2	3	4	5
Collecting information is a meaningful work for me	1	2	3	4	5
Collecting information gives me the feeling that data is needed for monitoring facility performance	1	2	3	4	5
Collecting information gives me the feeling that it is forced on me	1	2	3	4	5
Collecting information is appreciated by co-workers and superiors	1	2	3	4	5
Collecting information provides me the feeling that you have all the information to serve better your catchment area	1	2	3	4	5
Collecting information causes me to feel that you are wasting time	1	2	3	4	5

21. Have you trained on HIS/HMIS?   1) Yes   2) No
22. Position in the case team /department   1.Case team leader   2.Service provider
23. Types of institution you working 1) primary hospital   2) General Hospital   3) referral hospital
24. In the past 3 months did you get supervision from higher officials?   1) Yes   2) No
25. Did you get regular Feedback from top level organization through regular report based on evidence in the last quarter?   1) Yes   2) No
26. Have you ever been participating in aggregation or compilation of data from tally sheet/registration
   1) Yes   2) No.
27. Did you conduct data accuracy test?   1) Yes   2) No

Part III characteristic of HMIS tools

The following are question to assess HMIS tools, please say " yes " or "no " by reading each question thoroughly.

S. No	Question to assess complexity of HMIS formats	1.Yes	2.No
23. 1	Do you think HMIS formats are easily understandable /user friendly		
23. 2	Do you think Each cell of the HMIS format is enough to fill required information		
23. 3	Do you think Data in each cell of HMIS formats is easy to aggregate		
23. 4	Do you think Filling data in each cell of HMIS formats is **not** tedious		

Part VI. HMIS utilization

I would like to know your opinion about how strongly you agree with the following utilization statements. There are no right or wrong answers, only expressions of your opinion on a scale from 1 (strongly disagree) to 5 (strongly agree). 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 the intensity of 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 be frank and choose your answer honestly.

S. No		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
311	I can use HMIS data for day to day management of activities.	1	2	3	4	5
312	I can use HMIS data for planning future actions.	1	2	3	4	5
313	I can use HMIS data to find the root cause(s) of the problem/s in my department/facility.	1	2	3	4	5
314	I can use HMIS data to evaluate whether the targets or outcomes have been achieved?	1	2	3	4	5
315	I can use HMIS data for community education and mobilization.	1	2	3	4	5
316	I can use HMIS data to identify and manage epidemics.	1	2	3	4	5
317	I can use HMIS data to identify problems in performance, discuss and analyze with unit staff in team meeting.	1	2	3	4	5
318	I can use HMIS data to monitor change in indicators.	1	2	3	4	5

Part V- 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 or training. I'm interested in knowing how
Confident you feel in performing HMIS-related tasks. Please be frank and rate your confidence
Honestly.
Please rate your confidence in percentages that you can accomplish the HMIS 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

I can check data accuracy	0	10	20	30	40	50	60	70	80	90	100
I can calculate percentages/rates correctly	0	10	20	30	40	50	60	70	80	90	100
I can plot data by months or years	0	10	20	30	40	50	60	70	80	90	100
I can compute trend from bar charts	0	10	20	30	40	50	60	70	80	90	100
I can explain findings & their implications	0	10	20	30	40	50	60	70	80	90	100
I can use data for identifying gaps and setting targets	0	10	20	30	40	50	60	70	80	90	100

Table 1: Study participants' sociodemographic characteristics, Sidama region, 422, and 2021

Variables	Category	Frequency	Present
Age	< 30 years old	283	69.5
	> 30 years old	124	30.5
Sex	Male	173	42.5
	Female	234	57.5
Educational status	Certificate	5	.1.2
	Diploma	38	9.3
	Degree	331	81.3
	Masters and above	33	8.1
Position in the case team /department	Case team leader	70	14.7
	Service provider	407	85.3
Types of hospital	Primary	72	17.7
	General	162	39.8
	Referral	173	42.5

Table 2: Knowledge on HIS/HMIS among physicians and nurse working at hospitals of Sidama region, Ethiopia, 422, 2021-2021

Questions to assess providers knowledge of HMIS	participant correctly answered	
	N	%
HMIS Collects data from service and administrative records	324	83
HMIS Provides signals that can be reviewed frequently to monitor program implementation	301	74
HMIS is Used for decision making	288	70.8
HMIS is important for policy Making and management decisions	307	75.4
HMIS is important for Monitoring and Evaluation of performance	327	80.3
HMIS data can be presented by using Charts, graphs and tables	314	77.1
HMIS is an integral part of Health Information System	326	80.1
HMIS data can be utilized at providers ,facilities and administrative level	313	76.9

Table 3: data accuracy, completeness and timeliness at selected hospitals, 2021

Criteria	No- of Hospitals	%
Hospitals that fulfilled accuracy (n=5)	4	80%
Hospitals that fulfilled report completeness (n=5)	5	100%
Hospitals fulfilled timeliness criteria (n=5)	3	60%
Hospitals fulfilled content completeness criteria (n=11)	5	100%

Table 2 model showing level of association between utilization of HMIS data and independent variables using Bi-Variable and Multi-Variable Logistic Regression, n=422, 2022

Variables		Utilization (n=422)		COR (95% CI)	AOR (95% CI)
		Good	Poor		
Age of respondents	>30yrs	50	145	1	1
	<30yrs	74	138	0.640.42-0.97)	0.77(0.46-1.29)
Training on HMIS	No	147	180	1	1
	Yes	48	32	1.84(1.12-3.02)	1.45 (0.78-2.69)
Level HMIS format complexity	Fully complex	28	64	1	1
	Somewhat complex	52	68	1.75(0.99-3.10)	0.61(0.31-1.21)
	Little complex	54	34	3.36(1.96-6.73)	1.57(0.83-2.99)
	Not all Complex	61	46	3.03(1.69-5.45)	1.55(0.84-2.86)
Levels of hospital	primary	42	30	1	1
	General	70	92	0.54(0.31-0.95)	0.92(0.47-1.80)
	Referral	83	90	0.66(0.38-1.15)	1.45(0.72-2.92)
Knowledge on HMIS	Poor knowledge	46	112	1	1
	Good knowledge	149	100	3.63(2.37-5.56)	3.72(2.29-6.04)**
level of Confidence to accomplish HMIS activities	less confident	71	139	1	1
	Confident enough	124	73	3.33(2.21-4.99)	2.81(1.75-4.44)**

Feed-back from top level supervision	No	100	144	1	1
	Yes	95	68	2.01(1.35-3.01)	1.47(0.89-2.44)
Management support	No support(poor)	79	130	1	1
	Had good support	116	82	2.33(1.56-3.47)*	1.90(1.17-3.09)*
Participation on data Aggregation	No	78	116	1	1
	Yes	117	96	1.81(1.22-2.69)	0.97(0.59-1.61)
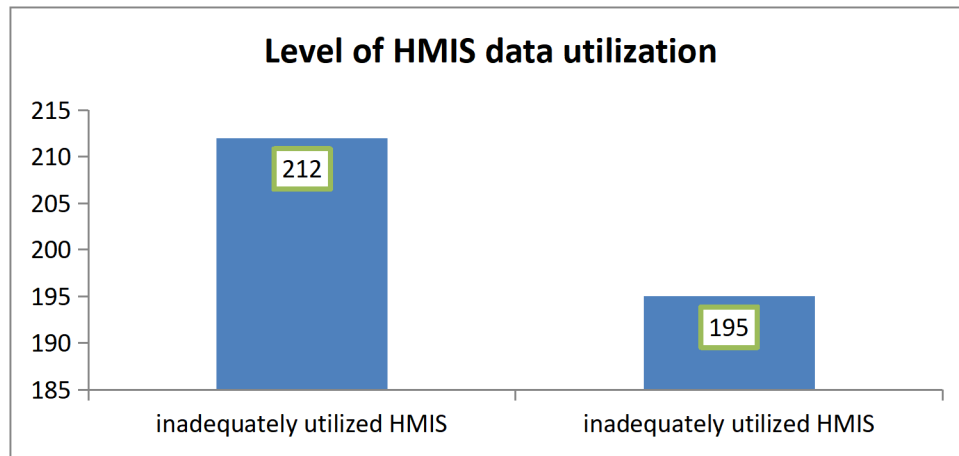
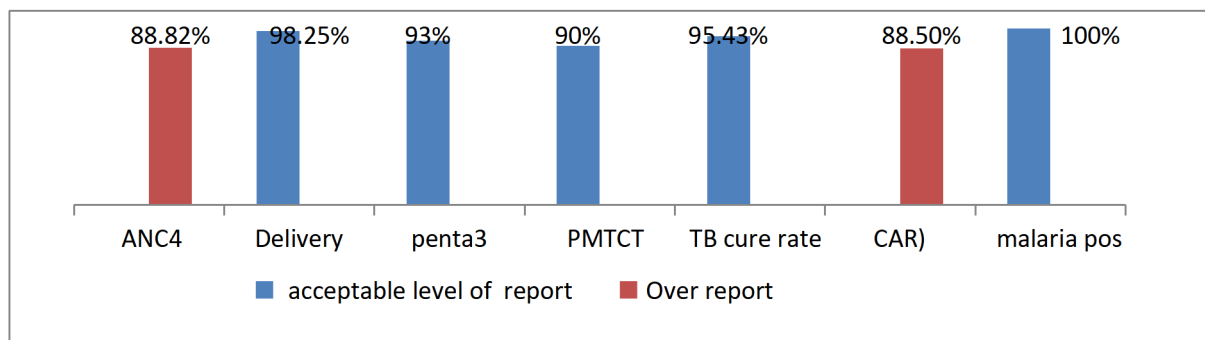Figure 1: level of HMIS Data utilization among physicians and nurses, n=422, 2021

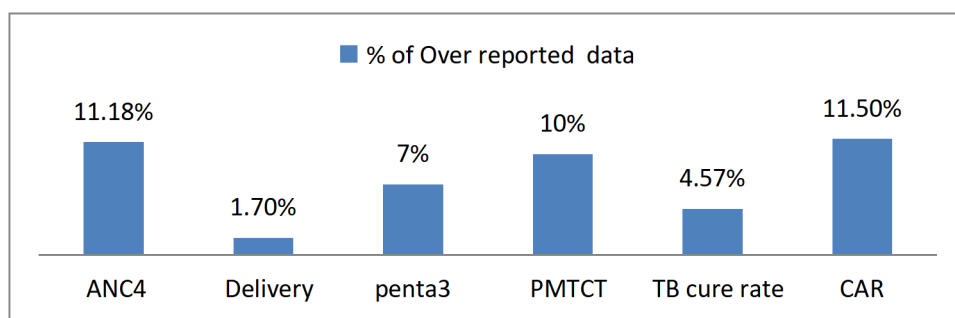Figure 2 Data accuracy at study hospitals of Sidama region, Ethiopia, 2021

Figure 3 Percentage of over reported data at five hospitals (n=5), 2021