



RESEARCH ARTICLE

UTILIZATION OF HEALTH MANAGEMENT INFORMATION SYSTEM AND ASSOCIATED FACTORS IN HEALTH INSTITUTIONS OF KEMBATA TEMBARO ZONE, SOUTHERN ETHIOPIA

Hailu Kebede Kondoro¹ , Eyassu Mathewos Oridanigo¹ , Tessema Abera Osse² ,
 Teshome Sosengo³

¹Kembata Tembaro Zone Health Department, P.O. box 20, Durame, Ethiopia.

¹Department of public health, College of Medical and Health sciences, Wachemo University, Durame Campus, Durame, Ethiopia.

²Durame Town Health Office Kembata Tembaro Zone, Durame, Ethiopia.

³School of Pharmacy, Haramaya University, Harar, Ethiopia.

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*Address for Correspondence:

Eyassu Mathewos Oridanigo, Department of Nursing, College of Medical and Health Sciences Wachemo University, Durame Campus, Durame, Ethiopia. Tel- +251911598052; E-mail: eyumathi@gmail.com

Abstract

Background: Health Management Information System (HMIS) is one of the six building blocks of a health system designed to provide important data for continuous quality improvement at all levels of health care administration. It is a major source of information for monitoring and adjusting policy implementation and resources use. Some studies have been conducted in health data collection and ways to improve data quality, but little is known about utilization of HMIS in health services organization. Therefore, this study aimed to assess the utilization of HMIS and associated factors in the study area.

Methods: A facility-based cross-sectional study conducted in public health institutions of Kembata Tembaro zone from March 1 to 30 March 2018. The sample size was calculated using single population proportion formula, and a total of 317 heads of units/departments of district health offices and health facilities were included. Both quantitative and qualitative data were collected using structured questionnaires, observational check-lists and interview guide by trained data collectors. Multivariable logistic regressions were performed using Enter method to identify factors independently associated with dependent variable. Statistical significant variables were declared at *p*-value less than 0.05 and Odds ratio with 95% confidence interval were used for data interpretation.

Result: In this study, overall data utilization was 131(41.59%) with 95% CI of 38.9-46.1%. The data utilization was found to be 98(38.73%) and 33(53.23%) in the health facilities and health administrative units respectively. Training for HMIS [AOR (95% CI)=3.06(2.15-6.75)], availability of procedure manuals [AOR (95% CI)=3.67(1.78-9.01)], and Supportive supervision [AOR (95% CI)=5.30(3.05-11.53)] were found to be significant with HMIS utilization.

Conclusion: Utilization of HMIS in public health institution was lower compared to previous studies. HMIS training, supportive supervision and availability of procedure manuals were positively associated with utilization of HMIS. Health facilities and offices should avail HMIS manuals and capacity building of health workers through training and supportive supervision was recommended.

Keywords: Ethiopia, HMIS utilization, Kembata Tembaro, Public health institutions.

INTRODUCTION

Health management information system (HMIS) is defined as collective effort to collect, process, report and use health information and knowledge to influence policy making, programme action and research¹. The purpose of HMIS is to routinely generate quality health information that provides

specific information support to the decision-making process at each level of the health system for improving the health system performance, to respond to emergent threats, and to improve health². Utilization of data from HMIS is the practice of maintenance and care of health records by traditional (paper-based) and electronic means in hospitals, health administrative office, health departments, health insurance companies,

and other facilities to generate quality health information and use that information for management decisions to improve the performance of health services delivery³. Utilization of data from HMIS at all level of health services organizations is used to improve health services effectiveness and efficiency³. Despite the credible use of data from HMIS for evidence based decision making, countries with the greatest burden of ill health and the most urgent needs for good data have the weakest utilization of health data in the vast majority of world's low income countries⁴. Although high effort to improve the efficiency of data utilization in the past few years, low and ineffective data utilization practicing from HMIS, poor utilization of data at the local level and inadequate knowledge and interest of health service providers in HMIS was seen in health system⁵. Poor/absence of data utilization will result in occurrence of inadequate transparency between health administrative units and health care providing centers, which encounter unfair allocation of resources according to their need and interrupt supplies within the organization. As a result, it can frustrate the health staffs in health facilities compromising the attention paid to successful application of the system⁶. Government of Ethiopia gives due recognition to HMIS as a management support system for improving the health system in Ethiopia by providing continuous information support to decision-making process at each decision-making⁷. Federal Ministry of Health (FMOH) emphasized HMIS as a key to a successful implementation of the Health Sectors Transformation Plan (HSTP) and used information revolution for transformation agenda⁹. HSTP underlined that routine data generated at district health facilities should be considered as the entrance to utilizing health information and a primary source of information for continuous monitoring of health services in the country, and that data should be utilized at the place where it was generated⁸. Even though the FMOH has made tremendous efforts on initiative of HMIS and reform changes, data/information utilization remains weak, particularly at district health offices and primary health care facilities, which have primary responsibility for operational management and decision making¹⁰. According to study conducted in public HCs of Addis Ababa, Ethiopia, level of HMIS utilization was 41.7%⁴. According to HMIS performance base line survey conducted in Southern Nations Nationalities and People Republic (SNNPR) of Ethiopia, the utilization of information was found to be limited in the assessed zones/special woreda. Absence of guidelines and limited information feedback to health facilities were the contributing factors for the observed minimum use of HMIS¹¹. Therefore, this study was designed to greatly signal the current status of HMIS utilization in the study area, which can strengthen the communication channel for timely delivery of services.

MATERIALS AND METHODS

Study area and period

A facility based cross-sectional study design using both quantitative and qualitative study was used in public health institutions of Kembata Tembaro zone from March 1 to 30, 2018. The Zone is located in Southern Nations, Nationalities and People Republic (S/N/N/P/R) of Ethiopia and its capital town, Durame, which is located 293 kilometers (KM) from Addis Ababa and 118 KM from Hawassa, capital town of S/N/N/P/R government of Ethiopia. In this zone, there are 8 woreda health offices and 4 health administrative health units, 1 general and 4 primary hospitals, 33 governmental and 3 non-governmental health centers, 136 health posts and 1170 different types of health professionals.

Source and study population

The source population were all health units/departments of Zonal health department, district health offices and Health facilities (HF) while study population were randomly selected units/departments of Zonal health department, district health offices and HF in the zone.

Sample size determination and sampling technique

The sample size was calculated using single population proportion formula, assuming 5% precision, 95% confidence interval and 32.9% proportion of overall utilization of HMIS in Jimma zone at district level¹². The population correction formula was used since the source population was less than 10,000 (13) and by assuming 10% non-response rate, the final sample size was 317. Since all health facilities in the Zone currently were implementing HMIS, all units/departments heads from all health facilities and offices were included in the study. In the study area, there were 633 units/departments from all health facilities and health offices. Simple Random Sampling (SRS) was used to select 64 and 253 study participants from health administrative units/health offices and health facilities respectively. For qualitative study, heads of health offices, hospital and health centres, HMIS focal persons and case team leaders were selected purposively for in-depth interview.

Data collection tools and techniques

Data were obtained from heads of units/departments of health facilities and health offices of the zone. A face-to-face interview was conducted using self-administered structured questionnaires that were developed after reviewing different relevant literatures^{4,12,14,15} and observational checklists in the study units/departments to identify how data and information is generated like observation of registration books, monthly and annual reports, and graph, charts and Maps. Six Bsc nurses and one health officer were recruited to collect the data and supervise data collection process respectively.

Data Quality control

The quality of data was assured by proper designing of the questionnaires and by training the data collectors and supervisors for two days before the data collection. Every day after data collection, questionnaires were reviewed and checked to maintain its accuracy and completeness by supervisors. The English version questionnaires were translated into Kambattissa and Amharic languages (local languages) and again

translated back to English version and comparisons were made on the consistency of these versions. Data collection tools were pretested at 5% of samplesize in shone primary hospital and East Badawacho health office, outside of the study areaprior to its actual use in data collection.

Data management and statistical analysis

Quantitative data were checked for completeness, inconsistency then coded and entered into epidata version 3.1 and exported to SPSS version 21 for analysis. Descriptive statistics were computed and tables, graphs and numerical summary presented the results. Bivariate analysis was carried out to see the association of each independent variable with utilization of HMIS. Variables with *p*-value less than 0.25 in bivariate analysis were considered as candidates for multivariable logistic regression analysis. Multivariable logistic regression analysis was performed using Enter method to identify factors independently associated with dependent variable. Statistical significance was declared at *p*-value less than 0.05 and the strength of statistical association was measured by adjusted odds ratios and 95% confidence intervals. The qualitative data were transcribed and coded then merged in their thematic areas and a thematic framework analysis was employed manually. Based on participants’ explanation, the descriptive summaries were made, which were used as supplementation for quantitative data to verify events.

Ethical consideration

The study was conducted after getting permission from the institutional review board (IRB) of Jimma university institute of Health (letter No: IRB/205/10 and date: 18/01/2018). Letter of cooperation was obtained from kembeta Tembero zone health department and worda health offices. After clear discussion about the actual study or explaining of

purpose of the study, verbal informed consent was obtained from each study subjects.

Operational definition

Utilization of HMIS: Utilization of data from HMIS was assessed by using matrixes such as information for decision making to take immediate action, feedback from respective supervisors, calculation of area coverage and preparation of maps, presentation of key indicators with charts or tables and presentation of achievements of targets. Based on these criteria, the respondents were considered as utilized data when they practiced a minimum of three out of five criteria^{4,12}.

Completeness: completeness is measured as filling in all data elements in the facility report form, and also as the proportion of facilities reporting in an administrative area. Completed if > 85 % of them were filled

Consistency: Is correspondence between data reported and data recorded in registers and patient/client records, as measured by a Lot Quality Assurance Sample (LQAS) checked by allunits/department Consistency >90%.

RESULTS

General characteristics of the respondents

In this study, 315 study participants responded to the questionnaires with a response rate of 99%. Out of total respondents who responded to the questionnaires, sixty two were selected from health administrative units (health offices) while 253 wereselected from hospitals and health centers. Out of total respondents, majority of them, 138(43.8) were within the age range of 25-30 with a mean and standard deviation age of 27.24 and 5.4 respectively. The sex distribution of individuals working in the study units showed that about two third of them, 197(62.5%) were males.

Table 1: General characteristics of respondents.

Variables		Frequency (%)
Age	19-24	18 (5.7)
	25-30	138 (43.8)
	30-34	82 (26.0)
	35-39	60 (19.1)
	≥40	17 (5.4)
Sex	Male	197 (62.5)
	Female	118 (37.5)
Service year	6m-2yrs	65 (20.5)
	2-4 years	131 (41.6)
	4-6 years	99 (31.4)
	6 years and above	20 (6.3)
Salary in ETB	< 1249	29 (9.2)
	1250-2249	148 (47.0)
	>2250	138 (43.8)
Level of education	Diploma	198 (62.9)
	Degree	113 (35.9)
	Master	5 (1.6)
Occupation in the organization	Health officers	78 (24.8)
	Medical Doctors	8 (2.5)
	Laboratory technologists/technicians	50 (15.9)
	Pharmacists/pharmacy technicians	56 (17.8)
	Public health specialists	5 (1.59)
	HIT professionals	8 (2.5)
	All types of nurses	110 (34.9)

Table 2: Organizational characteristics of the study subjects.

Variables		Frequency (%)
Availability of computers and computer programs	Yes	99 (31.4)
	No	216 (68.6)
Supportive supervision within the six months	Yes	127 (40.3)
	No	188 (59.7)
Receiving of training on HMIS including in-service training	Yes	168 (53.3)
	No	147 (46.7)
Presence of multi-disciplinary committee	Yes	204 (64.8)
	No	111 (35.2)
Frequency of meeting within the last six months	None	60 (19)
	Monthly	106 (51.9)
	Quarterly	158 (77.5)
Presence of health information system steering committee	Yes	168 (53.3)
	No	147 (46.7)
Presence of data collection standards including case definitions	Yes	289 (91.7)
	No	26 (8.3)
Adapt national target to local situation	Yes	296 (94.0)
	No	19 (6.0)
	No	28 (8.9)
Had monthly and quarterly reporting formats and tally sheets	Yes	190 (60.3)
	No	125 (39.7)
Had standard HMIS registers	Yes	162 (51.4)
	No	153 (48.6)
Had HMIS procedure manuals	Yes	191 (60.6)
	No	124 (39.4)

About two fifth, 131(41.6%) respondents' service year was 2-4 years. Regarding educational status of respondents, 198(62.9%) were diploma holders (Table 1).

Organizational characteristics

Among 315 observed units/departments, 99(31.4%) of them had computers. Based on organizational classification, 50(15.9%) and 49(15.6%) units/ departments in health facilities and health offices had computers respectively. Regarding supervision, 127 (40.3%) units/departments were supervised at least once by higher bodies to provide and support directions of health services in the last six months. Among them, about one quarter, 33(26%) were supervised irregularly

while 42(33%), 32(25%) of them were supervised once, twice and 3 times respectively.

One of HMIS focal persons from health centre said that "... supervision was conducted poorly and it was irregular, and not planned, supported by check list and well organized. Although, it was conducted as supportive, was simply traditional type and conducted during seasonal programs like campaigns."

About two third of the observed units/departments, 204(64.8%) had HMIS multi-disciplinary committee for over all design and direction users of data. Among them, 60(19%) of units/departments didn't have schedule for meeting any more.

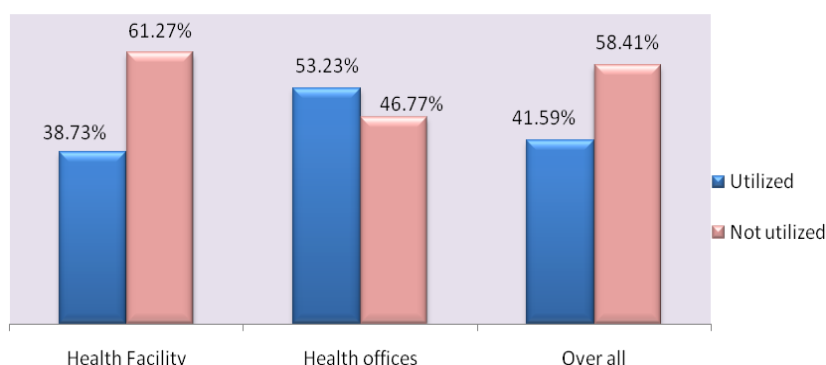


Figure 1: Utilization of data from HMIS in different health services organizations.

One of key informant from head of health offices said that "...there were meetings in the departments/units for reviewing performance. They were conducted not according to plan and schedule setted but they were conducted as needed and not problem solving and some times corrections were not given on the points that were mentioned and discussed during the meetings"

Regarding HMIS training and technical support, 168(53.3%) staffs working in the units/departments received training (Table 2).

Quality dimension of study subjects

In this study, almost all the units/departments prepared reports to submit next higher officials on weekly, monthly, quarterly and annual basis. Out of total units/departments, 301(95.6%) had data transmission, processing, and reporting rules.

Table 3: Quality dimensions of the study subjects in health institutions.

Variables		Frequency (%)
Prepared reports to higher officials	Yes	312 (99.05)
	No	2 (0.95)
Keep their reports and registrations	In organized hard copy	201 (63.81)
	Both hard and soft copy form.	88 (27.94)
	Didn't organize at all	26 (8.25)
Converted data into information	Yes	225 (87.31)
	No	90 (12.69)
Completeness of data	Yes	249 (79.05)
	No	66 (20.95)
Consistency of data with register book, tally sheets and reporting formats.	Yes	198 (62.86)
	No	117 (37.14)

Among the total units/departments, 248(78.7%) keep their reports and registrations in well-organized hard copy form while 56(17.8%) keep their reports in both hard and soft copy form. Regarding submission of reports, 117(37.1%) submit reports within 20-24 days (Table 3). From the total interviewed respondents in the units/departments, 186(59.1%), 58.7%, and 46.7% revealed ambiguity and absence of WHO codes,

redundancy and incompleteness of reporting formats respectively.

One of the HMIS focal person from the health centers said that "...routine data was collected from both individual and working unit level but the tally process was laid to the HMIS focal person. Therefore, the data were not tallied in daily basis due to negligence, shortage of tally sheets and problem of awareness on reporting formats ..."

Table 4: Multivariable logistic regression analysis showing predictors of data utilization in units/departments of health sectors.

Variables	Category	Utilization of HMIS		COR	AOR(95% CI)
		Utilized	Not utilized		
HMIS training	Yes	107(63.7%)	61(36.3%)	2.40	3.06(2.15, 6.75)
	No	62(42.2%)	85(57.8%)	1	1
Availability of procedure manuals	Yes	98(51.0%)	94(49.0%)	2.73	3.67(1.78, 9.01)
	No	34(27.6%)	89(72.4%)	1	1
Supportive supervision	Yes	101(79.5%)	26(20.5%)	17.60	15.30(13.05, 21.53)
	No	34(18.1%)	154(81.9%)	1	1
Keep their reports and registrations	In organized hard copy	106(52.7%)	95(47.3%)	1	1
	In organized hard and soft copy	58(65.9%)	30(34.1%)	1.73	2.03(0.98, 6.78)
	Didn't organize at all	12(46.2%)	14(53.8%)	0.77	0.58(0.49, 2.43)
Availability of computers and computer programs	Yes	65(65.7%)	34(34.3%)	2.21	2.64(0.78, 6.67)
	No	100(46.3%)	116(53.7%)	1	1
Service years respondents in the units/departments	6m-2 years	28(43.1%)	37(56.9%)	1	1
	2-4 years	74(56.5%)	57(43.5%)	1.72	3.52(0.64, 2.78)
	4-6 years	63(63.6%)	36(36.4%)	2.31	2.12(0.61, 5.43)
	6 years and above	12(60%)	8(40%)	2.01	4(0.133, 7.09)
Presence of data collection standards including case definitions	Yes	176(60.9%)	113(39.1%)	1.82	1.42(0.78, 4.32)
	No	12(46.2%)	14(53.8%)	1	1

Data utilization

More than half of the units/departments, 182(57.8%) calculated area coverage. Regarding receiving of feedback to recommend future action, more than half, 162(51.4%) of the units/departments received feedback. Most of the units/departments, 287(91.1%) had key indicators and about half of the units/departments presented their achievement of the targets. Based on measurement criteria, the overall data utilization was 131(41.59%) with 95% CI: (38.9-46.1%). The data utilization was found to be 98(38.73%) and 33(53.23%) in the health facilities and health administrative units/health offices respectively (Figure 1).

One of the head of health centers said that *"...the utilization of data was gearing back ward to traditional type since there was inappropriate data management due to inadequate investment and attention given in the data utilization and management from concerned bodies. Most of the health workers considered the data utilization as responsibilities of heads and HMIS focal persons..."*

One of HMIS focal person of woreda health office said that.... *"Most reports were aggregated but not analyzed and interpreted in work units at health center level. But this was relatively better worked in Woreda health offices and zonal health department; the problem is due to the complexity of reporting formats,*

miss matching of calculation indicators and understanding level of health workers.”

Factors associated with data utilization

Among sixteen variables in bivariate logistic regression analysis, seven of them had a *p*-value less than 0.25; hence, they were candidates for multivariable logistic regressions. The candidate variables were again entered in to multivariable logistic regression model to obtain variables which were independently associated with outcome variable, utilization of data. The variables with *p*-value less than 0.05 in multivariable logistic regression analysis were taken as significant predictors of outcome variable. Supportive supervision, availability of procedure manuals, and receiving of HMIS training was found to be significantly associated with data utilization. Health units/departments, which had trained staffs were 3.06 times more likely utilizing routine data as compared to the units/departments without trained staffs [OR (95% CI)=3.06(2.15, 6.75)]. Health units/departments, which had HMIS procedure manuals were 3.67 times more likely utilizing data as compared to units/departments without HMIS procedure manuals [OR (95% CI)=3.67(1.78, 9.01)] (Table 4).

DISCUSSION

Sound and reliable information has remarkable importance on decision-making across all health system building blocks, and it is essential for health system policy development and implementation¹⁶. The finding of this study revealed that utilization of HMIS was 41.6% in all study units/departments. This finding was comparable with study conducted at public health centers in Addis Ababacity that reported the data utilization of 41.7%⁴. However, it was lower than what was documented in studies conducted in East Ethiopia, 53.1%¹⁷ and East Gojam Zone of Northwest Ethiopia, 45.8%⁹. This variation might be due to inadequate provision of training and supervision for healthcare providers in this study than previous studies.

In this assessment, health units/departments, which used HMIS manuals as reference and guidelines were more likely utilizing routine data as compared to units/departments, which didn't use HMIS procedure manuals for data utilization. This finding was comparable to study conducted in Addis Ababa city and S/N/N/P/R^{4,11}. This might be due to utilizing HMIS procedure manual may guide the operation and used as reference for routine health data generated from daily health care service in health facility level¹⁸. Receiving of training on HMIS was an important predictor that was significant with utilization of HMIS. Health units/departments, which had trained staffs, were more likely utilizing routine data as compared to units/departments without trained staffs. This finding was supported by studies conducted in different regions of Ethiopia^{9,17,19}. Staff training is the most important motivator and could improve the potential of health workers to analyze and make evidence-based decision^{20,22,23}. It is known that continuous training as a part of capacity development is important to create awareness on data utilization and decrease data

misinterpretation due to the lack of the right capacity, which is experienced in all developing countries²¹. In this study, supportive supervision was another important factor that was significant with utilization of routine data. This finding was supported with study conducted in Northwest Ethiopia⁹. This might be due to the fact that supervision has a significant role in identifying the gaps of routine health data use and provides feedback on identified problems and improving health workers' performance. Availing of manuals for HMIS and capacity building of health workers through training and supportive supervision was recommended.

Limitation

Limitation of the study was relatively small sample size which might reduce the power of the study and increase margin of error.

CONCLUSIONS

Utilization of HMIS in public health institution was lower compared to previous studies for decision making in health institutions of Kembata Tembaro Zone. There was poor capacity building of health workers in HMIS training and inadequate and irregular provision of supportive supervision to service units/departments from higher officials. Among many factors affecting the utilization of HMIS, only receiving of training for HMIS, availability of procedure manuals and supportive supervision were found to be significantly associated. Woreda health offices should avail the procedure manuals for the units/departments of both health facilities and health offices. SNNPR health bureau should arrange HMIS training for health workers in the study area. The data sets used and/analyzed during this study are available from the corresponding author up on reasonable request.

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AUTHOR'S CONTRIBUTION

Kondoro HK: writing original draft, conceptualization. **Oridanigo EM:** methodology, formal analysis, conceptualization. **Osse TA:** data curation, investigation. **Sosengo T:** editing, data interpretation. The final manuscript was read and approved by all authors.

DATA AVAILABILITY

The data and material are available from the corresponding author on reasonable request.

CONFLICT OF INTEREST

There is no conflict of interest associated with this study.

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