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EVIDENCE-BASED MEDICINE & MEDICAL INFORMATICS | RESEARCH ARTICLE

Determinants of routine health information utilization at primary healthcare facilities in Western Amhara, Ethiopia

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Abstract: *Background*: Evidence based practice is a key tool to increase effectiveness and efficiency of healthcare providers worldwide. Even if using health facility data at all levels is vital, it is poorly practiced in developing countries. This study was aimed at assessing routine health information utilization and its determinants among health centres in East Gojjam Zone, Northwest Ethiopia. *Methods*: An institution based cross-sectional study was conducted from May to June 2016 among 250 health centre and department/unit heads. Data collected using a pretested self-administered questionnaire and an observation checklist were analysed by SPSS version 20. A multivariable logistic regression analysis was used to identify determinant factors. *Results*: The majority (80%) of the respondents were males, and 54% of them were in the ≤30 years age group. Of all 250 study participants, only 96 (38.4%) routinely used facility health information for two or more purposes in addition to reporting duties; 50 (52%) to develop plan, 23 (24%) for feedback, 17 (18%) for patient management, and 6 (6%) to conduct research. Residence, data management

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Mulusew Andualem Asemahagn, instructor at Bahir Dar University College of medicine and health s sciences. My major tasks as higher education staffs are lecturing, conducting research and community services. Health information system, data management practices, evidence based practice, ICTs in health (mobile health, eHMIS, GIS, GPS, tele medicine, electronic medical recording systems …), healthcare service quality, TB, HIV/AIDS, malaria, intestinal parasitic diseases, human nutrition, traditional practices among women and children, and non-communicable diseases are my research areas on which I conducted more than 30 research works. I have more than 18 published works on electronic medical record, TB, child nutrition, information need, intestinal parasites, female genital mutilation, hypertension, eHMIS, and data management practices, willingness of text message reminders on TB and HIV patients. The current research work is one of my major research areas mentioned above and one of the current priority area of the Ethiopian Federal Ministry of Health.

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PUBLIC INTEREST STATEMENT

"Routine health information", information gathered from each health facility, is an important asset of healthcare facilities. Poor routine health information utilization at facility level, which greatly decreases effectiveness, efficiency and service quality, becomes a key challenge to the world, mainly to developing countries. This article describes the level of routine health information utilization and its determinants at the health centers based on data gathered through interview of heads of health centers and respective departments. The health information use for managing patients and managerial issues was poor (38.4%) due to residence, technical, workload and organizational related factors. Obviously, this has a profound effect on service quality, customers' satisfaction, health facilities' performance and profitability, increasing morbidity, disability, and death, which also affects stability and economic activities of a country. Knowing the utilization level and its determinants can help the government and health facilities to plan evidence based interventions to solve the problem.

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knowledge, work load, computer skill, computer access, supportive supervision, HMIS training, and availability of HMIS guideline and formats were important factors affecting health information utilization. *Conclusions*: In this study, the overall health information utilization of health centres was low compared to previous studies. Personal factors (skills, knowledge, workload, residence), and organizational (access to raining, computer, HMIS formats, guidelines, supervision) were determinants of health information utilization. Improving computer access, data management inputs, training and supportive supervision are crucial to solve the problem.

1. Background

A health information system (HIS) is a system designed for the collection, processing, use and dissemination of health related data with the goal of improving healthcare outcomes (Edwards, 2006; World Health Organization, 2000). A HIS is one of the basic building blocks of a given health system aimed to produce valid health information to support both clinical and managerial decision-makings (Ethiopian Federal Ministry of Health, 2013; World Health Organization, 2007a). One of the essential components of a/any HIS is the health management information system (HMIS) implemented in most healthcare industries worldwide to manage routine data (Edwards, 2006; Ethiopian Federal Ministry of Health, 2013; Mucee, Kaburi, Odhiambo-Otieno, & Kinyamu, 2016; World Health Organization, 2000, 2007a, 2007b). The main purpose of HMIS is generating quality health data to be used and communicated at the right time to the right recipient using the right format (Abajebel, Jira, & Beyene, 2011; Edwards, 2006; Ethiopian Federal Ministry of Health, 2013; Mucee et al., 2016; World Health Organization, 2000). With the objective of generating quality and timely health information, the Ethiopian Federal Ministry of Health adopted HMIS in 2005/6 (Ethiopian Federal Ministry of Health, 2013; Ethiopian Federal Ministry of Health & Tulane University, 2008).

Healthcare data collected using HMIS is vital for planning and evaluating healthcare services of health facilities using important healthcare indicators (Ethiopian Federal Ministry of Health, 2007, 2013; Mucee et al., 2016; Nisingizwe et al., 2014; World Health Organization, 2007b). The Federal Ministry of Health can easily follow and audit health facilities since they are all using the same health data managing tool, HMIS. HMIS data quality (completeness, consistency and relevance) is important to determine data utilization and quality of decisions in healthcare industries (Abera, 2011; Edwards, 2006; Ethiopian Federal Ministry of Health, 2013; USAID, 2008; World Health Organization, 2000).

Data management, timely utilization and communication practices of health facilities are very poor, mainly in developing world (Abajebel et al., 2011; Abera, 2011; Andualem, Kebede, & Kumie, 2013; Ethiopian Federal Ministry of Health & Tulane University, 2008; Kihuba et al., 2014; Mucee et al., 2016; Nisingizwe et al., 2014; Teklegiorgis, Tadesse, Mirutse, & Terefe, 2014; World Health Organization, 2007b). A study finding from South Africa indicated that the overall percentage of HMIS information use was 65% (USAID, 2008). Evidences from Kenya (Jeremie, Kaseje, Olayo, & Akinyi, 2014; Kihuba et al., 2014; Mucee et al., 2016) revealed that HMIS data utilization at healthcare facilities was poor. A study finding from Cote D'Ivoire using Performance of Routine Information System Management (PRISM) framework (Nutley, Gnassou, Traore, Bosso, & Mullen, 2014) showed an overall health information utilization score of 38% at healthcare facilities. Here, the PRISM contains several routine HIS indicators to describe the routine health information use status and the overall score was calculated from those various indicators.

A study from Dire Dawa, Eastern Ethiopia, showed that more than half (53.1%) of the district health facilities (health centres and health posts) used the routine HMIS records/data for various purposes

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(Teklegiorgis et al., 2014). Health information utilization was found to be lower at health posts than the health centers. Nonuser friendliness of HMIS formats and poor feedback from higher offices were causes to low HMIS utilization. Other studies conducted in Addis Ababa indicated that HMIS data utilization was limited and focused on data collection and reporting to the respective bodies (Ethiopian Federal Ministry of Health, 2008; Hirpa, Nigussie, & Aragaw, 2010). Likewise, studies from Jimma (Abajebel et al., 2011) and North Gondar (Andarge, 2006) district health facilities (Ethiopia) reported lower routine HMIS data utilizations for various purposes; 32.9 and 22.9%, respectively.

Poor data management skills, lack of management support, infrastructure, and migration of trained workers were stated factors to lower health information management and use at the health facility level (Abajebel et al., 2011; Abera, 2011; Andualem et al., 2013; Jeremie et al., 2014; Mucee et al., 2016; Nisingizwe et al., 2014; Teklegiorgis et al., 2014; World Health Organization, 2000). Hence, improving healthcare data quality and utilization at facility levels became a primary agenda to the Ethiopian government.
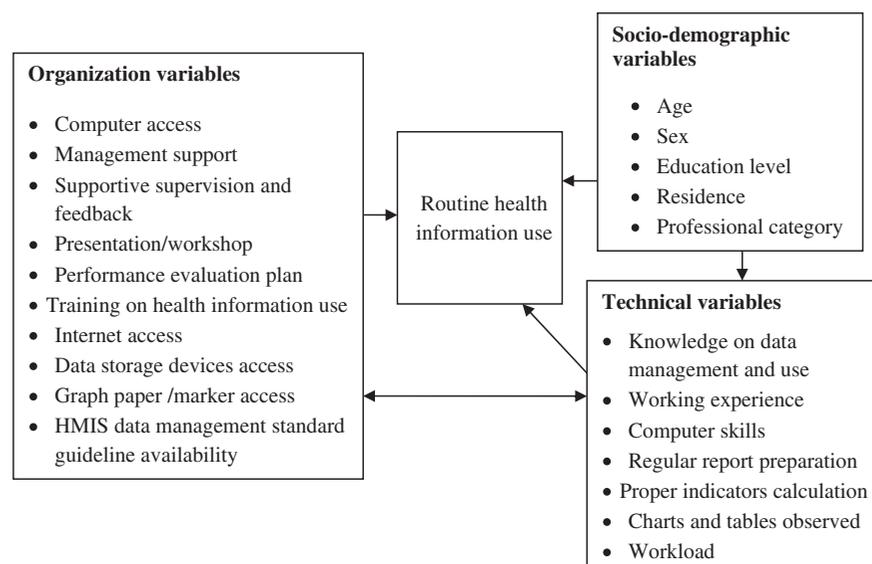
The aim of this study was to assess routine healthcare data utilization and its determinants at public health centers in Western Amhara Region, Ethiopia. The findings of this study will be important to Amhara Regional Health Bureau, East Gojjam Zone, and it is particularly important for the studied health facilities to know about their health information use status and the determinant factors so that appropriate interventions can be made to scale up health centres' evidence-based practice (Figure 1).

2. Materials and methods

2.1. Study design and area

An institution based cross sectional study was conducted among 250 health centre, and department/unit heads selected from 25 public health centres from May to June 2016. The study was conducted in East Gojjam zone, Western Amhara Regional State, Ethiopia. East Gojjam zone is one of the 11 zones in Amhara Region. It is located 300 kilometres to the Northwest from Addis Ababa, the capital city of Ethiopia and 255 Kilo meters from Bahir Dar, the capital city of Amhara Regional State. There were about 100 functional health centers (HCs) and 18 woreda health offices (4 urban and 14 rural) using HMIS as routine data management tool (Yetayew, Alamerrew, & Andualem, 2014). Woreda in Ethiopian context is a local administration containing at least 100,000 populations and it is then divided in to the lowest administrative level, Kebele, which contains about 5000 population (Ethiopian Federal Ministry of Health, 2009).

Figure 1. Conceptual frame work to routine health data use, East Gojjam zone, Amhara Region, Ethiopia, 2016.

Organization variables

- Computer access
- Management support
- Supportive supervision and feedback
- Presentation/workshop
- Performance evaluation plan
- Training on health information use
- Internet access
- Data storage devices access
- Graph paper /marker access
- HMIS data management standard guideline availability

Routine health information use

Socio-demographic variables

- Age
- Sex
- Education level
- Residence
- Professional category

Technical variables

- Knowledge on data management and use
- Working experience
- Computer skills
- Regular report preparation
- Proper indicators calculation
- Charts and tables observed
- Workload

2.2. Sample size and sampling methods

All centre and department/unit heads of district health canters in East Gojjam zone formed study population in this study. The study was conducted among 25 randomly selected health centers (one quarter of total health centres due to resource and geographic related issues). There were nine departments/units in each health centre: namely; Outpatient Department1 (OPD1), Outpatient departmnt2 (OPD2), laboratory, pharmacy, under five, maternal and child health (MCH), delivery, Tuberculosis, and HIV/AIDS (ART) departments. The heads of all health centres and of each department/unit were included in the study (n = 25*10 = 250) (Figure 2).

2.3. Data collection and quality assurance

Data were collected using a pretested self-administered questionnaire and an observation checklist. Socio-demographic descriptions, knowledge and practice of data management/use, purpose of information use and factors affecting health information use were major questionnaire contents. The questionnaire was compiled from the related literatures (Abajebel et al., 2011; Andarge, 2006; Jeremie et al., 2014; Mucee et al., 2016; Teklegiorgis et al., 2014; Yetayew et al., 2014). Four data collectors (nurses) and one supervisor (public health professional) participated in data collection.

Pretesting the questionnaire, training the data collectors/supervisors, supportive supervision and making study participants clear on study objectives were activities to ensure data quality. Qualitative data were collected via observation of participants' offices using the observation checklist.

In this study, routine health information utilization was assessed in terms of using information for decision-making in management and clinical services. Calculating and presentation of indicators using charts/graphs, feedback reports, decision-making (management and clinical), developing strategic plan, and conducting research were some main areas used to assess information use at health centres. The health centre and department/unit heads were classified as health information users if they practiced a minimum of two of the above utilization dimensions in addition to using the routine health information for reporting duties since the latter is compulsory or a must task for all. Thus, while calculating the overall information utilization, information used for reporting purpose was not included.

2.4. Data management and analysis

The supervisor checked data completeness and consistency daily. The investigator used SPSS version 20 (software) to edit and analyse the data. Descriptive statistics were used to describe study objectives. Multivariable logistic regression analysis was employed to identify determinant factors of information utilization. Different descriptive statistics were computed from observational data to support quantitative data findings (Table 2).

Figure 2. Schematic sampling presentation of study facilities and respondents, 2016.
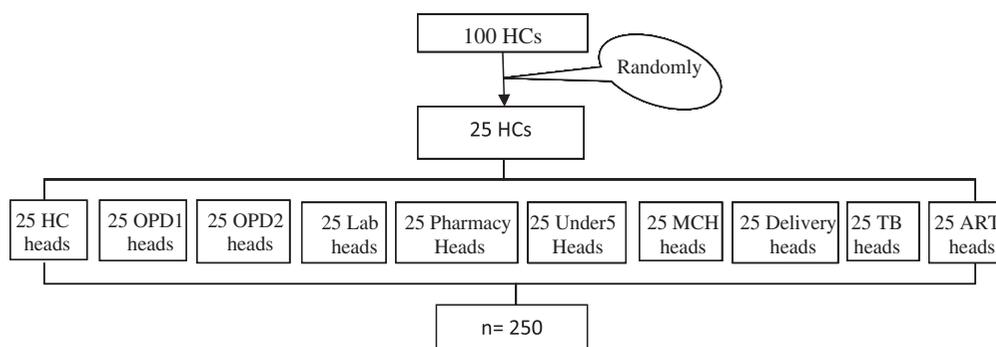
2.5. Ethical clearance

The ethical clearance was granted from Amhara Regional Health Bureau Research and Ethics Review Committee 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.

3. Results

3.1. Socio demographic characteristics

A total of 250 health centre, and Department/Unit heads (Figure 2) participated in the study. The majority (200; 80%) were male respondents. More than half (135; 54%) of the respondents belonged to the age group of ≤30 years. The mean age of the respondents was 29 ± 3.2 and all of the respondents held bachelor degrees. More than half (140; 56%) were BSc nurses and 150 (60%) of the respondents had ≤6 years working experience. Only 80 (32%) of the included health centres were from urban areas (Table 1).

3.2. HMIS data documentation and inputs assessment

Both the quantitative and qualitative data showed the following findings. More than two thirds (170; 68%) of study participants had regular health facility reports in hard copy formats and only 80 (32%) had softcopy reports. Very few (72; 28.8%) respondents had monitoring and evaluation/feedback reports. More than half (150; 60%) of the participants did appropriate HMIS indicators calculation to be presented in tables and charts. A relatively small number of respondents (30; 12%) took training on how to use routine/HMIS data. Only 75 (30%) and 15 (6%) respondents had computer and internet access at their offices, respectively. Availability of graph paper & marker (98; 39.2%), CD/flash drives (100; 40%) and HMIS data management guidelines (25; 10%) were reports on HMIS inputs to routine health information use (Table 2).

Table 1. Socio-demographic variables of respondents in health centers, East Gojjam, 2016		
Variable	**Responses**	**Percent**
Age in years	≤30	54.0
	>30	46.0
Sex	Male	80.0
	Female	20.0
Educational status	Bachelor	100
Professional category	BSc Nurse	56.0
	Health officer	12.4
	Environmental health	1.6
	Laboratory	10.0
	Pharmacy	10.0
	Midwifery	10.0
Working experience	≤6 years	60.0
	>6 years	40.0
Residence	Rural	68.0
	Urban	32.0

Table 2. Documentation practice and HMIS inputs at health centres, East Gojjam zone, 2016			
Variable	**Responses**	**Frequency**	**Percent**
Having copy of regular reports	Hard copy	136	68.0
	Soft copy	64	32.0
Feedback reports available	Yes	72	28.8
HMIS indicators calculated properly	Yes	150	60.0
Presentations/workshops available	Yes	30	12.0
Trainings on HMIS data use	Yes	50	20.0
Computer access at office	Yes	75	30.0
Internet access at office	Yes	15	6.0
CD/flash derives availability	Yes	100	40.0
Graph paper & marker availability	Yes	98	39.2
HMIS data management guideline	Yes	25	10.0

3.3. Health information utilization practice

Although regular reporting to the concerned offices is a must task to all (100%), only (200; 80%) of the study participants used routine HMIS data to prepare reports. Of all 250 study participants, only 96 (38.4%) routinely used facility health information for two or more purposes in addition to reporting duties; 50 for developing plan, 23 for feedback, 17 for patient management, and 6 for conducting research (Figure 3). This percentage did not include HMIS data used for reporting purposes since it is constant and a must task to all health facilities.

3.4. Determinant factors to HMIS data utilization at primary healthcare facilities

Based on multivariable logistic regression analysis; residence, computer access, data management knowledge, computer skills, workload, supportive supervision, availability of graph paper and marker, training on HMIS data use, data presentation/workshop, and HMIS guideline availability showed significant association with low routine health information utilization of health centres at 95% confidence level (CI) (Table 3).

Figure 3. Routine HMIS Health information use at health centers in East Gojjam, 2016.
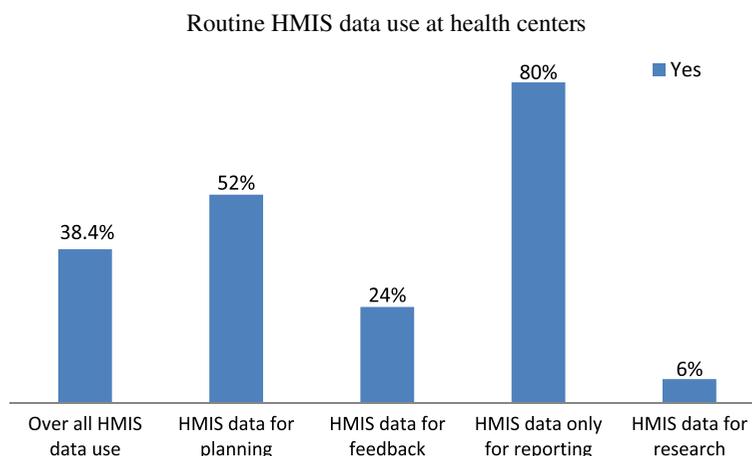

Routine HMIS data use at health centers

■ Yes

- Over all HMIS data use: 38.4%
- HMIS data for planning: 52%
- HMIS data for feedback: 24%
- HMIS data only for reporting: 80%
- HMIS data for research: 6%

Table 3. Determinant factors to Health information utilization at health center level, 2016					
Variable	**Response**	**Health information Utilization**		**COR (95% CI)**	**AOR (95% CI)**
		Yes (%)	**No (%)**		
Age in years	≤30	55 (22.0)	80 (32.0)	1.24 (0.72, 2.14)	0.89 (0.42, 1.78)
	>30	41 (16.4)	74 (29.6)		
Sex	Male	78 (31.2)	122 (48.8)	0.88 (0.45, 1.74)	0.54 (0.23, 1.45)
	Female	21 (8.4)	29 (11.6)		
Work experience in years	≤6	66 (26.4)	84 (33.6)	1.83 (1.04, 3.25)	1.19 (0.68, 2.07)
	> 6	30 (12.0)	70 (28.0)		
Residence	Rural	22 (8.8)	58 (23.2)	0.49 (0.27, 0.91)	0.32 (0.19, 0.64)
	Urban	74 (29.6)	96 (38.4)		
Computer availability	Yes	41 (16.4)	34 (13.6)	2.63 (1.46, 4.77)	2.20 (1.24, 3.51)
	No	55 (22.0)	120 (48.0)		
Computer internet	Yes	8 (3.2)	7 (2.8)	1.91 (0.60, 6.09)	1.51 (0.27, 4.82)
	No	88 (35.2)	147 (58.8)		
Data management and use Knowledge	Good	32 (12.8)	24 (9.6)	2.71 (1.41, 5.21)	2.41 (1.28, 4.66)
	Poor	64 (25.6)	130 (52.0)		
Computer skills	Good	58 (23.2)	52 (20.8)	2.99 (1.71, 5.26)	2.54 (1.51, 4.93)
	Poor	38 (15.2)	102 (40.8)		
Work load	Yes	27 (10.8)	69 (27.6)	0.49 (0.27, 0.86)	0.32 (0.19, 0.58)
	No	69 (27.6)	85 (34.0)		
Supportive supervision	Present	56 (22.4)	49 (19.6)	3.00 (1.71, 5.28)	2.65 (1.51, 4.92)
	Absent	40 (16.0)	105 (42.0)		
Graph paper and marker availability	Yes	55 (22.0)	41 (16.4)	3.46 (1.96, 6.14)	2.84 (1.63, 5.87)
	No	43 (17.2)	111 (44.4)		
Data presentation/ workshop	Present	18 (7.2)	12 (4.8)	2.73 (1.18, 6.40)	2.14 (1.12, 5.31)
	Absent	78 (31.2)	142 (56.8)		
Management support on information use	Present	27 (10.8)	33 (13.2)	1.43 (0.73, 2.69)	0.89 (0.35, 1.98)
	Absent	69 (27.6)	121 (48.4)		
Trained on HMIS use	Yes	30 (12.0)	20 (8.0)	2.85 (1.44, 5.66)	2.31 (1.26, 4.58)
	No	69 (27.6)	131 (52.4)		
HMIS data management Guideline available	Yes	16 (6.4)	9 (3.6)	3.22 (1.27, 8.32)	2.41(1.18, 6.37)
	No	80 (32.0)	145 (58.0)		

4. Discussion

Findings in this study clearly showed that routine HMIS information use at the health centre level was poor even reporting which is a must task. Based on the report, 20% (50 of 250) respondents did not use their routine health information even for reporting (Figure 3). This is a critical issue that needs an immediate intervention to help those health centres in improving HMIS data management and uses so that they improve evidence based practice and contribute more to enhance the perfor-mance of the Ethiopian health system. If continues with this situation, they even become totally isolated from the system and be challenges to the health system in several ways. The possible ex-planation to this condition could be poor knowledge on HMIS data management and use, less atten-tion from the management, absence of HMIS formats and guidelines, poor supportive supervision from higher officials, and being geographically isolated. All these may affect communication, super-vision... HMIS formats access and other services which are important to data management and in-formation use.

In this study, of all 250 study participants, only 96 (38.4%) routinely used facility health information for two or more purposes in addition to reporting duties. This clary indicated that health information at its primary source was poorly utilized and unless corrective measures made, the effectiveness and service quality of health facilities might be greatly affected. This overall information utilization is in line with study findings from Cote d'Ivoire (Nutley et al., 2014) where overall routine health information use score at facility level was 38%. On the other hand, it is lower compared to study findings from Eastern Ethiopia (Teklegiorgis et al., 2014), Southern Ethiopia (Ako, Yitayal, & Alamrew, 2012), and Addis Ababa (Gelaneh, 2012) in which the overall routine health information use for various purposes were 54.4, 53.1 and 78%, respectively. This variation could be the result of differences in data management knowledge (58.2% in Southern Ethiopia and 75% in Addis Ababa, but 22.4% in the current study; Table 2), management support (only 24% in the current study; Table 2) or the type of studied health facilities.

On contrary, the current utilization practice level is higher than found in studies from Jimma (Abajebel et al., 2011), Arsi (Abera, 2011) and Gondar (Andarge, 2006) zones, Ethiopia, where facility health information uses for decision-making were 32.2, 32.1 and 22.9%, respectively. The possible explanations for this variation could be differences in study period, and facility type/unit; zonal and district health offices were included in the case of Arsi and Jimma, and only the HIV/AIDS unit of health facility was studied in the case of Gondar, but in our case, all departments of health centres.

In this study, only few (45; 18%) of the respondents used the routine HMIS data for managing their patients (Figure 3), which is very low compared to other studies and the national expectation (Gelaneh, 2012; Nutley et al., 2014; USAID, 2008; World Health Organization, 2007a, 2007b). This clearly shows that unless immediate actions to improve HMIS data use such as training of healthcare workers, workshops on HMIS data use, availing HMIS data user guideline, awareness creation on the importance of routine HMIS data use … are made, quality of healthcare services will be highly compromised. This may result in low patient satisfaction, decrease customer attendance, poor health centre performance and profitability.

Based on a multivariable logistic regression analysis, determinant factors affecting routine health information utilization at primary healthcare facilities could be grouped as personal, technical and organizational factors. These had previously been reported by others constraints to health information use in Cote D'Ivoire and other areas (Abajebel et al., 2011; Andualem et al., 2013; Mucee et al., 2016; Nutley et al., 2014; World Health Organization, 2007b). Respondents from rural health facilities were 51% times less likely to practice health information use: COR = 0.49, 95% CI = [0.27, 0.91] than their counter parts in the urban areas. The finding is supported by the WHO HMIS guideline (World Health Organization, 2007b) and by studies from South Africa (USAID, 2008) and Kenya (Jeremie et al., 2014). This may be due to limited technology access, less supportive supervision, poor awareness about data management and use, and inputs (formats, guidelines, graph papers …) shortage due to infrastructure and geographic location compared to urban regions. Respondents who have computer access and skills at office were 2.63 times (95% CI = [1.46, 4.77]) and 2.99 times (95% CI = [1.71, 5.26]) more likely to use routine health information as compared to those who had no computer access and skills, respectively. This finding is supported by study findings from Kenya (Jeremie et al., 2014; Mucee et al., 2016), Ethiopia (Andualem et al., 2013; Teklegiorgis et al., 2014), and Uganda (Asiimwe, 2016). Possible explanation for this variation could be the importance of computer to collect, process, communicate and use of patient data through the application of computer skills.

Respondents who have knowledge on data management and use were 2.71 times more likely to be good on information use than others (OR = 2.71, 95% CI = [1.41, 5.21]). This factor was also mentioned as crucial to information utilization by various studies: WHO (World Health Organization, 2007b), Kenya (Mucee et al., 2016), Ethiopia (Ako et al., 2012; Andarge, 2006; Ethiopian Federal Ministry of Health, 2008, 2013; Teklegiorgis et al., 2014). This could be because users with adequate

knowledge on how to manage, process, communicate and use health information, can incorporate these skills more easily in to their daily activities.

Supportive supervision and follow-up from concerning offices was found as another determinant factor of information use at health centres. Respondents who got supportive supervision and timely feedback were 3 times more likely to be good practitioners of health information use than those who did not get it (95% CI = [1.71, 5.28]). It is known that if health facilities get more support and feedback on data management and use, they will improve their knowledge and personal initiation to manage and use their data at hand for various purposes (Andarge, 2006; Ethiopian Federal Ministry of Health, 2008; Yetayew et al., 2014).

Graph paper/marker access (OR = 2.73, 95% CI = [1.18, 6.40]), HMIS training (OR = 2.85, 95% CI = [1.44, 5.66]), data presentation (OR = 2.73, 95% CI = [1.18, 6.40]) and data management guideline availability (OR = 3.22, 95% CI = [1.27, 8.32]) were also found to be determinants of routine health information use at the health centres. Again, these findings were reported as factors to information utilization by previous studies: WHO (World Health Organization, 2007b), Kenya (Jeremie et al., 2014; Mucee et al., 2016; Ojuok, 2015), Uganda (Asiimwe, 2016), Ethiopia (Ako et al., 2012; Andarge, 2006; Andualem et al., 2013; Teklegiorgis et al., 2014; Yetayew et al., 2014). Training and data management guideline will improve users' knowledge, attitude and inputs (HMIS registration formats, guidelines, paper, markers …) availability which will enable users to apply their knowledge and skills for data processing and information use. Workshop presentations are one of the outputs of data management and use which will then increase users' preparation for data processing and use since data presentation requires different data processing skills.

5. Conclusions

In this study, the overall routine HMIS records/data utilization at health centers (primary healthcare facilities) was low compared to previous studies and national expectation. Health facilities used health information principally to prepare reports, and develop strategic plan. Residence, computer access and skills, knowledge on information use, workload, supportive supervision, graph paper/inputs access, workshop, training on HMIS data use and data management guideline access were determinant factors of routine health information use at the health centres level. Improving users' knowledge, skills, computer access, supportive follow up, data management inputs, and training access is important to scale-up information use in health centres.

List of abbreviations

AOR	adjusted odds ratio
ART	anti-retroviral therapy
CI	confidence interval
COR	crude odds ratio
HCs	health centres
HIS	health information system
HIV	human immune deficiency virus
HMIS	health management information system
Lab	laboratory
MCH	maternal and child health
OPD	outpatient department
SPSS	statistical package for social sciences
TB	tuberculosis
WHO	World Health Organization

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References
Abajebel, S., Jira, C., & Beyene, W. (2011). Utilization of health information system at district level in Jimma zone Oromia regional state, South West Ethiopia. *Ethiopian Journal of Health Sciences, 21*(3).

Abera, M. (2011). *Health policy and the extent of health information use in Woreda health care system of Arsi zone, Oromia Region, Ethiopia* (Unpublished thesis Work). Addis Ababa University, Addis Ababa.

Ako, S., Yitayal, M., & Alamrew, A. (2012). Data management knowledge, practice and associated factors of ethiopian health extension workers in Gamo Gofa Zone, Southern Ethiopia: A cross-sectional study. *Health & Medical Informatics, 5*.

Andarge, G. (2006). *Assessment of utilization of health information system at district level with particular emphasis to HIV/AIDS program in North Gondar zone Amhara National Regional State*. Retrieved from www.aau.edu.et/library/.../aau-institutional-repositoryelectronic-thesis-and-dissertation

Andualem, M., Kebede, G., & Kumie, A. (2013). Information needs and seeking behaviour among health professionals working at public hospital and health centres in Bahir Dar, Ethiopia. *BMC Health Services Research, 13*, 30. https://doi.org/10.1186/1472-6963-13-534

Asiimwe, A. K. (2016). *Determinants of effective utilization of routine health information within private health facilities in Kampala, Uganda* (a thesis work).

Edwards, M. (2006). *Routine health information systems: Concepts and methods.* Baltimore, MD: Johns Hopkins Bloomberg, School of Public Health.

Ethiopian Federal Ministry of Health. (2007). *HMIS/M&E Indicator Definitions: HMIS/M&E Redesign: Technical Standards: Area 1, Version1.0; HMIS Reform Term.*

Ethiopian Federal Ministry of Health. (2008, January). *Health management information system, monitoring and evaluation information use guide line and tools.* Addis Ababa: Author.

Ethiopian Federal Ministry of Health. (2009). *Ethiopian population based national TB prevalence survey research protocol.* Addis Ababa: Author.

Ethiopian Federal Ministry of Health. (2013). *HMIS information use training manual.* Addis Ababa: Author.

Ethiopian Federal Ministry of Health and Tulane University. (2008, June). *HMIS Reform Training for master mentors in Ethiopia. Lecture Notes of HMIS reform training.* Tulane University Technical Assistance Project Ethiopia/TUTAPE.

Gelaneh, M. K. (2012). *Assessment of HMIS design and implementation in Ethiopia: The case of selected public health facilities in Addis Ababa health bureau* (Unpublished master thesis). Addis Ababa University, Ethiopia.

Hirpa, W., Nigussie, F., & Aragaw, H., (2010). Implementation of an integrated HIMS, monitoring and evaluation system in Ethiopia progress and lessons from pioneering regions A/A, FMOH. *Quarterly Health Bulletin, 3*(1).

Jeremie, N., Kaseje, D., Olayo, R., & Akinyi, C. (2014). Utilization of Community-based health information systems in decision making and health action in Nyalenda, Kisumu county, Kenya. *Universal Journal of Medical Science, 2*(4), 37–42.

Kihuba, E., Gathara, D., Mwinga, S., Mulaku, M., Kosgei, R., Mogoa, W., ... English, M. (2014). Assessing the ability of health information systems in hospitals to support evidence-informed decisions in Kenya. *Global Health Action, 7*(1), 24859. doi:10.3402/gha.v7.24859

Mucee, E. M., Kaburi, L. W., Odhiambo-Otieno, G. W., & Kinyamu, R. K. (2016). Routine health management information use in the public health sector in Tharaka Nithi County, Kenya. *Imperial Journal of Interdisciplinary Research (IJIR), 2*(3). ISSN: 2454-1362. Retrieved from http://www.onlinejournal.in

Nisingizwe, M. P., Iyer, H. S., Gashayija, M., Hirschhorn, L. R., Amoroso, C., Wilson, R., ... Binagwaho, A. (2014). Toward utilization of data for program management and evaluation: Quality assessment of five years of health management information system data in Rwanda. *Global Health Action, 7*, 25829. doi:10.3402/gha.v7.25829

Nutley, T., Gnassou, L., Traore, M., Bosso, A. E., & Mullen, S. (2014). Moving data off the shelf and into action: An intervention to improve data-informed decision making in Côte d'Ivoire. *Global Health Action, 7*(1), 25035. doi:10.3402/gha.v7.25035

Ojuok, T. O. (2015). *Determinants of utilization of health related data for service improvement: A case of healthcare facilities in Nyando sub-county, Kenya* (a master thesis work).

Teklegiorgis, K., Tadesse, K., Mirutse, G., & Terefe, W. (2014). Factors associated with low level of health information utilization in resources limited setting, Eastern Ethiopia. *International Journal of Intelligent Information Systems, 3*(6), 69–75. https://doi.org/10.11648/j.ijiis.20140306.13

USAID. (2008, September). *MEASURE evaluation: Data quality audit tool. Guidelines for implementation, USAID*. Retrieved from http://www.cpc.unc.edu/measure

USAID. (2008). *Measure evaluation in South Africa district health information system, identifying performance levels and its determinants.*

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World Health Organization. (2000). *Primary intervention for strengthening national information system, Regional office for Africa.* Geneva: WHO.

World Health Organization. (2007a). *Everybody's business: Strengthening health systems to improve health outcomes.* Geneva: WHO's Framework for Action.

World Health Organization. (2007b). *Strengthening health information systems.* Geneva: Author. Retrieved from http://apps.who.int/gb/ebwha/pdf_files/WHA60/A60_22-en.Pdf

Yetayew, T., Alamerrew, A., & Andualem, M. (2014). *Primary health data management practices among health Extension workers in East Gojjam zone, Ethiopia* (Unpublished thesis work).