

Utilization of Electronic Medical Record and Associated Factors Among Health Professionals in Public Health Facilities With Service Delivery, Eastern Ethiopia

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Research article

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Abstract

Background

adoption of electronic medical record (EMR) systems in the healthcare delivery has the potential to transform healthcare in terms of saving costs, reducing medical errors, and data quality. However, even if a lots of efforts in the use of electronic health records, such systems have not been implemented and used at expected scale. Thus, his study assessed utilization of electronic medical record and associated factors among health professionals in Eastern Ethiopia.

Methods

an institutional based analytic cross sectional study was conducted among randomly selected 412 health professionals from Harari and Dire Dawa, eastern Ethiopia using self-administered questioner. Binary logistic regression was performed for each independent variable against outcome variables (EMR utilization) to estimate the crude and adjusted odds ratio with 95% Confidence interval. P value less than 0.05 was used to declare statistical significance.

Results

a total of 412 health professionals from different category and educational level with mean age of 29 year (± 6.4 years) were interviewed. Majority of respondents were from Harari region (70.4%). A total of 229 (55.6%) and 300 (72.8%) of health professionals had good knowledge and attitude towards EMR for health facilities. About 279 (67.7%) reported that they use EMR in their facility currently with (54%) use it on daily basis. A total of 272(66%) of respondents reported to prefer EMR instead of paper based system. Health professional with more than five years' experience had two times higher odds for using EMR (AOR = 2.22; 95% CI; 1.12–4.42) than early career workers (0–2 years of experience. Having previous EMR training were significantly more to use EMR (AOR = 5.88; 95% CI; 2.93–11.88) as compared to those who did not take training. In addition, having good knowledge (AOR = 1.52; 95% CI; 0.92–1.5) and good attitude on EMR system (AOR = 2.4; 95% CI; 1.35–4.31) had 50% and 140% more odds to use EMR in their facility.

Conclusion and recommendations

utilization of EMR was found to be optimal and age, work experience, knowledge, attitude and training were positively associated with use of EMR in their facility. There should be organizational support, more specifically making the system full functional and targeted, timely, effective training packages for health professionals to improve their skills and attitudes.

Background

Health records are the most important database of patient record which consists of various data entered by health care professionals in either paper or electronic form (1). Computer-Based Record (CPR) is a depository of electronically maintained information about an individual's lifetime healthstatus and health care, which have the objective of supporting patient care and improving the quality of health care (2). This is all about saving life by facilitating communication, practicing evidence based decision, and others (2, 3). Among the different IT system initiatives in developing countries electronic medical records (EMR) systems are becoming dominant with the vision of improving data handling and communication in healthcare organizations (3, 4). The development of EMR system helped institutions to handle patient record in wise, safe and quality manner. However, these systems had various problems and barriers that can hinder its implementation at better scale or ideal scope (5).

EMR is computerized medical information systems that collect, store and display patient information. It can embrace much information such as socio demography, insurance, medications details of present and past history, allergies,

laboratory and test results; immunization, medical surgical, and hospitalization history; progress assessment, and others under the protection of security, patient privacy and confidentiality (5, 6). They are means to create legible and organized recordings and to access clinical information about individual patients (5, 7).

It has been suggested that, wide scale adoption and implementation of the EMRs could be pivotal for improving patient safety and health care quality (8-10). It may also reduce the costs of providing ambulatory care. However, despite emerging evidence about the benefits of EMRs, there are considerable barriers to adoption (7, 11). This urges the need for developing countries to have evidence based improvement and scale up of EMR system with in their facilities (12).

But, low-income countries have struggled to initiate large-scale EMR systems for their context despite the fact that resource scarcity and lack of proper skill and set up to initiate such technologies. These systems require abundant resources including skilled labor, technological, and financial means, all of which can be difficult to procure in low-income settings (13).

Despite the high expectations and interest in adopting and using EMR systems, its overall adoption rate is relatively low, especially in the resource-limited countries where high diseases prevalence and incidence rates are predominant (1, 6, 7, 11, 14). As indicated by various studies, the adoption and use of EMR systems in developing countries is in its embryonic stage for several reasons (1, 6). Users' attitude, knowledge, technical skills, functionality of the working environment/infrastructure, and lack of adequate resources are pointed out as important determinants for the functionality of the adopted EMR system (15). Healthcare infrastructures, health professionals' attitude and awareness level, lack of proper management, resource shortage, skill related issues, users' resistance, policy related issues, poor commitments of staffs, and poor maintenance services are other reasons for the limited adoption and use of EMR system in developing countries (16, 17).

In Ethiopia the organization, availability, accessibility and quality of health data are still poor. Moreover, information is not being stored and used effectively in health care resulting in inappropriate and uncertainty in clinical decision-making (18, 19). The Ethiopian government is training health informatics professionals to support the health management information system and transform the health care system (15). Studies show that the adoption of an EMR system in the healthcare system has the potential to transform healthcare in terms of saving costs, reducing medical errors, improving service quality, increasing patients' safety, decision-making, saving time, data confidentiality, and sharing medical information (14, 20-22).

So far, studies conducted give an insight on EMR acceptance, use, and other issues in some parts of the country where the EMR implementation and scale of adoption is different (18) (23) (24). Utilization rate of 71% (18) from northern part of Ethiopia and 33% in India (23). Higher level of education, training on EMR, management support and computer literacy has shown to be associated with EMR use (18) (23) (24), but with inconsistent evidences. Various health facilities in developing countries are using EMR systems in varying degrees for several reasons (15). Thus, Eastern Ethiopia one of the area where large proportion of people reside with different disease patterns. Governments' need to deliver evidence based health services were basic reasons to adopt EMR systems in developing countries (22, 24, 25). This urges the need to find context specific evidence on the level of adoption, EMR implementation utilization and barriers for not using the system. This particular research tried to pinpoint the level of EMR utilization and barriers that hinders utilization of EMR with in case of eastern Ethiopia.

Objective of the study

To assess utilization of electronic medical record and associated factors among health professionals governmental Health Facilities in Eastern Ethiopia.

Methods

Study setting

This study was conducted in Eastern Ethiopia (Dire Dawa, Eastern Harerghe, Harar and Ethiopian Somali). Thus out of these study sites three areas reported to have established EMR system in their health care system namely Dire Dawa Administration, Harari regional state and Ethiopian Somali. Harar is located at 526 Km East of Addis Ababa, the capital city of Ethiopia. The two regions and the Administrative town together comprises more than 4.5 million population. All are located in the Eastern part of the country. There are about 6755 health care workers working in these regions including Harari region (26).

Study design and period

Institutional based quantitative cross sectional study was conducted with assessment of EMR utilization.

Population

Voluntary health professionals who are working in health facilities, Eastern Ethiopia where there is functional EMR system with in the facilities. All randomly selected health professionals from all categories working in the selected health facilities where there is functional EMR system with in the facilities were included in the study. While, those who were on annual or maternal leave were not included in this study.

Sample size determination

Sample size was determined using single population proportion formula at 95% Confidence level, 5% significance level, EMR utilization among health care workers (p) of 70.8 % (18), desired degree of precision (d) of 5 %, and design effect (1.5). The final sample size became 525 with inclusion of 5% non-response rate.

Sampling Procedure /Techniques

Sampling with stratification was employed. Proportionate allocation was done to each region and health facilities (sampling with proportional to size). The stratification was based on the regions, and types of health facility. The study samples was proportionally allocated to the each health facilities depending on the number of health professionals with in that facility. In order to develop a sampling frame, the list of health facilities and health care workers was obtained from health bureau of the respective regions and city administration. However, as the EMR system is available in two sites (namely Harar and Dire Dawa one health facility only), the sampling population became smaller and all available health professional working on all facilities with established EMR system were included (detail is shown figure below).

Data collection instrument and technique

Data were collected using self-administered structured questionnaire which include information on socio-demographic, Organization and Technology related factors as well as knowledge, attitude and utilization of electronic medical record. The questionnaire were adopted from previous studies (10, 25, 27-29). The questionnaire were prepared in English language. Regarding data collection, diploma health Informatics students and Technicians were involved in administering

the questionnaire after they took 2 days training. BSC holders in any health science fields were together with investigators supervised the data collection process closely.

Data quality issues

Structured self-administered questionnaires were adopted from previous studies and checked for its consistency. Data collection information sheet was developed by investigator on the objective of the study, how to collect data (technique of data collection), ethical issue and description about inclusive and exclusive criteria and training was provided for the data collectors. All filled questionnaires were reviewed after with the data collectors for its clarity, completeness and its relevance. Close supervision was done accordingly. The collected data were entered in a pre specified format using Epi Data version 3.01 for consistency case, double data entry, legal values, skip patterns and others.

Variables of the study

The dependent variable of this study was utilization of EMR (Utilized or Not utilized) while, socio demographic variables (age, sex, income, educational level, professional category), years of service, technology related variables, access to computer, knowledge, attitudes and training on EMR were independent variables considered.

Data processing and analysis

Data were entered in Epi Data version 3.01 and cleaned and analyzed using SPSS version 20 statistical software. Descriptive analyses such as frequency, percentages, graphic presentations and summary tables was conducted for categorical variables. Bivariate logistic regression was performed for each independent variable against outcome variable (EMR utilization) to estimate the crude odds ratio. EMR utilization using EMR system for recording, storing, retrieving, reporting other eight core functions of EMR in a daily task was be grouped as EMR system users whereas, those who did not use EMR for the above mentioned (twelve core functions) tasks were considered as non-users of EMR system in this study. While, for knowledge health professionals who respond above or equal to the median score of the questions related to their knowledge and attitude was grouped as having a good knowledge and attitude towards the EMR system respectively.

The candidate variables for the multivariable analysis were selected at p-value of less than 0.2. Multivariable logistic regression method was used to assess the independent effect of different variables after simultaneously controlling for the effect of other factors. Finally, variables which show significant association in the multivariable analysis with p value less than and equal to 0.05 were taken with 95% confidence interval for adjusted odds ratio.

During model development stepwise regression procedure will be used. The assessment of confounding and interaction will be also conduct. For variables considered as having confounding and interaction a change in beta coefficient of (> 20%) will be assumed and otherwise there is no confounding and interaction effect. The goodness of fit of the model was assessed using Hosmer – Lemeshow's statistical test. Its values above 5% indicate that the model has good predictive ability. In addition, significant omnibus test and improved classification precision was also assessed.

Ethical considerations

Ethical approval was obtained from the Research and Technology interchange (RTI) of Dire Dawa University (DDU) and collaboration letter was obtained. Written informed consent was obtained from respondents. Privacy and confidentiality

was maintained through not asking personal identifiers like, name and address.

Results

Characteristics of study participants

A total of 412 health professionals from different category and educational level with mean age of 29 year (\pm 6.4 years) were interviewed. Majority of respondents were from Harari region (70.4%), Hospitals (78.2%) and were males (51%). In addition more than three fourth (77.7%) were degree holders and nurses or midwives account for about 56.3%. the average working experience of the health professionals were 5.8 years.

Table 1 basic characteristics of Health professionals from study on utilization of EMR in Eastern Ethiopia, 2019.

Variables		Frequency	Percent
Study site	Harari	290	70.4
	Dire Dawa	122	29.6
Sex	Male	210	51.0
	Female	202	49.0
Type of facility	Hospital	322	78.2
	Health center	90	21.8
Educational level	Diploma	61	14.8
	Bsc	320	77.7
	MSc/MPH	17	4.1
	Specialty	14	3.4
Professional category	General practitioner/specialty	52	12.6
	Health offices	35	8.5
	Nurse/Midwife	232	56.3
	Medical laboratory	19	4.6
	Pharmacist	39	9.5
	Others*	35	8.5

* refers to health informatics, environmental health

Utilization of EMR by Health professionals

A total of 363 (88.1%) reported that, they are able to use computer. However, less than the number of computer users, only 330 (80.1%) had access to computer with in their facility. From them more than half, 211(51.2%) use it for data recording followed by report generating and reading. About two-third of health professionals, 279 (67.7%) reported that they use EMR in their facility currently with (54%) use it on daily basis. Out of this, 178(43.2%), 103(25%), 82(20%) and 74(18%) use EMR system for report generating, report sending, data retrieving and data analysis purpose respectively (Table 2).

A total of 272(66%) of respondents reported to prefer EMR instead of paper based system. Of these, saves time (51%), stores more data (33.7%), easy to access data (30.6%), easy to write report (22.1%) and increase data quality (30.3%) were main reasons to prefer EMR. Almost more than two third dictated that EMR is not difficult to use (75%), not need much computer skills (73.4%) and not electric dependent (95.7%). In addition, it is found that only 106 (26%) had even took any EMR related training. Regarding the presence of any contingency in the absence of electricity, majority (75%) had standalone generator while more than half (53%) use generators when the power supply to computers is off.

Table 2 patterns of EMR use among Health professionals in Eastern Ethiopia.

Variables		Frequency	Percent
Able to use computer (n=412)	Can use	363	88.1
	Can't use	49	11.9
Access to computers (n = 412)	Yes	330	80.1
	No	82	19.9
For what purpose do you use computers? (n =330)	Data recording	211	51.2
	Report generating	46	11.2
	Reading	62	15.0
	Video accessing	11	2.6
Do you currently use EMR in your facility? (n= 412)	Yes	279	67.7
	No	133	32.3
How often do you use EMR? (n = 279)	Daily	223	54.1
	Three times week	24	5.8
	Once a week	19	4.6
	I do not remember	13	3.2
Report generating (n = 279)	Yes	178	43.2
	No	101	24.5
Report sending (n = 279)	Yes	103	25.0
	No	176	42.7
Data retrieving (n = 279)	Yes	82	19.9
	No	197	47.8
Data analysis (n = 279)	Yes	74	18.0
	No	205	49.8

With subgroup analysis, about 52.8%, 67.6% and 59.3 % had good knowledge, attitude and use EMR respectively from Harari region. While higher proportion, 62.3%, 85.2% and 87.7% had good knowledge, attitude and use EMR respectively from Dire Dawa (Table 3).

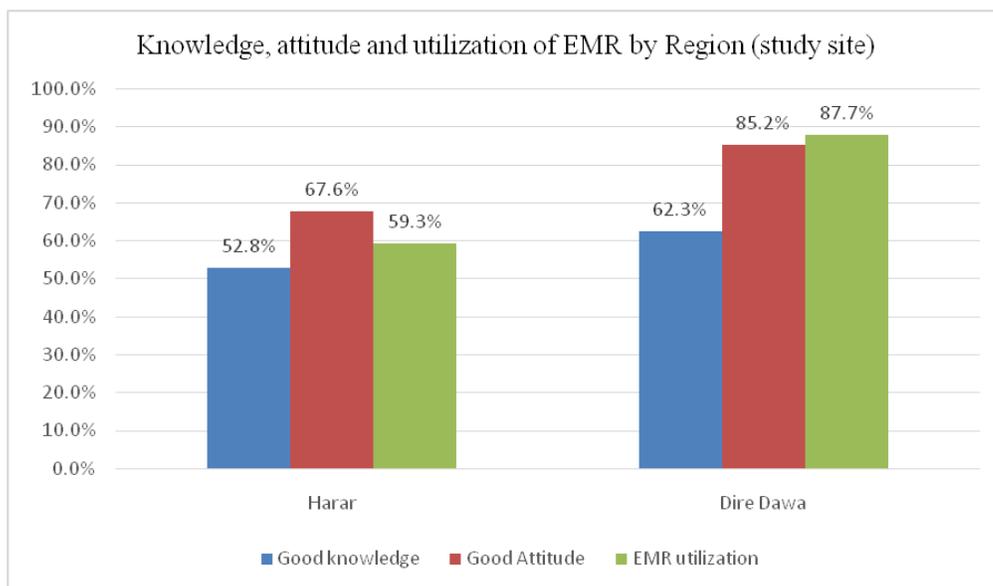


Table 3 Knowledge, attitude and utilization of EMR by Region (study site)

Knowledge and attitude towards EMR

Table 4 Knowledge of Health professionals on EMR

Knowledge parameters (n = 408) EMR system allows to		Frequency	Percentage
Review patient problem	Yes	351	86
	No	57	14
Seek out specific advice	Yes	344	84.3
	No	64	15.7
Follow patient results	Yes	334	81.9
	No	74	18.9
Enter daily notes	Yes	318	78
	No	90	22
Order laboratory	Yes	359	88
	No	49	12
Obtain test result	Yes	352	86.3
	No	56	13.7
Report Patient status	Yes	352	72.8
	No	56	27.2
Write prescription	Yes	297	74.5
	No	111	25.5
Had role based interface	Yes	328	80.4
	No	80	19.6
Had registered codes	Yes	309	75.7
	No	99	24.3
Improve quality	Yes	354	87.2
	No	52	22.8
Improve data handling	Yes	348	85.7
	No	58	14.3
Reduce medical error	Yes	332	81.8
	No	74	18.1
Perform clinical decision	Yes	306	75.4
	No	100	24.6
Facilitate transparency	Yes	322	79.3
	No	84	20.7

Table 5 Attitudes of health professionals towards use of EMR

What you feel about, EMR allows....		Frequency	Percentage
Easy to enter data	Disagree	40	9.7
	Agree	368	89.3
Improve service quality	Disagree	54	13.1
	Agree	354	85.9
Saves cost	Disagree	82	19.9
	Agree	326	79.1
Saves time	Disagree	42	10.2
	Agree	366	88.8
Increase patient satisfaction	Disagree	62	15.0
	Agree	346	84.0
Increase health of patient	Disagree	64	15.5
	Agree	344	83.5
Support Information	Disagree	50	12.1
	Agree	358	86.9
Support clinical decision	Disagree	42	10.2
	Agree	366	88.8
Increase timely decision	Disagree	57	13.8
	Agree	351	85.2
Needs training	Disagree	54	13.1
	Agree	354	85.9
Reduce medical error	Disagree	85	20.6
	Agree	323	78.4
Acceptable by professional	Disagree	63	15.3
	Agree	345	83.7
Willingness to use EMR	No	56	13.6
	Yes	352	85.4

The kolmogrov-Sminirove test was used to assess the distribution of knowledge score and attitude score of health professionals, in that the p value was less than 0.001 which violates the hypothesis that the data is normally distributed. Thus mean was used as cuts off point to classify the attitude and knowledge level in to good and poor (those who score the mean and above were considered as good. The mean knowledge and attitude score was 12.2(±3.3) and 12.8 (± 3.7) which was scored out of 15 knowledge measuring questions. A total of 229 (55.6%) and 300 (72.8%) of health professionals had good knowledge an attitude towards EMR for health facilities.

About 227 (55.1%) of respondents mentioned that there is person assigned to facilitate EMR with in the institution. From this manage the EMR system (38%), conduct EMR (15%), training, generating overall report (13.3%) were the perceived role of the assigned person. Only 68.3% of respondent responded affirmatively for the presence of the facility management support for EMR. A total of 116 (28.2%) state that there is regular meeting regarding EMR implementation with in the facility. More than half (52.2%) state that generator was the first alternative in the presence of power interruption, in which 75% respond for the presence of standalone generator with in the facility.

Factors associated with Utilization of EMR

Under bivariate analysis sex, age, work experience knowledge, attitude on EMR and other factors were associated with utilization of EMR. Majority of those who currently use EMR were males (COR =1.42; 95 CI: 0.93-2.14), work in health center (1.75; 95 CI=1.02-3.01) and with specialty (COR= 2.4 95% CI: 0.6-9.4).

Health professionals with higher age, above 35 years (COR =5.2; 95% CI; 2.3-11.8) and work experience, above five years (COR= 2.9; 95% CI: 1.7-5.0) were two and five times more likely to use EMR. Those with EMR training were more likely to use EMR than without training (COR = 5.14; 95% CI; 2.7-9.8).

Furthermore respondents with good knowledge (COR= 2.24; 95% CI; 1.42-3.42) and god attitude (COR =2.22, 95% CI; 1.42-3.49) were more likely to use and practice EMR with their facility (*Table 5*).

Table 6 Factors associated with Utilization of EMR (both crude and adjusted measure of association) among Health professionals in eastern Ethiopia, 2019

Associated factors		EMR use		COR with 95% ci	P value	AOR	P value
		Yes	No				
Sex	Male	150	60	1.42 (0.93-2.14)	.101	1.06 (0.66-1.70)	.815
	Female	129	73	1		1	
Type of facility	Health center	69	21	1.75 (1.02-3.01)	.042		
	Hospitals	210	112	1			
Age category in years	20-24	36	41	1		1	
	25-29	152	64	2.71 (1.59-4.62)	.000	1.86 (1.01-3.42)	.046
	30-34	45	18	2.85 (1.41-5.77)	.004	1.33 (0.56-3.17)	.514
	>=35	46	10	5.24 (2.31-11.86)	.000	2.54 (0.96-6.70)	.059
Educational level	Diploma	37	24	1		1	
	BSC	219	101	1.41 (0.80-2.48)	.237	1.35 (0.70-2.60)	.377
	MSC/MPH	12	5	1.56 (0.49-4.98)	.456	1.59 (0.44-5.76)	.474
	Specialty	11	3	2.38 (0.60-9.42)	.217	1.59 (0.34-7.40)	.552
Work experience	0-2 years	61	53	1		1	
	3-5 years	103	46	1.95 (1.17-3.23)	.010	1.59 (0.89-2.83)	.117
	>5 years	115	34	2.94 (1.73-4.99)	.000	2.22 (1.12-4.42)	.023
Computer literacy	Can use	274	89	27.1 (10.4-70.4)	.000		
	Can't use	5	44	1			
Can access computer	Yes	269	61	31.75 (15.49-65.07)	.000		
	No	10	72	1			
Prefer EMR than paper based	Yes	255	17	37.50 (18.96-74.17)	.000		
	No	24	60	1			
EMR training	Yes	94	12	5.14 (2.7 - 9.8)	.000	5.88 (2.93-11.78)	.000
	No	183	120	1		1	
Knowledge level	Good	173	56	2.24 (1.47-3.42)	.000	1.52 (0.92-2.51)	.105
	Poor	106	77	1		1	
Attitude level	Good	218	82	2.22 (1.42-3.49)	.001	2.41 (1.35-4.31)	.003
	Poor	61	51	1		1	

After controlling for confounding variables, sex, educational status, age, work experience, knowledge, attitude, and training were important factors associated with EMR utilization. The Hosmer and Lemeshow's goodness of fit showed a good measure of model fitness ($\chi^2 = 4.1$, $df = 8$ and p value = 0.728) which fails to reject the null hypothesis that the model is fit. Health professional with more than five years' experience had two times higher odds for using EMR (AOR= 2.22; 95% CI; 1.12 - 4.42) than early career workers (0-2 years of experience). Having previous EMR training were significantly more to use EMR (AOR= 5.88; 95% CI; 2.93-11.88) as compared to those who did not take training. In addition, having good knowledge (AOR= 1.52; 95% CI; 0.92-1.5) and good attitude on EMR system (AOR= 2.4; 95% CI; 1.35-4.31) had 50 % and 140% more odds to use EMR in their facility (*Table 5*).

With the assumption that the predictors of EMR use is affected by training on EMR and computer literate will influence the predictors further stratified analysis based on this factors was done. Having good attitude, good knowledge, work experience and were significantly associated with EMR use for with and without training on EMR. The model fitness were also good for both with p-value for Hosmer-Lemeshow test of model fitness above 5%. However, for those who are computer illiterate, the knowledge, attitude

and other variables were not significant predictors. At the same time, training of individual without computer literacy did not affect the EMR use (AOR = 0.000; p -value =0.99). In contrary, training for those with computer literacy showed to reduce the actual EMR use (AOR =0.18; p -value = 0.0001).

Discussion

The findings of this study showed that, 279 (67.7%) of respondents reported that they use EMR in their facility currently with (54%) use it on daily basis. In addition, higher proportion of health professionals (34%) reported that they prefer paper based system instead of the EMR. Evidences showed that health professionals consider EMR as easier and effective way of handling patient record (8). However, there are so many factors that can slow down its adoption and use by health professionals. In this study, relatively higher level of use was observed. It might be due to respondent's tendency to respond in a positive way (social desirability bias or over reporting) or their actual practice. The other way round, some facilities in the study area do not have EMR in all units and others did not implement it at scale needed. Finding from (15) showed that utilization decreased from 71.6% to 35% immediately at the start of EMR and three years later.

Result from northern Ethiopia (27), also showed that a comparable level of readiness to implement EMR with in their facility (54.1%) and about 71% use EMR in other study by (18). In comparison to this, respondents also had good knowledge (74.3%) and attitude (54.6%), which might make this level of acceptability. In the current study about 55.6% and 75.6% had good knowledge and attitude towards EMR, which shows the level EMR knowledge may not be satisfactory, leading to lower utilization. It may also be partly due to the fact that only 26% of respondents reported to have training on EMR. Even if there is training, the presence of organized organizational support system and management is essential (5).

As EMR is efficient in improving quality, missing data ($p < 0.01$) and overall health care (21), there is need to upgrade acceptance by health care providers. This appreciates the presence of barriers and obstacles from health care providers and some organizational related factors play an important role on the adoption and implementation of EMR at large scale. It shows the need of regional and local officials to create enabling environment in health care institution that is conducive for EMR implementation (12).

While result from Ayder hospital showed that almost all, 95% use EMR system in the hospital, where, almost all 92% of units are organized with EM system (10). The use of EMR system among health professional in western Oromia was found to be 42% (29). In addition about 70.8% of health care providers from northern Ethiopia use electronic medical record (18). This might be due the fact that EMR system is not well established in all parts, that it is under pilot stage some areas of Oromia region.

It may be partly due to some features of the system that hinders utilization which demands upgraded open source HER system which is more user friendly with improved features (30). This may decrease job burden on health professionals where the caseload and number of health professionals is not balanced, in case of referral hospitals. While others struggle that EMR for health care providers is time consuming, have extra burden and make them busy (17, 23). But as quality and improve patient care is the ultimate goal of health facilities, EMR use should be improved.

Health professional with more than five years' experience had two times higher odds for using EMR (AOR= 2.22; 95% CI; 1.12 - 4.42) than early career workers (0-2 years of experience). Similar study showed that those who have above six years of experience use EMR less frequently (AOR = 1.81; 95% CI: 1.04-3.16)). Furthermore, study also depicted that professionals with age less than 30 years were more likely to use EMR (18). However, experienced health care providers usually have skills gained during training, work stay and other occasions that they will have better skills and motives than fresh graduates. Thus it emphasizes the need to focus on fresh graduates for training on EMR.

In addition, those with computer literacy, and have access to computer were more likely to use EMR. Similar studies showed that previous computer skill and access were positively related to use of EMR (31). Health professionals with computer skills were two times more likely to use EMR service (AOR = 1.74; 95% CI: 1.16-2.85)(18). It emphasizes the need to upgrade the computer skills of providers for better use of EMR through various hands-on trainings. Besides the other important point to consider is the availability of functional computers within each unit. However, in those who are literate the effect of training was found to be negative, which might be due to the double burden to handle the client information on paper base in addition to EMR which might create burden and less motivation to go for EMR.

In addition, some factors like knowledge (AOR= 1.52; 95% CI; 0.92-1.5) and good attitude on EMR system (AOR= 2.4; 95% CI; 1.35-4.31) were positively associated with use of EMR. In this study about half of respondents were knowledgeable on EMR, which may hinder the use. Other study also identified lack of skills, knowledge and motivation to use EMR were main barriers for use EMR (5).

Having previous EMR training were significantly more to use EMR (AOR= 5.88; 95% CI; 2.93-11.88) as compared to those who did not take training. It is a fact that effective training and refreshment trainings are means of acquiring and increasing skills related to EMR and improve confidence for use. This will allow them to refresh their knowledge and skills related to the core functions of the system. Furthermore, one study (32) emphasizes the need for continuous training of health care provider after start of EMR. Even beyond this, the way of training should be shifted to e-learning approach (33) to address the vast majority in resource-limited settings. The implementation of effective and targeted training coupled with attitude change within health care providers is crucial for improved utilization of EMR (34). Trainees should also be selected from each unit/department/ rather than training HMIS focal persons repeatedly or preparing in-service training will be better options.

This study tried to point out, the use of EMR and its associated factors. Thus the results of this study should be taken in the consideration of some limitations. Among this as the data is mainly reported from providers, the issue of social desirability bias (over-reporting or under-reporting) could not be avoided. The other important thing is that, this study did not assess the organizational readiness and overall situation in detail which might affect the utilization level. Otherwise this study is a valuable input for Harari region and Dire Dawa health bureau for evidence-based improvement of the EMR system in each facility.

Conclusion And Recommendations

The utilization of EMR was found to be optimal and age, work experience, knowledge, attitude and training were associated with use of EMR in their facility.

Generally based on the findings of this study:

Regional Health bureaus in collaboration with hospitals and health center to strengthen and support the EMR in their facility. There should be continuous, targeted and effective EMR training and refreshment training once EMR is established. Above all there should be measures to improve skills and attitudes of health care providers towards the benefits of implementation EMR.

Declarations

Availability of data and material:All data generated or analyzed during this study are included in this published article.

Competing interests

Authors declare that they have no competing interest.

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Ethics approval and consent to participate

The research was reviewed and ethically approved by independent Research ethical review committee. Then a written informed consent considering their free will to participate in the study, confidentiality of their information and each participant was giving informed consent on separate paper and then they were eligible for the questionnaire. All possible ethical cares were respected throughout the conduct of research project.

Consent to Publish: Not Applicable

List Of Abbreviations

A/COR – Adjusted/Crude Odd ratio; CI- Confidence Interval; EMR- Electronic Medical record; ART- Ante retroviral treatment; HIV/AIDS – Human Immune Virus/Acquired Immune deficiency syndrome/; PLWHA – people living with HIV/AIDS

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Figures

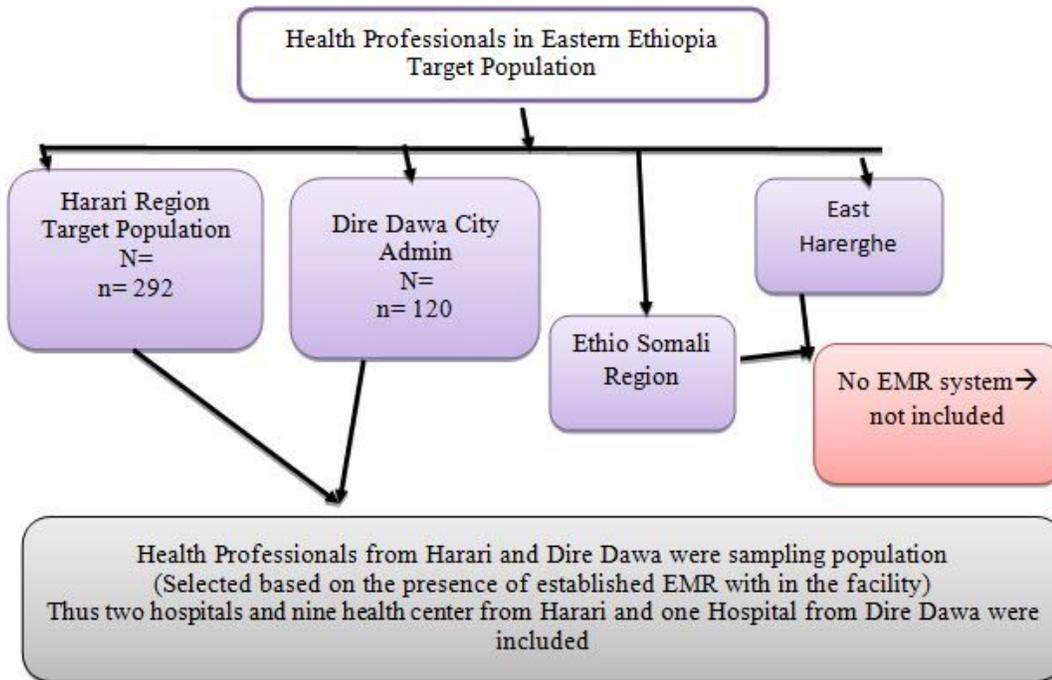


Figure 1

Diagrammatic summary of the sample size (sampling procedure) for each region and city Administration based on the stratification & proportion of their Health care work force

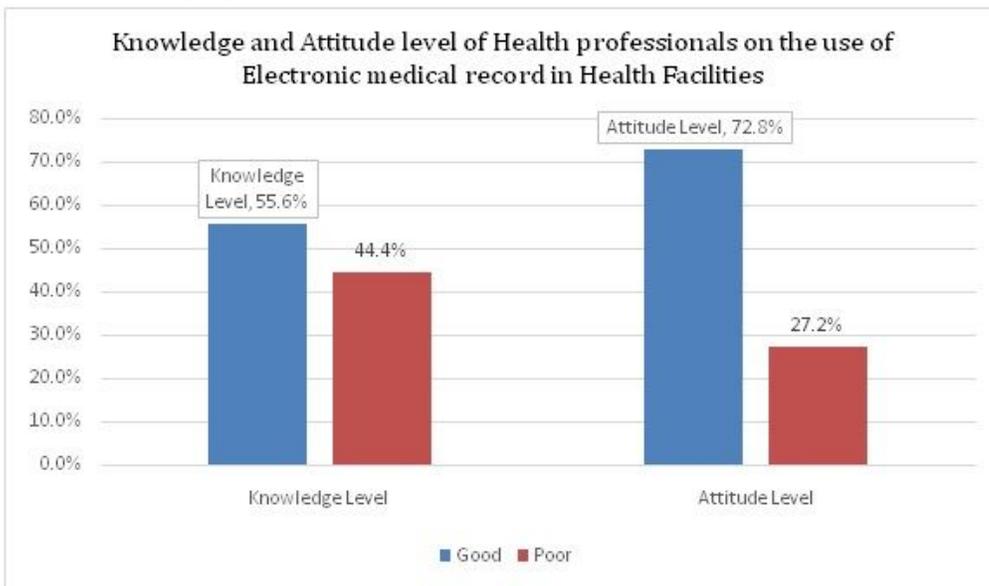


Figure 2

Knowledge and Attitude level of Health professionals on the use of Electronic medical record in Health Facilities