Utilization and Determinants of Electronic Medical Record System among Health Professionals in Public Health Facilities of Harari Regional State, Eastern Ethiopia

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Abstract

Background: Electronic medical record systems are increasingly incorporated into the healthcare systems of developing countries, including Ethiopia, to improve the effectiveness and efficiency of the healthcare institutions.

Objective: The level of utilization and determinants of electronic medical record use among health professionals working in public health facilities in Harari Regional State, Eastern Ethiopia

Methods: A facility- based cross-sectional study was conducted on 498 randomly selected health professionals at public health facility of Harari Regional State, Eastern Ethiopia. Pre-tested, structured, and self-administered questionnaire was used to collect data. Data collection facilitators were participated in the data collection process. Data were entered into Epi Data Version3.1, and exported to STATA version 14.2 for data processing and analysis. Descriptive statistics were computed to describe the study variables. Bivariate and multivariate logistic regression analyses were used to identify the predictors of the outcome variable. A p-value <0.05 at a 95% confidence level were considered as statistically significant.

Results: Of the total 551 approached health professionals, 498(90.3%) were returned the questionnaire. Out of this, 211(42.3%, 95% CI: 38, 46) were using the electronic medical recording system. Females (AOR=0.40, 95% CI: .251-.66), professionals with good attitude (AOR=1.71, 95% CI: 1.07, 2.72), professionals with good knowledge (AOR=2.48, 95% CI: 1.53- 4.00), and those having basic computer course (AOR= 4.45, 95% CI: 2.17 – 9.10) were significantly associated with the EMR system utilization.

Conclusion and Recommendations: In the present study the utilization of Electro medical record system was low**.** Health professional with basic computer courses, having good knowledge and a good attitude, were found to use an electronic medical record system. Therefore improving knowledge and awareness of health professionals is important for scaling up the electronic medical record system used in facilities.

Keywords: Electronic medical record • Ethiopia • Attitude • Knowledge and determinants • Harari and Eastern Ethiopia

Introduction

Electronic medical record systems are computerized patient records introduced in the early 1970s. However, they were not widely accepted by the health care sector until the 1990s [1]. Electronic Health (e-Health) covers the development and use of a wide range of ICT systems for healthcare e.g. electronic medical records (EMR), telemedicine, health information systems, mobile devices, e-learning tools, and decision support systems. It has value is in its ability to help lower costs in the health sector at the same time delivering better care within a citizen-centered approach. [2].

Electronic medical records (EMR) applications can prompt for completeness; provide a better ordering for searching and retrieval, and permit validity checks for data quality, research, and especially decision support. It can also support medical professionals in their decision-making and also improve operating efficiency, thus improving medical care quality However Healthcare professionals perceive that EMR systems are difficult to use. Therefore, a preference still exists for paper charting patients' medical records [3].

Implementation of effective Electro medical record system mainly associated, Health care 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 some of the reasons for the limited adoption and use of EMR system in developing countries [4]. Findings of other studies indicate that users' attitudes, acceptance, and skills are vital in

the success of EMR system implementation in the healthcare systems since they are the primary users of the system [5]. The benefits of using electronic medical records (EMRs) have been well documented; however, several implementation barriers have impeded their widespread use

The utilization of EMR after deployment in the health facility is poor and susceptible to failure due to resistance from health care providers. As a result, there are still a lot of challenges in institutionalizing and using well-functional EMRs as a means of delivering quality health care services to meet the needs of clients. However, there is no information about the utilization and associated factors of EMR in the Harari region. Therefore, this study aimed to investigate and analyses the utilization and determinants of EMR system use among health professionals in public health facilities of Harari regional state, Eastern Ethiopia.

Methods and Materials

Study setting and period

Harari regional state is one of the nine regions of Ethiopia, located in the eastern part, according to 2015 CSA data, the 2019 projected population of the region was 257,309. Nearly 50.8 % male and 54% of the population is urban residence respectively. There are two governmental hospitals, one federal police hospital, one fistula hospital, and two private hospitals eight health centres', and 34 private clinics are found in Region. This study was conducted in 8 health centres and one regional hospital. In Harari regional state, Eastern Ethiopia

Study design

An institutional based cross-sectional study was conducted.

Population

Source population: All health professionals working in public health facilities in Harari Regional state.

Study population: All health professionals working in the selected public health facilities during the study period.

Sample size determination

Sample size (n) is calculated by using double or two population proportions formula by using Epi Info statically calculation. Where α= type I error (level of significance), B=Type two error (1-B=power of the study), Power=the probability of getting a significant result,

$(B, \alpha)=(Z\alpha/2+ZB) 2$ When the Power=80% and the level of significance is 5%.

The calculated sample size for this study was 506 by adding a 5% non-response rate and the final sample size was 531.

Sampling procedure

The sample for the study was taken from the health care providers of the public health facilities actively implementing the EMR in Harari regional state. According to the information from Regional health bureau human resource department, the number of health professionals in facilities actively implementing the EMR from health centres were (340), and from public hospital actively were (211). In order to get a representative sample of study participants from the study unit, proportional allocation of sample size based on total number health professions in the selected health facility, then study participants from each health facilities were selected by simple random sampling method.

Data collection method

The sample for the study was conducted from the health professionals that worked in public health facilities actively implementing the EMR at Harari regional state. A structured self-administered questionnaire was prepared to conduct the study based on the WHO EMR readiness evaluation framework

and additional literature. The questionnaire is comprised of socio demographic, behavioural (knowledge and attitude), and organizational variables.

Data quality control

Pretesting of the questionnaire was done on a 5%, training was given for data collectors on how to conduct the data collection and how to use the tools properly for one day. To ensure data quality, the data supervisors and principal investigator was checked the completeness, consistency, and accuracy of the data.

Method of data processing and analysis

Double data entry was done using Epi Data version 3.1 based on the necessary study variables and analysed the data using the statistical software and Stata 14.2 for analysis respectively. Descriptive statistics and bivariate logistic regression analysis was used for computing to identify the relationship between dependent and independent variable. The crude and adjusted Odds ratios at 95% confidence level were used to describe the strength of association. A P-value <0.05 was considered to declare a result as statistically significant.

Results

Socio-demographic characteristics of health professionals

A total of 498 health professionals were participated in the study with a response rate of 90.3%. The mean age of study participants was 31.2 with 95% CI of (30.6-31.8) and (SD ± 6.5) years. About 172 (34.5%) of the study participants were in the age category of 36-40 years. More than half, 52.0% of the participants were nurses in profession and 48.5% were working in the outpatient department and half of participant had 5-10 year work experience (Table 1).

Knowledge and attitude of EMR system: The majority, 88.1% of the participants did not have basic computer training course and about 121(24.2%) do have the skill to access Microsoft word (Table 2).

Utilization of the EMR system: The overall utilization of the EMR system was 42.3% (95% CI: 0.38-0.46). Of these, around 56.8% were used EMR for four year at most and 79.1% used the system regularly. Network interruption and lack of skill in using EMR was the commonly raised reason for not using EMR system (Table 3).

Electro medical record system use related: More than half of the respondents (64.7%) were received training on EMRs. About (60.9%) had functional computer access in their working area. Regarding too presence of EMRs manual, (41.8%) responded said, user manual to the EMR system were available at their working units (Table 4).

Factor associated with utilization of EMR: Multivariate logistic regression was computed to determine the relationship between dependent and independent variables. Health professionals in the age group of 26-30 years were 1.61 times more likely to use the EMR system than those whose age was >40 with (AOR=1.61, (95% CI: 1.55 – 4.73)). Regarding to the gender of the study participants, being male were 54% less likely to use the EMR system compared with those their counterparts (AOR=0.46, 95% CI=0.29 - 0.73). This study also showed that Health professionals having educational level of 1st degree and above were 1.92 times more likely to use the EMR system as compared with those diploma holders (AOR= 1.92, 95% CI= 1.21 - 3.05)). The study also indicate that health professionals working in MCH department were 2.26 times more likely to use the EMR system than those in OPD (AOR= 2.26, 95% CI= 1.18 - 4.34). The study participants who have basic computer course were 4.12 times more likely to use the EMR system compared to those not having a basic computer course (AOR= 4.12, 95% CI= 2.02 – 8.40).

The present study also indicate that study participants who have access to EMRs manual in their working units were 1.80 times more likely to use the EMR system than those who did not have. (AOR=1.80, 95% CI= (1.16 - 2.79)).

Table 1. Socio-demographic characteristics of the study participants (health professionals) in selected health facilities of Harari regional state, 2020 (n=498).

Variables	Category	Freq.	Percent (%)
Age	21-25	140	28.1
	26-30	52	10.4
	31-35	104	20.8
	36-40	172	34.5
	>40	30	6
Gender	Male	238	47.7
	Female	260	52.2
Health facilities	Jugel Hospital	201	40.3
	Jinela HC	48	9.6
	Aboker HC	39	7.8
	Arategna HC	37	7.4
	Amirnur HC	32	6.4
	Hassengey HC	32	6.4
	Erer HC	34	6.8
	Sofi HC	37	7.4
	Harewe HC	38	7.6
Educational level	Diploma	274	55
	1st degree	208	41.7
	Masters and above	16	3.2
Profession	Nurses	259	52
	Pharmacy	71	14.2
	Laboratory	38	7.6
	GP***	16	3.21
	Midwife	93	18.6
	Radiology & HO**	21	4.2
Working experience	<5 years	86	17.2
	5-10 years	253	50.8
	>10 years	159	31.9
Working Department	OPD***	242	48.5
	Pharmacy & Lab	107	21.4
	IPD***	55	11
	MCH***	84	16.8
	X-ray D	10	2.01

Table 2. Utilization of EMR system by health professionals from selected public health facilities in Harari regional state, Eastern Ethiopia 2020 (n=498).

Variables	Category	Frequency(N)	Percent (%)
Utilization of EMRs	Yes	211	42.4
	No	287	57.6
Regular utilization of EMRs	Yes	150	79.1
	No	61	28.9
Reason for not used EMRs regularly	Network interruption	43	74.7
	Electric problem	10	8.6
	Other reasons	8	6.9
Experience on Use of EMRs	<1 Years	55	26
	1-4 Years	120	56.8
	>4 years	36	17
Purpose of using (EMRs)	More secured	206	97.6
	Time saving	147	69.6
	Store more data	153	72.5
	Easy to access	118	55.9
	Easy to write report	115	54.5
	Others reasons	18	8.53
Reasons for not used EMRs	Needs computer skill	285	99.3
	Difficult to use	284	98.9
	Time Consuming	164	57.1
	Electric dependent	82	28.5
	Others reasons	9	4.56

Table 3. Knowledge and attitude of EMR system by health professionals from selected public health facilities in Harari regional state, Eastern Ethiopia 2020 (n=498).

Variables	Category	Frequency(N)	Percent (%)
Basic computer training course	Yes	59	11.8
	No	439	88.1
Basic computer application skills	MS word	121	24.2
	Power point	117	23.4
	Excel	68	13.6
	Access	43	8.6
	Other	4	1

Table 4. Electro medical record system use Related factor by health professionals from selected public health facilities in Harari regional state, Eastern Ethiopia 2020 (n=498).

Variables	Category	Frequency(N)	Percent (%)
Training on EMRs	Yes	322	64.7
	No	176	35.3
Presence of functional computer	Yes	303	60.9
	No	195	39.1
Presence of EMRs user manual	Yes	208	41.8
	No	290	58.2
Supportive supervision from facility on EMR	Yes	265	53.3
	No	233	46.7
Supportive supervision from region on EMR	Yes	295	59.3
	No	203	40.7
Discussion On EMRs issues on hospital meeting	Yes	152	30.6
	No	346	69.4
Availability of uninterrupted electric power	Yes	319	64.1
	No	179	35.9
Availability of functional UPS	Yes	165	33.2
	No	333	66.8
Availability of Standby Generator	Yes	294	59.1

***HC: Health Center, GP: General Practitioner, OPD: Outpatient Department, IPD: Inpatient Department; MCH: Maternal and Child Health, HO: Health Officers

The study participants who have supportive supervision and technical support on EMR system from health facility itself and regional health bureau were (AOR=1.82, 95% CI= (1.10 - 2.99)), (AOR=2.12, 95% CI= (1.34 - 3.38)) more likely to use the EMR system than those their counter parts respectively. This study also showed that health professionals who have a good knowledge about The EMR system were 2.44 times more likely to use the EMR system with (AOR=2.44, (95% CI: 1.53 - 3.90)) and those who had good attitude were 1.72 times more likely to use the EMR system as compared to their counterparts (AOR=1.72, (95% CI: 1.09 - 2.70) (Table 5).

Discussion

In this study age educational level, study department, who have basic computer course, who have access to EMRs user manual, who gat supportive super vision both from facility and regional health bureau, presence of standby generator, study participant those who have good knowledge and attitude were significantly associated with EMRs use.

Health professionals are the main actors in the utilization and sustainability of the system; interventions are needed in building attitude and Knowledge on the EMR systems. The overall utilization of the EMR system among the health professionals were 42.37%. This was lower than a similar studies conducted in eleven developed and two developing countries; Netherlands (98%), Norway (98%), New Zealand (97%), United Kingdom (96%), Australia (95%), Sweden (94%), Germany (82%), United States (69%) and France (67%). A report from Antiretroviral Therapy (ART) Clinic of Malawi (70%) and in northern parts of Ethiopia (70.8%). However, it is only similar to the study conducted in Switzerland (41%) [7-9]. The most possible reasons for this variation might

Table 5. Factors associated with EMR utilization among health professionals from selected public health facilities in Harari regional state, Eastern Ethiopia, (n=498) 2020.

Variables	Category	EMR utilization		AOR(95% CI)
		No (%)	Yes (%)	
Age	21-25	80(57)	60(43)	0.59(0.22,1.57)
	26-30	17(33)	35(67)	1.61(1.55,4.73)**
	31-35	45(43)	59(57)	1.13(041,)3.15
	36-40	126(73)	46(27)	0.27(0.10,4.71)
	>40	19(64)	11(36)	1
Gender	Male	154(65)	84(35)	0.46(0.29,0.73)**
	Female	133(51)	127(49)	1
Education	1st degree and above	114(49)	110(51)	1.92(1.12,3.05)**
	Diploma	173(63)	101(37)	1
Working department	Pharmacy & Lab	84(79)	23(21)	0.34(0.18,0.65)**
	MCH	28(31)	56(69)	2.26(1.18,4.34)**
	IPD	29(53)	26(47)	1.15(0.57,2.35)
	X-ray D	8(80)	2(20)	0.24(0.04,1.36)
	OPD	138(57)	104(43)	1
Basic computer training course	Yes	18(37)	41(63)	4.12(2.02,8.40)**
	No	269(38)	170(62)	1
Presence of functional computer	Yes	167(55)	136(45)	1.32(0.79,2.21)
	No	120(62)	75(38)	1
Availability of EMR manual	Yes	110(52)	99(48)	1.80(1.16,2.79)**
	No	177(61)	112(39)	1
Supportive super vision from the facility	Yes	34(21)	131(79)	1.82(1.10,2.99)**
	No	153(66)	80(34)	1
Supportive super vision from Regional health bureau	Yes	159(54)	136(46)	2.12(1.34,3.38)**
	No	128(63)	75(37)	1

** P-value <0.05

be due to difference socio demographic characterises, knowledge, attitude, good infrastructure, support and attention of health professionals to EMR in this case.

Different factors affect utilization of EMRs by health professionals either positively or negatively. In this study, male health professionals were less likely to use the EMR system compared with those being female. This find is somewhat different from finding conducted at 3 hospitals in North West Ethiopia on 606 professionals. The study was shows that, Male health professionals were more likely to be used for EMR system than female health professionals [9]. The possible reason for this variation may be that, number of female participants were higher than male in our study as compared with reference.

In this study, health professionals those whose age was 26-30 years were more likely to use the EMR system than those whose age was >40. This finding is in line with findings from Northern Ethiopia, at Mekele Ider referral Hospital [6], at 3 hospitals of North West Ethiopia [9] and conducted in teaching hospital in Nigeria [10]. This may be due to the fact that younger people natural tend to have more motive, interest, and readiness to accept new technology developments.

This study also showed that Health professionals having education level of 1st degree were more likely to use the EMR system as compared with their counter parts. This is similar to a study conducted in Ethiopia at hospitals of North Gondar Zone [9]. The possible reason could be exposure to ICT facilities, received basic computer training course and used e-resources for their researches during their university training.

Computer skill is known for health professionals to utilize the EMR system. In the present study health professionals who have basic computer course were more likely to use the EMR system compared to their counter parts. This is similar with the study conducted in Northern Ethiopia [6] and North West Ethiopia [9]. The possible justification to this finding could be health professionals who have computer skill have the tendency to accept the technology and utilize the EMR system.

The above study findings strengthen by anther findings that health professionals who have a good knowledge and attitude about EMR system were more likely to use the EMR system. This was similar with the study conducted in south Florida [11], Benghazi Libya [12], Kenya [13] and North West Ethiopia [9]. Thus health professionals who have good knowledge and attitude may have the tendency to accept the advantage of technology and utilize the EMR system.

In addition to above the health professional knowledge, attitude and computer skill. Having EMR manual has seen found to be essential for EMR use. The present study also identified that the presence of an EMR manual has a significant impact on EMR system use, and the study participants who have access to a manual in their working units were more likely to use the EMR system than those who did not have the access. This is similar with study conducted in Nigeria [10]. The possible justification to this finding could be the presence EMR manual is important to utilize and trouble shoot EMR problem and will also serve as guidance for the users and will improve the EMR system use.

The study also reviled that participants who got supportive supervision and technical support on EMR system from health facility itself and regional health bureau were more likely to use the EMR system than those their counter parts respectively. This finding is in line with findings from Malawi at Queen Elizabeth and Kamuzu Central Hospital [8] and in Ethiopia at hospitals of North Gondar Zone. [9]. A possible justification to this finding could be that the presence of standby generator will increase utilization of EMRs at time of electric power interruption and supportive supervision will increase motivation of the staff. In addition to this, training on EMR were found non-significant variables (P-value > 0.05) on EMR system use. This find is in lined with findings from North Gondar, Ethiopia [9].

Conclusion

Overall Electro medical record system utilization in the present study areas was low Gender were negatively and age, basic computer course, knowledge, attitude, absence of EMR manual, supportive supervision from region health bureau and the facilities and absence of standby generator were positively impacted factors for the health care professionals on utilization of EMR system. Improving knowledge of health professionals on EMR System, awareness, infrastructure, management, and basic computer course training are important interventions to improve the EMR system performance in the study area.

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