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The Attitude towards and Use of Electronic Medical Record System by Health Professionals at a Referral Hospital in Northern Ethiopia: Cross-Sectional Study

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Background and Purpose: Electronic medical record (EMR) systems are increasingly incorporated into the healthcare systems of developing countries to improve the effectiveness and efficiency of the healthcare institutions. Inaccuracy, non-timeliness, incompleteness and inconsistency of paper-based data are basic triggering points to adopt EMRs in developing countries. The purpose of this study was to assess the attitude, use, and hindering factors of health professionals' use of EMR in one referral hospital in Ethiopia that has used the EMR for the last two years.
Methods: An institutional based cross-sectional quantitative study was conducted in March 2014 among 501 health professionals. Self-administered questionnaire was used to collect data. Data were entered and analysed using Epi-Info version 7 and SPSS version 20 respectively. Descriptive statistics were computed to describe study variables. Bivariate and multivariate logistic regression analyses were used to show the presence of association between the study and outcome variables. Odds ratio at 95% confidence level was used to describe the strength of association.
Results: A total of 428 health professionals participated in the study with a response rate of 86%. The majority, 318 (74.3%) were computer literate and more than half, 246 (57.5%) of them had computer access. A large number (71.0%) of respondents used EMR and more than half (56.1%) had a good attitude towards it. Health professionals' age, computer literacy, computer assess, working experience, regular meeting and training on the EMR system were significant factors (p-value <0.05) to the attitude and use of EMR system. Educational level, knowledge on EMR and using EMR were also variables affecting users' attitude towards EMR.
Conclusions: Majority of the respondents used the EMR system in their daily works and more than half of them had a good attitude towards EMR. Technical (computer literacy, knowledge), organizational (computer access, infrastructure, training access, regular meeting, management support), and personal (age, working experience) variables are significant factors to develop a good attitude towards and high use of the system. Improving skills, awareness, infrastructure, management and resource allocation are important interventions to improve the EMR system performance and positive attitude towards health professionals in the study area.

Keywords: Electronic Medical Record, Ethiopia, Attitude.

1 Introduction

Incorporating different information technologies (ITs) into the healthcare system of developing countries is not all about modernizing the health system but it is about saving life by facilitating communication, practicing evidence based decision, incorporating e-learning to remote health professionals, use it as a medium to access recent healthcare information, data handling and processing activities among staffs [1] [2]. Among the different IT system initiatives in developing countries electronic medical records (EMR)

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systems are becoming dominant with the vision of improving data handling and communication in healthcare organizations [2-5].

It is hypothesized that EMR systems strengthen the health system and clinical care by supporting to have legible and organized medical records and to access clinical information about individual patients [6-9]. Different researches 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 [6] [8] [10-16].

Various health facilities in developing countries are using EMR systems in varying degrees due to several reasons [10] [11] [17] [18]. Environmental competition, fragmented health information system, incompleteness and inconsistency of paper based data, poor quality and non-timeliness of reports, poor data utilization of health facilities, time/resource consuming of paper based system, innovation of new technologies, and governments' need to deliver evidence based health services were basic reasons to adopt EMR systems in developing countries [9] [18-22].

Despite the high expectations and interest in adopting and using EMR systems worldwide, its overall adoption rate is relatively low, especially in the resource-limited countries where high diseases prevalence and incidence rates are predominant [1] [2] [6] [7] [10] [23]. As indicated by various studies, the adoption and use of EMR systems in developing countries is in its embryonic stage for several reasons [1] [2] [10].

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 some of the reasons for the limited adoption and use of EMR system in developing countries [19] [24] [25].

Findings of different studies indicate that users' attitude, 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 [10] [12] [13] [14] [18] [20] [26]. It is true that the system will be functional if the users and working environment are ready to adopt and use the EMR system.

In Ethiopia, EMR system is one of the major ICT projects among the other different initiatives like health data warehouse, Health-net, tele-education, telemedicine, human resource information system, electronic health information management system, *woreda* based planning system, and health integrated financial information system planned by the Ethiopian Federal Ministry of Health (EFMoH) and its partners [27]. The EFMoH with the support of Tulane University adopted an EMR system called Smart Care in hospitals and health centres to improve healthcare services through quality evidence [27] [28]. Users' attitude, knowledge, technical skills, functionality of the working environment/infrastructure, and adequate resources are pointed out as important determinants for the functionality of the adopted EMR system [29].

Despite the adoption of the system, there is no adequate evidence on the attitude, use and determinant factors of the health professionals towards the EMR system in Ethiopia. In order to effectively implement the EMR in future implementations, evidence on the main factors of EMR success or failures must be studied. However, there is little evidence on determinant factors of EMR success generally in implementations in resource-limited settings where unsustainable power supply and limited computer skills are major concerns. Therefore, the aim of this study is to assess the attitude, use and factors associated with EMR system use among health professionals working in the Ayder Referral Hospital, Tigray Regional State, Northern Ethiopia where the Smart Care system is adopted as a pilot study for the last two years. The main contribution of this work is to identify the main determinant factors of EMR use and attitude of health professionals in the implementation of EMR in hospitals with limited resources. The results are useful for EMR implementers, governmental organizations and non-governmental international organizations for proper planning before costly EMR implementations.

2 Materials and methods

An institutional based cross-sectional quantitative study was conducted in March 2014 to assess the attitude, use and determinants of EMR systems among health professionals in Ayder Referral Hospital, Northern Ethiopia. A cross-sectional study design was selected because we are interested to determine the use and attitude of health professionals towards EMR after two years of use. Ayder Referral Hospital is found in the Mekelle city administration, the capital city of the Tigray Regional State - one of the regions in the nine administrative regions of Ethiopia. The city is located about 780 kilometres away from Addis Ababa, the capital city of Ethiopia [30]. There are two governmental hospitals and seven health centres

within the city administration. Ayder Referral Hospital is giving healthcare services for an estimated of 5 million population. The hospital started EMR system applications as a pilot study since 2012. About 500 health professionals from different categories are employed and working in the hospital.

All the health professionals working in the hospital were the study population of this study. Health professionals with less than 6 months of working experience or absent from their work due to annual leave and maternity issues were excluded from being study participants in the study. All the health professionals were approached for this study.

Health professionals who used EMR system for recording, storing, retrieving and reporting purposes in daily tasks were grouped as EMR system users whereas those who did not use it at all or sometimes for the above tasks were considered as non-EMR system users in this study. Health professionals who responded above the mean score of questions related to their attitude were grouped as having a good attitude towards the EMR system and those scored below the mean score were assumed as having a poor attitude towards the EMR. Respondents who can perform at least basic Microsoft Office applications (MS Word, PowerPoint, Excel, Access and Internet services) were considered as computer literate.

Data on different variables were collected using a pre-tested self-administered questionnaire. The questionnaire was developed based on previous validated instruments [15] [16] [17] [21]. The tool was first prepared in English, translated to Tigrigna (local language), and then back to English by language experts to check its consistency. Socio-demographic, technical, attitudinal and organization-related variables were the major contents of the tool. It was pre-tested in Minilik Hospital, Addis Ababa, to check its validity based on feedbacks.

Four diploma nurses and one health officer were recruited as data collector and supervisor respectively. They were trained for one day on the objective of the study, data confidentiality, data quality assurance, contents of the questionnaire, and the rights of the respondents.

Ethical clearance for this study was obtained from the Ethical Review Committee of the Institute of Public Health, University of Gondar, Ethiopia. Written consent was taken from the Tigray Regional Health Bureau and the hospital manager. Informed verbal consent was also obtained from each health professional after the clear explanation of the study objectives, data confidentiality issues, and their rights during the data collection process. Data collectors collected the required data by distributing the questionnaire among the health professionals. The principal investigator and the supervisor did supportive supervision on the data collectors daily. Data collectors, the supervisor, and authors checked the completeness, consistency, and accuracy of the data daily to take actions on the next days.

After the completion of the data collection, the authors edited data manually. Authors created a data entry template using Epi Info version 7 based on the necessary study variables. The authors did data editing and analysis using the statistical software Epi Info version 7 and SPSS version 20, respectively. Descriptive statistics and bivariate regression analysis were computed to describe the study population and identify associated factors on the attitude towards and use of EMR system respectively. Variables having a p-value of <0.2 in the bivariate analysis were adjusted to the multivariate logistic regression analysis to check the presence of confounding effect in the association. Odds ratio at the 95% confidence level was used to describe the strength of associations between the study and outcome variables.

3 Results

3.1 Socio-demographic characteristics of health professionals

A total of 428 health professionals participated in the study with a response rate of 86%. 248 (58.0%) of the respondents were within the age category of ≥ 30 years. The mean age of the respondents was 27.36 (SD±4.746) years. More than half (53.7%) of the respondents were males. A majority, 75.7% of the study participants had a monthly salary of ≥2225 ETB (Ethiopian Birr). About three quarters (76.2%) of the respondents were degree holders and more than half (52.1%) of them nurses. Majority, 74.3% and 70.0% of the respondents were computer literate and had working experience of ≤ 6 years respectively (Table 1).

3.2 The attitude towards and use of the EMR system by health professionals

Of the total respondents, 125 (29.6%) did not use the EMR system for their daily work and 240 (56.7) of them had a good attitude towards EMR system use (Figure 1).

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Table 1. Socio-demographic characteristics of health professionals in the hospital.

Variables	Frequency	Percent (%)
Sex of the respondents:		
Male	230	53.7
Female	198	46.3
Age of the respondents:		
<30 years	180	42.0
≥30 years	248	58.0
Educational status:		
Degree	326	76.2
Master and above	102	23.8
Professional category:		
GP and specialist	45	10.5
Pharmacy	71	16.6
Laboratory	53	12.4
Nurse	223	52.1
Others	36	8.4
Monthly income in Birr:		
< 2225	104	24.3
≥ 2225	324	75.7
Working experience:		
≤ 6years	299	70.0
> 6 years	129	30.0
Computer literacy:		
Yes	318	74.3
No	110	25.7

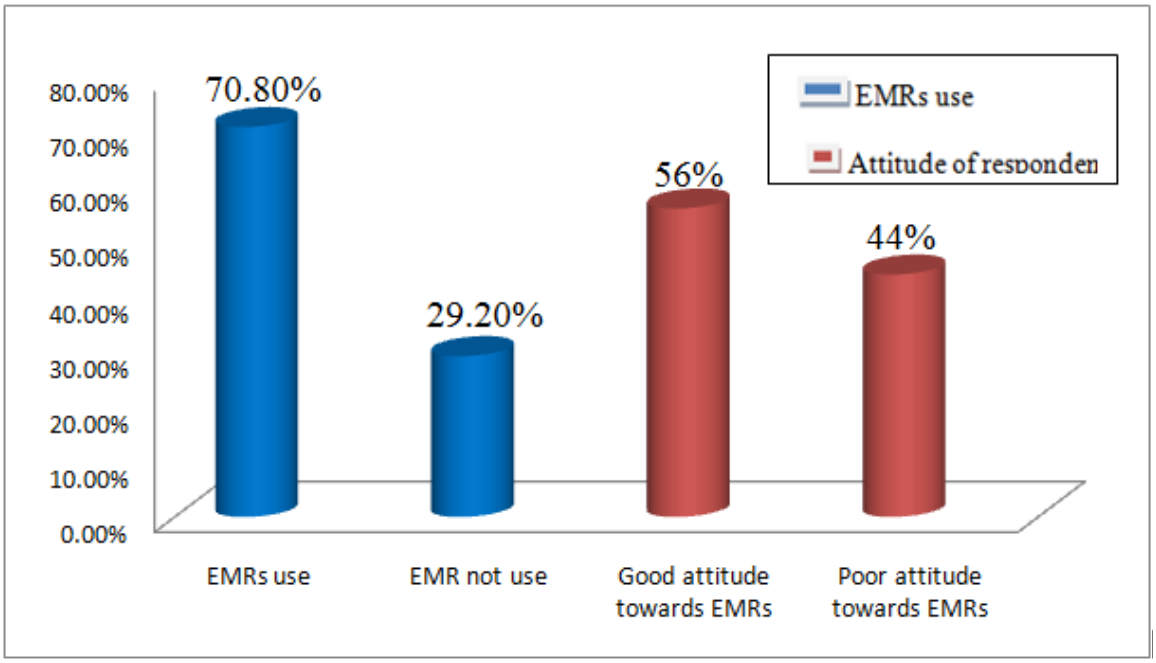

Fig. 1. Attitude towards and us of the EMR among the health professionals in the hospital.

3.3 Technology-related variables of health professionals

Concerning the frequency of EMR system use, 39.3% of the respondents used the EMR system daily, 75.5% three times a week, 4.4% once a week and 20.5% did not remember the frequency of use. The respondents' use of EMR system was as follows: 69.2% for patient data recording, 47.0% for report generating, and 53.3% for data processing and communication purposes (Table 2).

Table 2. Technology-related variables of health professionals in the hospital.

Variable	Response	Frequency	Percent
EMR system used	Yes	303	70.8
	No	125	29.6
EMR system use frequency	Daily	168	39.3
	Three times a week	32	7.5
	Once a week	19	4.4
	I do not remember exactly	87	20.5
EMR system used for	Recording patient data	296	69.2
	Report generating	203	47.0
	Report sending	228	53.3
	Data retrieving and analysis	250	58.4
Prefer EMR instead of paper based	Yes	327	76.4
	No	101	23.6
Reasons for preferring EMR system	More secured	319	74.5
	Time saving	299	69.9
	Store more data	315	73.6
	Easy to access data	323	75.5
	Easy to write report	304	71.0
Reasons for not using EMR	Time consuming	78	18.0
	Difficult to use	51	11.9
	Needs computer skill	67	15.7
	Electric dependent	76	17.8
Refreshment training on EMR	Yes	152	35.5
	No	276	64.5
EMR system acceptance by health professionals	Yes	147	34.3
	No	154	36.0
	Not certain	127	29.7
Functionality of EMR system	Yes	76	17.8
	No	362	82.2

Almost three quarters (72.2%) of the health professionals had awareness on the EMR system. A large number (76.4%) of the respondents preferred the EMR system than paper based for the reasons of high security (74.5%), time saving (69.9%), better data storage (73.6%), ease of data access (75.5%), and ease of generating reports (71.0%). The rest 23.6% of the respondents did not prefer EMR system for the reasons of difficulties to use (17.8%), time consuming (18.0%), demand of computer skills (15.7%), and electric power dependency (11.9%). Only 35.5% of the respondents had access to the refreshment trainings on EMR system.

3.4 Organisation-related variables on the use of EMR system

More than half of the respondents (57.5%) had computer access in their working area. Regarding the purpose, 45.6% of the respondents used computers for data recording, 45.1% for report generating, 40.2% for reading, and 29.9% for videos accessing. Nearly three quarters (72.0%) of the respondents knew the presence of a responsible body for EMR system in their hospital. Duties of the assigned body mentioned were managing the system, conducting trainings, system maintenance, collecting data from each department, and preparing the overall report to the hospital (Table 3).

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Table 3. Organisation-related variables on the use of EMR system in the hospital.

Variables	Response	Frequency	Percent
Computer access in working area	Yes	246	57.5
	No	182	42.5
Purpose of computer use	Data recording	195	45.6
	Report generating	193	45.1
	Reading	172	40.2
	Video accessing	128	29.9
Presence of an assigned body to EMR	Yes	308	72.0
	No	120	28.0
Duties of assigned person	Managing the EMR system	151	35.3
	Conduct training on EMR	89	20.8
	EMR system maintenance	116	27.1
	Generating overall report	107	25.0
	Collect data from each department	107	25.0
Is there management support to EMR system	Yes	170	39.7
	No	258	60.3
Regular meeting on EMR system	Yes	80	18.7
	No	348	81.3
Discussion of EMR issues in any hospital meeting	Yes	44	10.3
	No	151	35.3
	I do not know	233	54.4
Presence of EMR manual	Yes	113	26.4
	No	315	73.6
Access of uninterrupted electric power in your department	Yes	72	16.8
	No	356	83.2
Means of managing patient data during the absence of electric power	Using generator	274	64.0
	Using paper based	33	7.7
	Leaving it unlit light comes	64	15.0
	Using paper temporarily and recording to EMR	13	3.0
Access to standby generator in your department	Yes	272	63.6
	No	156	36.4

Only 39.7% of the respondents mentioned the presence of management support, 16.6% a budget allocation, and 18.7% regular meetings on the EMR system. A small number of respondents (15.4%) responded to have a standard protocol manual to the EMR system available in their working units. Only 16.8% of the respondents reported to have the presence of uninterrupted electric power. Nearly two-thirds (64.0%) of health professionals used a generator when there is an electric power interruption (Table 3).

3.5 Factors associated with the EMR system utilization

In both bivariate and multivariate analysis, age, working experience, computer accesses, computer literacy, management support, uninterrupted electric power, regular meetings on the EMR, the presence of an EMR system manual, the presence of a standby generator, refreshment training and budget allocation were variables showing a significant association (p-value <0.05) on the EMR system use (Table 4).

Health professionals with the age of <30 years were (OR=3.47, 95% CI= [2.18-5.51]) times more likely to use the EMR system compared with those whose age was >=30 years. Health professionals having working experiences of <=6 years were (OR= 2.23, 95% CI= [1.31-3.82]) times more likely to use the EMR system for their daily tasks than those having > 6 years working experiences. The study participants who have computer access, are computer literate and got management support on EMR system were (OR=1.64, 95% CI= [1.06-2.56], OR=2.06, 95% CI= [1.27-3.34] and OR=1.60, 95% CI= [1.02-2.54]) times more likely to use the EMR system than their counterparts respectively (Table 4).

Table 4. Factors associated with the EMR system utilization in the hospital.

Characteristics	Respons e	EMR Utilization		COR(95%CI)	AOR(95%CI)
		Users (%)	Not Users		
Age:	< 30	77(18.0)	103(24.0)	3.47 [2.18-5.51]	2.13[1.51-3.93]
	>=30	44(10.3)	204(47.7)	1	1
Sex:	Male	159(37.2)	71(16.6)	0.84 [0.54-1.31]	0.68[0.45-1.22]
	Female	144(33.6)	54(12.6)	1	1
Educational level:	Degree	225(52.6)	101(23.6)	0.69[0.40-1.18]	0.86[0.57-1.69]
	Master +	78(18.2)	24 (5.6)	1	1
Work experience:	<=6 yrs	105(24.5)	24(5.6)	2.23 [1.31-3.82]	1.81(1.04-3.16)
	>6 yrs	198(46.3)	101(23.6)	1	1
Computer access:	Yes	185(43.2)	61(14.2)	1.64 [1.06-2.56]	1.32(1.04-2.36)
	No	118(27.6)	64(15.0)	1	1
Computer literacy:	Yes	238(55.6)	80(18.7)	2.06[1.27-3.34]	1.74[1.16-2.85]
	No	65(15.2)	45(10.5)	1	1
Management support to EMR:	Yes	130(30.4)	40(9.3)	1.60 [1.02-2.54]	1.21[1.01-2.13]
	No	173(40.4)	85(19.9)	1	1
Presence of an assigned body:	Yes	221(51.6)	87(20.3)	1.18[0.73-1.91]	0.89[0.65-1.78]
	No	82(19.2)	38(8.9)	1	1
Regular meetings on the EMR:	Yes	65(15.2)	15(3.5)	2.00[1.06-3.85]	1.68[1.04-2.64]
	No	238(55.6)	110(25.7)	1	1
Presence of EMR manual:	Yes	95(22.2)	18(4.2)	2.72 [1.51-4.92]	1.52 [1.28-3.86]
	No	208(48.6)	107(25.0)	1	1
Refreshment training on EMR:	Yes	119(27.8)	33(7.7)	2.11[1.31-3.43]	1.98 [1.65-3.02]
	No	174(40.7)	102(23.8)	1	1
Budget allocation for EMR:	Yes	58(13.6)	13(3.0)	2.17 [1.10-4.35]	1.64 [1.08-2.91]
	No	240(56.1)	117(27.3)	1	1
Raising EMR on any meeting:	Yes	32(7.5)	12(2.8)	1.11[0.53-2.38]	0.86[0.36-1.89]
	No	271(63.3)	113(26.4)	1	1
Uninterrupted electric power:	Yes	59(13.8)	13(3.0)	2.08 [1.06-4.17]	1.81[1.13-3.05]
	No	244(57.0)	112(26.2)	1	1
Access to standby generator:	Yes	204(47.7)	68(15.9)	1.73 (1.10-2.70)	1.23 [1.06-2.41]
	No	99(23.1)	57(13.3)	1	1

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 using the EMR system (OR=2.72, 95% CI= [1.51-4.92]) times more than those who did not have the access. On the other hand, variables such as professional category, sex, educational level, presence of an assigned body on EMR, and raising the EMR system issues on any meetings did not show a significant association on the EMR system use (Table 4).

3.6 Factors associated with the attitude of health professionals on the EMR system

Age, education level, working experience, regular meetings on EMR, computer literacy, computer access, training on EMR, knowledge on EMR, and using EMR were significant variables (p-value < 0.05) to the attitude of health professionals towards the EMR system (Table 5).

Health professionals with the age of < 30 years were about (OR=1.89, 95% CI= [1.25-2.86]) times more likely to have a good attitude towards the EMR system compared with those >= 30 years old. Health professionals having first-degree education level were (OR= 3.24, 95% CI= [1.98-5.31]) times more likely to have a good attitude towards the EMR system than Master's and above holders. Respondents having working experience on EMR, computer literacy, training on EMR, using EMR for daily tasks, and knowing the EMR system were (OR= 1.80, 95%CI= [1.13-2.86], OR= 3.30, 95% CI= [2.04-5.34], OR= 2.33, 95% CI= [1.51-3.62], OR= 2.00, 95% CI= [1.28-3.11], and OR= 2.26, 95% CI= [1.44-3.56]) times more likely to show a good attitude towards the EMR system as compared with their counterparts respectively (Table 5).

In other words, sex, position/role in the hospital, functionality of the system, presence of EMR manual, presence of an assigned body on EMR, budget allocation for EMR, management support, and presence of

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uninterrupted electric power were found non-significant variables (P-value > 0.05) on the attitude of health professionals towards the EMR system (Table 5).

Table 5. Factors associated with the attitude of health professionals on the EMR system in the hospital.

Variables	Responses	Respondents' Attitude		COR [95% CI]	AOR[95% CI]
		Good (%)	Poor (%)		
Age in years	< 30	117 (27.3)	63 (14.7)	**1.89 [1.25-2.86]**	**1.56 [1.18-2.34]**
	>=30	123 (28.7)	125 (29.3)	1	1
Sex	Male	135 (31.5)	95 (22.2)	1.26 [0.84-1.88]	0.82 [0.32-1.62]
	Female	105 (24.5)	93 (21.8)	1	1
Education level	Degree	205 (47.9)	121 (28.3)	**3.24 [1.98-5.31]**	**2.52 [1.75-4.13]**
	Master +	35 (8.2)	67 (15.6)	1	1
Working experience in years	<=6	183 (42.8)	116 (27.1)	**1.80 [1.13-2.86]**	**1.41[1.06- 2.47]**
	>6	57 (13.3)	72 (16.8)		1
Position	Professional	208 (48.6)	154 (36.0)	1.44 [0.82-2.51]	0.92 [0.48-2.35]
	Head	32 (7.5)	34 (7.9)	1	1
Computer literacy	Literate	202 (47.2)	116 (27.1)	**3.30 [2.04-5.34]**	**2.86 [1.82-4.25]**
	Illiterate	38 (8.9)	72 (16.8)	1	1
Computer access	Yes	153 (35.8)	93 (21.7)	**1.80 [1.20-2.70]**	**1.33 [1.61-2.49]**
	No	87 (20.3)	95 (22.2)	1	1
Functionality of EMR	Yes	50 (11.1)	26 (6.8)	1.64 [0.94-2.85]	0.74 [0.53-1.92]
	No	190 (44.5)	161 (37.6)	1	1
Presence of EMR manual	Yes	60 (14.0)	53 (12.4)	0.85 [0.54-1.34]	0.69 [0.28-1.29]
	No	180 (42.1)	135 (31.5)	1	1
Regular meetings on EMR	Yes	54 (12.6)	26 (6.0)	**1.81[1.05-3.12]**	**1.55 [1.03-2.85]**
	No	186 (43.5)	162 (37.9)	1	1
Assigned body to EMR	Yes	181 (42.3)	127 (29.7)	1.47 [0.94-2.30]	1.25 [0.75-2.06]
	No	59 (13.7)	61(14.3)	1	1
Trained on EMR	Yes	105 (24.5)	47 (11.0)	**2.33 [1.51-3.62]**	**2.14 [1.32-3.26]**
	No	135 (31.5)	141(33.0)	1	1
Budget allocation to EMR	Yes	44 (10.3)	27 (6.3)	1.34 [0.77-2.33]	1.16 [0.69-2.19]
	No	196 (45.8)	161 (37.6)	1	1

4 Discussion

This study mainly tried to assess the attitude towards and use of an EMR system among health professionals working in the Ayder Referral Hospital, Ethiopia. Based on this, only 240 (56.0%) and of the health professionals had a good attitude and nearly three quarters (70.8%) used the EMR system (Figure 1). The utilization is better compared with another study conducted in Addis Ababa [29] and Gondar University Referral Hospital, which was 46.5% [30]. The most probable reason for this variation may be that Ayder Referral Hospital is one of the pilot sites for EMR system for the Federal Ministry of Health and Tulane University. It thus started the service early, and the users may also be informed well earlier than in the Gondar University Hospital. The presence of a higher number of computer literate respondents in this study may be another reason to have relatively better EMR system utilization.

On the other hand, the EMR system utilization in this study (70.8%) is smaller than in study findings from Sweden and the Netherlands, where the overall EMR utilization was 90.0% and 88.0% respectively [13]. The most obvious reasons for this variation mentioned may be electric power interruption, limited standby generator access, poor maintenance, poor management support, limited trainings on EMR system, less attention to EMR and technical problems in our case. However, the utilization in our case is higher compared with study findings from Denmark (62.0%), Finland (56.0%) and Austria (55.0%) [13].

Health professionals' acceptance (56.0%) is almost the same with study findings from the Gondar University Hospital (54.0%) [30]. It is smaller than study findings from Southeast Iran [31], where 64.7% of health professionals preferred the EMR system to the paper-based one. Possible reasons for this

difference may be differences in infrastructure, computer literacy, computer access, management support and personal initiation. In other comparisons, the respondents' attitude in this study is lower than in study findings from Malawi [17] and Norway [21], where 71.0% and 81.0% of health professionals perceived that the EMR system changed the quality of healthcare services and satisfied users, respectively.

Even though various studies [23] [24] [26] [32] indicated that an EMR system is important to improve the efficiency and effectiveness of healthcare institutions, some studies stand in contrary to this by assuming that an EMR system is time consuming, creates additional workload to record data to the system, and also requires computer skills [14] [27]. The findings of the current study supported these previously mentioned issues in both directions.

As indicated by various studies, the adoption of an EMR system is varying across the world due to several reasons. The current study also identified several hindering factors which affect the attitude towards and use of an EMR system by health professionals. Age, working experience, computer literacy, computer access, regular meetings on EMR, and training on EMR were significant variables (p-value < 0.05) with health professionals' attitude towards and use of the EMR system (Tabel 4, Table 5). Respondents in the age category of <30 years old were (OR=1.89, 95% CI= [1.25-2.86]) and (OR=3.47, 95%CI= [2.18-5.51]) times more likely to have a good attitude towards and in using the EMR system compared with the rest, respectively. The reason may be that three quarters of the study participants were within the <30 years age category and computer literate/familiar with different technologies, therefore they are more eager to accept and use an EMR system to deliver their healthcare services than older groups.

Respondents who have ≤6 years of working experience had higher levels of attitude towards and use of the EMR system compared with the rest; (OR=1.80, 95% CI= [1.13-2.86]) and (OR =2.23, 95% CI= [1.31-3.82]), respectively. This finding supports the study findings from Kuwaiti, Saudi Arabian and Malawian hospitals, which showed the inverse association of working experience with the attitude towards and use of an EMR system by health professionals (as working experience increased, the attitude towards and use of the EMR systems decreased [7] [13]). The possible explanation of this finding could be the variation in the access to new technologies, computer literacy, educational level and personal initiation between younger and older staff.

Computer literacy, having regular meetings, and training on EMR system were positive contributors to change the attitude towards and use of EMR system (OR=3.30, 95% CI= [2.04-5.34]), (OR=1.81, 95% CI= [1.05-3.12]), and (OR=2.33, 95% CI= [1.51-3.62]), respectively. From different findings and logic, it is true that training can change the knowledge, attitude and skills of health professionals on EMR systems. Study findings from Iran [9], Norway [21], the Netherlands [24], Ethiopia/Gondar University [30], Iran [31], University of Texas [33], Ethiopia/Bahir Dar [34], Libya [35], WHO [36], Ethiopia/Addis Ababa [37] and Africa [38] support this conclusion.

Additionally, management support, presence of EMR manual, proper budget allocation, uninterrupted electric power and standby generator availability were significant variables to determine the utilization of the EMR system (Table 4). A possible justification to this finding could be that the presence of management support will increase supportive supervision and motivation of the staff. The EMR manual will also serve as guidance for the users and proper budget allocation will improve the refreshment training and timely system maintenance. Different evidences from various places [30] [34] [35] [36] [37] [38] also support this justification.

5 Conclusions

The majority of the respondents used the EMR system in their daily work and more than half of them had a good attitude towards it. Variables related to personal (age, working experience), technology-related (computer literacy, knowledge) and organization-related (computer access, infrastructure, training access, regular meeting, management support) factors are significant to the attitude towards and use of an EMR system by health professionals. Improving skills, awareness, infrastructure, management, and resource allocation are important interventions to improve the EMR system performance in the study area.

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Statement on conflicts of interest

The authors declare that there are no competing interests.

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