

# Attitudes toward implementation of electronic medical record and its associated factors among health professional workers in selected public hospitals in Addis Ababa, Ethiopia, 2023: A multi-center cross-sectional study

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## Abstract

**Background study:** Electronic medical record (EMR) systems in healthcare delivery have the potential to transform healthcare in terms of saving costs, reducing medical errors, and improving data quality. This study aimed to assess the Attitudes toward implementing electronic medical records and associated factors among health professional workers in selected public hospitals in Addis Ababa.

**Method:** An institution-based cross-sectional study was conducted on 422 health professionals in selected hospitals in Addis Ababa, Ethiopia, in 2023. The study participants were selected using a simple random sampling technique. A binary and multivariable logistic regression model was used to identify associated factors for electronic medical record implementation. A *p*-value < .05 was considered statistically significant.

**Result:** The overall electronic medical record implementation perceived as useful by health workers is 298 (73.6%), with an allocation of enough budget [AOR = 3.196 (1.49–6.735)] has no networking or problem with internet access [AOR = 1.794(1.089–2.954)]. Electronic medical record increases workload [AOR = 2.350 (1.302–4.243)], which was significantly associated with electronic medical record implementation.

**Conclusion and Recommendation:** According to this study, the overall perception of health professionals toward electronic medical record implementation was high. However, it would be better to build and establish strong internet connectivity and stable power supply or internet access without networking problems, allocate enough budget, and work in collaboration with hospitals and health bureaus to strengthen and support the electronic medical record in their facilities.

## Keywords

Attitude, electronic medical record, Ethiopia, implementation

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## Introduction

Information and communication technologies (ICT) are currently being used in developing and developed countries to improve health care, providing.<sup>1,2</sup> An electronic medical record (EMR) is the legal and longitudinal electronic record of patient health information that is created in digital format in hospitals.<sup>3,4</sup> It is a digitalized system for maintaining patient records that has become extensively employed worldwide.<sup>5,6</sup>

WHO described electronic medical records as a digital version of all the information typically found in a provider's

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paper chart: medical history, diagnoses, medications, immunization dates, allergies, lab results, and doctor's notes.<sup>7</sup> It is designed to manage both the distribution and processing of the information required for the care delivery process, including patient care records, demographics, and billing details in some systems.<sup>8–10</sup>

Electronic health records (EHRs) have become an integral part of modern healthcare since their initial mainstream implementation in the mid-late 2000's through the passing of the Health Information Technology for Economic and Clinical Health Act in the US and the National Health Service National Program for Information technologies in England.<sup>11,12</sup>

Information technology system initiatives in developing countries and electronic medical record systems are becoming dominant with the vision of improving data handling and communication in healthcare organizations.<sup>7,13</sup> Paper-based hospital record-keeping and workflows dependent on paper have proven to become more and more inefficient and are continuously failing to meet care providers' and patients' needs. Paper records were criticized for their limited accessibility and their general incompleteness.<sup>14,15</sup>

Healthcare stakeholders believe that the growing use of electronic medical records will eventually enhance the quality of medical care by reducing medical mistakes, minimizing duplication errors, reducing unnecessary diagnostic procedures, and making data collection easier.<sup>16,17</sup>

Several factors that influenced the success of health information systems were reported, including system quality attributes like ease of use, response time, and usability; information quality attributes like completeness, the accuracy of data, and legibility; Usage attributes like several entries, frequency of use, and duration of use User attributes like user satisfaction, attitude, and friendliness Individual impact attributes like changes to work patterns, documentation frequency, and time of day for documenting; and organizational impact attributes such as the impact on patient care, communication and collaboration, reduction of staff, and time-saving.<sup>18–20</sup>

Previous studies conducted in Ethiopia suggest that paper-based medical recording is the cause of several problems, tremendous errors, and an alliance for clinical decision-making time.<sup>21</sup> However, these studies were not comprehensive in that they did not adequately assess many factors that might predict electronic medical record implementation. In Ethiopia, the biggest challenges to implementing EMR were lack of funding, lack of capacity, infrastructure constraints, legal aspects, resistance to computer technology, computer systems literacy, strong resistance to change by many healthcare professionals, the issue of privacy and confidentiality, and inadequate knowledge and attitude of healthcare professionals on EMR implementation was the big challenge.<sup>4,9,12</sup>

Implementation of electronic medical records in Ethiopia will improve the quality of medical care, by providing a

variety of clinical services, such as test ordering, consultation, e-prescription, decision support system, digital imaging, and telemedicine, while protecting patient privacy and confidentiality. This prompted health administrators to develop a program to promote the Implementation of electronic medical records in the health care system in Ethiopia. Furthermore, the finding improves health care providers' knowledge in identifying factors affecting the Implementation of EMR and, helps to promote health research and even the practical aspect of the profession to provide evidence-based quality care and used as an input for future researchers.

## Methods

### Study setting

This study was conducted in the capital city, Addis Ababa, Ethiopia in public referral hospitals. The altitude of the city ranges from 2200 to 3000 m above sea level with an average temperature of 22.8 °C. According to the 2021 census, about 5,005,524 people live in the city.<sup>22</sup> At the time of this study, there were 13 public hospitals, 40 health centers, 122 health stations, 37 health posts, and 382 modern private clinics in Addis Ababa. The study was conducted in selected government hospitals in the city.

### Study design and period

A multicenter institution-based cross-sectional study was conducted in the capital city of Addis Ababa, Ethiopia, from April 15, 2023, to May 30, 2023.

### Source population and study population

**Source population.** The source of the population for this study was all health professionals who were workers in Addis Ababa Hospital.

**Study population.** Health professionals who worked at selected hospitals that implemented electronic medical records during the data collection period and who fulfilled the inclusion criteria.

### Inclusion and exclusion criteria

Health professionals who had adequate exposure to electronic medical record-keeping were included in the study. Health professionals who were unable to speak on the day of the interview were excluded from the study.

### Study variables

**Dependent variable.** Attitude toward implementation of electronic medical record

**Independent variables.** Sociodemographic characteristics:

- Age
- Sex
- Place of residence
- Marital status
- Occupation
- Level of education

### Sample size determination and sampling procedure

**Sample size determination.** For the first objective, a single population proportion formula was used to calculate the sample size by considering the following statistical assumptions:

$Z_{\alpha/2}$  = the corresponding Z score of 95% CI (confidence interval) = 1.96

$d$  = Margin of error (5%) = 0.05

$n$  = required sample size

$P$  = proportion the required sample size can be determined by using a single population formula response of (electronic medical record) EMR is 50% taken since no previous study.

Level of significance = 0.05

Marginal error ( $d$ ) = 5%

$n$  = sample size

$Z(\alpha/2)$  = Z-score at 95% confidence interval = 1.96

$Q = 1 - p$

Nonresponse rate = 10%

the formula for calculating ( $n$ ) is  $n = \frac{\frac{(z\alpha)^2 p(1-p)}{d^2}}{(0.05)^2}$

=  $(1.96) \times (1.96) \times 0.5(1 - 0.5) = 384$

So calculated is  $n = 384$

The sample size was 384 then after adding a 10% contingency rate the final sample size was 422.

**Sampling procedure.** The systematic random sampling technique was used to select study areas, and by using the lottery method, seven hospitals were selected, which are St Peter Hospital (SPH), Alert Hospital (AH), Saint Paul Hospital (SPH), Minilik Hospital (MH), Trunesh Beijing Hospital (TBH), Ras Desta Hospital (RDH), and Blackline (TH). After allocating a proportional sample size to each hospital, stratified random sampling was utilized to reach the final sample using a sampling frame containing the list of professionals in each professional category of each hospital.

### Data collection procedures and quality assurance

The checklist was adapted from the International Program on Electronic Medical Record Implementation Assessment Tool. Data was collected using a structured Likert scale questionnaire by trained data collectors. Health professionals at selected Addis Ababa hospitals were used to obtain the required data. The data captured includes sociodemographic characteristics.

Two days of training were given to three data collectors with an academic background of a BSC degree in nursing and one coordinator working in the hospital concerning the data collection tool and the data collection process before the actual data collection period. In addition, data quality was assured by designing a proper data abstraction tool. The data form was pretested on five percent of the sample size at Yekatit 12 Hospital to ensure the questions were balanced, correctly constructed, and could obtain crucial information. The adapted checklist was evaluated by experienced researchers and trained in electronic medical records. The principal investigator examined data completeness and consistency through spot checks and a review of the questionnaire. It was checked internally to be consistent with Cronbach's alpha coefficient.

### Data management and analysis

After the data were collected, each questionnaire was cleaned and coded separately using Epi-Info version 7, then exported to and analyzed by SPSS version 26 statistical software. The demographic details of the patients included in the analysis were described using simple descriptive statistics. Continuous variables were expressed as means and standard deviations, and categorical variables were expressed as frequency and percentages. The study's findings were presented in the form of text, tables, and graphics. The normality of the data was checked (Kolmogorov-Simonov test).

A binary logistic regression model with a 95% confidence interval was used to infer an association between treatment outcomes and associated factors. To control for possible confounders, a multivariable logistic regression analysis was performed. Multicollinearity among selected independent variables was checked by using the variance inflation factor. All the independent variables with a  $p$  value  $< .25$  in bi-variable analysis were included in multivariable analysis to identify predictors for EMR implementation. A  $p$ -value  $< .05$  was considered statistically significant. The assumption on the fitness of goodness: the final model was checked by the Hosmer and Lemeshow tests.

### Results

Overall, 422 respondents were expected, but only 405 study participants completed the questionnaire with a response rate of 96%. According to this study, the overall electronic medical record implementation perceived as useful by health workers is 298 (73.6%). Of the total respondents, 248 (61.2%) of the study participants were female. The participant's age was between 20 and 65 years, with a mean age of  $35 + 7.6$  SD years. The majority of the respondents, 171 (42.2%), were between the ages of 30 and 39, and some of them, 23 (5.6%), were over 50 years old. Regarding the marital status of participants, 172 (47.3%) were married,

104 (25.7%) were single, 65 (16.0%) were divorced, and 44 (10.9%) were widowed (Table 1).

### *Attitudes of health professionals toward electronic medical record implementation*

The attitude of respondents toward electronic medical record implementation was assessed. Out of the total participants, 405, 153 (37.8%) agree on supporting electronic medical record implementation, 139 (34.3%) strongly

agree to take EMR training to improve their performance, 118 (29.1%) respondents strongly agree internet access is helpful for electronic medical record practice, and 129 (31.9%) respondents agree that allocating budget is important for their electronic medical record implementation sustainability. 91 (22.5%) agree that making easy computer access in their working area was helpful for electronic medical record implementation; 108 (26.7%) respondents think the purpose of computer use is for reading; 120 (29.6%) think the purpose of computers is to use EMR data recording, as shown in Table 2.

**Table 1.** Sociodemographic characteristics of health professionals on electronic medical record implementation in Addis Ababa hospitals.

Variables	Variables categories	Frequency	Percentage (%)
Sex	Male	157	38.8
	Female	248	61.2
Marital status	Married	192	47.7
	Unmarried	104	25.7
	Divorced	65	16.0
	Widowed	44	10.9
Education	Degree	250	64.2
	MSC	94	23.2
	Above MSC	51	12.6
Age	20–29	129	31.9
	30–39	171	42.2
	40–49	82	20.2
	50–65	23	5.7
Occupation	General practitioner	66	16.3
	Nurse	125	30.9
	Pharmacy	40	9.9
	Midwife	60	14.8
	Laboratories'	49	12.1
	Anesthetist	38	9.4
	Public health	27	6.7
Managerial role of health professional	Yes	58	14.3
	No	347	85.7

**Table 2.** Attitudes of health professionals toward electronic medical record implementation.

Variables	Variables categories	Frequency	Percentage (%)
Support EMR Implementation	Strongly disagree	67	16.5
	Disagree	105	25.9
	Neutral	26	6.4
	Agree	153	37.8
	Strongly agree	54	13.3
Taking EMR Training helpful	Strongly disagree	76	18.8
	Disagree	128	31.7
	Neutral	32	7.9
	Agree	50	12.3
	Strongly agree	119	29.3
Internet access is helpful for EMR practice	Strongly disagree	61	15.1
	Disagree	100	24.7
	Neutral	44	10.9
	Agree	82	20.2
	Strongly agree	118	29.1
Allocating the budget is important for their EMR implementation	Strongly disagree	78	19.3
	Disagree	90	22.2
	Neutral	40	9.9
	Agree	129	31.9
	Strongly agree	68	16.8
Making easy Computer access in the working area helps full for EMR	Strongly disagree	70	17.3
	Disagree	87	21.5
	Neutral	60	14.8
	Agree	97	24
	Strongly agree	91	22.5
computer use reading on EMR implementation	Strongly disagree	56	13.8
	Disagree	99	24.4

(continued)

Table 2. Continued.

Variables	Variables categories	Frequency	Percentage (%)
	Neutral	47	11.6
	Agree	108	26.7
	Strongly agree	95	23.5
computer use EMR Data recording on EMR implementation	Strongly disagree	63	15.6
	Disagree	98	24.2
	Neutral	37	9.1
	Agree	120	29.6
	Strongly agree	87	21.5
computer use Report preparation on EMR implementation	Strongly disagree	68	16.8
	Disagree	92	22.7
	Neutral	65	16
	Agree	86	21.2
	Strongly agree	94	23.2
computer use video Accessing	Strongly disagree	69	17
	Disagree	82	20.2
	Neutral	51	12.6
	Agree	120	29.6
	Strongly agree	83	20.5
computer use for Internet accessing	Strongly disagree	71	17.5
	Disagree	66	16.3
	Neutral	62	15.3
	Agree	129	31.9
	Strongly agree	77	19
Delegating Responsible person for EMR:	Strongly disagree	75	18.5
	Disagree	88	21.7
	Neutral	39	9.6
	Agree	131	32.3

(continued)

Table 2. Continued.

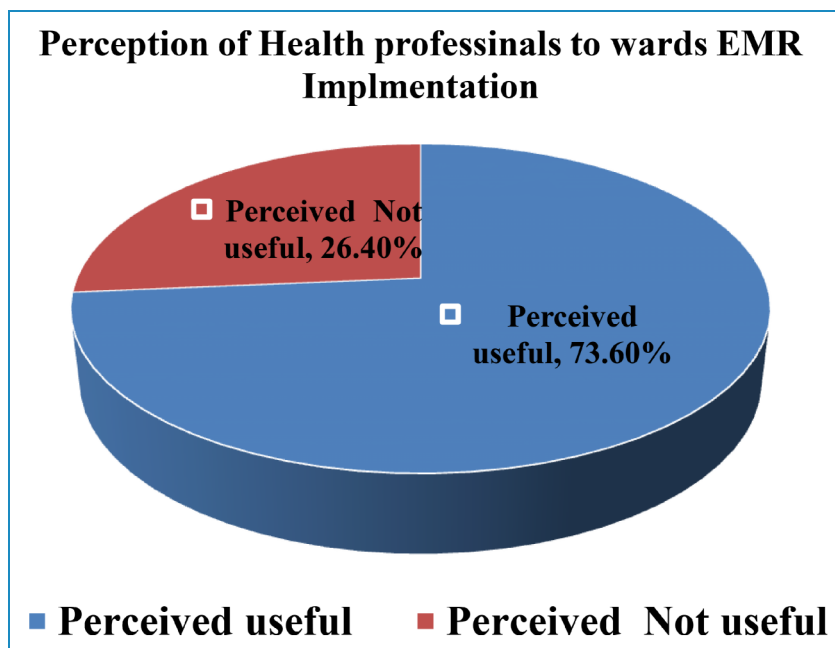
Variables	Variables categories	Frequency	Percentage (%)
ICT center for computer maintenance always needs:	Strongly agree	72	17.8
	Strongly disagree	70	17.3
	Disagree	84	20.7
	Neutral	58	14.3
	Agree	98	24.2
Involve HP In EMR activities helpful for EMR implementation	Strongly agree	95	23.5
	Strongly disagree	69	17
	Disagree	67	16.5
	Neutral	65	16
	Agree	140	34.6
Helpful Internet access at the workplace	Strongly agree	64	15.8
	Strongly disagree	72	17.8
	Disagree	89	22.0
	Neutral	34	8.4
	Agree	121	29.9
Raise EMR issues during the meeting	Strongly agree	89	22.0
	Strongly disagree	73	18.0
	Disagree	72	17.8
	Neutral	50	12.3
	Agree	136	33.6
	Strongly agree	74	18.3

Of the total respondents, Perception of health professionals toward electronic medical record implementation was 298(73.6%) perceived electronic medical record implementation as useful but 107(26.4%) perceived electronic medical record implementation as Not useful (Figure 1).

### Perception of health professionals toward electronic medical record implementation used

*Technology-related variables of health professionals.* Of the total respondents, 270 (66.6%) of respondents do not

know electronic medical record implementation. Of the total respondents 364(89.9%) of respondents have not taken EMR Training, and 84(20.7%) of respondents think the purpose of EMR on computers used for reading patient data. Of the total respondents, 76(18.8%) of respondents used it for recording patient data, 101(24.9%) respondents reported the preparation of patient data, 57(14.1) respondents believed EMR was used for video Accessing patient data 87(21.5%) respondents believed EMR was used internet access to know patient data, 284(70.1%) respondents have no Computer literacy, 281(69.4%) respondents has no previous EMR experience 291



**Figure 1.** Perception of health professionals toward electronic medical record implementation used in a selected hospital, Addis Ababa, Ethiopia 2023.

(71.9%) has no IT-related experience and prefer EMR than paper-based as shown below (Table 3).

#### *Attitudes of health professionals toward electronic medical record on organizational implementation*

The attitude-related 54 (13.3%) of respondents strongly support electronic medical record implementation, and 66 (16.2%) of respondents strongly believe Internet access is helpful for electronic medical record implementation. 120 (29.6%) health professionals agree on computer use for electronic medical records. Data recording on electronic medical record implementation 131 (32.3%) of health professionals agree that delegating a responsible person for electronic medical record implementation is helpful. 95 (23.4%) of health professionals strongly agree that ICT centers for computer maintenance are always needed, and 140 (34.5%) of health professionals agree with Involve HP. In electronic medical record activities helpful for electronic medical record implementation, 74 (18.2%) of health professionals strongly agree on raising electronic medical record issues during meetings, as shown below (Table 4).

#### *Multivariable analysis of factors affecting EMR implementation of respondents*

In the multivariable logistic regression model, allocation of enough budget, good internet connectivity, and perception of increased workload were significantly associated with the implementation of EMR ( $<0.05$ ). The result of the

multivariable analysis revealed that health professionals who allocated enough budget were 3.196 times more likely to implement EMR as compared to those who did not [AOR = 3.196 (1.49–6.735)]. The odds of health professionals who have good internet connectivity and unstable power supply were 1.794 times higher than those who had a networking problem [AOR = 1.794 (1.089–2.954)]. The odds of health professionals who believed electronic medical recording increased their workload were 2.35 [AOR = 2.350 (1.302–4.243)] times more likely to delay or lag compared to those who did not perceive electronic medical records (Table 5).

#### **Discussion**

This study would provide vital information regarding the implementation of health professionals' attitudes toward electronic medical records and factors affecting electronic medical record implementation, as can be seen from the results of this study. Electronic medical record implementation in different hospitals was interrupted due to a networking system and a lack of budget, and most health professionals around 330 (81.5%) believed electronic medical record implementation increased workload.

A total of 405 health professionals responded to electronic medical record implementation, resulting in a non-respondent rate of 4%. According to this study, the overall perception of electronic medical record implementation as Not useful was 107 (26.4%). This may suggest an inadequate awareness of the technology adoption model.



**Table 3.** Technological factors of respondents toward electronic medical record.

Variable	Variable category	Frequency	Percentage (%)
knowledge about EMR	Yes	135	33.3
	no	270	66.6
Refreshment training on EMR	Yes	41	10.1
	no	364	89.9
Purpose of computer use	reading	84	20.7
	for Data recording	76	18.8
	Report preparation	101	24.9
	video Accessing	57	14.1
	internet accessing	87	21.5
Computer literacy	Yes	284	70.1
	no	121	29.9
previous EMR experience	Yes	281	69.4
	no	124	30.6
Enough budget allocated for EMR	Yes	36	8,9
	no	369	91.1
EMR System worked without the problem of network	Yes	132	32.6
	no	273	67.4
Having IT-related experience	Yes	291	71.9
	no	124	28.1
Prefer EMR to paper-based	Yes	255	63.0
	no	150	37.0
If yes, Reason for preferring EMR	EMR is time-saving	53	20.7
	Store more data	39	15.2
	Easy to access data	36	14.1
	Easy to write report	27	10.8
	More secured	100	39.2
If no, Reason for not preferring EMR	EMR is time-consuming	46	30.8

(continued)

Table 3. Continued.

Variable	Variable category	Frequency	Percentage (%)
	EMR is difficult to use	43	28.6
	Needs computer skills	36	24
	Is electric dependent	25	16.6

Table 4. Attitudes of respondents toward EMR implementation.

Variables	Variables categories	EMR Implementation	
		Perceived useful	perceived not useful
Support EMR implementation	Strongly disagree	56	11
	Disagree	72	33
	Neutral	17	9
	Agree	112	41
	Strongly agree	41	13
Internet access is helpful for EMR practice	Strongly disagree	42	19
	Disagree	70	30
	Neutral	14	14
	Agree	11	11
	Strongly agree	33	33
Allocating the budget is important for their EMR implementation	Strongly disagree	54	24
	Disagree	71	19
	Neutral	31	9
	Agree	90	39
	Strongly agree	52	16
Making easy Computer access in the working area helps full for EMR	Strongly disagree	50	20
	Disagree	62	25
	Neutral	38	22
	Agree	72	25
	Strongly agree	76	15

(continued)

Table 4. Continued.

Variables	Variables categories	EMR Implementation	
		Perceived useful	perceived not useful
Computer use reading on EMR implementation	Strongly disagree	45	11
	Disagree	65	34
	Neutral	25	22
	Agree	90	18
	Strongly agree	73	22
Computer use EMR Data recording on EMR implementation	Strongly disagree	47	16
	Disagree	71	27
	Neutral	24	13
	Agree	97	23
	Strongly agree	59	28
Computer use Report preparation on EMR implementation	Strongly disagree	14	54
	Disagree	29	63
	Neutral	11	54
	Agree	25	61
	Strongly agree	28	66
Computer use video Accessing	Strongly disagree	48	21
	Disagree	65	17
	Neutral	35	16
	Agree	89	31
	Strongly agree	61	61
			22
Computer use for Internet accessing	Strongly disagree	57	14
	Disagree	49	17
	Neutral	40	22
	Agree	93	36
	Strongly agree	59	18

(continued)

Table 4. Continued.

Variables	Variables categories	EMR Implementation	
		Perceived useful	perceived not useful
Delegating Responsible person for EMR:	Strongly disagree	52	23
	Disagree	66	22
	Neutral	28	11
	Agree	104	27
	Strongly agree	48	24
ICT center for computer maintenance always needs:	Strongly disagree	51	19
	Disagree	62	22
	Neutral	38	20
	Agree	71	27
	Strongly agree	76	19
Involve HP In EMR activities helpful for EMR implementation	Strongly disagree	42	27
	Disagree	42	25
	Neutral	49	16
	Agree	113	27
	Strongly agree	52	12
Helpful Internet access at the workplace	Strongly disagree	55	17
	Disagree	66	23
	Neutral	231	13
	Agree	86	35
	Strongly agree	70	19
Raise EMR issues during the meeting	Strongly disagree	57	16
	Disagree	56	16
	Neutral	36	14
	Agree	100	36
	Strongly agree	49	25

**Table 5.** Multivariable analysis of factors affecting electronic medical record implementation in selected Hospital Addis Ababa Ethiopia, 2023.

Variables	Variables Categories	Chi-square	Crude OR (95%CI)	p-Value	Adjusted OR (95%CI)	p-Value
Enough budget allocated	Yes	0.001	0.325(0.157–0.672) *	.002	<b>3.196(1.495–6.835)</b> *	.003
	no					
EMR increases workload	Yes	0.000	0.458(0.262–0.800) *	.006	<b>2.350(1.302–4.243)</b> *	.05
	No					
Internet Access worked with no network problem	Yes	0.002	0.576(0.328–1.013) *	.011	<b>1.794(1.089–2.954)</b> *	.022
	no					

Note: \*means p-value < .05; CI means confidence interval.

The study conducted at the Breast Cancer Institute revealed that there was a significant statistical relationship between technological and organizational factors and existing electronic medical record levels. Inadequate and non-functional electronic medical record-related infrastructure, weak internet connectivity, and unstable power supply were the key technological factors, while lack of adequate financial resources, inadequate training support by the hospital management, inadequate technical expertise, non-user involvement, and a lack of harmonized standard legal enforcement were the major organizational factors that contributed to the low rate of electronic health record (EHR) adoption. Individual factors had the least influence on the low rate of adoption.<sup>23,24</sup>

This study revealed that 153(37.8%) had a good attitude toward EMR implementation. This finding is lower than the studies done in the USA, with 97%,<sup>25</sup> Saudi 70%,<sup>26</sup> and South Africa 67.2%.<sup>27</sup> This inconsistency might be due to a difference between those who are working in high-resource countries and those who have computer experience in their day-to-day life might understand the relative advantage of electronic medical record systems in health care.

In this study, the attitude toward EMR implementation was lower than when compared with studies done in our country like studies done in Northern Ethiopia, with 50.6%,<sup>21</sup> Amhara region hospitals 58.3%,<sup>19</sup> and Eastern Ethiopia 72.8%.<sup>28</sup> A possible cause for these variations could be due to differences in the setting area, and the sampling techniques used difference.

In this study, the perception of health professionals toward Electronic medical record implementation was 298(73.6%) higher compared with other studies done in Gondar University Hospital (54.0%),<sup>17</sup> a study done in Malawi 71%,<sup>29</sup> and a study done in Southeast Iran 64.7%.<sup>30</sup> But when we compared the study done in Norway 81%<sup>31</sup> it was lower than with this study. This

variation might be due to differences in infrastructure, computer literacy, computer access, resource allocation, management support, internet access and personal initiation variation in different setting areas.

The odds of health professionals who worked for a budget-allocated organization had a 3.196 times higher likelihood of implementing electronic medical records as compared to those who did not [AOR = 3.196 (1.49–6.735)]. The odds of health professionals who had good internet connectivity, stable power supply, or internet access or worked without a networking problem were 1.794 times higher than those of health professionals who had a networking problem or a problem with internet access [AOR = 1.794 (1.089–2.954)]. Poor network infrastructure and hardware/software-related issues were challenges that contributed to EMR system failure at Addis Ababa hospitals, as the data attested to the above results or became significant. The ICT system is found to be the most piercing challenge. ICT infrastructure, due to a lack of budget availability of equipment, and incentive mechanisms were mentioned as significant problems.

### Conclusion and recommendation

According to this study, the overall perception of health professionals toward electronic medical record implementation was high. It would be better to build and establish strong internet connectivity and stable power supply or internet access without networking problems, allocate enough budget, and work in collaboration with hospitals and health bureaus to strengthen and support the EMR in their facilities.

### Strength and limitation of the study

The strength of our study was multicenter data collection, so this was used for generalization of the results, which would be helpful as a baseline for future researchers.

The limitations of this study were that it was limited to assessing factors affecting electromechanical recording factors and their implementation in Addis Ababa private hospitals and health centers. It did not include in this study private hospitals and health centers. After all, there are many health centers and privately owned hospitals that the principal investigator could afford to study because the principal investigator has a shortage of budget. After all, it needs more money to collect data from these hospitals. Due to their number in this study, it was not easy to undertake such a large task within the period and budget available for the investigator.

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## Acronyms and abbreviations

AOR	adjusted odds ratio
BSC	Bachelor of Science
CI	confidence interval
COR	crude odds ratio
EHRs	electronic health records
EMR	electronic medical record
HMIS	health management information system
HP	health professionals
Lab	laboratory
PBHR	paper-based health recording
I	principal investigator
SDG	sustainable development goal
SPSS	statistical package for social science
VIF	variance inflation factor
WHO	World Health Organization.

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