



Knowledge and Attitude Towards ICT Among Medical Record Unit Workers, Northwest Ethiopia, 2018: Institutional Based Cross-Sectional Study

Maru Meseret^{1,*}, Mihret Tesfu², Mulunesh Alemayehu², Yihalem Abebe²

¹Department of Health Informatics, College of Health Science, Debre Markos University, Debre Markos, Ethiopia

²Department of Public Health, College of Health Science, Debre Markos University, Debre Markos, Ethiopia

Email address:

marumeseret@gmail.com (M. Meseret), mercytes3@gmail.com (M. Tesfu), mulu2019@gmail.com (M. Alemayehu),

yih2000ho@gmail.com (Y. Abebe)

*Corresponding author

To cite this article:

Maru Meseret, Mihret Tesfu, Mulunesh Alemayehu, Yihalem Abebe. Knowledge and Attitude Towards ICT Among Medical Record Unit Workers, Northwest Ethiopia, 2018: *Institutional Based Cross-Sectional Study*. *International Journal of Wireless Communications and Mobile Computing*. Vol. 8, No. 1, 2020, pp. 1-8. doi: 10.11648/j.wcmc.20200801.11

Received: March 30, 2020; Accepted: April 14, 2020; Published: May 14, 2020

Abstract: Background: - In Ethiopian medical care system, medical record unit is an entry to medical care services which is 100% run by non-medical health care workers. Therefore, looking at their knowledge and attitude towards ICT as a pre-requisite to electronic medical record system is mandatory. Methods: Institutional based cross-sectional study design was conducted from November 15, 2017 to 30, and 2017 G. C. Descriptive statistics like frequency tables and percentages were used to present descriptive data. At bivariable analysis, the effect of each independent variable was tested at individual level holding other variables constant against the dependent variable. Finally, variables with p-value<0.2 were taken to multivariate analysis and existence of association was declared for variables with p-value<0.05 at 95% confidence interval. Result: A total of 261 study participants were involved in the study with a response rate of 91.3%. The mean age of the participants was 26 (SD=±6.8) and 111 (42.5%) of their age group was ≤25 years of old. Of all the study participants, 169 (64.8%) of them had adequate knowledge. However, only 141 (54%) of the study participants had favorable attitude towards ICT. At multivariate analysis only residence (AOR=2.56, 95% CI [1.28, 5.10]), workload (AOR=3.67, 95% CI [1.92, 7.00]) and basic computer training (AOR=14.5, 95% CI [6.82, 30.9]) were identified as factors affecting knowledge towards ICT while residence (AOR=7.04, 95% CI [3.5, 14.17]), experience (AOR=1.99, 95% CI [1.06, 3.72]), workload (AOR=2.84, 95% CI [1.5, 5.38]) and availability of a computer (AOR=9.16, 95% CI [4.17, 20.11]) were factors affecting attitude towards ICT. Conclusion and recommendations: The level of knowledge and attitude towards ICT among non-health care provider medical unit workers was very low as per expectations and compared to literatures reviewed in this research. Recruiting additional medical record unit workers, giving training, availing computer, creating a mechanism experience sharing and on job training were recommended to improve the problem.

Keywords: Knowledge, Attitude, ICT, Associated Factors, Ethiopia

1. Background

The use of ICT involves computational technology and internet use to access, store, transmit, and manipulate information [1]. World health organization (WHO) pinpoints that the integration of computer and information science to health care can bring a number of desired health outcomes. For instance, it can enable health providers make better decisions, health facilities provide quality and safer care,

make governments responsive to public health needs and policy makers and the public aware of health risks [2].

With the intensive advance of ICT over the past two decades specifically in health care environment, many innovative approaches in the health sector are being created throughout the world such as electronic health record/electronic medical record (EMR/EHR), telemedicine and etc. [3].

EMR is a digital version of a patient's medical history [4].

The electronic health record includes all information contained in a traditional health record including a patient's health profile, behavioral and environmental information. As well as content the EMR also includes the dimension of time, which allows for the inclusion of information across multiple episodes and providers, which will ultimately evolve into a lifetime record [5, 6].

In Ethiopia though the use of EMR has been started in partnership with Tulane University and Center for disease control (CDC) some years ago, it has not achieved as per the expectations. Many reasons can be given to poor use of EMR but the main ones are related to poor infrastructure, skill gap, poor investment on EMR and etc. [7].

To narrow this gap, Ethiopian ministry of health has declared information revolution as part of health sector transformation plan. Digitalization and scale-up of priority health information system (HIS) is one of the two pillars in information revolution [8].

Hence, digitalization in health care settings starts at patient entry i.e. medical record unit to capture basic social and demographic data. Medical recording units are also used to store electronic medical data coming from different departments in the facility forever and accesses when needed.

Parallel to digitalization, there has to be skilled, competent and passionate medical record unit workers. As to our experience for the last 10 years in Ethiopian health sector, employees working at medical record units are less educated, unprivileged and sometimes demotioned from other departments due to misbehavior. Therefore, the aim of this research was to assess the magnitude of knowledge and attitude towards ICT and its associated factors among medical record unit workers.

2. Methods

Study design: Institutional based cross-sectional study design was conducted from November 15, 2017 to 30, 2017 G. C.

Study area: The study was conducted in East Gojjam Zone, Amhara national regional state, Ethiopia. East Gojjam zone is one of the eleven regional administrative zones in the region. The zone is bordered by South Gondar zone in the north, Oromia region in the south, South Wollo zone in the east and West Gojjam zone in the west. In the administrative zone, there are eighteen districts and two town administrations with a total of 2,632,632 inhabitants. Within this administrative zone, there were 9 hospitals (1 referral hospital and 8 primary hospitals) and 102 health centers. According to the structure of health facilities, a referral hospital, primary hospital and a health center are expected to have 13, 4 and 3 medical record unit workers respectively. However, during the study period a total of 286 medical record unit workers were on duty in the zone.

Source population: The source population for this study was all employees working in a medical record unit. However, all employees working in a medical record unit selected to participate in the study in the administrative zone were considered as a study population.

2.1. Inclusion and Exclusion Criteria

Medical record unit workers who had been working for more than six months in medical record units of public hospitals and health centers were included in the study. However, those hospital and health center medical record unit workers who were at annual leave, absent from work for unknown reasons and sick during data collection were excluded from the study.

2.2. Sample Size Determination and Sampling Procedure

The maximum sample size calculated using single population proportion formula for this research was 423 but the total medical record unit workers in the administrative zone were only 286. Therefore, all medical record unit workers meeting eligibility criteria were included in the study.

2.3. Measurements and Definitions

Knowledge of medical record unit workers towards ICT was categorized as adequate and inadequate. A) Those study participants who scored above the mean value to a given questions were considered as having adequate knowledge where as those who scored less than or equal to the mean value were considered as having inadequate knowledge. Regarding attitude, participants view was assessed by likert scale questions ranging from strongly disagree to strongly agree. Finally, attitude of medical record unit workers towards ICT was dichotomized into favorable and unfavorable. B) Those study participants who scored above the mean value to a given questions were considered as having favorable attitude while those who scored less than or equal to the mean value were considered as having unfavorable attitude. C) Computer literacy was also assessed. A medical record unit worker was considered as computer literate if he/she was able to work on at least two application soft wares (Microsoft Word, Microsoft Excel, Microsoft PowerPoint, Microsoft Access and Database design using Microsoft Access).

Data were also collected on age, gender, residence, educational status, marital status, religion, salary, individual characteristics including experience, computer literacy, job satisfaction, drinking status, smoking status, Kchat chewing and institutional factors including workload, availability of computer, availability of printer, photocopy, cellphone, training, access to internet, availability of electricity, staff motivation.

2.4. Data Collection and Quality Assurance

Data were collected from the study population using a structured self-administered questionnaire and observational checklist in local language by trained data collectors. The questionnaire was prepared first in English and translated back to Amharic for ease of understanding but the checklist was prepared in English. The data were collected by ten health informatics technicians working in other district of

data collection and close supervision during data collection was done by principal investigators. Training was given to data collectors and properly designed and pre tested questionnaire was used to prevent any confusion and would have a common understanding about the study. The questionnaire was pre tested on 5% of study population to avoid uncertainty prior to actual data collection. The pilot area was Dembecha district. The filled questionnaire was checked for completeness by data collectors and principal investigators on daily basis. Consequently, problems were discussed and solved immediately.

2.5. Data Analysis and Ethical Approval

The collected data were entered and cleaned using Epi data version 3.1. After that it was exported to SPSS version 20 for analysis. Descriptive statistics like frequency tables and percentages were used to present descriptive data. At bivariable analysis, the effect of each independent variable was tested at individual level holding other variables constant against the dependent variable. Finally those variables with p-value less than 0.2 at bivariable analysis were further taken into multivariate logistic regression to see their adjusted effects on the dependent variables. P-value below 0.05 in multivariate analysis was used to declare existence of association at 95% confidence interval.

The ethical approval and clearance for this study was obtained from Debre Markos University College of medicine and health science institutional research ethics review committee. At all levels officials were contacted and permission from administrators was secured. All necessary explanations about purpose of the study and its procedures were explained with the assurance of confidentiality. Consent from the study participants was obtained.

3. Result

Socio-demographic determinants of knowledge towards ICT

A total of 261 study participants were involved in the study with a response rate of 91.3%. The mean age of the participants was 26 (SD=±6.8) and 111 (42.5%) of their age group was ≤25 years of old. Majority (65.9%) and (62.5%) of the study participants were female and rural residents respectively. More than half (57.5%) of them were married while almost all (97.7%) of them were orthodox in religion. Regarding educational status and salary, 174 (66.7%) and 183 (70.1%) of the study participants were diploma holders and earning above 2103.00 Ethiopian birr per month respectively (Table 1).

Table 1. Socio-demographic determinants of knowledge and attitude towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Characteristics	Frequency	%
Place of residence		
Rural	163	62.5
Urban	98	37.5

Characteristics	Frequency	%
Sex of respondents		
Male	89	34.1
Female	172	65.9
Age of respondents		
≤25 years of old	111	42.5
26-29 years of old	72	27.6
≥30 years of old	78	29.9
Marital status of respondents		
Single	96	36.8
Married	150	57.5
Widowed	6	2.3
Divorced	9	3.4
Religion of respondents		
Orthodox	255	97.7
Muslim	6	2.3
Educational status of respondents		
Senior secondary school (9-12 th)	42	16.1
Certificate	33	12.6
Diploma	174	66.7
Degree	12	4.6
Monthly salary of respondents		
≤2103 ETB	78	29.9
>2103 ETB	183	70.1

Individual determinants of knowledge and attitude towards ICT

Out of the total study participants, 139 (53.3%), 186 (71.3%) and 162 (62.1%) of them had ≥4 years' work experience, computer literate and satisfied with their job respectively.

Observational checklist was used to assess computer literacy. Hence, out of the total study participants 198 (75.9%), 174 (66.7%) and 143 (54.8%) of them were able to work on Microsoft word, excel and PowerPoint respectively. However, none of them were able to work on Microsoft access and any database design using MS access.

Among the study participants, none of them were smoking cigarette and chewing Kchat. However, 27 (10.3%) of them were drinking alcohol. Of those study participants who were smoking cigarette, 18 (66.7%) were drinking alcohol once a week (Table 2).

Table 2. Individual determinants of knowledge and attitude towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Characteristics	Frequency	%
Experience of the study participants		
≤ 3 years	122	46.7
>3 years	139	53.3
Computer literate		
No	75	28.7
Yes	186	71.3
Job satisfaction		
No	99	37.9
Yes	162	62.1
Alcohol drinking		
No	234	89.7
Yes	27	10.3
Frequency of alcohol drinking (n=27)		
Once a week	18	66.7
Twice a week	3	11.1
More than twice a week	6	22.2

Institutional determinants of knowledge and attitude towards ICT

Among all study participants, 188 (72%) of them had access to computer/s/. Of those who had access to computer (s), 12 (6.4%) of them had personal computer. Moreover, 240 (92%) of them had personal cellphone.

Of all study participants, 48 (18.4%), 21 (8%) and 15 (5.7%) of them were working in facilities having printer, photocopy machine and internet connections respectively. However, 195 (74.7%) of them were working in facilities with electricity access and 197 (75.5%) of them had basic computer training (Table 3).

Table 3. Institutional determinants of knowledge and attitude towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Characteristics	Frequency	%
Workload		
≤99 patients per day	147	56.3
>99 patients per day	114	43.7
Availability of computer		
No	73	28
Yes	188	72
Availability of personal computer (n=188)		
No	176	93.6
Yes	12	6.4
Personal cell phone		
No	21	8
Yes	240	92
Availability of a printer		
No	213	81.6
Yes	48	18.4
Availability of photocopy machine		
No	240	92
Yes	21	8
Basic computer training		
No	64	24.5
Yes	197	75.5
Availability of internet in the office		
No	246	94.3
Yes	15	5.7
Availability of electricity in the office		
No	66	25.3
Yes	195	74.7
Availability of motivation mechanism in the institution		
No	198	75.9
Yes	63	24.1

Knowledge towards ICT

Twelve questions were employed to assess the level of knowledge towards ICT among medical record unit workers. Of the total study participants, 201 (77%), 197 (75.5%) and 164 (62.8%) were able to open the computer by themselves, taken basic computer training and able to write both in Amharic and in English using a computer respectively.

Similarly, 198 (75.9%), 174 (66.7%) and 143 (54.8%) were able to work with MS word, MS excel and MS PowerPoint respectively. Moreover, 157 (60.2%), 142 (54.4%) and 9 (3.4%) had taken SmartCare training in their lifetime able to register patient profile on a SmartCare and load any software on a computer respectively.

Majority (87.7%) of the study participants had Facebook

account but only 181 (69.3%) of them had personal email account and 191 (73.2%) of them were able to search an internet (Table 4).

Table 4. Characteristics of knowledge towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Characteristics	Frequency	%
Able to open the computer		
No	60	23
Yes	201	77
Taken basic computer training		
No	64	24.5
Yes	197	75.5
Able to write both in Amharic and English		
No	97	37.2
Yes	164	62.8
Able to work with MS word		
No	63	24.1
Yes	198	75.9
Able to work with MS excel		
No	87	33.3
Yes	174	66.7
Able to work with MS PowerPoint		
No	118	45.2
Yes	143	54.8
SmartCare training in lifetime		
No	104	39.8
Yes	157	60.2
Able to register patient profile using SmartCare		
No	119	45.6
Yes	142	54.4
Able to load any software on a computer		
No	252	96.6
Yes	9	3.4
Facebook account		
No	32	12.3
Yes	229	87.7
Personal email account		
No	80	30.7
Yes	181	69.3
Able to search the internet		
No	70	26.8
Yes	191	73.2

Of all the study participants, 169 (64.8%) of the study participants had adequate knowledge (Figure 1).

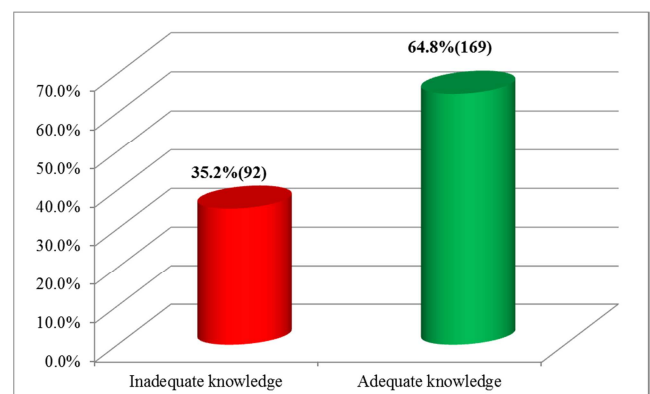


Figure 1. Level of knowledge towards ICT among medical record unit workers in East Gojjam Zone health facilities, 2017/18.

Attitude towards ICT

Thirteen questions were employed to assess the level of attitude towards ICT among medical record unit workers. Of the total study participants, 141 (54%), 156 (59.8%) and 162 (62.1%) strongly agree that using ICT enabled them accomplish registration task more quickly, improved the

quality of registration work they did and made them do their registration work easily respectively.

However, 104 (39.8%) and 97 (37.2%) of the study participants disagreed that Learning to operate ICT was easier for them and using ICT did not often frustrate them respectively (Table 5).

Table 5. Characteristics of attitude towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Characteristics	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Using ICT enables me accomplish registration task more quickly	3 (1.2%)	3 (1.2%)	9 (3.4%)	105 (40.2%)	141 (54%)
Using ICT improves the quality of registration work I do	3 (1.2%)	3 (1.2%)	3 (1.2%)	96 (36.8%)	156 (59.8%)
Using ICT make me do my registration work easily	9 (3.4%)	3 (1.2%)	3 (1.2%)	84 (32.2%)	162 (62.1%)
Using ICT make me improve my job performance	0	9 (1.2%)	0	117 (44.8%)	135 (51.7%)
Using ICT gives me greater control over my work	0	6 (2.3%)	9 (3.4%)	89 (34.1%)	157 (60.2%)
Using ICT increases my work productivity	9 (3.4%)	3 (1.2%)	5 (1.9%)	93 (35.6%)	151 (57.9%)
Using ICT is compatible with all aspects of my work	9 (3.4%)	15 (5.8%)	21 (8%)	106 (40.6%)	110 (42.2%)
I think ICT I used fits well with the way I like to work	3 (1.2%)	21 (8.1%)	22 (8.4%)	113 (43.3%)	102 (39%)
Using ICT does not require a lot of mental effort	0	45 (17.2%)	27 (10.3%)	80 (30.7%)	109 (41.8%)
Using ICT does not often frustrate me	106 (40.6%)	97 (37.2%)	21 (8.1%)	27 (10.3%)	10 (3.8%)
Learning to operate ICT is easier for me	83 (31.8%)	104 (39.8%)	30 (11.5%)	24 (9.2%)	20 (7.7%)
ICT is very feasible in the institution where I work	20 (7.7%)	93 (35.6%)	21 (8%)	49 (18.8%)	78 (29.9%)
It is not difficult to use ICT	68 (26%)	37 (14.2%)	28 (10.7%)	54 (20.7%)	74 (28.4%)

In this research, overall favorable attitude status was found to be 54% (Figure 2).

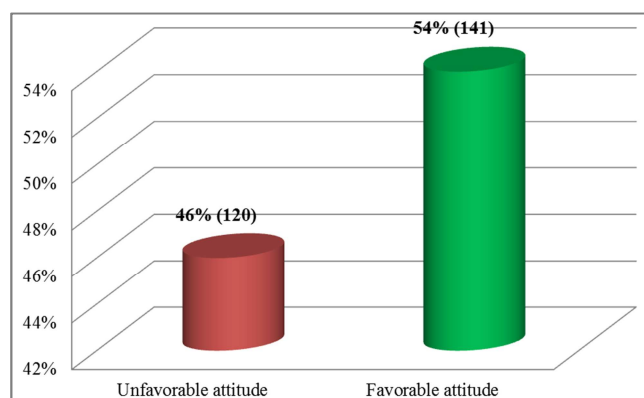


Figure 2. Level of attitude towards ICT among medical record unit workers in East Gojjam Zone health facilities, 2017/18.

Determinants of knowledge towards ICT

At bivariate analysis, the effect of all independent variables was tested at individual level holding other variables constant against the dependent variable. However, only variables such as residence (COR=3.09, 95% CI [1.73,

5.51]), experience (COR=1.85, 95%CI [1.10, 3.11]), workload (COR=2.98, 95% CI [1.76, 5.04]), availability of the computer (COR=3.44, 95% CI [1.96, 6.04]) and basic computer training (COR=13.2, 95% CI [6.65, 26.11]) met the eligibility criteria.

However, at multivariate analysis only residence (AOR=2.56, 95% CI [1.28, 5.10]), workload (AOR=3.67, 95% CI [1.92, 7.00]) and basic computer training (AOR=14.5, 95% CI [6.82, 30.9]) were significant at p-value <0.05 with 95% confidence interval (Table 6).

Medical record unit workers working in urban health facilities were 2.56 times more likely to have adequate knowledge towards ICT compared to rural (AOR=2.56, 95% CI [1.28, 5.10]) while medical record unit workers who were serving ≤99 patients per day were 3.67 times more likely to have adequate knowledge towards ICT compared to those who served >99 patients per day (AOR=3.67, 95% CI [1.92, 7.00]). Moreover, medical record unit workers who had basic computer training were 14.5 times more likely to have adequate knowledge towards ICT compared to those who didn't have basic computer training (AOR=14.5, 95% CI [6.82, 30.9]).

Table 6. Determinants of knowledge towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Variable	Knowledge status		COR with 95% CI	AOR with 95% CI
	Adequate	Inadequate		
Residence				
Rural	91	72	1	1
Urban	78	20	3.09 [1.73, 5.51]	2.56 [1.28, 5.10]*
Experience				
≤3 years	88	34	1.85 [1.10, 3.11]	1.79 [0.94, 3.40]
>3 years	81	58	1	1
Workload				
≤99 patients per day	111	36	2.98 [1.76, 5.04]	3.67 [1.92, 7.00]*
>99 patients per day	58	56	1	1
computer available				
No	32	41	1	1

Variable	Knowledge status		COR with 95% CI	AOR with 95% CI
	Adequate	Inadequate		
Yes	137	51	3.44 [1.96, 6.04]	1.48 [0.72, 3.06]
Taken basic computer training				
No	14	50	1	1
Yes	155	42	13.2 [6.65, 26.11]	14.5 [6.82, 30.9]*

*Significant at p-value <0.05.

Determinants of attitude towards ICT

At bivariate analysis, the effect of all independent variables was tested at individual level holding other variables constant against the dependent variable. However, only variables such as residence (COR=9, 95% CI [4.84, 16.86]), experience (COR=2.28, 95%CI [1.38, 3.76]), workload (COR=2.53, 95% CI [1.53, 4.18]), availability of the computer (COR=12.6, 95% CI [6.2, 25.75]) and basic computer training (COR=2.23, 95% CI [1.26, 3.98]) met the eligibility criteria.

However, at multivariate analysis only residence (AOR=7.04, 95% CI [3.5, 14.17]), experience (AOR=1.99, 95% CI [1.06, 3.72]), workload (AOR=2.84, 95% CI [1.5, 5.38]) and availability of a computer (AOR=9.16, 95% CI [4.17, 20.11]) were significant at p-value <0.05 with 95% confidence interval (Table 7).

Medical record unit workers working in urban health facilities were 7.04 times more likely to have adequate knowledge towards ICT compared to rural (AOR=7.04, 95% CI [3.5, 14.17]) while medical record unit workers who were serving ≤99 patients per day were 2.84 times more likely to have adequate knowledge towards ICT compared to those who served >99 patients per day (AOR=2.84, 95% CI [1.5, 5.38]). Moreover, medical record unit workers who had access to computer were 9.16 times more likely to have adequate knowledge towards ICT compared to those who didn't have access to computer (AOR=9.16, 95% CI [4.17, 20.11]) and medical record unit workers who served ≤3 years were 1.99 times more likely to have adequate knowledge towards ICT compared to those who served >3 years (AOR=1.99, 95% CI [1.06, 3.72]).

Table 7. Determinants of attitude towards ICT among medical record unit workers in East Gojjam Zone, Amhara region, Ethiopia, 2017/18 (N=261).

Variable	Attitude status		COR with 95% CI	AOR with 95% CI
	Favourable	Unfavourable		
Residence				
Rural	59	104	1	1
Urban	82	16	9 [4.84, 16.86]	7.04 [3.5, 14.17]*
Experience				
≤3 years	79	43	2.28 [1.38, 3.76]	1.99 [1.06, 3.72]*
>3 years	62	77	1	1
Workload				
≤99 patients per day	94	53	2.53 [1.53, 4.18]	2.84 [1.5, 5.38]*
>99 patients per day	47	67	1	1
computer available				
No	11	62	1	1
Yes	130	58	12.6 [6.2, 25.75]	9.16 [4.17, 20.11]*
Taken basic computer training				
No	25	39	1	1
Yes	116	81	2.23 [1.26, 3.98]	0.99 [0.45, 2.16]

*Significant at p-value <0.05.

4. Discussion

This study has been conducted on non-health provider medical record unit workers working in public health facilities in East Gojjam zone. Of all the study participants, 169 (64.8%) of them had adequate knowledge. This result is lower than the finding in Punjab, India [22] and three public hospitals in Ethiopia [23] but higher than the findings in rural African health facilities [18], Nigeria [4].

The discrepancies might be due to the fact that the study participants of this research were non-health provider medical record unit workers working only on medical records. In Ethiopian context, the nation is working on modernizing electronic medical records hence, majority of non-health provider medical record unit workers were given

basic ICT training for realizing SmartCare performance. Therefore, this instance may improve knowledge towards ICT among non-health provider medical record unit workers.

However, only 141 (54%) of the study participants had favorable attitude towards ICT. This is lower than the findings in Swedish hospital departments, Sweden [26], Nigeria [4] and Referral Hospital in Northern Ethiopia [20] but consistent with a research conducted in three public hospitals of Ethiopia [23].

All findings used in this research for comparison purpose were obtained from health care providers. In our context despite tedious works, salaries paid, allowances and respect given for health care providers are by far better than non-health care provider medical unite workers in Ethiopia. Moreover, majority (75.9%) of respondents felt that there

was no any motivational mechanism for workers with good performance. These may have its own implication on the attitude towards ICT among non-health care provider medical record unit workers.

Regarding factors affecting knowledge towards ICT among non-health care provider medical unit workers, residence, workload and basic computer training were significantly associated with knowledge towards ICT at p -value <0.05 with 95% confidence interval. Medical record unit workers working in urban health facilities were 2.56 times more likely to have adequate knowledge towards ICT compared to rural while medical record unit workers who were serving ≤ 99 patients per day were 3.67 times more likely to have adequate knowledge towards ICT compared to those who served >99 patients per day. Moreover, medical record unit workers who had basic computer training were 14.5 times more likely to have adequate knowledge towards ICT compared to those who didn't have basic computer training.

These factors were not significantly associated with knowledge towards ICT among researches in rural African health facilities [18] and at National Hospital Abuja, Nigeria [4] whereas in Ethiopian literature basic computer training was in line with this finding [25]. The possible reason for the differences could be differences in study participants.

In this research residence, experience, workload and availability of a computer were identified as factors affecting attitude towards ICT among non-health care provider medical unit workers. Medical record unit workers working in urban health facilities were 7.04 times more likely to have adequate knowledge towards ICT compared to rural while medical record unit workers who were serving ≤ 99 patients per day were 2.84 times more likely to have adequate knowledge towards ICT compared to those who served >99 patients per day. Moreover, medical record unit workers who had access to computer were 9.16 times more likely to have adequate knowledge towards ICT compared to those who didn't have access to computer and medical record unit workers who served ≤ 3 years were 1.99 times more likely to have adequate knowledge towards ICT compared to those who served >3 years.

Despite the differences in the study participants, experience and availability of a computer were also significantly associated with attitude towards ICT in a research conducted in referral hospital in northern Ethiopia [20]. However, residence and workload were significantly associated with attitude towards ICT in none of our literatures. Probably this may happen as long as individuals have access to computer. Moreover, in Ethiopian colleges IT is given as a supportive course in most departments and hence fresh graduates may recall their IT knowledge better than former graduates.

5. Conclusion

In Ethiopian health sector, many investments have been made to modernize medical record system. Of those investments, training medical record unit workers on how to

handle a SmartCare as a tool to modernize medical records was one of the efforts made so far. According to the findings of this research the level of knowledge and attitude towards ICT among non-health care provider medical unit workers was very low as per expectations and compared to literatures reviewed in this research.

Hence, residence, workload and basic computer training were identified as factors affecting knowledge towards ICT while residence, experience, workload and availability of a computer were factors affecting attitude towards ICT.

Data Availability

The SPSS data used to support the findings of this study are available from the corresponding author upon request.

Competing Interests

The authors declare that we have no competing interests.

Funding Statement

This research was not funded by any external organization but for academic purpose.

Authors' Contributions

Maru Meseret designed the study.

Maru Meseret, Mihret Tesfu, Mulunesh Alemayehu and Yihalem Abebe conducted the study and supervised data collection. All authors analyzed and interpreted the data. Maru Meseret drafted the manuscript. All authors read and approved the final manuscript.

Acknowledgements

This study was supported by Debre Markos University College of health science. Authors, Maru Meseret, Mihret Tesfu, Mulunesh Alemayehu and Yihalem Abebe were involved in the design, collection, analysis, and interpretation of data; in writing the manuscript; and in the decision to submit for publication. We would like to thank medical record unit workers who were involved in this study and data collectors in collecting data.

References

- [1] Ibrahim Taiwo Adeleke et al. ICT knowledge, Utilization and Perception among Healthcare Providers at National Hospital Abuja, Nigeria. Health Information Technology in Developing Nations: Challenges and Prospects Health Information Technology.. *American Journal of Health Research*. 2015; 3 (1-1).
- [2] Dzenowagis. Connecting for health: Global vision, local insight. Geneva: WHO; 2005.

- [3] WHO. Electronic Health Records: Manual for Developing Countries: Western Pacific Region. Manila, Philippines: World Health Organization, Regional Office for the Western Pacific Publication Office; 2006.
- [4] Eysenbach G. 'What is e-health?'. *J Med Internet Res*. 2001; 3 (2).
- [5] Mon D. Defining the Differences between the CPR, EMR, and EHR. *Journal of AHIMA*. 2004.
- [6] Amatayakul MK. Electronic Health Records: A Practical Guide for Professionals and Organizations. *Journal of AHIMA*. 2004.
- [7] Federal Democratic Republic of Ethiopia Ministry of Health. Concept Notes and Status of ICT Programmers Implementation. 2009.
- [8] Ethiopian Federal Ministry of Health. Information Revolution Roadmap. 2016.
- [9] Emans E, Rajinder M, Veena B. An Exploratory Study to Assess the Computer Knowledge, Attitude and Skill among Nurses in Health care Setting of a Selected Hospital, Ludhiana, Punjab, India: MEDINFO: 1304-1307. 2004.
- [10] Biruk et al. Health Professionals readiness to implement electronic medical record system at three hospitals in Ethiopia: a cross sectional study. *BMC Medical Informatics and Decision Making*. 2014 14: 115.
- [11] Felix Sukums et al. Health workers' knowledge of and attitudes towards computer applications in rural African health facilities. *Global Health Action* 2014 (7).
- [12] Mohammed et al. Knowledge and utilization of computer among health workers in Addis Ababa hospitals, Ethiopia: computer literacy in the health sector. *BMC Research Notes*. 2013; 6: 106.
- [13] McGrath D., Herbst K., Fraser HS. Electronic Medical Record (EMR) systems for HIV care in resource poor settings: report from an international workshop. International Conference of AIDS 2004.
- [14] Alavi M, Leidner DE. Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS Quarterly*. 2001; 25: 107-136.
- [15] Dubow J. Improving health, connecting people: the role of ICTs in the health sector of developing countries. InfoDev. 2006.
- [16] Mansell R, When U. Knowledge Societies: Information Technology for Sustainable Development, OUP, Oxford. 1998.
- [17] Opit LJ. How should information on health care be generated and used?. *World Health Forum* 1987 (8).
- [18] Finau SA. National health information system in the Pacific islands: In search of a future. *Health Policy and Planning*. 1994; 9 (2).
- [19] Gebre-Mariam M. Exploring Challenges in Patient Monitoring and Clinical Information Management of Antiretroviral Therapy (ART) and the Perceived Usefulness of Electronic Medical Records (EMR system) in
- [20] HIV Care in Ethiopia. MSc thesis. Ontario, Canada: Western University. 2010.
- [21] WHO. Patient monitoring guidelines for HIV care and antiretroviral therapy (ART) 2005.
- [22] Asemahagn MA. Challenges of ICTs Utilization among Health Professionals: The Case of Public Hospitals in Addis Ababa, Ethiopia.. *SM J Public Health Epidemiol*. 2015; 1 (3).
- [23] Andualem et. al. The Attitude towards and Use of Electronic Medical Record System by Health Professionals at a Referral Hospital in Northern Ethiopia: Cross-Sectional Study. *J Health Inform Afr*. 2015; 3 (1).
- [24] Bellamy C. 'Moving to e-Government: The role of ICTs in the public sector', in Public Management and Governance, T. Bovaird & E. Löffler (eds), London, Routledge, 113-25. 2003.
- [25] Kalid Alwan, Tadesse Awoke, Binyam Tilahun. Knowledge and Utilization of Computers Among Health Professionals in a Developing Country: A Cross-Sectional Study. *JMIR Human Factors* 2015; 2 (1).
- [26] Gund et al. Attitudes among healthcare professionals towards ICT and home follow-up in chronic heart failure care. *BMC Medical Informatics and Decision Making* 2012; 12: 138.