Journal of Global Health Science

JGHS

Original Article

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Primary health care physicians' perception of electronic health records adoption in Timor-Leste: a cross-sectional study

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ABSTRACT

Background: This study aimed to identify the factors affecting the successful operation of electronic health records (EHRs) during the initial pilot implementation period from 2015 to 2017. The EHR system in Timor-Leste was first launched in 2015 after the VI Constitutional Government introduced the "Saúde na Familia" initiative. In January 2019, the system was discontinued after being disrupted by a political impasse between 2017 and 2018. The new Minister of Health reactivated the adoption of the EHR system as of August 2020.
Methods: This study included a cross-sectional survey. The questionnaire covered benefits, barriers, and satisfaction categories along with sociodemographic variables.
Results: Statistically significant differences between age groups were noted for the benefits, perceived barriers (such as the ability to use computers), and overall satisfaction of the EHR system. The slope of the benefit category (β = 0.497, t = 11.361) was a statistically significant predictor of satisfaction with EHR system implementation. However, the slope of the barrier category had a negative statistical significance for satisfaction (β = −0.086, t = −1.794). Satisfaction with the EHR system was influenced by its perceived benefit and reduced perceived barriers due to individuals' utilization of the information and communication technology system.
Conclusion: Continuous political commitment to health policy, financial support, friendly end-user applications, improved quality of Internet service, and a positive attitude toward the system were crucial for its successful implementation.

Keywords: Electronic health records; Perception; Personal satisfaction; Timor-Leste

INTRODUCTION

In 1960, Dr. Lawrence L. Weed introduced the notion of utilizing electronic health records (EHRs) in the medical field with the core objective of recording all patients' data. In 2000, owing to the evolution of the Internet and widespread utilization of Web software, many countries began to implement EHR systems. On February 17, 2009, former President Barack Obama's mandate for the American Recovery and Reinvestment Act of 2009, which included

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the Health Information Technology for Economic and Clinical Health Act (HITECH), was initiated.[1] The HITECH Act was intended to promote and expand EHR implementation by health providers. EHR has since been adopted worldwide in 66% of developed countries, 52% of upper-middle-income countries, 35% of lower-income countries, and 15% of low-income countries.[2] The EHR system is a secure form of healthcare information technology shared between diverse healthcare institutions and includes patients' medical health information such as laboratory test results and prescriptions.[3] Universal health coverage (UHC) is, therefore, achieved through this interaction between human resources within the health system.[4,5]

Timo-Leste, a country new to the digital era, is also concerned with information and communication technology infrastructure and connectivity. Despite all the challenges, Timor-Leste was committed to achieving UHC in 2017. On April 29, 2015, the VI Constitutional Government of Timor Leste launched the "Saúde na Familia" (Health in the Family) program, and on July 22, 2015, the EHR program was launched in the capital, Dili, and soon expanded to the other 12 municipalities.[6]

The "Saúde na Familia" program was adapted from Cuba's primary health care intervention named "dispensarización" (stratification). It consisted of 3 types of visits, namely, integral, regular, and epidemiological. The main objective was to provide a comprehensive primary health care system through house-to-house visits in areas ranging from urban to extremely remote. Consequently, in 2017, the "Saúde na Familia" program reached 94% of households, and 82% of individual health data were captured electronically.[6] The program was abruptly stopped due to a political impasse between 2017 and 2018,[7] and the government eventually decided to discontinue system implementation from January 2019.[8] However, since late August 2020, the EHR system has been officially reactivated under the direction of the new Minister of Health.

The purpose of this study was to understand how primary healthcare physicians in Timor-Leste perceived the adoption of the EHR system between 2015 and 2017. The specific aims were to identify the benefits, barriers, and satisfaction with utilizing the system at the primary healthcare level and to make recommendations for its revitalization.

METHODS

Study design

The study implemented a cross-sectional online survey to identify the perceptions held by primary healthcare doctors in Timor-Leste.

Study population

The inclusion criteria for research participants were health professionals who had worked under the Ministry of Health of Timor-Leste between 2015 and 2017, and who had the opportunity to utilize the EHR system in their primary healthcare facilities after having received relevant training. The sample size was calculated with G*Power 3.1.9.4 by performing the F test (effect size = 0.15, alpha error = 0.05, power = 0.95). The results determined that a minimum of 129 participants were required to conduct the investigation.

Instrument and variables

An online questionnaire was constructed using a previously developed online Google instrument used by Secginli et al.[9] The questionnaire categories consisted of sociodemographic items, benefit items (21), barrier items (12), and satisfaction items (12). The questionnaire was translated into Tetum, the national language. The reliability of the modified questionnaire was determined by Cronbach's alpha of 0.88. Each statement of benefit, barrier, and satisfaction was measured using a 5-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, and 1 = strongly disagree).

Data collection

After approval by the Severance Institutional Review Board, the questionnaire was sent directly to the participants via Messenger and WhatsApp. At the same time, the researcher explained the purpose of the study and the importance of informed consent. Participants voluntarily signed the informed consent by clicking "accept" prior to continuing the survey. Data were collected from September 21 to October 8, 2020.

Data analysis

Responses received from the online Google survey were inserted into Microsoft Excel spreadsheets, and then coded and analyzed using statistical software. Descriptive statistics such as frequency, percentages, means, and standard deviations (SDs) were used to describe the respondents' demographic characteristics. A t-test and analysis of variance were performed to determine the differences in perceptions of benefits, barriers, and satisfaction with the EHR system. Pearson's correlation was performed to analyze the relationship between satisfaction and benefits or barriers. Finally, a multiple linear regression analysis was performed to predict the variables affecting satisfaction. Statistical significance was set at $P < 0.05$ with a 95% confidence interval.

Ethical statement

Ethical approval was given by the Yonsei Medical Center Research Review Committee, Institutional Review Board (registration No. 2020-2142-002; approval No. Y-2020-0117).

RESULTS

Sociodemographic characteristics of the participants

The total number of respondents was 149 (77 males, 51.7%; 72 females, 48.3%). All participants received EHR training and had registered practical experience using the EHR system between 2015 and 2017. The majority of respondents were aged between 31 and 35 years old (n = 107, 71.8%, mean ± SD = 34 ± 0.5). One hundred and five participants had been practicing as medical doctors for 3 to 6 years (n = 105, 70.5%, mean ± SD = 6.0 ± 0.5) and 44 had been practicing for over 7 years (n = 44, 29.5%, mean ± SD = 6.0 ± 0.5). Most respondents worked at community health centers (n = 87, 58.4%), followed by health posts (n = 47, 31.5%) and district health services (n = 15, 10.1%) (**Table 1**). The majority of participants had usernames to access the EHR application (n = 129, 86.6%), whereas some did not (n = 20, 13.4%). Sixty-six (44.3%), fifty-four (36.2%), and twenty-nine (19.5%) participants used the EHR program for less than 2 hours per day, 2 to 4 hours, and 4 to 6 hours, respectively. It was found that a computer was frequently used in the workplace (n = 60, 40.3%), at home (n = 21, 14.1%), or at both locations (n = 68, 45.6%). Only 98 (65.8%) respondents stated that they had good computer literacy abilities (n = 98, 65.8%), as shown in **Table 1**.

Table 1. Sociodemographic characteristics (n = 149)

Items	No. (%)	Mean ± SD
Sex		
Male	77 (51.7)	
Female	72 (48.3)	
Age, yr		33.60 ± 2.23
25–30	16 (10.8)	
31–35	107 (71.8)	
36–40	26 (17.4)	
Years practicing as a medical doctor		2.30 ± 0.45
3–6	105 (70.5)	
> 7	44 (29.5)	
Area of workplace		
Health post	47 (31.5)	
CHC	87 (58.4)	
DHS	15 (10.1)	
Has a username		
Yes	129 (86.6)	
No	20 (13.4)	
Time spent using EHR daily, hr		
Few (2)	66 (44.3)	
Average (2–4)	54 (36.2)	
Many (4–6 or more)	29 (19.5)	
Has own computer		
Yes	90 (60.4)	
No	59 (39.6)	
Location of computer use		
Home	21 (14.1)	
Workplace	60 (40.3)	
Home and workplace	68 (45.6)	
Level of computer literacy (writing, Internet Explorer, and installation of applications)		
Poor	3 (2.0)	
Fair	48 (32.2)	
Good	98 (65.8)	

SD = standard deviation; EHR = electronic health record; CHC = community health center; DHS = district health services.

The benefits and barriers of EHR implementation

All participants' sociodemographic data according to the perception of the benefits, barriers, and satisfaction with EHR implementation at the primary health care level is shown in **Table 2**. Regarding the benefits perceived using EHR, statistical significance was found only in the age group (t = 3.30, P = 0.04). However, participants' computer literacy abilities were statistically significant for barriers to EHR implementation (t = 4.80, $P \leq 0.001$). Participants' satisfaction was only statistically significant for the location of computer use (t = 3.41, P = 0.003).

The benefits and barriers of EHR implementation

Respondents perceived a decreased need for paper-based documentation (n = 114, 76.5%, mean ± SD = 4.7 ± 0.5), easy access to medical history information (n = 109, 73.2%, mean ± SD = 4.7 ± 0.5), access to patients' data and analysis (n = 103, 69.1%, mean ± SD = 4.7 ± 0.5), enabling follow-up by patients (n = 100, 67.1%, mean ± SD = 4.7 ± 0.5), and reduction of duplication of patient health information (n = 100, 67.1%, mean ± SD = 4.6 ± 0.5) to be the benefits of EHR implementation. However, fewer than 100 respondents accepted the items such as providing quick and reliable access to scientific research; providing better data; and making it easy to transfer data with similar frequencies and percentages (n = 98, 65.8%) (**Table 3**).

Table 2. Perception of benefits, barriers, and satisfaction according to sociodemographic characteristics (n = 149)

Characteristics	Benefit			Barrier			Satisfaction		
	Mean ± SD	t/F	P	Mean ± SD	t/F	P	Mean ± SD	t/F	P
Sex		0.21	0.83		−0.41	0.68		0.34	0.73
Male	96.5 ± 9.3			39.7 ± 8.8			53.3 ± 7.0		
Female	96.1 ± 8.8			40.2 ± 7.7			52.0 ± 6.0		
Age		3.30	0.04[a]		2.80	0.06		0.40	0.67
25–30	93.6 ± 9.2			43.8 ± 8.3			51.1 ± 6.6		
31–35	97.5 ± 8.5			39.0 ± 7.8			52.4 ± 6.5		
36–40	93.2 ± 9.6			41.5 ± 9.5			51.7 ± 6.8		
Years practicing as medical doctor		1.04	0.33		−1.74	0.08		0.70	0.40
3–6	97.5 ± 8.0			38.2 ± 8.4			52.8 ± 6.7		
> 7	96.0 ± 9.2			40.8 ± 8.2			52.0 ± 6.5		
Area of workplace		0.74	0.48		0.61	0.54		1.24	0.30
Health post	95.0 ± 9.7			39.7 ± 6.1			51.5 ± 7.3		
CHC	96.8 ± 8.5			40.5 ± 9.2			52.8 ± 5.8		
DHS	97.5 ± 8.6			38.0 ± 8.0			50.3 ± 7.8		
Has a username		0.21	0.83		1.00	0.32		−0.67	0.50
Yes	96.2 ± 8.7			39.7 ± 8.2			52.3 ± 6.4		
No	96.7 ± 10.6			41.7 ± 8.8			51.2 ± 7.6		
Time spent using EHR daily, hr		1.98	0.14		2.09	0.13		2.49	0.09
Few (< 2)	95.2 ± 8.9			41.5 ± 8.0			50.9 ± 7.0		
Average (2–4)	96.1 ± 9.5			38.7 ± 8.4			52.8 ± 6.0		
Many (> 4)	99.1 ± 7.4			38.9 ± 8.4			53.8 ± 6.4		
Has own computer		−0.17	0.87		1.67	0.09		−0.19	0.85
Yes	96.4 ± 9.1			39.1 ± 8.0			52.2 ± 6.3		
No	96.2 ± 8.7			41.4 ± 9.0			52.0 ± 6.8		
Location of computer use		1.70	0.18		0.73	0.48		3.41	0.03[a]
Home	93.4 ± 10.0			41.9 ± 7.7			49.5 ± 7.1		
Workplace	96.0 ± 8.5			40.5 ± 7.4			51.6 ± 6.6		
Home and workplace	97.5 ± 8.8			39.3 ± 9.1			53.4 ± 6.5		
The ability to use a computer		1.90	0.15		4.80	0.01[a]		0.76	0.47
Poor	105.0 ± 0.0			54.0 ± 5.2			65.7 ± 3.0		
Fair	95.1 ± 7.9			40.3 ± 7.9			52.3 ± 5.8		
Good	96.5 ± 9.4			39.4 ± 8.2			52.0 ± 6.9		

SD = standard deviation; EHR = electronic health record; CHC = community health center; DHS = district health services.
[a]$P \leq 0.05$.

The attitudes of respondents relating to the perceived barriers of EHR are summarized in **Table 4**. The most challenging points related to EHR implementation were the need for frequent modifications as technology advances (n = 76, 51.0%, mean ± SD = 4.2 ± 0.8), compatibility of the Web browser (n = 73, 49.0%, mean ± SD = 3.8 ± 0.9), frequent system malfunction (n = 63, 42.3%, mean ± SD = 4.2 ± 0.9), and cost (n = 56, 37.6%, mean ± SD = 3.8 ± 1.0). They also found it difficult to provide data security in EHRs (n = 63, 42.3%, mean ± SD = 2.68 ± 1.0) and instructions for EHR use (n = 57, 38.3%, mean ± SD = 2.9 ± 1.0). Furthermore, the system was found to decrease interaction between health professionals and patients (n = 56, 37.6%, mean ± SD = 3.0 ± 1.2), and increase health professional workloads (n = 52, 34.9%, mean ± SD = 3.0 ± 1.0), as shown in **Table 4**.

Satisfaction with EHR implementation

Table 5 summarizes respondents' perceived satisfaction with using EHRs. Overall, respondents agreed on declarations such as EHR is useful, EHR is an important system for primary health care (both: n = 88, 59.1%, mean ± SD = 4.5 ± 0.6), patients' safety improved owing to EHR, and using the EHR would be proper for a doctor in the primary health care area (both: n = 77, 51.5%, mean ± SD = 4.4 ± 0.7). Less than 50% agreed with the statement

Table 3. The benefits of EHR implementation (n = 149)

Benefits of EHR adoption	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean ± SD
Provides quick and reliable access to scientific research	98 (65.8)	51 (34.2)	0 (0.0)			4.7 ± 0.5
Enables easy access to information from past medical records	109 (73.2)	39 (26.2)	1 (0.7)			4.7 ± 0.5
Provides access to patients' data and analysis	103 (69.1)	43 (28.9)	3 (2.0)			4.7 ± 0.5
Provides better data	98 (65.8)	49 (32.9)	2 (1.3)			4.6 ± 0.5
Makes it easy to transfer data	98 (65.8)	46 (30.9)	3 (2.0)	2 (1.3)		4.6 ± 0.6
Provides access to practice standards	74 (49.7)	72 (49.3)	3 (2.0)			4.5 ± 0.5
Enables follow-up by patients	100 (67.1)	46 (30.9)	3 (2.0)			4.7 ± 0.5
Makes it easier to schedule patients' regular visits	91 (61.1)	56 (37.6)	2 (1.3)			4.6 ± 0.5
Enables tracking of test results	68 (45.6)	68 (45.6)	13 (8.7)			4.3 ± 0.6
Saves time in documenting health data	92 (61.7)	50 (33.6)	6 (4.0)	1 (0.7)		4.6 ± 0.6
Decreases paper-based documentation	114 (76.5)	31 (20.8)	3 (2.0)	1 (0.7)		4.7 ± 0.5
Improves the quality of care	92 (61.7)	54 (36.2)	3 (2.0)			4.6 ± 0.5
Improves the feeling of professionalism	95 (63.8)	45 (30.2)	8 (5.4)	1 (0.7)		4.6 ± 0.6
Contributes to health professional's ability to make patient care decisions	91 (61.1)	52 (34.9)	6 (4.0)			4.6 ± 0.6
Improves communication between health professionals and patients	79 (53.0)	62 (41.6)	8 (5.4)			4.5 ± 0.6
Improves communication between health professionals	96 (64.4)	47 (31.5)	5 (3.4)		1 (0.7)	4.6 ± 0.6
Reduces medical error	78 (52.3)	55 (36.9)	15 (10.1)	1 (0.7)		4.4 ± 0.7
Reduces duplication of patient health information	100 (67.1)	45 (30.2)	4 (2.7)			4.6 ± 0.5
Accuracy and timely access	97 (65.1)	47 (31.5)	3 (2.0)	2 (1.3)		4.6 ± 0.6
Disease surveillance and monitoring	97 (65.1)	50 (33.6)	2 (1.3)			4.6 ± 0.5
Makes e-prescribing easier and faster	82 (55.0)	60 (40.3)	7 (4.7)			4.5 ± 0.6

Values are presented as numbers (%).
SD = standard deviation; EHR = electronic health record.

Table 4. The barriers to EHR implementation (n = 149)

Barriers to EHR implementation	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Mean ± SD
Complicated and not user friendly	13 (8.7)	33 (22.1)	44 (29.5)	49 (32.9)	10 (6.7)	3.0 ± 1.1
Compromises patient safety	45 (30.2)	54 (36.2)	17 (11.4)	25 (16.8)	8 (5.4)	3.7 ± 1.2
Decreases interaction between health professionals and patient	22 (14.8)	36 (24.2)	24 (16.1)	56 (37.6)	11 (7.4)	3.0 ± 1.2
Increases health professional workloads	15 (10.1)	32 (21.5)	42 (28.2)	52 (34.9)	8 (5.4)	3.0 ± 1.1
Difficult to provide data security	5 (3.4)	24 (16.1)	39 (26.2)	63 (42.3)	18 (12.1)	2.6 ± 1.0
Consumes more time than a paper-based system	25 (16.8)	39 (26.2)	31 (20.8)	45 (30.2)	9 (6.0)	3.2 ± 1.2
Frequent system malfunctions	58 (38.9)	63 (42.3)	21 (14.1)	6 (4.0)	1 (0.7)	4.2 ± 0.9
Costly	39 (26.7)	56 (37.6)	39 (26.2)	12 (8.1)	3 (2.0)	3.8 ± 1.0
Need for frequent modifications as technology advances	53 (35.6)	76 (51.0)	16 (10.7)	3 (2.0)	1 (0.7)	4.2 ± 0.8
Compatibility of Web browser	25 (16.8)	73 (49.0)	43 (28.9)	6 (4.0)	2 (1.3)	3.8 ± 0.9
Instructions for EHR use	14 (9.4)	30 (20.1)	38 (25.5)	57 (38.3)	10 (6.7)	2.9 ± 1.1
Comprehensiveness	9 (6.0)	36 (24.2)	45 (30.2)	50 (33.6)	9 (6.0)	3.0 ± 1.0

Values are presented as numbers (%).
SD = standard deviation; EHR = electronic health record.

that the quality of their work has improved (n = 74, 49.7%, mean ± SD = 4.3 ± 0.7) even though more than 51% (n = 76) were satisfied with EHRs in primary health care. Participants responded neutrally to the statement that their performance had improved (n = 37, 24.8%, mean ± SD = 4.0 ± 0.8), as shown in **Table 5**.

The relationship between benefits and barriers to satisfaction

There was a strong positive relationship between participants' ratings of satisfaction regarding EHR utilization and its perceived benefit (r = 0.708, $P \leq 0.001$) and vice versa. There was also a significant correlation between time spent using EHR (r = 0.178, $P = 0.03$) and location of computer use (r = 0.211, $P = 0.01$). There was no statistically significant relationship between satisfaction and age (r = 0.007, $P = 0.94$), workplace (r = 0.004, $P = 0.97$), the username (r = 0.055, $P = 0.50$), and having their own computers (r = 0.016, $P = 0.85$). The results showed that there was a weak significant negative correlation between benefits and barriers (r = −0.14, $P = 0.07$), as shown in **Table 6**.

Table 5. Satisfaction with EHR implementation (n = 149)

Satisfaction with EHR implementation	Strongly agree	Agree	Neutral	Disagree	Mean ± SD
I feel EHR is useful.	88 (59.1)	54 (36.2)	7 (4.7)		4.5 ± 0.6
I feel EHR is an important system for the primary health care level.	88 (59.1)	53 (35.6)	8 (5.4)		4.5 ± 0.6
I feel the EHR is worth the time and effort required to use it.	68 (45.6)	70 (47.0)	10 (6.7)	1 (0.7)	4.4 ± 0.6
I feel the quality of my work has improved.	59 (39.6)	74 (49.7)	14 (9.4)	2 (1.3)	4.3 ± 0.7
I feel the quality of information has improved owing to the EHR.	62 (41.6)	66 (44.3)	20 (13.4)	1 (0.7)	4.3 ± 0.7
I feel my performance has improved owing to the EHR.	42 (28.2)	66 (44.3)	37 (24.8)	4 (2.7)	4.0 ± 0.8
I feel patient safety has improved owing to the EHR.	77 (51.5)	58 (38.9)	14 (9.4)		4.4 ± 0.7
I feel the communication between health professionals has improved owing to the EHR.	60 (40.3)	70 (47.0)	19 (12.8)		4.3 ± 0.7
Quality improvement in providing health services.	72 (48.3)	67 (45.0)	10 (6.7)		4.4 ± 0.6
I feel more comfortable using an EHR than a paper-based one.	60 (40.3)	66 (44.3)	20 (13.4)	3 (2.0)	4.2 ± 0.6
I think using the EHR would be proper for a doctor in my area.	77 (51.7)	55 (36.9)	17 (11.4)		4.4 ± 0.7
Overall, I am satisfied with the EHR in healthcare	76 (51.0)	63 (42.3)	9 (6.0)	1 (0.7)	4.4 ± 0.6

Values are presented as numbers (%).
SD = standard deviation; EHR = electronic health record.

Table 6. Correlation between satisfaction and related factors (n = 149)

Item	Satisfaction	Sex	Age	Years of practice	Workplace	Username	Time spent using EHR	Have own computer	Place using computer	Computer ability	Benefit	Barrier
Satisfaction	1.000											
Sex	−0.028	1.000										
	0.734											
Age	0.007	−0.276[b]	1.000									
	0.936	0.001										
Years of practice	−0.076	−0.078	−0.197[a]	1.000								
	0.357	0.343	0.016									
Workplace	0.004	−0.034	0.045	−0.262[b]	1.000							
	0.965	0.681	0.586	0.001								
Username	0.055	0.026	0.125	−0.112	0.152	1.000						
	0.504	0.751	0.129	0.175	0.064							
Time spent using EHR	0.178[a]	−0.038	0.042	−0.122	0.146	0.182[a]	1.000					
	0.030	0.650	0.614	0.137	0.075	0.026						
Have own computer	0.016	−0.096	−0.131	0.070	0.053	−0.077	−0.048	1.000				
	0.848	0.245	0.110	0.396	0.525	0.349	0.562					
Location of computer use	0.211[b]	−0.166[a]	−0.111	−0.015	0.127	0.176[a]	0.159	0.245[b]	1.000			
	0.010	0.043	0.177	0.852	0.124	0.032	0.053	0.003				
Computer ability	−0.064	−0.204[a]	−0.034	−0.006	0.051	0.028	0.163[a]	0.016	0.037	1.000		
	0.438	0.013	0.684	0.941	0.538	0.731	0.047	0.844	0.653			
Benefit	0.708[b]	−0.018	−0.052	−0.108	0.096	−0.018	0.152	0.014	0.148	0.002	1.000	
	0.000	0.830	0.532	0.191	0.242	0.831	0.064	0.869	0.071	0.982		
Barrier	−0.210[b]	0.034	−0.032	0.132	−0.022	−0.082	−0.144	−0.138	−0.095	−0.153	−0.144	1.000
	0.010	0.679	0.696	0.108	0.790	0.322	0.079	0.094	0.249	0.063	0.079	

EHR = electronic health record.
[a]Correlation is significant at the 0.05 level (2-tailed); [b]Correlation is significant at the 0.01 level (2-tailed).

Factors influencing EHR satisfaction

According to the multiple regression analysis, the R^2 for the overall model was 54%, with an adjusted R^2 of 51%. As shown in **Table 7**, the participants' satisfaction and other factors had a positive slope, such as age (B = 0.520, t = 0.656, P = 0.51), username (B = 0.741, t = 0.634, P = 0.53), time spent using EHR (B = 0.521, t = 0.991, P = 0.32), and location of computer use (B = 0.980; t = 1.669, P = 0.09). The variable benefit (B = 0.497, t = 11.361, $P \leq$ 0.001) had a statistically significant impact on satisfaction with EHR implementation (R^2 = 51.0%). Multiple linear analysis revealed that these predictor variables were not statistically significant predictors of the model (P > 0.05). The model reported a significant effect of variation in satisfaction with EHR utilization by the linear combination of predictor variables. It can be concluded that the participants' satisfaction was not statistically impacted by other variables, except for that of perceived benefit.

Table 7. Factors influencing EHR satisfaction (n = 149)

Item	B	SE	β	t	Sig.	VIF
(Constant)	6.879	7.200		0.955	0.341	
Sex	−0.055	0.836	−0.004	−0.066	0.948	1.242
Age	0.520	0.794	0.042	0.656	0.513	1.242
Years of practice	0.157	0.877	0.011	0.179	0.858	1.179
Workplace	−0.920	0.654	−0.086	−1.406	0.162	1.126
Username	0.741	1.168	0.039	0.634	0.527	1.128
Time spent using EHR	0.521	0.526	0.061	0.991	0.323	1.133
Have own computer	−0.242	0.817	−0.018	−0.296	0.768	1.136
Location of computer use	0.980	0.587	0.106	1.669	0.097	1.220
Computer ability	−1.143	0.758	−0.091	−1.508	0.134	1.108
Barrier	−0.086	0.048	−0.109	−1.794	0.075	1.105
Benefit	0.498	0.044	0.680	11.361	0.000	1.080
	$R^2 = 0.545$			Adj. $R^2 = 0.508$		

EHR = electronic health record; SE = standard error; VIF = variance inflation factor.

DISCUSSION

This study's findings indicated that not all sociodemographic characteristics were associated with the perception of benefits, barriers, and satisfaction related to the implementation and utilization of the EHR system. The age of the respondents showed statistical significance in perceptions of benefit. This is consistent with the findings of Jung et al.[10] who indicated that younger professionals had a more positive attitude toward technological changes than older ones. Regarding the barriers, the findings signaled a statistically significant difference in the level of computer literacy, which was consistent with the rapid umbrella review by Fennelly et al.[11] which revealed that technological literacy is one of the major factors influencing EHR implementation. Therefore, training provided before EHR utilization would be helpful for successful EHR implementation.[12]

The positive behavior toward EHR adoption among medical doctors results from the perceived benefit, as highlighted by this study and further supported by Shiferaw and Mehari.[13] Just over 3-quarters of respondents agreed that using EHR decreases paper-based documentation, which was consistent with the results of previous research.[14] In line with previous studies, easy access to information from past medical records and patients' data and analysis was found to enable better quality care delivery outcomes.[15-17] The findings of the present study were also in line with Ganiga et al.,[15] Casey et al.,[18] and Willis et al.[19] with regard to EHR allowing a reduction in the duplication of patient health information and quicker data-sharing and documenting compared to paper-based reports.

The negative perceptions of EHR may be influenced by the short duration of its implementation, less time spent on EHR utilization, and respondents' poor technological literacy. Consequently, the continuum of capacity-building support for electronics use needs to be offered. Furthermore, EHR implementation during medical school would be advantageous in reducing paper-based health status documentation.[20-22]

The present study's findings regarding general physicians' perceptions of EHR implementation at the primary health care level in Timor-Leste suggest that EHR decreases paper-based documentation, leads to quality health care, enables easy access to patient's health records, enables patient follow-ups, reduces duplication of patient health information, and allows faster data transfer. The satisfaction with EHR was influenced by the benefits perceived while utilizing the system and by a reduction in barriers to its use. Political

commitment, financial support, user-friendly applications, improved quality of Internet service, and a positive attitude toward EHR were crucial for successful implementation. The findings of this study will contribute to the Ministry of Health of Timor-Leste by enlightening healthcare leaders on the necessary strategies for facilitating successful engagement in health reform and developing a strategic plan based on evidence. Hence, the Timorese population will benefit from a holistic, comprehensive, and innovative healthcare service.

ACKNOWLEDGMENTS

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