

## Empowering Health Care Through EHR: Staff Attributes and System Sustainability

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### ABSTRACT

**Background:** *Electronic health record, is a digital format, capable of providing timely, accurate and accessible patient data. It is applied by the healthcare providers to manage, and share seamless patients' information for quality purposes. Sustainable use of this system can enhance affordable healthcare cost, improved coordination, and quality decision making. However, sustaining the utilization of this system remains a significant challenge in middle-income Countries. Training, perceived benefits and user satisfaction are some of the staff traits that affect the sustainability of Electronic Health Records (EHR) in healthcare facilities. Therefore, this study investigated the sustainability of EHRs in public health facilities in Siaya County, Kenya.*

**Methods:** *Structured questionnaires were used to collect data for the cross-sectional descriptive survey design. While binary logistic regression (including bivariate and multivariate analyses) and chi-square tests examined the connections between staff traits and EHR sustainability. Descriptive statistics provided an overview of socio-demographic features.*

**Results:** *The study findings indicated that sustainability is significantly predicted mostly by training frequency, While the influence of user satisfaction and perceived benefits on EHR sustainable use varied across settings. Healthcare professionals who received training at least three times a year had a 44.7-fold higher chance of continuing to utilize EHRs than those who only received training once. The probability of sustainability was 30 times higher with an intuitive user interface. Adoption rates were also increased by positive attitude and regular integration of EHR into daily tasks. Perceived benefits by themselves, however, had little effect on sustainability, thus identifying training as the most significant factor.*

**Conclusion:** *To improve sustainability, the study suggests frequent EHR training, motivation of the users by maintaining their satisfaction, and monitoring of the system's results. Programs for digital literacy, user-centered EHR design, and leadership dedication to ongoing professional development should be given top priority in policy interventions. To support long-term EHR sustainability, future studies should examine customized interventions that address particular difficulties in various healthcare environments.*

**Key Words:** Electronic Health Records, Staff Attributes, Sustainability, Digital Literacy, Training, Healthcare Technology

## **1.0 Introduction**

Electronic Health Records (EHR), a comprehensive digital tool enhance healthcare by facilitating efficiency, reducing medical errors, and supporting communication, resulting in better patient outcomes (1). (2), healthcare in an era of digital transformation struggles to implement EHR. However, its sustainability in developing nations remains a key problem, attributable to training, perceived benefits and user satisfaction. Understanding these factors is critical for maximizing the systems usage in healthcare settings since regular EHR training equips providers with competency for EHR sustainability (3).

According to (4) proper EHR training boosts the user confidence and increases system usage, for better decision making. System underutilization in Siaya County has been associated with inconsistent training, evidenced by most healthcare professional turning to manual record-keeping. (5), training affects user attitudes as facilities that invest in ongoing training programs have reported on the systems' benefits.

Beyond training, EHR sustainability depends on user satisfaction and perceived advantages. Healthcare professionals integrate EHR into their daily tasks when they find it easy and useful since system design influence EHR maintenance (6).(7), EHR support and technical challenges leads to system resistance. Addressing these concerns is paramount to sustaining EHR use and improving service delivery, especially in low resource counties like Siaya.

A positive outlook on digital tool increases EHR survival while negative perception may lead to underutilization (8), while resistance, perceived system complexity, or skepticism can jeopardize EHR long-term use (9). Regular training, user satisfaction, and effective policies are crucial factors to system's sustainability. This study evaluates how staff characteristics influence EHR sustainable use in public health facilities underscoring the need for tailored programs to address barriers that healthcare providers face in EHR utilization.

## **2.0 Broad objective**

To investigate the factor influencing sustainable use of Electronic Health Records in Siaya County public health facilities.

## **2.1 Specific objective**

- i) To assess Staff attributes influencing the sustainable use of Electronic Health Record system in Siaya County public health facilities.

## **2.2 Research question**

- i) What Staff attributes influence the sustainable use of Electronic Health Record system in Siaya County public health facilities.

## **3.0 Theoretical Framework**

Technology Continuance Theory (TCT) by Liao (10) supports the study, emphasizing training, satisfaction, and usability as key drivers to EHR sustainability. Findings align reinforcing these factors in maintaining the system usage.

## **4.0 Methodology**

### **4.1 Research Design**

An analytical cross-sectional design with purely quantitative techniques was applied, to ensure clarity, maintain data collection and analysis consistency, while avoiding ambiguity, since the same participants responded to the questionnaire. This allowed single point data collection, assessing staff characteristics and system use (11). A structured survey captured quantitative and qualitative data across cadres, providing a comprehensive EHR uptake overview. Similar studies (12) used this approach for sufficient healthcare technology study.

### **4.2 Study area**

Conducted in Siaya County, Kenya, between November and December 2024, the research focused on public health facilities. Despite the donor support, issues on EHR still persist (**Nason et al. 2024**), (13) leading data inconsistencies, intermittent system, medical errors and patient long time waiting.

### **4.3 Study Participants**

Participants were included if they were employees of the sampled facilities, trained on EHR and belonged to the target cadre. Exclusion criteria included interns, professionals outside the sampled cadre, and those unwilling to participate. Participants were sourced from departmental and human resource records. Stratified sampling was used to identify groups, followed by simple random sampling.

### **4.4 Study Variables**

**Table 1: The study variables and their measurements**

<b>Variable Category</b>	<b>Variable name</b>	<b>Indicators</b>	<b>Measurement method</b>
<b>Independent variables</b>	User training	Frequency and duration of training sessions	Survey questionnaire
	Perceived benefits	Improved workflow efficiency, data accuracy, and patient care	Likert scale survey
	User satisfaction	Ease of use, technical support, system responsiveness	Likert scale survey
<b>Intervening variables</b>	System Operating Manual	Availability and accessibility of EHR guidelines	Survey questionnaire
	Contingency Plan	Existence of backup systems, downtime response strategies	Survey questionnaire
	EHR Training Manual	Availability and implementation of structured training programs	Survey questionnaire
<b>Dependent variables</b>	Dedicated Budget	Funds allocated for EHR system maintenance and operation	Financial reports review
	Uninterrupted Utilization	System uptime, frequency of downtime	Staff questionnaire
	Integration into Daily Operations	Use of EHR for patient records, reporting, and decision-making	surveys

The table categorizes variables into independent, dependent, and intervening. Based on literature (14), **staff attributes** are key **EHR sustainability**, while the role played by **EHR policies, standards and guidelines is demonstrated by the intervening variable**.

Intervening variables, mediate the link between Staff characteristics and sustainable EHR use. A structured system operating manual, ensures inconsistencies (15), while Clear guidelines enhance usability and minimize errors. Financial investment, system dependability, and daily integration influence the dependent variable. Contingency plan prevents disruptions and budget allocation ensures training and maintenance.(16). System uptime affects information management (17) while smooth integration promotes patient outcomes (18).This study investigated these factors in low-resourced public health hospitals.

#### **4.5 Bias**

##### **Recall and social desirability**

This study may have been faced with recall and social desirability biases, since it solely relied on self-reported data, despite this, leading questions in the questionnaire was minimized, and anonymity maintained. This bias was put into consideration during results interpretation.

##### **4.6 Sample size and Sampling strategy**

Leslie Kish's method for finite populations determined sample size (19). From 333 medical professionals in Siaya County public health facilities, 224 was calculated at a 95% confidence level ( $Z = 1.96$ ), and 80% statistical power, increasing generalizability and validity. A stratified random sampling, grouped respondents by cadre and health facility, guaranteeing fair representation (20). Simple random selection reduced bias, assigning random values within each group, with highest ranked persons included. If excluded, the subsequent in line was selected.

##### **4.7 Data Collection**

Primarily quantitative method was used, complimented with qualitative for in-depth insights. Structured questionnaires were distributed to doctors, nurses, clinicians, pharmacists, health records officers, and lab technicians. Closed-ended items used Likert scales, ordinal rankings, and categorical responses. A pilot study enhanced validity and reliability (21). Ethical approval obtained and participants provided informed consent. Triangulating survey results and interviews increased the reliability, providing a comprehensive knowledge on the facilitators of EHR sustainability.

##### **4.7 Statistical Analysis**

Descriptive and inferential statistical methods were applied to provide a full understanding of the correlations between staff qualities and the EHR system's sustainability. Frequencies and percentages were used to summarize socio-demographic characteristics as well as key study variables. These measurements gave a wide overview of the dataset, allowing the researchers to determine trends and distributions across participants.

Chi-square ( $\chi^2$ ) examined the relationship between categorical variables such training frequency, confidence levels, EHR satisfaction, and system sustainability. The method is useful for examining the independence of two categorical variables and determining if observed differences are statistically significant (22). Binary logistic regression assessed the impact of independent variables on the likelihood of sustainable EHR use. This was because the dependent variable (EHR sustainability) is binary as suggested by (23). The model computes Odds Ratios (ORs) to assess the likelihood of maintaining EHR use based on specific staff characteristics. Adjusted Odds Ratios (AORs) with 95% confidence intervals (CIs) employed to account for potential

confounders, resulting in more robust conclusions. Significance level established at  $p < 0.05$ , therefore any result below this threshold was considered statistically significant.

## **Declaration**

### **4.7 Ethical Consideration**

The study's ethical considerations were examined to guarantee participant protection and the integrity of the research procedure. The National Commission for Science, Technology, and Innovation (NACOSTI), under reference, **License No: NACOSTI/P/24/37271** the Maseno University Ethics and Review Committee (MUSERC) under reference **MUSERC/01347/24** and Siaya County hospital administration under number-**CGS/CHD/RESEARCH/1411/VOL.IV(146)** provided their ethical permission. Participants received comprehensive information about the study's potential risks and advantages. Benefits included enhanced healthcare quality through sustainable EHR use, whereas risks included emotional distress when disclosing sensitive information pertaining to EHR. All participants gave their informed participate freely in the study. Data privacy and anonymity were rigorously upheld. All possible biases were recognized and reduced to preserve the study's integrity and avoid conflicts of interest.

### **Authors' contributions**

A.J.A comprehended the idea, funded the research. D.O., and T.M., helped in refining, conceptualizing the study. A.J.A, D.O, T.M, and C.O.A, supported the analysis and interpretation of the findings. A.J.A, D.O, T.M, and C.O.A, both enhanced the manuscript development. A.J.A provided response to journal feedback on the manuscript. The final manuscript was reviewed and approved by all authors.

## **5.0 Results and Discussion**

### **5.1 Social demographics**

**Table 2: Socio-demographic characteristics of the participants.**

<b>Socio-demographic characteristics</b>	<b>n (%)</b>
<b>Age group</b>	
20-30	109(49.6%)
31-40	83 (37.9%)
Above 40	28 (12.5%)

<b>Gender</b>	
Female	99 (44.6%)
Male	121 (55.4%)
<b>Education level</b>	
Certificate	18 (8.0%)
Degree or above	78 (35.3%)
Diploma	124 (56.7%)

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Contains insights on participants' sociodemographic information. Participants 12.5% were over 40, while (49.6%) were aged 20 and 30 and 37.9% were between 31 and 40. Khan et al. (2025), noted that younger professionals are technologically adaptable to digital health. However, Akwaowo et al. (2022) established the significant role of older, experienced healthcare in EHR adoption.

On gender there were more men (55.4%) than women (44.6%). This reflect a more general gender dynamics in Kenya's medical workforce. Williams (2023), men likely hold leadership positions, while women predominate caregiving occupations like nursing. This is consistent with the study's statistics, where nurses, make up the biggest percentage of respondents (45.5%), while cadres like doctors (9.8%) and pharmacists (5.8%).

Majority (56.7%) had a diploma, (35.3%) degree, with only 8.0% certificate. (27), found that diploma clinical officers and nurses play a major role in service delivery. However, low percentage of degree holders may be a barrier to effective utilization of EHR, since Oo et al. (2021) higher learning is linked to better digital acceptance and less resistance. This suggests bridging this gap requires more tailored ongoing EHR professional training and development.

Nurses (45.5%), dominates the workforce, followed by clinicians (14.7%), laboratory technicians (14.3%) while both physicians and health records officers were (9.8%). This shortage of HRIOs is worrying since they are key in-patient data management. Nowrozy (2024) state that sufficient staffing of qualified information officers is significant for effective technology implementation.

## **5.2 Training and sustainability of electronic health records.**

Training and the long-term usage of EHR in Siaya County public health facilities are strongly correlated (Table 1).

**Table 3: Training results and sustainability of electronic health records.**

	EHR system		$\chi^2$	p value
	Unsustainable	Sustainable		
<b>Having been trained on HER</b>				
No	41 (51.2%)	39 (48.8%)	28.016	0.001
Yes	25 (17.6%)	115 (82.4)		
<b>The facility offers regular training on EHR</b>				
No	43 (51.2%)	41 (48.8%)	30.074	0.001
Yes	23 (16.7%)	113 (83.3%)		
<b>The frequency of the EHR training.</b>				
Once a year	14 (57.9%)	10 (42.1%)	34.026	0.001
Twice a year	6 (30.0%)	13 (70.0%)		
Thrice a year	5 (5.4%)	88 (94.6%)		
<b>Satisfaction with the level of Electronic Health records training</b>				
Very Satisfied	3 (13.6%)	25 (89.7%)	19.079	0.001
Satisfied	20 (21.5%)	72 (78.5%)		
Somewhat Satisfied	9 (33.3%)	18 (66.7%)		
Neutral	23 (44.4%)	29 (55.6%)		
Not Satisfied	11 (52.4%)	10 (47.6%)		

The chi-square test affirms the association between training and system use ( $\chi^2 = 28.016$ ,  $p = 0.001$ ) corresponding with earlier studies on EHR training. Khairat et al. (2018), training is a barrier to EHR sustainability lowering providers' trust and usability. Similarly, Mwogosi and Kibusi (2024), trained professionals likely apply the system into daily duties. Sustainability rate of institutions with ongoing EHR training was 83.3%, while those training once, 48.8%. ( $\chi^2 = 30.074$ ,  $p = 0.001$ ).

Facilities offering training three times had the highest sustainability rate (94.6%) compared to those offering training once (42.1%) ( $\chi^2 = 34.026, p = 0.001$ ). Khairat et al. (2018) found that regular training increased user competency, while irregular training resulted in high dropout rates as providers may find the system complex or lose interest. EHR training satisfaction was associated with Sustainability ( $\chi^2 = 19.079, p < 0.001$ ), with 89.7% of "very satisfied" users maintaining system usage, though 47.6% of dissatisfied respondents still sustained the system. Mwogosi and Kibusi (2024), support these findings, highlighting structured training's role in user engagement. This study establishes the necessity of EHR training in improving digital competency and system effectiveness, aligning with international best practices.

**5.3 Integration, satisfaction, level of confidence, Feeling, and EHR easing paper work.**

The results in **Table 2** show a strong correlation between the frequency of incorporating EHR into everyday tasks, confidence in utilizing the system, role of feeling and merits of EHR over paper work.

**Table 4: Frequency of EHR integration, satisfaction and confidence level of using EHR.**

	EHR system		$\chi^2$	p value
	Unsustainable	Sustainable		
<b>Satisfaction with the level of Electronic Health records training</b>				
Very Satisfied	3 (13.6%)	25 (89.7%)	19.079	0.001
Satisfied	20 (21.5%)	72 (78.5%)		
Somewhat Satisfied	9 (33.3%)	18 (66.7%)		
Neutral	23 (44.4%)	29 (55.6%)		
Not Satisfied	11 (52.4%)	10 (47.6%)		
<b>Having confidence in using the Electronic Health record</b>				
Very Confident	8 (19.5%)	32 (80.5%)	10.447	0.034
Confident	20 (21.6%)	75 (78.4%)		
Somewhat Confident	11 (42.3%)	15 (57.7%)		
Neutral	20 (44.4%)	24 (55.6%)		
Not Confident	7 (46.7%)	8 (53.3%)		
<b>The frequency of integrating the system in daily activities</b>				

Very often	8 (13.3%)	51 (86.7%)	14.226	0.007
Often	22 (30.3%)	52 (69.7%)		
Somewhat often	10 (33.3%)	20 (66.7%)		
Neutral	19 (44.2%)	23 (55.8%)		
Not often	7 (46.7%)	8 (53.3%)		
<b>How positive do you feel using the EHR in patient management?</b>				
1 (Not at all)	9 (64.3%)	5 (35.7%)	24.623	0.001
2	9 (64.3%)	5 (35.7%)		
3	17 (38.6%)	26 (61.4%)		
4	21 (25.0%)	65 (75.0%)		
5 (Way too much)	10 (15.6%)	53 (84.4%)		
<b>How does the use of EHR eased the former paperwork tasks?</b>				
1 (Not at all)	8 (61.5)	5 (38.5)	24.654	0.001
2	8 (61.5)	5 (38.5)		
3	10 (34.5)	18 (65.5)		
4	32 (33.3)	65 (66.7)		
5 (Way too much)	8 (11.4)	61 (88.6)		

EHR sustainability and the degree of confidence were associated ( $\chi^2 = 10.447$ ,  $p = 0.034$ ). Degree of those "very confident" was 80.5%, compared to 53.3% "not confident". This aligns with Tsai et al. (2019), showing that higher trust directly influence EHR use, while low confidence, leads to manual record-keeping dependent. Therefore, interventions such as hands-on training, mentorship programs, and technical assistance can foster user confidence and increase long-term system usage.

Integrating EHR into daily duties and sustainability were positively correlated ( $\chi^2 = 14.226$ ,  $p = 0.007$ ). Those who utilized the system "very often" had the highest sustainability rate (86.7%), whereas the lowest (53.3%) was among participants who used it "not often". Cooper etA al.

(2021) discovered that consistent use promotes familiarity and ease of handling the system. This calls for system improvement for usability to reduce workload stress.

Positive sentiments and EHR sustainable use are significantly correlated ( $\chi^2 = 24.623, p < 0.001$ ). Healthcare professionals are more likely to continue utilizing EHRs with a positive feeling. A bigger portion (84.4%) reported feeling "way too much", while (35.7%) "1 – Not at all"

This is consistent with Davis' (1989) TAM, highlighting the role of positive feeling on technology use since healthcare professionals are more likely to continue using EHRs if it improve workflow. Al-Otaibi et al. (2022) observed that doctors with positive attitudes were more satisfied and efficient while, negative feelings resulted in the system underutilization and resistance. This study findings affirms that favorable opinions are crucial to technology maintenance. The merits of technology over manual correlated with sustainable usage of EHR ( $\chi^2 = 24.654, p < 0.001$ ). The highest sustainability rate (88.6%) was attributed to those who felt that EHR had "way too much" decreased paperwork, whilst the lowest sustainability rate (38.5%) was attributed to those who said that EHR did not reduce paperwork.

These results align with Kroth et al. (2018), who noted that doctors who appreciates EHR effectiveness sustain its use due to reduced documentation, medical errors and enhanced work satisfaction. EHR preference significantly influence system survival, indicating the need for institutions to invest in interoperability and optimization. EHR preference strongly influences system longevity, emphasizing the need for institutions to invest in interoperability and optimization.

**5.4 The Perception, satisfaction and EHR sustainable use.**

Table 3 show how sustainable use of EHR in Siaya County public health facilities greatly influenced by knowledge and expertise, satisfaction, a user-friendly interface, and most enabler factor.

**Table 5: Perception, satisfaction, EHR interface and attributes influencing EHR sustainable use.**

	EHR system		$\chi^2$	p value
	Unsustainable	Sustainable		
<b>My understanding and experience with EHR are quite good</b>				
Strongly Agree	7 (15.6)	38 (84.4)	17.590	0.001
Agree	21 (22.6)	71 (77.4)		
Neutral	23 (48.9)	24 (51.1)		

Disagree	7 (46.7)	8 (53.3)		
Strongly Disagree	9 (37.5)	12 (62.5)		
<b>Satisfaction is a deterring factor for sustainable use of EHR</b>				
Strongly Agree	3 (7.5)	37 (92.5)	25.977	<0.001
Agree	20 (26.0)	56 (74.0)		
Neutral	28 (53.8)	24 (46.2)		
Disagree	6 (21.4)	19 (78.6)		
Strongly Disagree	10 (37.0)	17 (63.0)		
<b>The EHR interface is user friendly</b>				
Strongly Agree	6 (8.7)	62 (91.3)	43.384	<0.001
Agree	28 (28.2)	73 (71.8)		
Neutral	16 (51.6)	14 (48.4)		
Disagree	16 (76.2)	5 (23.8)		
<b>Which attributes provided most important for enabling your health facility to use EHR system in a sustainable manner?</b>				
Perceived benefits	20 (47.7)	22 (52.3)	8.866	0.012
User satisfaction	8 (32.0)	17 (68.0)		
User training	38 (24.5)	115 (75.5)		

A favorable experience of EHR strongly influenced sustainability ( $\chi^2 = 17.590$ ,  $p = 0.001$ ). Those with expertise 84.4% used it sustainably, in reference to 51.1% who were neutral. Davis (1989) on Technology Acceptance Model, links technology utilization to understanding. Kroth et al. (2018), users' adoption rates improved as they become accustomed to it, highlighting the value of practical experience. Satisfaction was a deterring factor ( $\chi^2 = 25.977$ ,  $p < 0.001$ ). Those who "strongly agreed" was 92.5%, whereas those neutral were 46.2%. Spatar et al. (2019) indicates that satisfaction majorly influence the adoption of EHRs. Users are satisfied with EHR when it is dependable, effective, and compatible with their workflow, while bad user experiences led to dissatisfaction.

A user-friendly interface and sustainable EHR use were strongly correlated ( $\chi^2 = 43.384$ ,  $p < 0.001$ ). While only 23.8% disagreed, 91.3% "strongly agreed" that the EHR interface was user-

friendly. Tutty et al. (2019) support this, highlighting system flexible in usability, while Spatar et al. (2019) discovered that ill-designed EHR led to its rejection. This demonstrates the importance user-centered design. User training (75.5% sustainability) had the greatest impact on EHR sustainability, followed by user satisfaction (68.0%) and perceived benefits (52.3%) ( $\chi^2 = 8.866$ ,  $p = 0.012$ ). Tsai et al. (2020) supports this, citing structured training’s role in long-term EHRs use, Niazkhani et al. (2020) highlights its role in reducing resistance and increases efficiency. Healthcare organizations must enhance training initiatives and strengthen user satisfaction.

**5.5 Benefits of EHR**

Table 4 examine the advantages of EHR and how they affect sustainable use. Chi-square test results show no statistically significant associations, despite data suggesting a positive perception of EHR such in productivity, error reduction, communication, and patient safety.

**Table 6: Perceived benefits of electronic health records.**

	EHR system		$\chi^2$	p value
	Unsustainable	Sustainable		
<b>I always feel fulfilled when using all EHR functionalities</b>				
Strongly Agree	10 (22.4)	33 (77.6)	5.447	0.142
Agree	23 (26.8)	62 (73.2)		
Neutral	15 (43.6)	19 (56.4)		
Disagree	11 (33.3)	23 (66.7)		
Strongly Disagree	9 (37.0)	15 (63.0)		
<b>EHR use has reduced medical errors</b>				
Strongly Agree	15 (23.1)	49 (76.9)	5.878	0.118
Agree	31 (29.1)	77 (70.9)		
Neutral	14 (46.9)	17 (53.1)		
Disagree	5 (29.4)	12 (70.6)		
<b>EHR has increased effective communication</b>				
Strongly Agree	15 (21.7)	53 (78.3)	6.491	0.090

Agree	35 (30.0)	83 (70.0)		
Neutral	10 (44.0)	14 (56.0)		
Disagree	5 (50.0)	5 (50.0)		
<b>EHR use has improved my productivity</b>				
Strongly Agree	15 (23.1)	49 (76.9)	2.103	0.551
Agree	33 (32.1)	71 (67.9)		
Neutral	14 (34.1)	26 (65.9)		
Disagree	4 (33.3)	8 (66.7)		
<b>EHR use has improved patient quality care and safety</b>				
Strongly Agree	15 (20.3)	61 (79.7)	6.738	0.081
Agree	38 (33.0)	67 (67.0)		
Neutral	11 (35.5)	21 (64.5)		
Disagree	4 (57.1)	3 (42.9)		
<b>EHR use has decreased patient-care interaction</b>				
Strongly Agree	14 (23.7)	44 (76.3)	4.746	0.191
Agree	30 (33.7)	60 (66.3)		
Neutral	20 (35.1)	36 (64.9)		
Strongly Disagree	2 (12.5)	14 (87.5)		

Users who "strongly agreed" that they felt fulfilled using all EHR capabilities had a sustainability rate of 77.6%. Association, was not statistically significant ( $p = 0.142$ ,  $\chi^2 = 5.447$ ). Kroth et al. (2018), discovered perceived utility as influencer of EHR sustainability possibly as a result of training gaps. Additionally, 76.9% believed EHR lowers medical errors; however no significant association ( $\chi^2 = 5.878$ ,  $p = 0.118$ ). Nevertheless, poorly designed EHR systems can result in additional errors (41). Though 78.3% of participants "strongly agreed" EHR enhanced communication, the association was not statistically significant ( $\chi^2 = 6.491$ ,  $p = 0.090$ ). Baporikar (2024), EHR reduces errors and improves communication by guaranteeing real-time data access across departments, facilitating improved care coordination. This implies that although EHRs have the potential to enhance communication, their actual impact is contingent upon system design.

The sustainability rate correlated with the believe in the EHR role in enhancing productivity, 76.9%, however no association was observed. Moy et al. (2023), suggests that productivity gains of EHR may be hindered by inadequate training and technical issues specifically in low resourced regions. Those who supported EHR as providing patient care and safety, (79.7%) utilized it sustainably, statistically it was not significant ( $p = 0.081$ ,  $\chi^2 = 6.738$ ). while (44) indicates EHR role as providing decision at the point of care, Furukawa et al. (2020) states patient safety as a significant driver of EHR implementation. The lack of significance may be explained by limited system integration.

Reduced patient-care interaction did not influence EHR sustainable use ( $\chi^2 = 4.746$ ,  $p = 0.191$ ). Studies have elicited mixed findings, Lyles et al. (2020), shows that EHR increase patient engagement through shared decision-making while Dendere et al. (2019) lowers substantial interactions. The study thus indicates EHR’s influence on engagement differs with workflow and usability integration. Despite participants positive attitude, the factors did not show the association with system sustainability. Therefore, elements like training, workflow compatibility, and system usability might be more potent predictors of sustainability.

**5.6 Staff attributes influencing EHR sustainability**

Table 9 provides results of bivariate and multivariate logistic regression. Employees having EHR training were more likely to use the system sustainably (AOR = 4.409, 95% CI: 2.334 – 8.330,  $p = 0.001$ ). Hospitals providing regular training saw increased sustainability rate. (AOR = 9.632, 95% CI: 1.407 – 65.915,  $p = 0.021$ ). Users who received training three times a year were 44.7 times more likely to continue using EHRs than those trained once a year, (AOR = 44.700, 95% CI: 7.441 – 68.522,  $p = 0.001$ ). Mohamadali and Aziz (2017) pointed insufficient training as a major obstacle to sustainability. Therefore, healthcare facilities should focus on regular, customized training in order to maximize the adoption of EHRs.

**Table 7: Bivariate and multivariate logistic regression results for staff attributes influencing EHR sustainability.**

	Sustainability	OR (95% CI)	<i>p</i> value	AOR (95% CI)	<i>p</i> value
Having received EHR training					
Yes	115 (82.4%)	4.914 (2.666 – 9.058)	0.001	4.409 (2.334 – 8.330)	0.001
No	39 (48.8%)	Ref		Ref	
Health facility offering regular training on EHR					
Yes	113 (83.3%)	5.238 (2.830 – 9.696)	0.001	9.632 (1.407 – 65.915)	0.021

No	41 (48.8%)	Ref			Ref
The frequency of offering the training					
Once per year	10 (42.1%)	Ref			Ref
Twice per year	13 (70.0%)	3.208 (0.967 – 10.648)	0.057	2.352 (0.536 – 10.326)	0.257
Thrice per year	88 (94.6%)	24.200 (6.721 – 87.139)	0.001	44.700 (7.441 – 68.522)	0.001
Satisfaction with the level of Electronic Health records training					
Very Satisfied	25 (89.7%)	9.533 (2.191 - 41.473)	0.003	4.506 (2.635 – 1.706)	0.009
Satisfied	72 (78.5%)	4.015 (1.493 – 10.794)	0.006	2.045 (1.101 – 5.876)	0.040
Somewhat Satisfied	18 (66.7%)	2.200 (0.681 – 7.103)	0.187	1.819 (0.713 – 6.466)	0.096
Neutral	29 (55.6%)	1.375 (0.500 - 3.779)	0.915	1.441 (0.449 – 6.526)	0.234
Not Satisfied	10 (47.6%)	Ref			Ref
Having confidence in using the EHR.					
Very Confident	32 (80.5%)	3.609 (1.009 -12.917)	0.048	1.816 (0.466 – 7.083)	0.390
Confident	75 (78.4%)	3.167 (1.030 - 9.740)	0.044	1.559 (0.468 – 5.194)	0.470
Somewhat Confident	15 (57.7%)	1.193 (0.332 - 4.285)	0.787	1.315 (0.354 – 4.887)	0.683
Neutral	24 (55.6%)	1.094 (0.339-3.533)	0.881	1.079 (0.209 – 2.540)	0.620
Not Confident	8 (53.3%)	Ref			Ref
The frequency of using the EHR system					
Very often	51 (86.7%)	5.687 (1.616 - 20.014)	0.007	4.295 (1.020 – 18.086)	0.047
Often	52 (69.7%)	2.016 (0.654 - 6.218)	0.222	1.494 (0.414 – 5.386)	0.540
Somewhat often	20 (66.7%)	1.750 (0.493 – 6.213)	0.387	1.490 (0.375 – 5.923)	0.571
Neutral	23 (55.8%)	1.105 (0.340 - 3.595)	0.868	1.094 (0.259 – 3.815)	0.993
Not often	8 (53.3%)	Ref			Ref
Rating the EHR positive feeling					
1	5 (35.7%)	Ref			Ref

2	5 (35.7%)	1.00 (0.21 – 4.693)	1.000	0.824 (0.138 – 4.930)	0.832
3	26 (61.4%)	2.859 (0.819 - 9.982)	0.100	2.173 (0.519 – 8.796)	0.293
4	65 (75.0%)	5.400 (1.635 - 17.839)	0.006	3.903 (1.054 – 15.968)	0.048
5	53 (84.4%)	5.600 (1.077 - 29.106)	0.001	5.638 (1.260 – 10.220)	0.024

EHR eased former paper work

1	5 (38.5)	Ref		Ref	
2	5 (38.5)	1.00 (0.206 – 4.856)	1.000	0.520 (0.079 - 3.440)	0.489
3	18 (65.5%)	3.040 (0.785 -11.780)	0.347	1.183 (0.251 – 5.570)	0.832
4	65 (66.7%)	3.200 (0.971- 10.550)	0.056	2.030 (0.333 – 12.369)	0.432
5	61 (88.6%)	12.400 (3.253 - 47.268)	0.001	1.456 (1.009 – 2.100)	0.044

Understanding and experience with the EHR are quite good

Strongly Agree	38 (84.4%)	3.257 (1.027 – 10.333)	0.045	1.852 (0.478 – 7.178)	0.373
Agree	71 (77.4%)	2.057 90.789 – 5.366)	0.140	1.289 (0.430 – 3.866)	0.650
Neutral	24 (51.1%)	0.626 (0.229 – 1.710)	0.361	0.549 (0.161 – 1.872)	0.338
Disagree	8 (53.3%)	0.686 (0.185 – 2.537)	0.678	0.626 (0.132 – 2.979)	0.556
Strongly Disagree	12 (62.5%)	Ref			

Satisfaction is a deterring factor for sustainable use of EHR

Strongly Agree	37 (92.5%)	7.255 (1.767 – 29.782)	0.006	7.839 (1.353 – 45.420)	0.022
Agree	56 (74.0%)	1.676 (0.660 – 4.260)	0.277	1.155 (0.308 – 4.334)	0.831
Neutral	24 (46.2%)	0.504 (0.194 – 1.307)	0.159	0.445 (0.116 – 1.702)	0.237
Disagree	19 (78.6%)	2.157 (0.654 – 7.116)	0.207	4.130 (0.846 – 20.175)	0.080
Strongly Disagree	17 (63.0%)	Ref			

The EHR interface is user friendly

Strongly Agree	62 (91.3%)	33.600 (9.088 - 124.219)	0.001	30.082 (3.021 – 99.609)	0.015
Agree	73 (71.8%)	8.166 (2.740-24.338)	0.001	4.903 (0.598 – 10.143)	0.083
Neutral	14 (48.4%)	3.000 (0.888 – 10.229)	0.079	4.198 (0.255 – 6.908)	0.151

Disagree	5 (23.8%)	Ref			
The most important attributes enabling sustainable use of EHR					
Perceived benefits	22 (52.3%)	Ref			
User satisfaction	17 (68.0%)	1.940 (0.694 -5.422)	0.206	1.456 (0.265 – 11.532)	0.896
User training	115 (75.5%)	2.811 (1.402 – 5.636)	0.004	2.534 (1.567 – 5.124)	0.017

Those who were very satisfied had 4.5 times higher chances continuing EHRs use (AOR = 4.506, 95% CI: 2.635 – 1.706, p = 0.009). Kroth et al. (2018) discovered that satisfying experiences increase user engagement. Despite having greater odds of continuing to use EHRs, the adjusted odds ratios of "very confident" and "confident" users were not significantly linked (AOR = 1.816, p = 0.390 and AOR = 1.559, p = 0.470). Papadopoulos et al. (2024) established a greater system participation as correlated with trust in using EHR. Confidence alone is inadequate; technical support, system usability, and training are necessary.

EHR usage frequency was 4.3 times higher for frequently users (AOR = 4.295, 95% CI: 1.020 – 18.086, p = 0.047). Cresswell et al. (2017) discovered that frequent engagement increases familiarity and lowers resistance. However, Adeyemi (2017) warned that EHR burden could result in burnout, thus systems should be tailored to prevent user fatigue. A favorable opinion of EHR influenced sustainability, respondents were 5.6 times likely to continue using the EHR (AOR = 5.638, 95% CI: 1.260 – 10.220, p = 0.024). Davis's (1989) Technology Acceptance Model, holds that perceived utility and usability are key factors in determining the acceptance of new technologies.

EHR interface enhanced sustainability. With users 30 times more likely to continue if they found it easy (AOR = 30.082, 95% CI: 3.021 – 99.609, p = 0.015). Touliabah et al. (2025) highlighted that intuitive system design increases that long-term engagement. User training had the greatest impact, enhances EHR use likelihood by 2.5 (AOR = 2.534, 95% CI: 1.567 – 5.124, p = 0.017). Remarkably, perceived benefits nor user happiness were not significant (p > 0.05). However, Sugandini et al. (2018) claimed perceived utility in the adoption of technology. This cites is crucial for sustainability of EHRs.

### **6.0 Conclusions and Recommendations**

There was association between EHR sustainability and training, system usability, frequency of use, and user perception. Training, at least three times a year, was the greatest factor followed by EHR interface promoting the adoption. However perceived benefits and EHR confidence were important, training and satisfaction mostly influenced the EHR maintenance, advocating the TAM framework. For health facilities to continue with EHR use, they require to prioritize

regular capacity building and user-friendly system design. Training needs to be practical and tailored to provider's needs. Technology developers to work with users in mind, regularly update the system and streamline the workflows for user satisfaction. Similarly, internet access, power supply and technical enhancement are essential. Standardized data protection should be reinforced by the authority to strengthen trust in EHR sustainable use.

### **Summary of the study's significance**

#### Known information

- Healthcare providers struggle to access information for better service delivery, despite EHR's role in enhancing patient management through improved data handling.
- Many facilities fail to sustain EHR utilization, limiting its benefits, while little is known on factors influencing its sustainability especially in developing countries.

#### What this study adds

- It offers valuable insights for healthcare management teams, administrators and users, for actionable recommendations for responsive training ensuring EHR infrastructure meets user needs and motivating staff to integrate the system into daily tasks for sustainability.

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