

Utilization of the TaifaCare Tiberbu Electronic Medical Records System (EMR) Among Healthcare Workers in Migori County Referral Hospital, Migori County, Kenya

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Abstract: Electronic Medical Records are increasingly recognized as critical tools for strengthening healthcare systems, improving clinical documentation, enhancing continuity of care, supporting health financing, and promoting Universal Health Coverage (UHC). Kenya has recently implemented the TaifaCare Tiberbu Electronic Medical Records system across public health facilities to support standardized patient management and integration with the Social Health Authority Kenya and Social Health Insurance Fund (SHIF). Despite rapid implementation, limited evidence exists regarding utilization, functionality, interoperability, and user experiences following roll-out in county referral hospitals. The system is the national Electronic Medical Records being rolled out across public health facilities in Kenya to support universal health coverage, Social Health Authority (SHA) claims processing and standardized clinical documentation. This study sought to: Describe the demographic and professional profile of users at Migori County Referral Hospital, quantify training coverage, frequency of use and self-rated competence, measure perceived improvements in documentation, retrieval, waiting time and reporting, Assess interoperability with SHA-SHIF and impact on claims and revenue and Surface user-reported challenges, suggestions and governance concerns (data protection, medico-legal). Chi-square and Fisher's exact tests identified several significant associations. Training was strongly associated with self-reported competence ($p < 0.001$), improved reporting ($p < 0.001$), and improved retrieval ($p = 0.005$). SHA-SHIF interoperability was strongly linked to seamless data exchange ($p < .001$) and to perceived claims-processing improvement ($p < 0.001$). Functional gadgets were associated with more favourable service-quality ratings ($p < .001$), and daily use was associated with skills and competence ($p < .001$). Gender was not associated with training ($p = 0.870$) or competence ($p = 0.630$). Training did not predict revenue improvement ($p = 1.000$), suggesting financial gains may depend on factors beyond formal training alone in this study.

Keywords: *Electronic Medical Records, TaifaCare Tiberbu, Utilization, SHA-SHIF Interoperability, Digital Health, Healthcare Service Delivery, Migori County Referral Hospital, Kenya, Health Information Systems.*

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I. INTRODUCTION

➤ Background Information

Electronic Medical Records (EMRs) are increasingly recognized as critical tools for strengthening healthcare systems, improving clinical documentation, enhancing continuity of care, supporting health financing, and promoting Universal Health Coverage (UHC). Kenya has recently implemented the TaifaCare Tiberbu Electronic Medical Records system across public health facilities to support standardized patient management and integration with the Social Health Authority Kenya and Social Health

Insurance Fund (SHIF). Despite rapid implementation, limited evidence exists regarding utilization, functionality, interoperability, and user experiences following roll-out in county referral hospitals.

Migori County Referral Hospital serves a population of 40,118 as the primary tertiary facility and teaching hospital for Migori County, functioning as the central referral hub for specialized services across Migori and neighboring counties. The facility is critical to healthcare delivery in the region, yet it has been systematically undermined by the rollout of this system.

- Biometric Verification Failures: The Tiberbu system experiences frequent downtimes sometimes up to five times a month—disrupting hospital operations. Biometric verification challenges are particularly acute for vulnerable patients without Identity cards (IDs) or those with faint fingerprints.

➤ *Comprehensive Assessment Report*

TaifaCare Tiberbu is an integrated Hospital Management Information System (HMIS) supporting patient registration, clinical care, laboratory, pharmacy, billing, inpatient services, disease programs, reporting, and interoperability within Kenya's digital health ecosystem. The assessment identified several operational and functional gaps affecting clinical workflows, reporting, revenue collection, patient management, and overall quality of service delivery. TaifaCare Tiberbu is the national EMR being rolled out across public health facilities in Kenya to support universal health coverage. Social Health Authority (SHA) claims processing and standardized clinical documentation. This utilization study sought to: Describe the demographic and professional profile of users at Migori County Referral Hospital, quantify training coverage, frequency of use and self-rated competence, Measure perceived improvements in documentation, retrieval, waiting time and reporting, Assess interoperability with SHA-SHIF and impact on claims and revenue and Surface user-reported challenges, suggestions and governance concerns (data protection, medico-legal).

➤ *Problem Statement*

The adoption and effective utilization of electronic medical record (EMR) systems are critical for improving healthcare service delivery, enhancing data quality, supporting clinical decision-making, and facilitating efficient health information management. The TaifaCare Tiberbu electronic medical record system was introduced to streamline patient medical record management, improve reporting, and strengthen healthcare operations. However, despite its potential benefits, its utilization among healthcare workers remains suboptimal.

➤ *Research Objective*

• *Broad Objective*

To assess the utilization of the TaifaCare Tiberbu Electronic Medical Records System, among the health care providers at Migori County Referral Hospital.

• *Specific Objectives*

- To examine the level of utilization of the TaifaCare Tiberbu Electronic Medical Records System among healthcare workers
- To assess the functionality of the TaifaCare Tiberbu Electronic Medical Records System in supporting healthcare service delivery.
- To evaluate interoperability between the TaifaCare Tiberbu Electronic Medical Records System and SHA-SHIF.

- To determine the influence of the TaifaCare Tiberbu Electronic Medical Records System, on service delivery outcomes.

II. LITERATURE REVIEW

A. Introduction

Electronic Medical Record (EMR) systems have become a cornerstone of digital health transformation globally due to their potential to improve healthcare quality, patient safety, efficiency, and health information management. The successful utilization of EMR systems depends on multiple factors, including user readiness, infrastructure availability, training, system interoperability, and institutional support. Despite substantial investments in digital health technologies, many healthcare facilities continue to experience challenges in achieving optimal system utilization, particularly in resource-constrained settings. This literature review examines existing evidence on EMR utilization with a focus on healthcare worker uptake, training, interoperability, system access, and availability of digital tools, which are relevant to the utilization of the TaifaCare Tiberbu EMR system.

➤ *Electronic Medical Record Utilization in Healthcare*

The adoption and utilization of Electronic Medical Record systems have been recognized globally as essential components of healthcare modernization. The World Health Organization emphasizes that digital health technologies strengthen health systems by improving data collection, service delivery, decision-making, and continuity of care (World Health Organization [WHO], 2021). According to the WHO Digital Health Strategy 2020–2025, healthcare organizations are encouraged to leverage digital technologies to improve patient outcomes and enhance healthcare efficiency (WHO, 2021).

Research has shown that successful EMR implementation contributes to improved clinical documentation, reduced medical errors, and enhanced healthcare coordination. However, achieving these benefits depends largely on the extent to which healthcare workers adopt and consistently utilize the systems (Boonstra et al., 2019). Studies indicate that healthcare workers' acceptance and routine use of EMRs are critical determinants of implementation success (McGinn et al., 2022).

➤ *Healthcare Workers' Uptake of Electronic Medical Records System*

Low uptake of EMR systems among healthcare workers remains a significant challenge in many healthcare settings. Aldosari (2017) found that Electronic Medical Record adoption rates varied considerably across healthcare facilities, with organizational support, user attitudes, and technological readiness influencing utilization levels. Healthcare workers who perceived Electronic Medical Record as useful and easy to use were more likely to adopt them in their daily practice.

Similarly, Kruse et al. (2016), through a systematic review, identified resistance to change, inadequate user

engagement, and poor system usability as major barriers to Electronic Medical Record adoption. The study concluded that low uptake often results from insufficient involvement of end-users during system implementation and inadequate support structures.

In Kenya, Ngugi et al. (2021) observed that despite increasing deployment of Electronic Medical Record systems, healthcare workers in resource-constrained facilities often continue using paper-based systems due to technological and operational challenges. This finding suggests that availability of Electronic Medical Records System, systems alone does not guarantee utilization, highlighting the need to address contextual barriers that affect uptake.

➤ *User Readiness and Access Challenges*

User readiness is a critical determinant of successful EMR implementation and utilization. Ajami et al. (2018) emphasized that organizational and individual readiness significantly influence Electronic Medical Records System, adoption outcomes. Their study found that healthcare workers who are adequately prepared and supported are more likely to embrace digital systems.

One challenge affecting utilization of the TaifaCare Tiberbu Electronic Medical Record system is the lack of One-Time Password (OTP) access, which limits healthcare workers' ability to log into and utilize the system effectively. Although OTP-specific challenges have not been extensively studied in EMR literature, access barriers are consistently identified as factors that reduce system utilization. Gagnon et al. (2020) noted that technical barriers, including authentication challenges and system accessibility issues, negatively affect healthcare workers' willingness to use electronic systems. Frequent login difficulties can lead users to revert to manual documentation processes, thereby reducing the effectiveness of EMR implementation efforts.

➤ *Influence of Training on Electronic Medical Records (EMR) Utilization*

Training is one of the most cited determinants of successful EMR utilization. According to Boonstra et al. (2019), inadequate training contributes significantly to user dissatisfaction, low confidence, and poor system adoption. Healthcare workers require continuous training to develop the competencies necessary for effective use of EMR systems.

McGinn et al. (2018) found that healthcare workers who receive comprehensive training are more likely to perceive EMRs positively and integrate them into their workflows. Similarly, Kruse et al. (2016) identified insufficient training as a leading barrier to Electronic Medical Record adoption across healthcare organizations.

In the Kenyan context, the Ministry of Health Kenya Digital Health Strategy recognizes capacity building and digital literacy among healthcare workers as key requirements for successful digital health implementation (Ministry of Health Kenya, 2022). The strategy emphasizes continuous professional development to ensure healthcare

workers can effectively utilize digital health solutions. Therefore, inadequate training on the TaifaCare Tiberbu Electronic Medical Records System, system may contribute to low utilization by limiting healthcare workers' knowledge, confidence, and ability to use the system effectively.

➤ *Interoperability and Integration with SHA-SHIF Billing and Revenue Systems*

Interoperability refers to the ability of different health information systems to exchange, interpret, and use data seamlessly. Effective interoperability is essential for achieving integrated healthcare service delivery and efficient health financing management.

The Ministry of Health Kenya Health Information System Interoperability Framework highlights interoperability as a key pillar for digital health transformation in Kenya (Ministry of Health Kenya, 2023). The framework emphasizes the need for integrated systems that support data exchange across clinical, administrative, and financial platforms.

The emergence of the Social Health Authority and the implementation of SHIF require healthcare facilities to maintain efficient digital claims management systems. According to the Social Health Authority Kenya (2024), healthcare facilities are expected to utilize interoperable digital systems that facilitate timely claims submission, verification, and reimbursement.

Studies have shown that lack of interoperability can significantly hinder EMR utilization. Gagnon et al. (2020) reported that fragmented systems and poor integration reduce user satisfaction and increase workload due to duplicate data entry requirements. Similarly, Were et al. (2019) observed that integrated EMR systems improve efficiency and support continuity of care, whereas disconnected systems create operational inefficiencies.

Where the TaifaCare Tiberbu Electronic Medical Record system lacks seamless integration with SHA-SHIF revenue systems, healthcare workers may experience increased administrative burdens, reduced efficiency, and diminished motivation to use the system.

➤ *Availability of Digital Tools and Infrastructure*

Adequate technological infrastructure is fundamental to EMR utilization. This includes reliable computers, tablets, laptops, internet connectivity, and power supply. Several studies have identified infrastructure limitations as major barriers to Electronic Medical Records System, adoption, particularly in low-resource settings.

Kruse et al. (2016) found that insufficient hardware and technological resources significantly impede EMR implementation. Likewise, Boonstra et al. (2019) reported that inadequate access to computers and related devices limits healthcare workers' ability to use electronic systems effectively.

In resource-constrained environments, healthcare workers often share limited devices, resulting in delays and reduced system usage. Were et al. (2019) highlighted that successful EMR implementation in low-income settings requires adequate investment in technological infrastructure and user support mechanisms.

The WHO classification of digital health interventions identifies hardware availability as a foundational requirement for digital health implementation (WHO, 2022). Therefore, inadequate provision of tablets and laptops within healthcare facilities may significantly affect healthcare workers' ability to access and utilize the TaifaCare Tiberbu Electronic Medical Records System,

➤ *Theoretical and Policy Context*

The WHO Global Strategy on Digital Health 2020–2025 advocates for strengthening digital health ecosystems through improved infrastructure, workforce capacity, interoperability, and governance mechanisms (WHO, 2021). Furthermore, WHO (2023) emphasizes the importance of monitoring and evaluating digital health interventions to identify implementation barriers and inform evidence-based improvements.

In Kenya, the Digital Health Strategy 2020–2025 and the Health Information System Interoperability Framework provide policy direction for digital transformation within the health sector (Ministry of Health Kenya, 2022; Ministry of Health Kenya, 2023). These frameworks emphasize user-centered digital health solutions, workforce capacity development, and interoperability among health information systems.

Despite these policy efforts, evidence remains limited regarding the utilization of specific EMR systems such as TaifaCare Tiberbu and the factors influencing healthcare workers' use of the platform, particularly in relation to OTP access, training, interoperability with SHA-SHIF systems, and availability of digital tools.

➤ *Knowledge Gap*

Existing literature demonstrates that EMR utilization is influenced by multiple factors, including user readiness, training, infrastructure, accessibility, and interoperability. While numerous studies have examined barriers to EMR adoption globally and within resource-limited settings, limited empirical evidence exists regarding the utilization of the TaifaCare Tiberbu Electronic Medical Records System, among healthcare workers in Kenya. Specifically, there is insufficient information on how low uptake, lack of One-Time Password OTP access, inadequate training, limited interoperability with SHA-SHIF revenue systems, and

inadequate availability of tablets and laptops affect system utilization. This study therefore seeks to fill this knowledge gap by assessing the utilization of TaifaCare Tiberbu EMR and examining the influence of these factors on its use among healthcare workers.

Evidence from routine implementation experiences indicates that many healthcare workers have not fully integrated the TaifaCare Tiberbu Electronic Medical Records system into their daily clinical and administrative workflows. Low system uptake has limited the realization of the expected benefits of digital health interventions, including timely access to patient information, improved continuity of care, and efficient health facility management. Several challenges have been identified as possible contributors to this low utilization.

One major challenge is intermittent /on and off One-Time Password (OTP) access and authentication support, which hinders user login and system accessibility. Additionally, inadequate training has left many healthcare workers without the necessary knowledge and skills to confidently use the EMR system, resulting in inconsistent utilization and reliance on paper-based records. Furthermore, the limited interoperability between the TaifaCare Tiberbu Electronic Medical Records system and the Social Health Authority (SHA) and Social Health Insurance Fund (SHIF) billing and revenue management systems has created inefficiencies in claims processing, financial reporting, and data exchange. The situation is further compounded by inadequate availability of essential digital devices such as tablets and laptops, restricting healthcare workers' ability to access and utilize the system at points of care.

➤ *Conceptual Framework*

Despite ongoing investments in digital health technologies, there is limited empirical evidence on the extent to which these factors influence the utilization of the TaifaCare Tiberbu Electronic Medical Records system among healthcare workers. Without a clear understanding of the barriers affecting system adoption and use, health facilities and policymakers may be unable to implement targeted interventions to improve EMR utilization and optimize healthcare service delivery. Therefore, this study seeks to assess the utilization of the TaifaCare Tiberbu Electronic Medical Record system among healthcare workers and examine how low uptake, lack of OTP access, inadequate training, limited interoperability with SHA-SHIF revenue systems, and insufficient digital equipment influence its utilization. The findings will provide evidence to guide strategies aimed at enhancing EMR adoption, improving health information management, and strengthening healthcare service delivery.

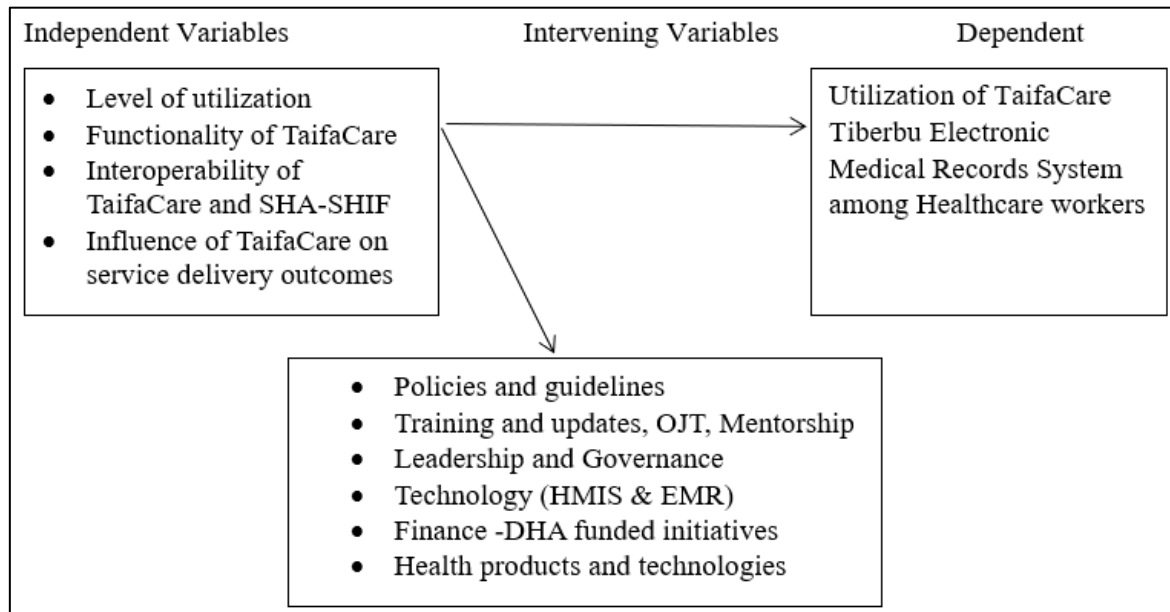


Fig 1 Conceptual Framework for the Successful Utilization of TaifaCare Tiberbu Electronic Medical Records (EMR)
Source: Amoti-Kaguma, and Nuwaha, 2000

III. MATERIALS AND METHODS

- Design: Cross-sectional descriptive survey. Sample: 184 health workers purposively sampled across departments. Instrument: structured questionnaire with closed-ended (Yes/No/Likert) and open-ended items. Analysis: descriptive frequencies and proportions for quantitative items; thematic grouping of open-ended responses for challenges, suggestions and opinions.

➤ Study Area

Migori County Referral Hospital department where EMR system was being used in patient care included OPD and Casualty and emergency, Medical Wards, Surgical Wards, Paediatrics and Newborn Ward, Pharmacy (Orders, dispensing and stock reconciliation) and SHA-SHIF and M-Pesa billing, claims and payments.

➤ Study Design

Cross-sectional descriptive survey.

➤ Study Population

All health care workers by cadre who offered direct health care services patients and clients.

➤ Inclusion Criteria

All staff offering health care services including registration, consultations, surgical procedures, dispensing drugs, billings and claims services.

➤ Exclusion Criteria

All non- clinical healthcare workers.

➤ Study Limitations

Findings reflected perceptions rather than audited system performance metrics. Revenue-improvement percentages used were estimates to limit the influence of extreme outliers.

➤ Sample Size

A sample of 184 healthcare workers was targeted, and 180 completed the questionnaire (response rate = 97.8%)."

Use Cochran formula:

$$n = Z^2 pq / d^2$$

The sample size was determined using Cochran's (1977) formula for proportions. At a 95% confidence level, 5% margin of error, and an assumed proportion of 50%, the initial sample size was calculated as 384 respondents.

$$n_0 = \frac{Z^2 pq}{e^2}$$

Since the target population of healthcare providers was finite (N = 320), the finite population correction formula was applied:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where:

n_0 = initial sample size

Z = Z-score at 95% confidence level = 1.96

p = estimated proportion = 0.5

q = 1 - p = 0.5

e = margin of error = 0.05

$$n_0 = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2}$$

$$n_0 = \frac{3.8416 \times 0.25}{0.0025}$$

$$n_0 = 384.16$$

Thus: $n_0 = 384$: This yielded a sample size of 175 respondents. After adjusting for a 5% non-response rate, the final sample size was 184 respondents, targeted which was considered adequate to achieve the study objectives and 180 participants responded to the questionnaire.

➤ Sampling Procedures

- Quantitative: Stratified random sampling.
- Qualitative: Purposive sampling.

➤ Data Collection

- Quantitative Data: Program indicators: Number of patients registered, number of claims, number of billings paid, number of reports, number of health workers trained, number of functional tablets and lap top computers.

➤ Qualitative Data

Focused Group Discussion (FGDs) and Key Informant Interview (KIIs)

➤ Data Analysis, Presentation and Interpretation

• Introduction

This report presents chi-square tests and binary logistic regression analyses of the TaifaCare Tiberbu Electronic

Medical Records Questionnaire (180 respondents). Chi-square and Fisher's exact tests examine associations between categorical variables. Logistic regression models estimate adjusted odds of binary outcomes. Significance is evaluated at $\alpha = 0.05$.

IV. RESULTS/FINDINGS

User opinion ranged from broadly positive 'reduced paper work', 'made work easier', 'should be rolled out to other counties', to other perceptions strongly critical, system was 'pathetic', 'frustrating patients', 'the full roll-out was rushed'). A recurring theme is that the product idea was sound but the implementation approach and change-management was weak. This was critical-feedback for the top leadership management for a corrective measure. Health care workers absent or unwilling to participate in the study. This report presents chi-square tests and binary logistic regression analyses of the TaifaCare Tiberbu Electronic Medical Records Questionnaire (180 respondents) from targeted 184 respondents. Chi-square and Fisher's exact tests examine associations between categorical variables. Logistic regression models estimate adjusted odds of binary outcomes. Significance is evaluated at $\alpha = 0.05$.

➤ Chi-Square Tests of Association and significance

Chi-square (or Fisher's exact) tests were used to examine associations between demographic factors, training, system use, interoperability, and perceived EMR outcomes.

Table 1 Chi-Square and Fisher's Exact Tests of Association

Comparison	n	Test	Statistic	p
Gender × Training received	180	χ^2	0.03	0.870
Gender × Competence	180	Fisher's exact	—	0.607
Training × Competence	180	Fisher's exact	—	< .001
Training × Documentation improved	180	χ^2	4.90	0.086
Training × Retrieval improved	180	Fisher's exact	—	0.005
Training × Waiting time reduced	180	Fisher's exact	—	0.152
Training × Reporting improved	180	χ^2	18.59	< .001
Training × Adequate support	180	χ^2	1.35	0.508
SHA interoperability × Claims improved	180	Fisher's exact	—	< .001
SHA interoperability × Data exchange	180	χ^2	32.62	< .001
Gadget functional × Service quality	180	Fisher's exact	—	< .001
Usage frequency × Competence	180	Fisher's exact	—	< .001
Gender × Revenue improved	180	Fisher's exact	—	0.066
Training × Revenue improved	180	Fisher's exact	—	1.000
Data protection × Medical-legal issues	180	Fisher's exact	—	< .001

Chi-square and Fisher's exact tests identified several significant associations. Training was strongly associated with self-reported competence ($p < .001$), improved reporting ($p < .001$), and improved retrieval ($p = .005$). SHA-SHIF interoperability was strongly linked to seamless data exchange ($p < .001$) and to perceived claims-processing improvement ($p < .001$).

Functional gadgets were associated with more favorable service-quality ratings ($p < .001$), and daily use was associated with competence ($p < .001$).

Gender was not associated with training ($p = .870$) or competence ($p = 0.630$). Training did not predict revenue improvement ($p = 1.000$), suggesting financial gains may depend on factors beyond formal training alone.

➤ *Logistic Regression Models*

Binary logistic regression was used to estimate adjusted odds of key binary outcomes while controlling for covariates.

• *Model 1: Self-Reported Competence*

Table 2 Logistic Regression Predicting Self-Reported Competence.
OR = odds ratio. Reference categories: male, non-daily use, untrained.

Predictor	OR	95% CI	z	p
Training received	6.32	[3.07, 13.41]	4.92	< .001
Age	0.99	[0.95, 1.03]	-0.36	= 0.717
Female	1.21	[0.59, 2.52]	0.52	= 0.602
Daily use	2.64	[0.89, 8.04]	1.75	= 0.080

After adjusting for age, gender, and daily use, training remained the strongest predictor of self-reported competence (OR = 6.32, was statistically significant, $p < .001$). Trained staff had approximately six times higher odds of reporting competence. Daily use approached significance (OR = 2.64, $p = .080$). Age and gender were not significant predictors.

This confirms the chi-square finding that training and competence are closely linked.

• *Model 2: Revenue Collection Improvement*

Table 3 Logistic Regression Predicting Revenue Improvement

Table below shows outcome: self-reported revenue collection improvement (Yes vs. No).				
Predictor	OR	95% CI	z	p
Training received	1.06	[0.53, 2.10]	0.18	= 0.858
Age	1.00	[0.97, 1.04]	0.28	= 0.781
Female	1.96	[1.04, 3.76]	2.07	= 0.039

Training (OR = 1.06, $p = .858$) and age were not significant predictors of revenue improvement. Female staff had higher odds of reporting revenue gains (OR = 1.96, was statistically significant, $p = 0.039$), which may reflect concentration of revenue-facing roles among female

respondents. This aligns with the non-significant training × revenue chi-square association in Table 1.

• *Model 3: Claims Processing Improvement*

Table 4. Logistic Regression Predicting Claims Processing Improvement
The Table Shows Outcome: Perceived Improvement in Claims Processing (Yes vs. No).

Predictor	OR	95% CI	z	p
SHA-SHIF interoperability	21.47	[7.31, 80.32]	5.12	< .001
Training received	0.51	[0.21, 1.11]	-1.64	= 0.101
Female	0.76	[0.36, 1.58]	-0.72	= 0.470

Perceived SHA-SHIF interoperability was a significant predictor of claims-processing improvement (OR = 21.47, was statistically significant, $p < 0.001$), after adjusting for training and gender. Training was not a significant independent predictor in this model. These results extend the

chi-square association between interoperability and claim by showing a positive adjusted odds relationship.

• *Model 4: Data Protection Perception*

Table 5 Logistic Regression Predicting Data Protection Confidence
Table Below Shows Outcome: Belief that Data Protection is Guaranteed (Yes vs. No).

Predictor	OR	95% CI	z	p
Training received	7.03	[3.07, 17.03]	4.49	< .001
Age	0.97	[0.93, 1.00]	-1.75	= 0.079
Female	0.88	[0.41, 1.90]	-0.32	= 0.747
Daily use	0.25	[0.05, 0.94]	-1.94	= 0.052

No predictor in the data-protection model reached statistical significance at $\alpha = .05$, consistent with divided staff opinion on governance safeguards. Confidence in data

protection therefore appears weakly related to the demographic and usage variables tested, and may require organizational policy interventions beyond end-user training.

Table 6 Summary of Logistic Regression Coefficients

Model	Outcome	Predictor	OR	95% CI	z	p
Competence	Self-reported competence	(Intercept)	0.41	[0.05, 2.82]	-0.89	= 0.376
Competence	Self-reported competence	Training received	6.32	[3.07, 13.41]	4.92	< .001
Competence	Self-reported competence	Age	0.99	[0.95, 1.03]	-0.36	= 0.717
Competence	Self-reported competence	Female	1.21	[0.59, 2.52]	0.52	= 0.602
Competence	Self-reported competence	Daily use	2.64	[0.89, 8.04]	1.75	= 0.080
Revenue	Revenue improvement	(Intercept)	1.20	[0.28, 4.96]	0.25	= 0.800
Revenue	Revenue improvement	Training received	1.06	[0.53, 2.10]	0.18	= 0.858
Revenue	Revenue improvement	Age	1.00	[0.97, 1.04]	0.28	= 0.781
Revenue	Revenue improvement	Female	1.96	[1.04, 3.76]	2.07	= 0.039
Claims	Claims improvement	(Intercept)	0.28	[0.08, 0.84]	-2.12	= 0.034
Claims	Claims improvement	SHA-SHIF interoperability	21.47	[7.31, 80.32]	5.12	< .001
Claims	Claims improvement	Training received	0.51	[0.21, 1.11]	-1.64	= 0.101
Claims	Claims improvement	Female	0.76	[0.36, 1.58]	-0.72	= 0.470
Data protection	Data protection guaranteed	(Intercept)	6.67	[0.89, 56.15]	1.82	= 0.069
Data protection	Data protection guaranteed	Training received	7.03	[3.07, 17.03]	4.49	< .001
Data protection	Data protection guaranteed	Age	0.97	[0.93, 1.00]	-1.75	= 0.079
Data protection	Data protection guaranteed	Female	0.88	[0.41, 1.90]	-0.32	= 0.747
Data protection	Data protection guaranteed	Daily use	0.25	[0.05, 0.94]	-1.94	= 0.052

Note. OR = odds ratio from binary logistic regression models.

Showed Low network bandwidth, finance-bill not integrated, and confusion between credit-revenue and cash-payer workflow were observed gaps in the EMR system performance.

V. DISCUSSION, RECOMMENDATION AND CONCLUSION

➤ Discussions

• Introduction

The results consolidated logistic regression across four outcomes. Training significantly predicted competence; SHA-SHIF interoperability predicted claims improvement; gender predicted revenue improvement; and no covariate significantly predicted data-protection confidence. Together, chi-square and logistic analyses indicate that training and interoperability are the most actionable levers for improving staff perceptions of the TaifaCare Tiberbu Electronic Medical Records system

Perceived improvements in documentation, patient record retrieval, reporting efficiency, and reduction of patient waiting time were modest, with most respondents selecting “Partial” or “No improvement” responses. Patient waiting time emerged as the weakest performance indicator, with 40/75 respondents reporting no reduction after implementation.

Despite these gains, major operational challenges were reported, including system downtime, slow processing speeds, inadequate network bandwidth, SHA claims rejection, delayed OTP authentication, inability to process inpatient claims, inadequate hardware, and uneven adoption across departments. Governance concerns were also identified, with only 46.7% of respondents expressing confidence in data protection measures and 42.7% believing the system adequately addressed medico-legal issues

associated with EMR-generated records. Qualitative findings revealed mixed user perceptions. Positive experiences included reduced paperwork, improved standardization, and easier patient tracking, while negative experiences centered on poor implementation planning, workflow disruptions, insufficient training, and weak change-management processes.

The findings of this study demonstrate substantial early adoption of the TaifaCare Tiberbu system at Migori County Referral Hospital, with 92.0% of respondents actively utilizing the system during patient interactions and 85.3% reporting daily use. These findings suggest strong institutional acceptance and increasing willingness among healthcare workers to transition from paper-based systems to digital health technologies. Similar studies conducted in low- and middle-income countries have reported that high EMR adoption rates are often associated with organizational commitment toward healthcare digitalization and national health information system reforms (Were et al., 2019; Gagnon et al., 2020).

The high interoperability ratings observed in this study further support Kenya’s broader digital health agenda aimed at strengthening interoperability, health financing, and continuity of care through integration with the Social Health Authority Kenya and SHIF systems. The finding that 76.0% of respondents confirmed interoperability between TaifaCare Tiberbu and SHA-SHIF aligns with the Ministry of Health Kenya Digital Health Strategy, which prioritizes integrated digital platforms to support Universal Health Coverage (UHC), electronic claims processing, and patient-centered healthcare delivery (Ministry of Health Kenya, 2022). The reported improvements in claims processing and revenue collection further indicate the potential contribution of EMR systems toward strengthening hospital financial management and reimbursement efficiency.

Despite the high uptake, the study revealed important implementation gaps related to training, technical support, and user competence. Only 62.7% of respondents had received formal training, while 30.7% reported requiring additional training and only 34.7% expressed satisfaction with day-to-day technical support. These findings suggest that system utilization has outpaced structured capacity-building efforts. Similar implementation challenges have been documented in other EMR implementation studies where inadequate user training, weak technical support, and limited post-implementation mentorship negatively affected effective system utilization and user satisfaction (Kruse et al., 2016; McGinn et al., 2018).

The modest perceived improvements in documentation, patient record retrieval, reporting efficiency, waiting time reduction, and inventory management indicate that high system adoption alone does not necessarily translate into optimal healthcare service delivery outcomes. Patient waiting time emerged as the weakest performance indicator, with most respondents reporting either partial improvement or no improvement after implementation. These findings are consistent with previous studies showing that infrastructural limitations, workflow disruptions, inadequate hardware, and unstable network connectivity can significantly limit the operational benefits of EMR systems in resource-constrained healthcare settings (Boonstra et al., 2019; Ajami et al., 2018).

Operational challenges identified in this study—including system downtime, slow processing speeds, inadequate network bandwidth, SHA claims rejection, delayed OTP authentication, inability to process inpatient claims, and insufficient workstations—demonstrate the complex nature of digital health implementation in public healthcare facilities. Similar findings have been reported across sub-Saharan Africa where rapid digital transformation often exceeds institutional readiness and infrastructure capacity (Gagnon et al., 2020). The inability to fully integrate financial workflows and inpatient claims processing further highlights the need for continuous system refinement and stronger vendor-health facility collaboration.

Concerns regarding data protection and medico-legal accountability also emerged prominently in this study. Less than half of respondents expressed confidence in data protection mechanisms or believed that the system adequately addressed medico-legal issues associated with electronic records. These findings underscore the importance of strengthening digital governance frameworks, audit trails, electronic signatures, confidentiality safeguards, and staff awareness regarding legal accountability in EMR-generated records. Similar concerns regarding cybersecurity, privacy protection, and medico-legal liability have been highlighted globally during Electronic Medical Records implementation processes (WHO, 2021).

Qualitative findings further revealed mixed user experiences. While some respondents appreciated reduced paperwork, improved standardization, and easier patient tracking, others expressed frustration regarding poor implementation planning, inadequate change management,

workflow disruptions, and insufficient technical support. These findings reinforce the importance of adaptive implementation strategies, continuous stakeholder engagement, phased system roll-out, and incorporation of user feedback during national digital health implementation programs. Previous studies have shown that phased implementation approaches, continuous mentorship, and participatory system refinement significantly improve user satisfaction and long-term EMR sustainability (McGinn et al., 2018; Were et al., 2019).

The largest cadres represented were Nurses, Clinical Officers, HRIOs, Pharmacists and Laboratory Officers, drawn from clinical, diagnostic and administrative departments including Casualty, Maternity, MCH, CCC, Laboratory, Pharmacy, Health Records and Administration.

- Reported interoperability challenges include: SHA claims rejections, delays in OTP authentication for SHA patients, inability to file inpatient claims (only outpatient), system downtime, frequent breakdowns.

➤ Recommendations

- *Strengthen Capacity Building Through Structured Re-training and Continuous Professional Development*

Implement a structured re-training programme for healthcare providers who identified themselves as requiring additional training, complemented by quarterly refresher training sessions and continuous on-site technical support during clinical shifts. Embedding on-site IT support alongside regular refresher trainings allows immediate resolution of user challenges during routine service delivery, reducing workflow disruptions and increasing user satisfaction.

- *Establish Departmental Electronic Medical Records Super-users and On-site Information Technology Champions*

Deploying departmental Electronic Medical Records super-users or Information Technology champions to provide real-time technical assistance across major service areas. Healthcare providers frequently encounter operational challenges that require immediate support, and delays in resolving these issues may discourage system utilization or encourage reverting to paper-based documentation. (Boonstra et al., 2014).

- *Improve Information Communication Technology (ICT) Infrastructure and Ensure System Continuity*

Upgrade the hospital's Local Area Network (LAN), strengthening Wi-Fi connectivity, investing in network infrastructure, and implementing an offline-capable fail-over mode to maintain service continuity during internet or server downtime. Reliable ICT infrastructure forms the foundation of successful electronic medical record implementation. Poor network connectivity and frequent system downtime significantly reduce user satisfaction, delay patient care, and increase resistance to Electronic (Kruse et al., 2018) and WHO, 2021.

- *Increase Availability of Electronic Medical Records Hardware*

Procure additional desktop computers, Lap tops and tablets for OPD Casualty, Maternity, and Pharmacy units where patient volumes are highest and reduce gadget sharing among users. (Kruse et al., 2018).

- *Enhance System Functionality Through Vendor Collaboration*

The study recommends engaging the Electronic Medical Records vendor to address persistent system challenges, including One Time Password (OTP) delays, inpatient insurance claims, finance-billing integration, duplicate patient registration, missing clinical templates, invoice printing, discharge payment processing, and improvements in Social Health Authority integration.

- *Strengthen Data Protection and Medico-Legal Compliance*

The study recommends publishing clear institutional guidelines covering data protection, audit trails, electronic signatures, record retention, and medico-legal responsibilities associated with Electronic Medical Records use. Healthcare providers require confidence that electronic documentation complies with legal, ethical, and professional standards.

- *Adopt Continuous Quality Improvement Through Monthly System Updates and Phased Rollout*

Implement monthly software release cycles that incorporate documented user feedback and adopting phased pilot testing before introducing new modules or expanding implementation to additional departments or health facilities and ensure Continuous quality improvement, (McAlearney et al., 2012).

➤ *Conclusion*

- Continuous competency development is fundamental for sustained Electronic Medical Records utilization. Structured re-training, regular refresher programs, and readily available technical support will improve healthcare providers' confidence, increase system utilization, and enhance the quality of electronic clinical documentation.
- Department-based Electronic Medical Records system champions will strengthen technical support, improve user confidence, reduce system-related frustrations, and promote sustainable utilization of the TaifaCare Tibebu
- Strengthen network infrastructure and introduce reliable offline functionality will improve system availability, minimize workflow interruptions, and enhance continuity of patient care.
- Adequate provision of computers and tablets will improve documentation efficiency, reduce patient waiting times, and support timely clinical decision-making.
- Regular software improvements guided by user feedback, together with phased implementation strategies, will improve system quality, increase user acceptance, and promote sustainable expansion of the TaifaCare Tibebu

- Comprehensive data governance policies will strengthen legal compliance, improve accountability, protect patient confidentiality, and enhance healthcare providers' confidence in electronic documentation.
- Addressing identified software limitations will improve system usability, reduce operational inefficiencies, strengthen insurance claims processing, and increase healthcare providers' satisfaction with the TaifaCare Tibebu

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