

MONITORING AND EVALUATION CAPACITY BUILDING ON PERFORMANCE OF ELECTRONIC HEALTH RECORDS AT A KENYAN REFERRAL HOSPITAL.

BY

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Abstract

This study looked at how Coast General Teaching and Referral Hospital's Electronic Health Record performance was affected by capacity building for monitoring and evaluation. A descriptive survey design using concurrent mixed-methods was used. A quantitative survey was conducted with 235 healthcare professionals. Department heads and information technology managers participated in qualitative key informant interviews. The data was examined using descriptive statistics and thematic analysis. The study discovered a positive correlation (Composite Mean = 3.46, Standard Deviation = 1.43) between Electronic Health Record performance and Monitoring and Evaluation capacity building. The most powerful factors influencing competency were ongoing mentoring and supervision (Mean = 3.64). However, there were not enough "Monitoring and Evaluation mentors" per shift due to high turnover rates and serious gaps in clinical staff's formal Monitoring and Evaluation-specific training. The success of electronic health records is significantly influenced by capacity building for monitoring and evaluation. Hospitals must designate ward-based Monitoring and Evaluations champions and institutionalize on-the-job training in order to go beyond one-time on boarding.

Keywords: Monitoring and Evaluation, Electronic Health Records, Capacity Building, Health Informatics, Kenya, Project Management.

1.0 Background of the Study

In modern project and program implementation, monitoring and evaluation has become a crucial management function. It offers organizations systematic feedback loops that allow them to evaluate resource utilization, gauge progress, and support evidence-based decision-making (Project Management Institute, 2021). Globally, Organizations that successfully integrate monitoring and evaluation into planning and resource allocation outperform those that treat it as an afterthought. Monitoring and evaluation are increasingly seen as strategic rather than administrative (Ovcinia & Arslanagic-Kalajdzic, 2024).

The effectiveness of accompanying monitoring and

evaluation frameworks is crucial for the successful integration of digital health solutions in the healthcare industry, such as electronic health records (WHO, 2021). Because they enable effective management of large patient volumes and produce accurate health statistics, electronic health record systems have become essential in the pursuit of universal health coverage and the Sustainable Development Goals (Fraser et al., 2024).

With the Digital Health Act of 2023 and the eHealth Strategy of 2024, Kenya has made significant policy progress toward the digitization of the health sector. The establishment of the Digital Health Agency, which is in charge of organizing health IT initiatives, approving software, and guaranteeing facility

interoperability, was made possible by these policy frameworks (Kenya eHealth Strategy, 2024). To enhance regular data collection and reporting, public hospitals have implemented national initiatives such as District Health Information Software and Kenya Electronic Medical Records.

However, the monitoring and evaluation procedures used by Kenyan public health institutions are still inconsistent in spite of these investments. Effective data collection and utilization are still hampered by low technological capacity, insufficient institutional support, and inadequate resource allocation (Hotchkiss et al., 2018). Despite the implementation of an electronic health record system at Coast General Teaching and Referral Hospital, there is a dearth of empirical data evaluating the system's efficacy due to problems like inconsistent data and misalignment with clinical workflows (Waweru et al., 2020).

Developing the knowledge, abilities, competencies, institutional systems, and resources necessary for staff to successfully gather, analyze, interpret, report, and use monitoring and evaluation data is known as capacity building (Masvaure et al., 2022). Capacity building in electronic health record projects goes beyond simple computer instruction to include proficiency in data entry, data quality, reporting, information retrieval, privacy and security, troubleshooting, data interpretation, and the use of data from electronic health records for managerial and clinical decisions.

The performance of digital platforms and health information systems is improved by capacity building for monitoring and evaluation, according to research (Rapemo & Mungai, 2025; Banzi & Tumuti, 2024; GirmaTaye et al., 2024; Asah & Kaasboll, 2023). However, there is little empirical data measuring its direct impact on the adoption and functional use of electronic health records, especially in Kenyan public referral hospitals.

2.0 Problem Statement

As part of the larger national digital health agenda, Kenyan public hospitals have made significant investments in electronic health record systems; however, the conversion of these investments into reliable, high-quality performance is still uneven across facilities (Kenya e Health Strategy, 2024). Project implementers frequently lack a clear roadmap

for tracking indicators of system uptake, data quality, and user satisfaction when monitoring and evaluation planning is inadequate (Effects of monitoring and evaluation Planning Process on Performance of County Government Funded Water Projects in Kisii County, Kenya, 2024). This makes it more difficult to identify and fix implementation bottlenecks in a timely manner.

Where data collection mechanisms supporting monitoring and evaluation are fragmented or poorly resourced, technical staff frequently produce incomplete or inaccurate assessments of system performance, weakening the evidentiary basis for management decisions (Impact of monitoring and evaluation Capacity on Performance of non-governmental organization Projects in Kenya's Coastal Region, 2024). Most public sector projects in Kenya produce substantial monitoring and evaluation data that are not analyzed to aid decision-making, meaning important information regarding system bottlenecks, user resistance, and inefficiencies is not conveyed to project managers (Uche, Nwachukwu & Eze, 2023).

The flexibility and accuracy of monitoring and evaluation functions supporting technology-based projects in Kenya's coastal counties have been found to be impacted by inadequacy of monitoring and evaluation personnel's analytical skills and reporting on systems (Impact of monitoring and evaluation Capacity on Performance of non-governmental organization Projects in Kenya's Coastal Region, 2024). It has not yet been determined empirically how much monitoring and evaluation planning, data collection, findings utilization, and capacity building together affect the effectiveness of electronic health record systems at Coast General Teaching and Referral Hospital.

3.0 General Objective:

To assess the influence of monitoring and evaluation systems on the performance of Electronic Health Records at Coast General Teaching and Referral Hospital, Mombasa, Kenya.

3.1 Specific Objectives:

- i. To analyze the role of Monitoring and Evaluation capacity building on performance of Electronic Health Records at Coast General Teaching and Referral Hospital.

4.0 Theoretical Framework

Technology Acceptance Model (TAM) Developed by Davis (1989), technology acceptance model posits that an individual's intention to use a technology is primarily influenced by Perceived Usefulness and Perceived Ease of Use. Perceived Usefulness refers to the extent to which users believe a system enhances their job performance, while perceived ease of use refers to the degree to which the system is perceived as easy to use (Davis, 1989; Venkatesh & Davis, 2000).

Monitoring and evaluation systems impact technology acceptance model constructs by providing performance feedback, identifying usability issues, and guiding focused capacity-building interventions. Monitoring and evaluation systems can improve perceived usefulness by showcasing concrete advantages of the electronic health record through regular monitoring of user compliance, system usage rates, and feedback reports. They can also improve perceived ease of use by informing system improvements and training requirements. For evaluating the adoption of electronic health records in healthcare settings, empirical research shows that the technology acceptance model is very helpful, particularly in low- and middle-income countries where sustained use depends on usability and observable benefits (Boateng et al. Al-Kahtani et al., 2021. (2023).

5.0 Empirical Review

5.1.0 Monitoring & Evaluation Capacity Building on electronic health record Performance

Developing the knowledge, abilities, competencies, institutional systems, and resources necessary for staff to successfully gather, analyze, interpret, report, and use monitoring and evaluation data is known as capacity building. According to a systematic review and meta-analysis by Ma'ruf, Prasetya, and Murti (2024), health workers' preparedness to use electronic medical records is significantly influenced by their knowledge and training.

Campione and Liu (2024) examined hospital staff perceptions of electronic health record training, support, and patient safety, highlighting the importance of training and organizational support in how healthcare personnel perceive and use electronic health record systems. Rapemo and Mungai (2025) studied the influence of knowledge transfer on project performance, concluding that transfer of knowledge

and continuous learning led to efficiency, accountability, and sustainability of projects.

5.1.1 Electronic Health Records Performance

The performance of electronic health records is the level of accomplishment of the aims that were set for the system regarding technical, organizational, clinical and managerial dimensions. As stated by Alharbi (2025), the analyzed literature provides evidence regarding the impact of electronic health record implementation on hospital efficiency and patient outcomes. It was discovered that there is high potential in electronic health record implementation in terms of improvement of healthcare efficiency, communication and patient outcomes but the benefits are conditional. This finding proves the idea that electronic health record performance is a multidimensional construct not only because one has to check whether electronic health record has been implemented or not. Finnegan and Mountford (2025), revealed the key components of successful electronic health record implementation as being collaboration, communication, training, support, implementation strategy, costs, competence development and compliance. Therefore, it proves that the performance of electronic health records is highly correlated not only with technical aspects but also with organizational and human ones. Fraser et al. (2024), conducted research that proves that electronic health record performance depends on the quality of data. The researchers analyzed 50 facilities and discovered that some factors that exist in the environment of electronic health record could affect the quality of information.

Wondwossen, Asemahagn, and Guadie (2025), conducted an empirical assessment of electronic medical record use in private healthcare facilities in Ethiopia. The study reported that electronic medical record utilization remained limited despite advances in information technology and emphasized the importance of workforce capacity, interoperability, and digital-health integration. This finding is particularly relevant to developing-country settings because it demonstrates that availability of technology does not necessarily translate into effective utilization.

Cahill, Cleary, and Cullinan (2025) carried out systematic review of the 32 studies examines the relationship between electronic health record design, the usability, and the medication safety. The findings

showed that electronic health record systems incorporating these design characteristics generally had higher usability and better medications safety, while poorly designed systems could contribute to user's errors and the medication-related problems. Because usability determines whether healthcare workers can use the system accurately and efficiently, the study is especially pertinent to the performance of electronic health records. If users have trouble finding information, entering data, navigating the system, or incorporating electronic health record activities into their regular clinical workflow, a technically advanced system may perform poorly in practice. A systematic review of fourteen studies on the semantic interoperability of electronic health records was carried out by Palojoki, Lehtonen, and Vuokko (2024). According to the review, interoperability strategies based on data models, ontologies, terminologies, classifications, and standards enhanced clinical information's accessibility and usability. These results suggest that the performance of electronic health records is significantly influenced by the capacity of different health information systems to exchange and communicate data without losing its meaning. Poor interoperability can lead to duplicate records, incomplete information, delays, and challenges in coordinating patient care in healthcare facilities where various departments or systems operate independently. A comprehensive analysis by Li et al. (2022) also looked at how safety and care quality are affected by interoperability of electronic health records. Positive effects on medication safety, patient safety incidents, and cost savings were found in the review. However, because of variations in study quality and outcome measures, the effects on time savings and clinical workflows were inconsistent.

Because clinical and management decisions rely on the accuracy, completeness, timeliness, and consistency of electronic data, data quality is one of the most crucial indicators of the performance of electronic health records. Fraser et al. (2024) examined 3,467 patient records and roughly 194,152 individual data items in a cross-sectional observational study involving 50 Rwandan healthcare facilities. The results demonstrated that, for the majority of data elements, electronic health record data were more than 85% complete. However, significant gaps were found in some drug-regimen data and viral-load information.

Data concordance was positively correlated with the availability and uptime of the electronic health record system. Additionally, the timeliness and completeness of certain data were greatly enhanced by clinical alerts. Therefore, monitoring electronic health record uptime, completeness, accuracy, and timeliness should form part of routine performance assessment. Owino et al. (2022) investigated the impact of electronic medical records on reporting human immunodeficiency virus health indicators in Kenya. The findings showed no statistically significant differences in reporting completeness and timeliness between facilities using electronic medical records and those without electronic medical records across the three human immunodeficiency virus programmatic areas examined. This conclusion is significant because it shows that better performance is not a direct result of electronic health record availability. Whether an electronic system results in better reporting outcomes depends on a number of factors, including infrastructure, training, data-entry methods, user practices, organizational processes, and system utilization. A systematic analysis of randomized clinical trials investigating electronic health record-based clinical "nudges" in primary care was carried out by Nguyen et al. (2024). Electronic cues or reminders known as "electronic health record nudges" are intended to motivate medical professionals to adhere to evidence-based procedures. The review looked at how they relate to patient outcomes and healthcare quality and discovered evidence that well-designed electronic health record interventions can enhance certain quality indicators and have an impact on clinical practice. This implies that electronic health record performance goes beyond maintaining records.

High-performing electronic health records can provide clinical decision-support functions, reminders, alerts, and evidence-based prompts that assist healthcare providers in delivering appropriate care. A systematic review by Klecun et al. (2022) evaluated electronic health record systems using eight characteristics associated with software quality: functional suitability, performance efficiency, compatibility, usability, reliability, security, maintainability, and portability. In a similar vein, Li et al. (2022) discovered that interoperability was linked to decreases in patient safety incidents and increases in drug safety. However, the researchers observed that the quality of the data

was inconsistent and that the evidence differed between studies. Additionally, more recent data about integrated electronic health record technologies is starting to surface. In a systematic analysis of smart infusion-pump/electronic health record interoperability, Sowan et al. (2026) discovered correlations with enhanced patient safety, operational effectiveness, financial performance, and user experience, while findings differed between research. Interoperability should be seen as a component of a larger sociotechnical system that includes technology, users, workflow, clinical information, and organizational practices, the authors stressed.

5.2 Research Gaps

While existing literature demonstrates that monitoring and evaluation capacity building enhances digital platform and health information system performance (Rapemo & Mungai, 2025; Banzi & Tumuti, 2024; Girma Taye et al., 2024; Masvaure et al., 2022; Asah & Kaasboll, 2023; Mukherjee, 2024), there is insufficient empirical data measuring its direct influence on adoption and functional use of electronic health records. Few longitudinal or quasi-experimental studies establish causal relationships, with most available research being descriptive or conceptual. Limited attention has been given to how institutionalized monitoring and evaluation training and performance monitoring team strengthening influence data quality, user compliance, and clinical decision-making across various healthcare settings. This gap highlights the need for facility-level research evaluating scalable and sustainable monitoring and evaluation capacity-building initiatives.

6. Methodology

The study used a descriptive survey design, which allowed systematic description of the characteristics of a population or phenomenon as it currently exists, without manipulating any variable (Creswell & Plano Clark, 2018). A concurrent mixed-methods approach was used to operationalize the design, gathering quantitative and qualitative data at the same time and combining them during interpretation.

The research was conducted at the Coast General Teaching and Referral Hospital in Mombasa County, Kenya. Medical specialists, nurses, clinical officers, pharmacists, laboratory technologists, health records

officers, IT support staff, and department heads were among the 850 healthcare professionals and administrative staff who were directly involved in the use, management, and monitoring of electronic health records at Coast General Teaching and Referral Hospital.

A sample size of 265 respondents was established using Krejcie and Morgan's (1970) table. To guaranty representation across professional categories, proportionate stratified sampling was employed, and simple random sampling was then conducted within each stratum.

Quantitative data were analyzed using statistical package for the social sciences version 25, employing descriptive statistics (frequencies, means, and the standard deviations). Qualitative data from interviews and open-ended questions were analyzed thematically following the six-phase process by Braun and Clarke (2006). Findings were integrated during the interpretation phase to allow triangulation.

Ethical approval was obtained and national commission for science, technology and innovation (License No. national commission for science, technology and innovation /P/26/4183640). Informed consents was obtained from all respondents, involvement was voluntary, and confidentiality was ensured by presenting results in summarized form without personal identifiers.

7.0. Findings

7.1 Response rate and respondent profile

Out of the 265 questionnaires distributed, 235 were returned, giving an 89% response rate. All selected key informants participated in the interviews. Women represented 54.9% of questionnaire respondents and men 45.1%. The biggest age category was 31 to 40 years (38.3%), followed by 41 to 50 years (24.3%). Nurses comprised 45.0% of respondents, doctors 14.0%, pharmacists 11.0%, laboratory technologists 9.0%, ICT and clerical staff 7.0%, clinical officers 6.0%, health-records officers 5.0%, and departmental heads/administrators 3.0%.

7.1.1 Capacity building and electronic health record performance

Monitoring and evaluation capacity building received a moderately positive rating ($M=3.46$, $SD=1.43$). Respondents reported training in monitoring and

evaluation principles and electronic health record data management ($M=3.54$), and they rated continuous mentorship and supervision most favorably ($M=3.64$). The availability of skilled monitoring and evaluation personnel was also viewed positively ($M=3.46$). However, regular capacity-building programs were less consistently experienced ($M=3.36$), and respondents agreed that inadequate monitoring and evaluation capacity limits effective use of electronic health record data ($M=3.32$).

Interviewees reported that initial electronic health record training had been provided, with occasional refresher sessions from Information Communication Technology staff and informal support from experienced “super-users.” Formal monitoring and evaluation -specific training for nurses, practical data-analysis skills, and ward-level mentorship were limited. Staff turnover also meant that new personnel could begin work without a consistent orientation to electronic health record and monitoring and evaluation procedures. Suggested responses included practical ward-based training, mandatory orientation for new staff, simple job aids, quarterly learning meetings, and ward-based monitoring and evaluation champions.

7.1.2 Perceived electronic health record performance

Electronic health record performance received a moderate composite rating ($M=3.21$, $SD=1.54$). Improved data management and reporting efficiency ($M=3.43$) and decreased service delivery delays ($M=3.37$) were the two areas that respondents most strongly supported. The use of data from electronic health records to guide patient care decisions received the lowest rating ($M=2.89$). Additionally, ratings for security, accessibility, and data accuracy were inconsistent ($M=3.03$), with a comparatively high standard deviation suggesting that different departments had different experiences. Effective monitoring and evaluation systems' contribution to the overall performance of electronic health records was rated by respondents at ($M=3.36$).

This pattern was supported by the interviews. When the system was operating, participants reported that electronic records made report generation and retrieval easier, but downtime could interfere with workflows.

Additionally, they stressed that the availability of information in the electronic health record did not ensure that medical professionals would regularly use it when making decisions about patient care. The lack of routine review and incomplete or inaccurate records were found to be obstacles to converting digital availability into clinical value.

7.2 Key Patterns Identified

7.2.1 Uneven Capacity Building Implementation

While electronic health record training and monitoring and evaluation were typically provided to staff, not all departments or staff categories consistently implemented capacity building programs. With 40% of respondents disagreeing that regular capacity building programs were conducted, the mean score of 3.36 ($SD=1.41$) indicates only moderate consistency. The results of Harerimana et al. are reflected in this pattern. (2025) that training initiatives, especially in African settings, frequently only go as far as initial implementation without ongoing monitoring.

7.2.2 Mentorship as the most effective Capacity Building Strategy

The highest average score was three.64 and $SD=1.40$ was acquired for continuing mentoring and oversight, suggesting that technical assistance from non-governmental organizations is more crucial and effective than intermittent training on its own. The results of Rapemo and Mungai(2025), who found that mentorship-based knowledge sharing significantly increased project sustainability and efficacy, are consistent with this pattern.

7.2.3 Critical Skills gap and staff turnover

Significant gaps in practical data analysis abilities, the ability to interpret monitoring and evaluation reports, and the lack of formal monitoring and evaluation training for nurses were identified by qualitative findings. A significant capacity issue was found to be high staff turnover, which brought in employees who had never received training in electronic health records, monitoring, and evaluation. This pattern is consistent with Asah and Kaasboll's (2023) finding that staff members' capacity to set up effective monitoring and evaluation systems is greatly impacted by insufficient training opportunities.

7.2.4 Link between Capacity building and electronic health record performance

Quantitative findings showed that the implementation and performance of electronic health records were positively impacted by staff training (mean=3.54), ongoing mentorship (mean=3.64), and qualified monitoring and evaluation staff (mean=3.46). The overall electronic health record performance score was lower than the composite mean of 3.46 for capacity building. Kaasbøll (2023) found that inadequate training opportunities and inadequate information communication technology infrastructure have an impact on monitoring and evaluation capacity.

8.2. Comparison with Literature

Capacity Building Effectiveness: The composite mean of 3.46 (SD=1.43) for monitoring and evaluation capacity building is consistent with research by Rapemo and Mungai (2025), who showed that knowledge exchange and education from non-governmental organizations improved project sustainability, effectiveness, and accountability. Similarly, Banzi and Tumuti (2024), training in monitoring and evaluation enhanced public project accountability, monitoring protocols, and report generation.

Campione and Liu (2024), who highlighted the critical significance of organizational support and training in how healthcare workers perceive and use electronic health record technology, are consistent with the finding that ongoing mentorship and supervision received the highest score (3.64).

Skills Deficiencies: The findings of Asah and Kaasbøll (2023), who found that insufficient training opportunities significantly impacted staff ability to establish efficient monitoring and evaluation systems, are consistent with the identification of significant skills gaps, especially in data analysis and monitoring and evaluation report interpretation. Concerns expressed by Finnegan and Mountford (2025), who noted that training, support, and competence development are crucial but frequently underfunded components of electronic health record deployment, are echoed in the problem of high staff turnover bringing in untrained personnel.

Lack of Adequate monitoring and evaluation Capacity: Mukherjee's (2024) conclusion that

improved resource allocation, data accuracy, and program effectiveness occur in health settings characterized by robust monitoring and evaluation systems and capacity building is supported by the finding that inadequate monitoring and evaluation capacity limits effective electronic health record use (mean=3.32). Masvaure et al. (2022) similarly argued that sophisticated monitoring and evaluation systems support precise data gathering and enhanced program outcome monitoring.

Training and electronic health record

Adoption: The positive relationship between training and electronic health record performance aligns with Ma'ruf, Prasetya, and Murti's (2024) meta-analysis finding that health personnel's preparedness to use electronic medical records is significantly influenced by expertise and training. Nguise et al. (2023) similarly found that capacity-building training increased competencies in data interpretation and clinical decision-making.

Contrasting Findings: While GirmaTaye et al. (2024) found that most Performance of Monitoring Teams were either inadequate or nonexistent, leading to low-quality data and poor use of health information, the current study found moderate capacity building success (mean=3.46), suggesting Coast General Teaching and Referral Hospital has made some progress in monitoring and evaluation capacity. However, qualitative results show that there are still issues that need to be resolved.

8.3 Implications and Significance

8.3.1 Implications

Hospital Management:

The study offers concrete proof that the performance of electronic health records is greatly improved by monitoring and evaluation capacity building. Hospital administrators need to do the following:

- i. Institutionalize continuous capacity building programs, including refresher training, hands-on mentoring, and supervision
- ii. Appoint departmental monitoring and evaluation champions to provide Non-Governmental Organization technical assistance
- iii. Develop mandatory monitoring and evaluation, and electronic health record orientation for all new staff

- iv. Provide regular monitoring and evaluation review meetings where staff can learn from findings
- v. Establish budget allocations for capacity building activities

Ministry of Health and Digital Health Agency:

Under the framework of the Digital Health Act, the study provides context-specific data to support national guidelines on monitoring and evaluation for digital health initiatives. Policymakers should:

- i. Develop national guidelines for routine electronic health record monitoring and evaluation with standardized indicators
- ii. Establish reporting and interoperability standards
- iii. Support continuous capacity building programs across public hospitals
- iv. Address infrastructure gaps including internet connectivity, backup power, data backup, system security, maintenance, and upgrades

8.3.2 Significance

Theoretical

The study contributes to theory by:

- i. Validating the technology acceptance models application to the electronic health record performance in the Kenyan healthcare settings
- ii. Extending understanding of monitoring and evaluation capacity building's role in digital health implementation
- iii. Contributing to institutional and systems management theories emphasizing evidence-based decision-making, stakeholder participation, and performance evaluation in healthcare information systems

Policy

The findings can guide:

1. Development of frameworks for evaluating electronic health record performance in developing countries
2. Strengthening of monitoring and evaluation systems to support improved healthcare service delivery
3. Resource allocation for digital health initiatives
4. Design of capacity building programs that address identified gaps
5. Creation of feedback mechanisms for continuous electronic health record improvement

8.4 Limitations and Further Research

The study was conducted in one public referral hospital and relied substantially on self-reported perceptions, so social-desirabilities and the common-

methods bias are possible. Its cross-sectional designs does not establish temporal or causal relationships. The thesis also reports descriptive findings more fully than inferential tests; accordingly, this article does not claim that the reported mean differences demonstrate statistical causation. Future multi-site and longitudinal studies should combine staff perceptions with system logs, data-quality audits, uptime measures, patient-waiting times, and indicators of clinical data use.

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