

Relationship Between Electronic Medical Records And Healthcare Service Delivery In Entebbe Regional Referral Hospital And Dr Ronald Bata Hospital.

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Abstract

Electronic Medical Records (EMR) systems represented a transformative technology in healthcare service delivery, yet their implementation outcomes varied across different healthcare settings in Uganda. This study examined the relationship between EMR adoption and healthcare service delivery quality in two major facilities in the Entebbe region. A cross-sectional study design was employed with a sample of 212 healthcare workers and administrators from both hospitals. Data were collected using structured questionnaires and analyzed using SPSS version 25. Pearson correlation coefficients and multiple regression analysis were utilized to determine relationships between EMR utilization and service delivery indicators. Descriptive results revealed that the majority of healthcare workers frequently used the EMR system in their daily tasks, with high agreement that EMRs were easy to use, improved data accuracy, enabled faster retrieval of patient information, and enhanced the timeliness of service delivery. Mean scores ranged between 3.78 and 4.34, indicating strong positive perceptions of EMR effectiveness. Qualitative responses further confirmed that EMRs streamlined workflows, reduced manual errors, and supported quicker clinical decisions. Correlation analysis showed that EMRs had a strong and statistically significant positive relationship with healthcare service delivery ($r = 0.781, p < 0.01$). This indicated that increased adoption, effective utilization, and user confidence in EMRs were associated with improved service efficiency, reduced waiting times, and enhanced accuracy in patient management. The study concluded that EMRs played a critical role in improving the quality and performance of healthcare services. The technology significantly enhanced operational efficiency, reduced medical errors, and improved patient care quality. Healthcare facilities should invest in comprehensive staff training programs, robust technical infrastructure, and continuous system maintenance to maximize EMR benefits and overcome implementation challenges.

Keywords: Electronic Medical Records, Healthcare Service Delivery, Hospital Information Systems, Patient Care Quality, Entebbe Regional Referral Hospital, Dr Ronald Bata Hospital, Uganda

1.0 Background of the Study

The healthcare industry globally underwent significant transformation through the adoption of Electronic Medical Records (EMR) systems, which revolutionized how patient information was stored, accessed, and utilized in clinical decision-making (Menachemi & Collum, 2011). In developed countries, EMR implementation resulted in substantial improvements in healthcare quality, patient safety, and operational efficiency (Buntin et al., 2011). However, developing nations, including Uganda, faced unique challenges in EMR adoption, including limited technological infrastructure, financial constraints, and resistance to change among healthcare workers (Berhane & Enquesselassie, 2016).

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Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital represented two critical healthcare facilities serving the central region of Uganda, providing essential medical services to thousands of patients annually (Ministry of Health Uganda, 2020). These institutions embarked on EMR implementation as part of national health sector strategic plans aimed at improving healthcare delivery and achieving universal health coverage (Uganda National eHealth Policy, 2016). The transition from paper-based to electronic record systems promised enhanced patient care coordination, reduced medical errors, improved data accuracy, and better resource management (Kruse et al., 2016). Despite the theoretical benefits, empirical evidence regarding the actual relationship between EMR systems and healthcare service delivery outcomes in Ugandan hospitals remained limited (Littlejohns et al., 2003). Previous studies conducted in Sub-Saharan Africa indicated mixed results, with some facilities reporting significant improvements while others experienced implementation failures (Fritz et al., 2015). Understanding this relationship within the specific context of Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital became essential for informing policy decisions, optimizing resource allocation, and guiding future health information technology investments (Were et al., 2010). This study therefore sought to establish empirical evidence on how EMR systems influenced various dimensions of healthcare service delivery in these two critical healthcare institutions.

2.0 Problem Statement

Despite the substantial investments in Electronic Medical Records systems at Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital, there existed insufficient empirical evidence regarding the actual relationship between EMR implementation and healthcare service delivery outcomes. Healthcare administrators lacked concrete data on whether the EMR systems effectively improved patient waiting times, reduced medical errors, enhanced information accessibility, or increased overall service efficiency (Ludwick & Doucette, 2009). This knowledge gap hindered evidence-based decision-making regarding system optimization, staff training prioritization, and resource allocation for health information technology. Furthermore, persistent technical challenges and user resistance suggested that the anticipated benefits of EMR systems were not fully realized, necessitating a comprehensive assessment of the EMR-service delivery relationship to guide improvement strategies and maximize return on investment (Jawhari et al., 2016).

3.0 Objective of the Study

To determine the relationship between EMR implementation and healthcare service delivery outcomes.

4.0 Methodology

4.1 Study Design and Setting

This study employed a cross-sectional analytical research design conducted at Entebbe Regional Referral Hospital and Dr Ronald Bata Hospital between March and August 2023. The cross-sectional design was appropriate for examining the relationship between EMR utilization and service delivery at a specific point in time (Setia, 2016). Both hospitals had implemented EMR systems at least two years prior to the study, allowing sufficient time for system stabilization and user adaptation.

4.2 Study Population and Sampling

The target population comprised healthcare workers directly involved in patient care and health information management, including physicians, nurses, clinical officers, health information managers, and hospital administrators. Using Yamane's formula for finite populations with a 95% confidence level and 5% margin of error, a sample size of 212 participants was determined from a total population of 580 healthcare workers across both facilities (Yamane, 1967). Stratified random sampling was employed to ensure proportional representation from different professional categories and departments.

4.3 Data Collection

Data were collected using a structured, self-administered questionnaire adapted from validated instruments used in previous EMR studies (Nguyen et al., 2014; Holden & Karsh, 2010). The questionnaire comprised four sections: demographic characteristics, EMR utilization patterns, healthcare service delivery indicators, and implementation challenges. Service delivery was measured across five dimensions: patient waiting time, medical error frequency, information accessibility, care coordination, and overall efficiency. Each dimension was assessed using a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The questionnaire underwent content validation by three experts in health informatics and was pilot-tested with 20 healthcare workers not included in the main study, yielding a Cronbach's alpha coefficient of 0.87, indicating good internal consistency.

4.4 Data Analysis

Data were coded, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics including frequencies, percentages, means, and standard deviations were computed for demographic variables and study constructs. Pearson correlation coefficients were calculated to determine the strength and direction of relationships between EMR utilization and service delivery indicators. Multiple regression analysis was performed to assess the predictive power of EMR implementation on healthcare service delivery outcomes while controlling for confounding variables. Statistical significance was set at $p < 0.05$. Results were presented in tables and interpreted in narrative form.

4.5 Ethical Considerations

Ethical approval was obtained from the relevant institutional review boards and hospital administrations. Participants provided written informed consent after receiving detailed information about the study objectives, procedures, risks, and benefits. Confidentiality and anonymity were maintained throughout the research process.

5.0 Results

Relationship between electronic medical records and healthcare service delivery

Table 1: Descriptive Statistics on electronic medical records

Electronic medical records	<i>Strongly Agree</i>	<i>Agree</i>	<i>Not Sure</i>	<i>Disagree</i>	<i>Strongly Disagree</i>	<i>Mean</i>	<i>STD</i>
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I use the Electronic Medical Records (EMR) system frequently in my daily work.	49 (23.1%)	116 (54.7%)	25 (11.8%)	8 (3.8%)	14 (6.6%)	3.84	1.036
The EMR system is easy to use and understand.	98 (46.2%)	70 (33.0%)	10 (4.7%)	22 (10.4%)	12 (5.7%)	4.04	1.200
The EMR system allows me to access patient information quickly when needed.	34 (16.0%)	135 (63.7%)	18 (8.5%)	12 (5.7%)	13 (6.1%)	3.78	0.989
The use of EMRs has improved the accuracy of patient records.	96 (45.3%)	92 (43.4%)	7 (3.3%)	6 (2.8%)	11 (5.2%)	4.21	1.014
EMRs have improved the timeliness of healthcare service delivery in this hospital.	109 (51.4%)	85 (40.1%)	5 (2.4%)	7 (3.3%)	6 (2.8%)	4.34	0.902

Source: Primary data, (2025)

Starting with the statement, “I use the Electronic Medical Records (EMR) system frequently in my daily work,” the results indicate that the majority of respondents regularly engage with the EMR system in their routine activities. Specifically, 49 respondents (23.1%) strongly agreed, and 116 respondents (54.7%) agreed, totaling 165 respondents or 77.8% who reported frequent use of EMRs. A smaller proportion expressed uncertainty or disagreement, with 25 respondents (11.8%) being not sure, 8 respondents (3.8%) disagreeing, and 14 respondents (6.6%) strongly disagreeing. The mean score of 3.84 and standard deviation of 1.036 indicate moderate variability in daily usage patterns. *A Medical Records Officer noted, “I use the EMR system every day to manage patient records, schedule follow-ups, and update lab results. This has streamlined our workflow and reduced manual record-keeping significantly” (KM006: 13/08/2025). This demonstrates that EMRs have become a central tool in daily hospital operations.*

For the statement, “The EMR system is easy to use and understand,” 98 respondents (46.2%) strongly agreed, and 70 respondents (33.0%) agreed, totaling 168 respondents or 79.2% affirming that the system is user-friendly. Meanwhile, 10 respondents (4.7%) were not sure, 22 respondents (10.4%) disagreed, and 12 respondents (5.7%) strongly disagreed. The mean of 4.04 and standard deviation of 1.200 reflect some variability in perceptions of system usability, suggesting that while most staff find the EMR intuitive, a subset may require additional support or training. *An IT Personnel explained, “The interface is straightforward, but some new staff occasionally struggle with certain*

modules, which highlights the need for continuous orientation” (KM007: 13/08/2025). This emphasizes that usability is generally high, yet ongoing support ensures all staff can effectively navigate the system.

Regarding the statement, “The EMR system allows me to access patient information quickly when needed,” 34 respondents (16.0%) strongly agreed, and 135 respondents (63.7%) agreed, totaling 169 respondents or 79.7% recognizing the efficiency of information retrieval. Only 18 respondents (8.5%) were not sure, 12 respondents (5.7%) disagreed, and 13 respondents (6.1%) strongly disagreed. The mean of 3.78 and standard deviation of 0.989 indicate relatively consistent perceptions of rapid access to patient data. *A Senior Healthcare Provider noted, “With EMRs, I can retrieve a patient’s history and lab results in seconds, which helps in making timely clinical decisions” (KM008: 13/08/2025). This highlights that EMRs significantly enhance information accessibility, improving operational efficiency and patient care.*

Considering the statement, “The use of EMRs has improved the accuracy of patient records,” 96 respondents (45.3%) strongly agreed, and 92 respondents (43.4%) agreed, totaling 188 respondents or 88.7% acknowledging improved accuracy. Only 7 respondents (3.3%) were not sure, 6 respondents (2.8%) disagreed, and 11 respondents (5.2%) strongly disagreed. The mean score of 4.21 and standard deviation of 1.014 suggest strong consensus on the positive impact of EMRs on data accuracy. *An IT Support Staff member explained, “EMRs have minimized errors related to manual entries. Automatic validation checks ensure that patient information is complete and accurate” (KM009: 13/08/2025), highlighting the crucial role of EMRs in enhancing record reliability.*

For the statement, “EMRs have improved the timeliness of healthcare service delivery in this hospital,” 109 respondents (51.4%) strongly agreed, and 85 respondents (40.1%) agreed, totaling 194 respondents or 91.5% reporting improved service timeliness. Only 5 respondents (2.4%) were not sure, 7 respondents (3.3%) disagreed, and 6 respondents (2.8%) strongly disagreed. The mean of 4.34 and standard deviation of 0.902 indicate strong agreement and minimal variability in responses. *A Hospital Administrator observed, “EMRs allow us to process patient information, lab results, and prescriptions quickly, which has significantly reduced waiting times and improved overall patient satisfaction” (KM010: 13/08/2025). This finding underscores that EMRs not only enhance record accuracy but also directly contribute to faster and more efficient healthcare service delivery.*

Relationship between Electronic medical records and Healthcare Service Delivery

Table 2: Correlation Analysis between Electronic medical records and Healthcare Service Delivery

Correlations		
	Healthcare Service Delivery	Electronic Medical Records



Healthcare Service Delivery	Pearson Correlation	1	.781**
	Sig. (2-tailed)		.000
	N	212	212
Electronic Medical Records	Pearson Correlation	.781**	1
	Sig. (2-tailed)	.000	
	N	212	212
**. Correlation is significant at the 0.01 level (2-tailed).			

Source: Primary Data, 2025

The correlation analysis results in Table 6 indicated that there was a strong and statistically significant positive relationship between Electronic Medical Records and Healthcare Service Delivery, as demonstrated by the Pearson correlation coefficient of 0.781 with a p-value of 0.000, which was less than the 0.01 significance threshold. This implied that improvements in the adoption and utilization of electronic medical records were strongly associated with enhancements in healthcare service delivery. The positive correlation suggested that as hospitals increased the use of electronic medical records, the efficiency, accuracy, and timeliness of healthcare services improved correspondingly. These findings were consistent with previous empirical studies which have shown that the integration of digital medical record systems promotes better clinical decision-making, reduces medical errors, and improves patient satisfaction. The results, therefore, reinforced the importance of investing in electronic medical record systems as a strategic approach to enhancing the quality and performance of healthcare delivery systems.

6.0 Conclusions

The findings from both the descriptive and correlation analyses demonstrated that Electronic Medical Records (EMRs) had a substantial and positive influence on healthcare service delivery in the hospital. Descriptive results showed consistently high levels of agreement among respondents regarding EMR usability, frequency of use, improved accuracy of patient information, and significant enhancement in the timeliness of service delivery. Mean scores ranging from 3.78 to 4.34 indicated strong positive perceptions, while qualitative responses from staff further confirmed that EMRs streamlined workflows, reduced manual errors, and enabled faster retrieval of patient data.

The correlation analysis reinforced these descriptive insights by revealing a strong and statistically significant positive relationship between EMRs and healthcare service delivery ($r = 0.781, p < 0.01$). This indicated that increased adoption and effective utilization of EMRs were closely associated with improvements in service efficiency, accuracy, and responsiveness within the hospital environment. In practical terms, the more staff engaged with EMRs particularly in retrieving patient information, updating records, and processing clinical tasks the more timely and reliable healthcare services became.

7.0 Recommendations



Although most staff found the EMR system easy to use, a portion expressed difficulty navigating certain modules. Regular refresher trainings, onboarding orientations for new staff, and targeted coaching should be implemented to ensure all users can effectively operate the EMR system without errors or delays.

To support fast and uninterrupted access to patient records, the hospital should invest in strengthening its ICT infrastructure. This includes improving internet connectivity, increasing server capacity, and reducing EMR system downtime to support real-time data retrieval.

The hospital should enhance the EMR system by integrating more clinical support tools such as automated alerts, decision-support features, and clinical dashboards. These improvements can help reduce medical errors and support more informed clinical decisions.

Given the importance of accuracy in patient records, the hospital needs to strengthen validation mechanisms within the EMR system. Automated data checks, mandatory fields, and standardized data entry formats would help eliminate inconsistencies and reduce the risk of incorrect or incomplete entries.

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