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Research Article

The Effect of Electronic Health Record (EHR) Implementation on Collaboration, Documentation and Quality of Nursing Services at Mitra Keluarga Gading Serpong: Descriptive Analysis

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Abstract

Background: The Hospital Management Information System (SIMRS) is an information technology that integrates all hospital service processes through a network of coordination, reporting, and administrative procedures to produce accurate and timely information. The implementation of the Electronic Health Record (EHR) is a digital innovation in healthcare that supports improved service quality, patient data integration, and the direction of national health development policies that emphasize technology-based promotive and preventive efforts.
Objectives: This study aims to determine the effect of EHR implementation on collaboration, documentation, and service quality at Mitra Keluarga Gading Serpong Hospital.
Methods: This study used a descriptive design with stratified random sampling with proportional strata. The sample consisted of 97 nurses with more than six months of service. Data analysis was conducted using the Partial Least Squares (PLS) method to test the research hypotheses.
Results: The analysis results show that there is a significant effect of EHR implementation on collaboration with a p value of 0.000 < 0.05. EHR implementation also affects documentation with a p value of 0.000 < 0.05. In addition, there is a significant effect of EHR implementation on service quality with a p value of 0.000 < 0.05.
Conclusion: These findings indicate that EHR implementation can enhance collaboration among healthcare professionals, improve the quality of nursing documentation, and enhance overall service quality. Data integration and easy access to information through the EHR have had a positive impact on the service process at Mitra Keluarga Gading Serpong Hospital.

Keywords: Collaboration, Documentation, EHR, Quality of Service

Introduction

Since the implementation of the Electronic Health Record (EHR), several obstacles have been experienced in its application. Medical documentation may be completed even before or long after physicians have examined the patient. Physicians can provide instructions through the EHR without having direct communication with nurses. Meanwhile, nurses do not continuously monitor the EHR, resulting in increased workload as they must contact the physician directly. Nursing documentation is conducted at each stage of the nursing process; however, nurses often complete the documentation in a general and routine manner. Based on observations, nurses also do not document immediately after providing nursing care to patients.

From the results of patient satisfaction surveys conducted by the hospital, the percentage of achievement for nursing services is generally above 90%. However, the evaluation remains general and has not been specifically related to the implementation of EHR. Similar conditions are found in the evaluation of interprofessional collaboration and nursing documentation. Based on the preliminary study and limited literature regarding the influence of EHR implementation on collaboration, nursing documentation, and the quality of nursing services, this research was conducted to answer the research question concerning the effect of EHR application on collaboration, documentation, and quality of nursing care. The purpose of this study is to determine whether the implementation of EHR influences collaboration, documentation, and quality of services. Electronic Health Record (EHR) is an electronic medical record system containing an individual's health information designed, integrated, managed, utilized, and referenced by authorized healthcare professionals within healthcare organizations according to interoperability standards (Darwito, Yuliana, and Azkiya, 2016). According to the International Standard Organization (ISO), EHR is defined as a location for storing a person's health information in a computer-processable format. According to Davis (1989), the components assessed in the implementation of information and communication technology include perceived usefulness, attitude, and behavioral intention.

According to the Canadian Interprofessional Health Collaborative (2011), interprofessional collaboration is a dynamic process of change, development, and maintenance of effective working relationships among professionals, including clinicians, patients/clients, families, and communities, in order to achieve optimal health outcomes through cooperation, mutual respect, shared decision-making, and partnership. Interprofessional collaborative practice strengthens the healthcare system and improves health outcomes (WHO, 2010). Communication skills play a crucial role in enhancing collaboration by facilitating interactions among individuals with different levels of understanding.

According to Nursalam (2015), models of nursing documentation are oriented toward the source (Source-Oriented Record), patient progress (Progress-Oriented Record), Charting by Exception (CBE), Problem-Intervention-Evaluation (PIE), and the Process-Oriented System (POS). Behavioral domains assessed in nursing documentation include cognitive, affective, and psychomotor aspects.

The quality of health services in a hospital is closely related to the structure, process, and output of the hospital service system. The quality of hospital services can also be assessed based on the level of service utilization, quality of services provided, and efforts by the hospital to achieve efficiency. Generally, the aspects of evaluation include evaluation, documentation, instruments, and audit (EDIA) (Nursalam, 2014).

Methods

This research design used descriptive analysis. The population was all nurses with a work experience of more than 6 months. The sample size was 97 respondents spread across all nursing units. Data were collected from 97 nurses selected through random sampling. After data collection, the data were analyzed using univariate and PLS. This

study used a standardized questionnaire; the I-SEE instrument, which covered collaboration (communication), documentation, and service quality. It consisted of 64 questions using a 7-point Likert scale for HER implementation, collaboration, and documentation, while for service quality, a 6-point Likert scale was used. The variables in this study were HER implementation, collaboration, documentation, and service quality.

Results

Table 1. AVE

Variable	Cronbach's Alpha	Rho_A	Composite Reliability	Average Variance Extracted (AVE)
Documentation	0.853	0.89	0.911	0.775
EHR	0.866	0.89	0.905	0.785
Collaboration	0.855	0.87	0.912	0.776
Service Quality	0.950	0.92	0.957	0.692

From the data in Table 1, the results indicate that the reliability of the EHR instrument has a Cronbach's Alpha value of 0.866; collaboration has a Cronbach's Alpha value of 0.855; documentation has a Cronbach's Alpha value of 0.853; and service quality has a Cronbach's Alpha value of 0.950. An instrument is considered reliable if it has a value greater than 0.6; therefore, the instruments for EHR, collaboration, documentation, and service quality are declared reliable and meet the requirements.

Table 2. Frequency distribution of respondents based on length of service, career level, and education (n=97)

Variable	Frequency	Percentage (%)
Education		
Diploma (D3)	26	26.8
Bachelor (S1)	4	4.1
Professional Nurse (S1 + Ners)	67	69.1
Career Level		
Pre-Competency	17	17.5
PK I	33	34.0
PK II	41	42.5
PK III	5	5.2
PK IV	1	1.0
Length of Service		
< 1 year	18	18.6
2–5 years	62	63.9
6–10 years	11	11.3
> 10 years	6	6.2

Based on Table 2, the results show that 42.3% of respondents (63 nurses) were at Clinical Nurse Level II. Clinical Nurse II refers to nurses with more than 3 years of work experience and who have fulfilled the requirements for PK I and PK II logbooks. Respondents with 2–5 years of work experience accounted for 63.9% (62 nurses), 18.6% (18 nurses) had less than 1 year of service, 11.3% (11 nurses) had 6–10 years of service, and 6.2% (6 nurses) had more than 10 years of service. In terms of education level, 69.1% (67 nurses) held a professional nurse degree, 4.1% (4 nurses) were bachelor students

currently pursuing their professional qualification, and 26.8% (26 nurses) held a diploma (D3) in nursing.

Table 3. Crossloading

Indicator	EHR	Collaboration	Documentation	Service Quality
Attitude	0.889	0.353	0.400	0.403
Behavior Intention	0.899	0.506	0.527	0.541
Perceived Usefulness	0.871	0.328	0.370	0.356
Intra-Organizational Communication	0.422	0.913	0.763	0.713
Interprofessional Communication	0.394	0.882	0.766	0.720
Patient Communication	0.403	0.847	0.676	0.694
Psicomotor	0.405	0.723	0.814	0.717
Afectif	0.452	0.771	0.930	0.894
Cognitive	0.463	0.712	0.893	0.830
Reliability	0.362	0.634	0.783	0.852
Responsiveness	0.431	0.643	0.783	0.853
Security	0.422	0.673	0.697	0.801
Tangible	0.362	0.670	0.783	0.848
Understanding	0.372	0.747	0.838	0.852
Access	0.420	0.602	0.740	0.791
Competence	0.436	0.649	0.724	0.783
Courtesy	0.448	0.608	0.689	0.761
Credibility	0.431	0.720	0.822	0.888

Based on Table 3, discriminant validity is assessed by comparing the square root of the Average Variance Extracted (AVE) for each construct with the correlation between that construct and other constructs. If the square root of the AVE is greater than the correlation with other constructs, discriminant validity is considered good. A recommended AVE value should be greater than 0.50. The data in Table 5.13 show that the AVE values were 0.686 for EHR, 0.653 for collaboration, 0.686 for documentation, and 0.648 for service quality, indicating accuracy and consistency of the measurement instrument. The findings demonstrate good discriminant validity, as the correlation values of each indicator were higher compared to the correlation with other constructs. This table also shows that the collaboration indicator has the highest loading factor compared to other constructs.

Table 4. R square

	R square	R square Adjusted
Documentacy	0,251	0,243
Collaboration	0,213	0,205
Mutupely	0,254	0,246

Based on Table 4, the R-Square value for the documentation variable is 0.251. This indicates that the documentation variable has an explanatory power of 25.1%, which is categorized as weak. The collaboration variable has an R-Square value of 0.213, meaning that the collaboration construct explains 21.3% of the variance in the model, also categorized as weak. Meanwhile, the service quality variable has an R-Square value of 0.254, indicating that 25.4% of its variance is explained by the model, which is also categorized as weak.

Table 5. Path coefficieny (Mean, STDEV, t-Value)

	Original Sample	Sample Mean	Standard Deviation	T Statistic	P Values
EHR > Documentary	0,501	0,503	0,078	6,388	0,000
EHR > Collaboration	0,462	0,467	0,076	6,086	0,000
EHR > Mutupely	0,504	0,505	0,077	6,539	0,000

Based on Table 5, the implementation of EHR on collaboration shows an original sample estimate of 0.462 with a significance level below 5%, indicated by a t-statistic of 6.086, which is higher than the t-table value of 1.660, and a p-value of 0.000 < 0.05. This indicates that the implementation of EHR has a significant effect on collaboration. The implementation of EHR on documentation shows an original sample estimate of 0.501, with a t-statistic of 6.388 greater than the t-table value of 1.660 and a p-value of 0.000 < 0.05, indicating a significant effect. The implementation of EHR on service quality shows an original sample estimate of 0.504, with a t-statistic of 6.539 greater than the t-table value of 1.660 and a p-value of 0.000 < 0.05, indicating that the implementation of EHR has a significant effect on service quality.

Discussion

The implementation of EHR on collaboration has an original sample estimate value of 0.462 with a significance level below 5%, as indicated by a t-statistic value of 6.086, which is greater than the t-table value of 1.660, and a p-value of 0.000 (<0.05). This shows that there is a significant influence of EHR implementation on collaboration. Electronic Health Records (EHR) are comprehensive electronic recording technologies containing client health information, including demographic data, vital signs, health progress notes, medical history, therapy, laboratory data, and radiology results (Caine et al., 2015). A study conducted by Wiratama (2019) showed that the behavior of doctors and nurses toward collaboration had mean scores of 69.8 for doctors and 60.31 for nurses, with a p-value of 0.001 (p <0.005), indicating a statistically significant difference. This result aligns with the current findings that collaboration has an influence on EHR implementation (Wiratama, 2019).

Communication and documentation serve as tools to exchange data and information. Systems are expected to facilitate communication and documentation among care providers to improve the quality of patient care and patient safety. The use of EHR provides benefits in improving service quality, time efficiency, communication, documentation, and professional practice. In terms of service quality improvement, EHR allows nurses to avoid spending excessive time reviewing demographic and medical history data, as everything is already documented within the system (Abrdo, 2011 in Fadhal, 2022).

According to the researchers, the implementation of computerized hospital information systems enables professional care providers to access patient data more easily and opens access across health services, leading to better patient care. Nurses' readiness in understanding the system, ease of system use, and adequate system availability contribute to forming positive perceptions in the collaborative process.

The implementation of EHR on documentation has an original sample estimate value of 0.501 with a significance level below 5%, as indicated by a t-statistic of 6.388, which is greater than the t-table value of 1.660, and a p-value of 0.000 (< 0.05). These

findings show that EHR implementation has a significant influence on documentation.

According to Susilaningsih (2011) in Bauw (2019), the Interprofessional Collaborative Practice Model (MPKIPK) is a care setting designed to streamline various involved professions (including physicians, nurses, pharmacists, and nutritionists) in providing care to hospitalized patients. This model consists of four components: integrated care pathways, team-based patient management, integrated care documentation, and joint problem-solving through interprofessional case discussions. Kutney-Lee et al. (2011) in Astrini (2018) also found that the implementation of EHR improves nursing care efficiency, strengthens nurse-to-nurse coordination, and enhances patient safety. Research by Swedarma and Dwidasmara (2019) supports these findings.

Research conducted by Gunningberg et al. (2009) in Astarini (2018) reported improvements in pressure ulcer documentation after the implementation of EHR. Entzeridou et al. (2018) in Dewi et al. (2019) found that electronic recording systems had a positive impact by enabling better, more effective, and faster decision-making. Coordination across hospitals and clinics also improved, leading to enhanced service quality and reduced healthcare costs (Lumbanbatu, 2018).

However, research by Bani Issa et al. (2020) indicated that nurses expressed concerns regarding electronic health record security (n = 270; 48%). The most frequently reported issues involved administrative security, inadequate training, and unauthorized access. Major patient safety issues were associated with non-technical factors, including lack of staff auditing, poor communication with technology vendors, and long documentation time requirements. These findings differ from the current study, as nurses' perceptions of EHR acceptance were formed prior to system training and supported by policies regulating implementation.

Based on the discussion above, the researchers concluded that regarding documentation, nurses demonstrated positive responses, and documentation had impacts on decision-making and coordination. System ease of use, regulatory clarity, streamlined workflows, real-time records, easy nursing documentation entry, and document integration contributed to positive perceptions of documentation.

High-quality EHR implementation significantly impacts improvements in healthcare quality (Ayaad et al., 2019). EHR use eliminates paper-based documentation, reducing overall healthcare costs. Standardized terminology in EHR ensures uniform information across healthcare professionals and maintains accountability in data security and access. EHR enables nurses to perform tasks that are traceable, accurate, and compliant with legal requirements.

The implementation of EHR on service quality has an original sample estimate value of 0.504 with a significance level below 5%, indicated by a t-statistic of 6.539, greater than the t-table value of 1.660, with a p-value of 0.000 (< 0.05). This shows a significant influence of EHR implementation on service quality.

A study in Saudi Arabia found a strong positive correlation between perceived benefits and ease of use, which positively affected nurse acceptance. Nurses at National Guards Health Affairs (NGHA) were willing to use EMR to improve service quality (Aldosari et al., 2018).

EHR implementation in hospitals influences the amount of time nurses spend interacting with patients and families. A study in the United States showed that before EHR implementation, nurses spent 50.5% of their time at the nurse station completing medical records and administrative tasks. After implementation, they spent only 35% of their time at the station, indicating more time allocated to interventions and interaction with patients and families (Schenk et al., 2018).

A systematic review by Gatiti et al. (2021) concluded that EHR significantly

improves healthcare quality by increasing patient safety and ensuring effective, efficient, timely, equitable, and patient-centered care. EHR functions that support this include practice management, communication, documentation and data entry, medication management, decision support, computerized prescriptions, electronic nursing documentation, and electronic care management. Challenges in EHR implementation include institutional factors, human resources, technological issues, and ethical concerns. These findings align with the current research, which also indicates a significant influence of EHR implementation on service quality.

EHR enhances the legality and accessibility of patient data and the care processes provided. This aligns with Schwartz (2015), who found that 57% of clients using EHR wished to access a comprehensive list of healthcare providers supplying accurate health information (Fadhal, 2022).

Electronic medical records improve care quality, patient outcomes, and safety by enhancing management, reducing medication errors, minimizing unnecessary investigations, and improving communication among primary care providers, patients, and other involved healthcare personnel.

EHR provides accurate and complete patient health information and medical history at the fingertips of care providers, enabling them to deliver the best possible care. This leads to better patient experiences and, more importantly, improved patient outcomes. EHR supports high-quality healthcare delivery (eduhealthsystem.com).

From the discussion above, EHR use in health services shortens service procedures through systems capable of monitoring patient flow, enhances patient experience, increases nurse–patient interaction time, reduces waiting times, improves communication using better information media, facilitates patient and family education access, and reduces patient safety incidents caused by data errors.

Conclusion

There is an influence of EHR implementation on collaboration, there is an influence of EHR implementation on documentation, and there is an influence of EHR implementation on service quality. The researcher would like to express sincere gratitude to the first and second supervisors, as well as the examiners, for their guidance during the implementation of this research. The researcher also extends appreciation to all parties who supported the smooth completion of this research.

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