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Analysis of the Completeness and Effectiveness of Electronic Inpatient Medical Record at Bandung City Hospital

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Abstract: Electronic Medical Records (EMR) are a digital documentation system essential for supporting effective and efficient healthcare services. This study aims to analyze the completeness of documentation and the effectiveness of EMR usage in the inpatient ward of RSUD Kota Bandung. A descriptive quantitative method was used with simple random sampling of 92 EMR documents and a questionnaire distributed to 30 healthcare workers. The results showed that the average completeness of EMR documentation was 88%, with the patient identity component achieving 100%, while the initial nursing assessment had the lowest completeness at 77%. The effectiveness assessment produced an average score of 3.97 on a 5-point scale, categorized as effective. The highest-rated indicators were system understanding and target accuracy, while timeliness was the lowest. It can be concluded that the EMR system at RSUD Kota Bandung functions effectively and is relatively complete; however, periodic evaluations, enhanced supervision, and continuous training are needed to optimize its use and improve healthcare service quality.

Keywords: electronic medical records, inpatient services, completeness, effectiveness, healthcare

INTRODUCTION

Hospitals, as healthcare service institutions, carry a significant responsibility to provide services that are high-quality, effective, and efficient. One of the most crucial elements in the delivery of medical services is the recording and management of patient health information through medical records. Medical records serve as legal evidence, a source of medical information, a basis for clinical decision-making, and a reference for research and quality assessment of healthcare services.

With the advancement of information technology and the digitalization of public services, the Electronic Medical Record (EMR) system has emerged as a recommended-and even mandated-solution by the government. Healthcare providers are required to implement EMR as a system that ensures fast, accurate, and accountable documentation of healthcare services (Ministry of Health Regulation No. 24 of 2022). This is also reinforced by

regulations that emphasize the importance of the completeness and accuracy of medical record content (Ministry of Health Regulation No. 269/MENKES/PER/III/2008).

The implementation of EMR is expected to address various issues often encountered in manual medical record systems, such as incomplete data, delayed information access, and the risk of document loss or physical damage. According to WHO (2016), the use of EMR systems has been proven to enhance work efficiency, accelerate clinical decision-making, and reduce documentation errors. However, field observations indicate that EMR implementation does not automatically guarantee improved documentation quality. Several studies have identified common challenges, including a lack of training for healthcare personnel, resistance to system changes, high workloads, and technical problems such as connectivity issues and unfriendly user interfaces (Setiawan et al., 2020; Siregar et al., 2021).

Bandung City Regional Public Hospital (RSUD Kota Bandung), a government-owned hospital, has implemented the EMR system in an effort to improve service quality and efficiency, including in its inpatient care units. Although the EMR system has been in operation, there is still no comprehensive report on the completeness of electronic documentation or the extent to which the system is effectively utilized by healthcare personnel in supporting patient care. In fact, the completeness of medical records is a key indicator for hospital accreditation and the legality of services. Meanwhile, the effectiveness of the system can be assessed by its ability to support timely documentation, facilitate data access, and help achieve clinical service objectives.

I am interested in examining the aspects of completeness and effectiveness because these two variables are key indicators of the successful implementation of the EMR system. By analyzing EMR documents and assessing user perceptions (medical personnel and nurses), this study is expected to provide a factual overview of EMR implementation at RSUD Kota Bandung. Furthermore, the findings are expected to serve as a basis for improving documentation quality and optimizing the use of health information systems, whether through system development, human resource training, or internal policy improvements. In other words, this topic is chosen for its practical relevance, policy urgency, and academic significance in strengthening modern hospital governance.

Measuring these two aspects—completeness and effectiveness—is essential to ensure that the system in which the hospital has invested not only operates technically but also functions optimally in daily clinical practice. By understanding the extent of EMR utilization and the perceptions of healthcare personnel, the hospital can improve its system, enhance the capacity of its human resources, and develop more targeted policies.

Electronic Medical Record (EMR)

The Electronic Medical Record (EMR) is a digital system used to record, store, access, and manage patient health data electronically. According to the Health Information and Management Systems Society (HIMSS), an EMR is a digital record of a patient's health information that can be accessed in real-time by authorized users. This system is designed to support safe, efficient, and integrated healthcare services. As stated in the regulations on medical records, the EMR is a medical record that is created, managed, and stored using an electronic system that ensures the security and confidentiality of patient information. Its purpose is to support the continuity of care and to enhance the quality and efficiency of healthcare services (Ministry of Health Regulation No. 24 of 2022).

Effectiveness of the Electronic Medical Record

The term "effectiveness" refers to the ability to achieve intended goals. In the context of health information systems, effectiveness relates to the extent to which a system can be used optimally to fulfill its functional objectives. Several factors contribute to the

effectiveness of the EMR system, including: Ease of system use, Speed of data access, Relevance of the information provided, Impact on the quality of documentation and healthcare services, Support for clinical decision-making. The effectiveness of the EMR system is influenced not only by technology but also by user competence, training, organizational culture, and supporting infrastructure.

Completeness of the Electronic Medical Record

Completeness in the context of medical records refers to the extent to which all elements or components of the medical record are filled out according to applicable standards and regulations. According to the Ministry of Health of the Republic of Indonesia (Ministry of Health Regulation No. 269 of 2008), medical records must reflect complete, structured, and accurate documentation to ensure continuity of care and provide legal protection for both patients and healthcare providers. Data completeness is essential in health information systems because incomplete data can lead to misleading information, which may compromise clinical decision-making (Soekidjo Notoatmodjo et al., 2012). In the electronic medical record (EMR) system, completeness can be assessed based on the entry of patient identification, anamnesis, diagnosis, therapy, nursing assessment, daily progress notes, and discharge summary. Completeness involves not only the presence of entries but also the accuracy of content, correct sequence, and timeliness of documentation. The more complete the medical record, the higher its validity and quality in supporting hospital service processes and reporting.

METHOD

This study employed a descriptive quantitative approach, aiming to describe and analyze the level of completeness and the effectiveness of the Electronic Medical Record (EMR) system usage in inpatient services. The quantitative approach was used to measure and present numerical data obtained from medical record documents and questionnaires distributed to healthcare personnel. Quantitative methods were chosen because the data collected consisted of numerical values and measurable results that could be analyzed statistically. This research is descriptive in nature, as it does not examine relationships between variables but focuses on describing the existing phenomenon, namely the condition of completeness and effectiveness of the EMR system implemented by the hospital.

The study was conducted at Bandung City Regional Public Hospital (RSUD Kota Bandung) from March to April 2025. This location was selected because the hospital had comprehensively implemented the EMR system, particularly in inpatient care services, and had a high patient volume, making it relevant for analysis in terms of documentation effectiveness and completeness.

The population in this study comprised all inpatients recorded at RSUD Kota Bandung in March 2025. Based on data from the medical record unit, the total number of inpatients during that period was 1,032 patients. This population served as the basis for determining the sample size for analysis.

The sample size was determined using the Slovin formula with a margin of error of 10% (e = 0.1) to obtain a representative sample size. The calculation resulted in a required sample of 92 electronic medical record documents. However, to enhance validity and strengthen the analysis results, the researcher used a total of 92 inpatient electronic medical record documents as the sample for this study.

Sampling was carried out using a simple random sampling technique, which is a method of selecting samples based on predetermined criteria aligned with the research objectives. The inclusion criteria in this study were as follows:

1. Inpatient medical record documents that were administratively complete
2. The inpatient period occurred in March 2025
3. The EMR documents were accessible and could be fully analyzed

RESULT AND DISCUSSION

This study was conducted with the aim of determining the extent to which the Electronic Medical Record (EMR) system has been used completely and effectively in inpatient services at Bandung City Regional Public Hospital (RSUD Kota Bandung). The researcher analyzed two main aspects: the completeness level of electronic medical record documentation and the effectiveness of its use by healthcare personnel. Data were collected through observations of 92 electronic medical record documents and questionnaires completed by 30 healthcare personnel respondents. The data were then analyzed using descriptive quantitative methods to present the actual conditions in the field.

The analysis results showed that the completeness level of each EMR component varied. Patient identification achieved perfect completeness (100%), reflecting a high level of compliance with administrative data requirements. The anamnesis component reached 92%, while both the medical diagnosis and medical procedures components recorded 90%. Meanwhile, the physician's progress notes showed a completeness of only 80%. The lowest completeness was found in the initial nursing assessment (77%), while the discharge summary recorded a completeness level of 88%.

Tabel 1. Avereges of Completness EMR

No	EMR Component	Completeness Percentage
1	Patient Identification	100%
2	Anamnesis	92%
3	Medical Diagnosis	90%
4	Medical Procedures	90%
5	Physician's Progress Notesr	80%
6	Initial Nursing Assessment	77%
7	Discharge Summary	88%
Average Completeness		**88%**

The overall average completeness of EMR documentation was 88%, which can be categorized as good. However, continuous monitoring and improvement are still required for certain aspects of documentation. The following is a summary of the completeness analysis results:

The low completeness observed in the nursing-related components may be attributed to several factors, including the high workload of nurses, limited time available for documentation, and the suboptimal technical training related to EMR system usage. This condition is supported by findings from Siregar et al. (2021), which state that the main challenges in EMR documentation implementation in hospitals are the lack of adequate training and the absence of a strong documentation culture among nurses.

Tabel 2. Total of repondent questionnaire

No	Type of Healthcare Personnel	Number (People)
1	Attending Physicians (DPJP)	5
2	Staff Nurses	10
3	Medical Record Officers	15
Total		**30**

The following are the questionnaire results completed by 30 healthcare personnel at Bandung City Regional Public Hospital (RSUD Kota Bandung). The responses were measured using a Likert scale of 1 to 5.

Explanation:
SD = Strongly Disagree (1.00 – 1.80)
D = Disagree (1.81 – 2.60)
N = Neutral (2.61 – 3.40)
A = Agree (3.41 – 4.21)
SA = Strongly Agree (4.21 – 5.00)

Based on the questionnaire results completed by 30 healthcare personnel at Bandung City Regional Public Hospital (RSUD Kota Bandung), it was found that the use of the Electronic Medical Record (EMR) system is perceived as being in the "agree" or "effective" category, with an overall average score of 3.97 on a 5-point scale.

The statement with the highest score was "I understand how the EMR system works," scoring 4.37, which falls into the "strongly agree" or "very effective" category. This indicates that healthcare personnel have a good understanding of the system in use, which is a key factor for the successful implementation of EMR. Additionally, other aspects such as fast data access, ease of documentation, and fulfillment of medical documentation objectives also scored above 3.90, placing them in the "agree" or "effective" category. This suggests that the EMR system has been helpful in supporting tasks and services in the inpatient care units.

However, there was one aspect with the lowest score "I can enter EMR data on time" which scored 3.43, although it still falls within the "agree" or "effective" category. This score indicates a time constraint in EMR data entry, which may be caused by workload, system limitations, or inefficiencies in the documentation workflow.

These findings are in line with research by Nugroho and Prasetyo et al. (2022), which stated that the effectiveness of health information systems is not only determined by user understanding but also by the availability of supporting facilities, training, and supervisory systems. Overall, the perception of healthcare personnel regarding the use of the EMR system at RSUD Kota Bandung is considered positive, categorized as "agree" or "effective." Nevertheless, special attention is still needed for the aspect of timely data entry to ensure the system functions optimally and truly supports high-quality healthcare services.

Tabel 3. Averages of Effective EMR

Indicator	Statments	Averege	Category
A. System Understanding	A1, A2	4.05	Very Effective
B. Target Accuracy	B3, B4	4.10	Very Effective
C. Actual Changes	C5, C6	3.90	Effective
D. Timeliness	D7, D8	3.75	Effective
E. Achievement of Objectives	E9, E10	4.05	Very Effective
Overall Averages		**3.97**	**Effective**

Interpretation of Results

1. Understanding of the System

This indicator achieved an average score of 4.05, which falls into the "very effective" category. This indicates that most respondents understand the EMR system in use and feel they have received sufficient training. Such understanding is a crucial foundation for implementing a digital system, as it directly impacts the accuracy and efficiency of data entry.

2. Target Accuracy

With an average score of 4.10, this indicator also falls into the "very effective" category. This means the EMR system meets the documentation needs of the inpatient care units. Healthcare personnel believe that the system assists them in recording and tracking patient history systematically and efficiently.

3. Actual Changes

This indicator received a score of 3.90, which is close to the "very effective" category. Respondents acknowledged improvements in work efficiency and the quality of medical documentation since the implementation of EMR. This supports the statement by WHO et al. (2016), which highlights that EMR systems can enhance productivity and accuracy in hospital services.

4. Timeliness

This indicator recorded the lowest score (3.75), although it still falls within the "effective" category. This finding shows that some respondents experienced time-related challenges when entering data into the EMR, which could be caused by factors such as high workload, slow network access, or a suboptimal user interface. Therefore, this aspect should be a focal point for system evaluation and further training.

5. Achievement of Documentation Objectives

This indicator achieved a score of 4.05, indicating that the primary objectives of the EMR system — fast, accurate, and complete medical documentation — have been met, according to user perceptions. This reflects the system's effectiveness in supporting clinical decisions and continuity of care.

The overall average score was 3.97. Based on the category guidelines by Sutrisno et al. (2007), this score is categorized as "Very Effective," indicating that the EMR system at RSUD Kota Bandung successfully meets its main objectives — enhancing the speed, accuracy, and quality of medical documentation. Based on the questionnaire responses from 30 healthcare personnel at RSUD Kota Bandung, it can be concluded that the use of the Electronic Medical Record (EMR) system is perceived as effective, with an overall average score of 3.97 on a 5-point Likert scale. This shows that most respondents agree or strongly agree that EMR supports the medical service process.

These findings are consistent with the research by Nugroho and Prasetyo et al. (2022), which states that EMR systems can improve the efficiency and quality of medical documentation when supported by adequate training and a user-friendly system. Additionally, these results align with the theory of system effectiveness by Sutrisno et al. (2007), which asserts that system effectiveness can be measured through five key indicators - all of which have been fulfilled by the EMR system at RSUD Kota Bandung.

CONCLUSION

Based on the results of this study, it can be concluded that the completeness level of Electronic Medical Record (EMR) documentation at Bandung City Regional Public Hospital (RSUD Kota Bandung) is in the "good" category, with an average completeness rate of 88%. The patient identification component showed the highest completeness (100%), while the initial nursing assessment had the lowest (77%). This indicates a strong commitment to EMR documentation, although certain components — particularly related to medical and nursing progress notes — still require improvement. In terms of effectiveness, the use of the EMR system was considered effective, as reflected by the average questionnaire score of 3.97. The highest ratings were given to system understanding and target accuracy indicators, suggesting that the system largely meets user needs. However, challenges remain in the aspect of timeliness, which should be addressed for future improvements. Overall, the EMR system at RSUD Kota Bandung functions effectively and with relatively good completeness.

Nevertheless, periodic evaluations, enhanced supervision, strengthened infrastructure, and continuous training are needed to ensure the EMR system is used optimally and continues to support sustainable healthcare service quality.

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