



The Benefits of Electronic Medical Records Reviewed from Economic, Clinical, and Clinical Information Benefits in Hospitals

Manfaat "Rekam Medis Elektronik" Ditinjau dari Manfaat Ekonomi, Klinis, dan Informasi Klinis di Rumah Sakit

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ABSTRACT

The development and progress of information technology are advancing very rapidly, electronic medical records are one form of these developments and advances in the health sector. A hospital is a place of service in the health sector that performs services related to medical records. Medical records can be made in full and clearly in electronic (digital) form. The implementation of medical record technology can solve many problems in the economic field, clinical, and information of clinical in the hospital system. The high cost of operational and complicated procedures is a crucial problem in the hospital system. So, the advance of medical technology can press high costs, cutting off the manual process to faster and more effective system and efficiency costs of operational. The study uses Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA), with many articles on the same issue. The same issues that can be found at the same topics of articles are probably more than fifty topics of articles. Articles were taken from various sources and database references, including Scopus 2 journals, Science Direct 16 journals, ProQuest 10 journals, Springer Link 3 journals, Google Scholar 36 journals, Research Gate 21 journals, PubMed 31 journals, and Emerald Insight 31 journals. So the total journal database is 133 journals. Then filtering was carried out by identifying the suitability of the journal until it was narrow and 27 articles were selected to be used as a reference in this research. The purpose of this study is to determine the benefits of applying Electronic Medical Records in terms of economic, clinical, and access to clinical information. Some of the economic benefits include cost savings, effectiveness, and cost efficiency. Clinical benefits include reducing medical errors, improving data readability, improving the quality of care services, and increasing the productivity of medical personnel. And the benefits of accessing clinical information include improving the accessibility of patient history information, improving patient confidentiality, and assisting the decision-making process.

ABSTRAK

Perkembangan dan kemajuan teknologi informasi melaju dengan sangat pesat, rekam medis elektronik merupakan salah satu bentuk perkembangan dan kemajuan tersebut dalam bidang kesehatan. Rumah sakit merupakan tempat pelayanan di bidang kesehatan yang melakukan pelayanan berkaitan dengan rekam medis. Rekam medis dapat dibuat secara lengkap dan jelas dalam bentuk elektronik (digital). Pada implementasinya teknologi rekam medis dapat memberikan manfaat dalam menyelesaikan berbagai permasalahan dari segi ekonomi, klinis, dan informasi klinis di Rumah Sakit. Biaya yang tinggi dan alur proses yang rumit bisa menjadi permasalahan penting pada rekam medis di rumah sakit. Sehingga Kemajuan teknologi rekam medis memberikan manfaat secara ekonomis yaitu dengan menekan biaya pasien, serta secara klinis dapat memotong proses manual pada rekam medis sehingga dapat berjalan lebih cepat, efektif dan efisien. Penelitian ini menggunakan pendekatan Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA), dengan banyak artikel tentang masalah yang sama. Kesamaan masalah pada beberapa artikel dapat dimungkinkan mencapai lebih dari 50 topik dengan tema yang sama. Artikel diambil dari berbagai sumber dan referensi database, antara lain Scopus 2 jurnal, Science Direct 16 jurnal, ProQuest 10 jurnal, Springer Link 3 jurnal, Google Scholar 36 jurnal, Research Gate 21 jurnal, PubMed 31 jurnal, dan Emerald Insight sebanyak 31 jurnal. Sehingga total keseluruhan database jurnal yaitu sebanyak 133 jurnal. Lalu dilakukan penyaringan dengan mengidentifikasi kesesuaian jurnal hingga mengerucut dan terpilih sebanyak 27 artikel untuk dijadikan acuan dalam riset ini. Tujuan penelitian ini adalah untuk mengetahui manfaat penerapan Rekam Medis Elektronik dari segi ekonomi, klinis, dan akses informasi klinis. Beberapa manfaat ekonomi meliputi penghematan biaya, efektifitas, dan efisiensi biaya. Manfaat klinis meliputi mengurangi kesalahan medis, meningkatkan keterbacaan data, meningkatkan kualitas pelayanan perawatan, dan meningkatkan produktivitas tenaga medis. Dan manfaat akses informasi klinis meliputi dapat meningkatkan aksesibilitas informasi riwayat pasien, meningkatkan kerahasiaan pasien, serta membantu proses pengambilan keputusan.

Keywords: *benefits, application, EMR*

Kata Kunci : *manfaat, penerapan, RME*

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INTRODUCTION

Currently, Indonesia is entering the industrial revolution 4.0, this is an information revolution and its application is a necessity for an industry.¹ Hospitals are a health industry that is busy infesting ways to improve service quality through the development of the Hospital Information System (HIS).² One of HIS's participation in improving the quality and efficiency of Hospital services is electronic medical record technology.³ An effort that can improve the quality of good service quality, it needs to be supported by the implementation of good medical records. The benefits of medical records can be very specific, even data related to the blood sugar levels of respondents can be obtained.⁴

The implementation of the health information system and the development of Electronic Medical Records have provided tremendous changes for patients, doctors, and other health services as well as health institutions in the world, especially in Indonesia. The implementation of Electronic Medical Records is intended to facilitate health services and is expected to have a positive effect on the treatment and actions provided to patients⁵. Electronic Medical Records are an important technological tool for healthcare, modernizing medical information management and participating in high-quality patient care and efficient management.^{3,6}

According to Permenkes number 269 of 2008 in⁷, Medical records are an information technology device used to collect, store, process and access data. The data is stored in the form of patient medical records and stored in a data-based management system that collects various medical data in the hospital. Electronic medical records are a clinical data storage application, as a system for supporting clinical decisions, standardizing medical terms, computerized data entry, and medical and pharmaceutical documentation that is composed of storage.⁸ The implementation of Electronic Medical Records has an impact on patient satisfaction, documenting accuracy, accelerating patient data access and reducing

clinical errors in services in health facilities including hospitals.⁹

The development of Electronic Medical Records in the world especially in developed countries is developing very quickly. In the American country, the development of Electronic Medical Records began in 2004.¹⁰ While in Denmark the application of Electronic Medical records began as early as the mid-1990s. In 2009, central Denmark had already decided to implement a comprehensive Electronic Medical Record.¹¹ Then in Japan the development of Electronic Medical Records is quite rapid whose application has begun in 2000.¹²

The benefits of Electronic Medical Records as the basis for making a decision for health workers used for planning treatment, treatment and medical actions to be provided to patients, improving the quality of services and providing legal protection for medical personnel, and can achieve efforts to improve the ideal degree of public health.¹³ In implementing Electronic Medical Records in hospitals, there are still obstacles including power failure problems or network disruptions that can hinder data processing.¹⁴

The use of Electronic Medical Records is expected to be able to increase and strengthen the benefits of medical records. Utilization of Electronic Medical Records, especially for the benefit of services to patients, including clinical and administrative services. The information generated from electronic medical records is also useful for education, regulatory preparation, research, community health management, policy support, and to support referral health services.¹⁵ In addition, ideally the application of Electronic Medical Records includes three benefits, including economic, clinical, and access to information benefits. In this article, the author would like to present an overview of how the impact of the use of Electronic Medical Records on Hospital management based on a systematic literature review study of several articles, both in domestic and foreign hospitals.¹⁶

The methods and results of systematic reviews should be reported in sufficient detail to allow users to assess the trustworthiness and applicability of the review findings. The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement was developed to facilitate transparent and complete reporting of systematic reviews and has been updated (to PRISMA 2020) to reflect recent advances in systematic review methodology and terminology.

METHOD

Design

This study uses a review method with the type of The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA). The systematic review of the literature review aims to identify the benefits of implementing Electronic Medical Records based on predetermined inclusion criteria. Sources of scientific articles are obtained from several databases based on predetermined initial criteria.

Criteria

Initial Articles Submission Criteria, The initial article collection was carried out by applying a random purposive sampling system. The requirement is in the form of the keyword “electronic medical record”.

Inclusion Criteria, the article screening process is carried out based on the inclusion criteria: (a) evaluation of the use of electronic medical records in hospitals, (b) quantitative reports on the use of electronic medical records, (c) original reports related to the use of electronic medical records. (d) Availability of journal’s information at Mendeley.

Search Engine Usage

Eight scientific search engines were used to obtain relevant sources from related databases related to specific problems of using Electronic Medical Records in Hospitals, namely: Scopus, Science Direct, ProQuest, Springer Link, Google Scholar, Research Gate, PubMed, Emerald Insight.

Literature Search

The search was conducted between June and July 2022 using keywords: evaluation, impact, effect, utilization, use, Electronic Medical Record, Hospital. To combine keywords, the Boolean operators “AND” and “OR” are applied in the search. The same criteria for each scientific database are applied.

Bias Risk Assessment

When applied according to procedures, the use of electronic medical records will have a positive impact on the internal side of the hospital. When the negative impact is conveyed by the hospital's internal parties, there is a bias in the electronic medical record data at the hospital.

Data Interpretation Method

Initial searches through Scopus, Science Direct, ProQuest, Springer Link, Google Scholar, Research Gate, PubMed, Emerald Insight yielded 133 articles that met the criteria of random purposive sampling on keywords. Preliminary screening of titles to exclude irrelevant studies resulted in 59 abstracts. Furthermore, articles that can be accessed in full or complete data on Mendeley are filtered and 34 articles are obtained as analysis material. And finally there are 27 articles that are complete in terms of information availability needs. The systematic review was then continued as in the PRISMA recommendation (Figure 1).

The steps in the search are adjusted to the guidelines in PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). PRISMA is an evidence-based minimum set of evidence that aims to help authors report multiple systematic objectives and meta-analyses assessing benefits. PRISMA focuses on ways in which authors can ensure transparent and complete reporting of this type of research.¹⁷

Data Analysis

Only studies related to the utilization of Electronic Medical Records were analyzed further to fulfill the purpose of this literature review. After

using the PRISMA approach, 27 articles were included in the review process.

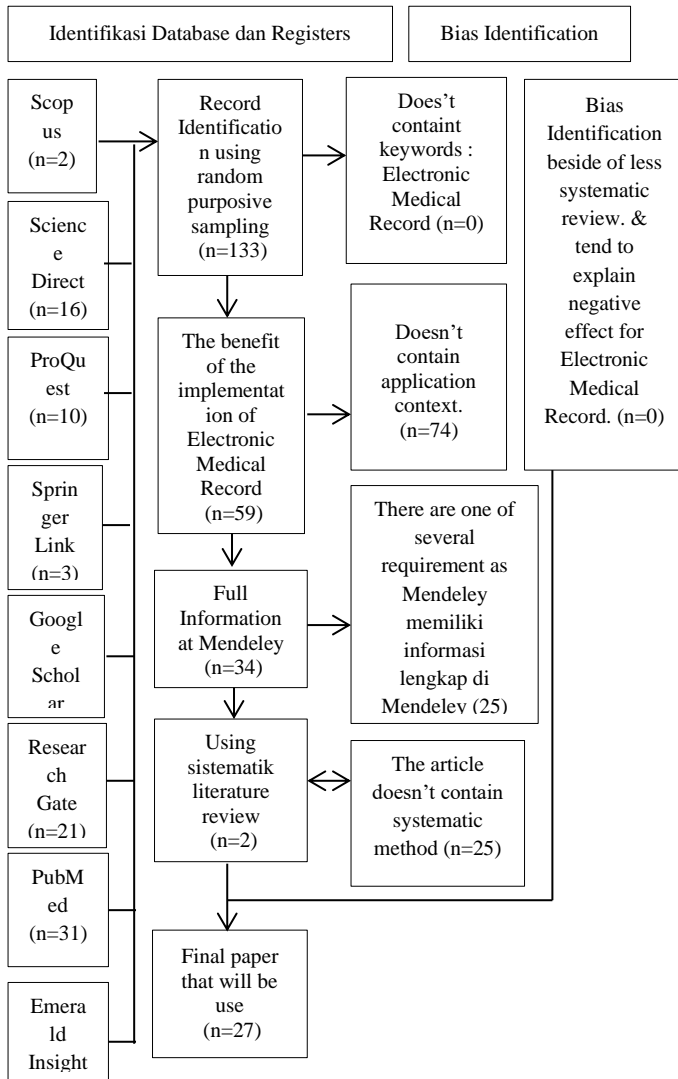


Figure 1. Flow Chart Screening Article

RESULT

Based on synthesized articles. There are 3 main ideas related to the benefits of implementing Electronic Medical Records. The idea includes the benefits of applying Electronic Medical Records based on economic aspects, the benefits of applying Electronic Medical Records based on clinical aspects, and the benefits of implementing Electronic Medical Records based on the benefits of accessing clinical information. The following results of articles reviewed by researchers as literature material are shown in table 1.

Table 1. Literature Materials

No	Main Idea	Similarities of Research Findings
1	Economic Benefits of Electronic Medical Records ^{14, 17, 18, 19, 20,21, 22}	According to various literature sources reviewed and examined, the economic benefits in the application of Electronic Medical Records are the impact felt by the institution or in this case the hospital is viewed from an economic point of view or the financial situation of the institution including cost savings, cost efficiency, and cost-effectiveness.
2	Clinical Benefits of Electronic Medical ^{7, 14, 21, 22 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 35, 36, 37, 38}	The clinical benefits of implementing Electronic Medical Records are the impact felt by institutions, users, and patients from the point of view of health observation or the quality of health services. The clinical benefits of implementing Electronic Medical Records include reducing medical errors, improving data readability, improving the quality of care services, and increasing the productivity of medical personnel.
3	The Benefits of Electronic Medical Record Clinical Information ^{14, 18, 20, 21, 22, 30, 31, 34, 39, 40, 41,}	The benefits of accessing clinical information from the application of Electronic Medical Records are the impact felt by institutions, users, and patients in terms of the ease of obtaining data and health information. The benefits of clinical information from implementing Electronic Medical Records include improving the accessibility of patient

No	Main Idea	Similarities of Research Findings
		history information, improving patient confidentiality, and assisting in the decision-making process.

Ideally the application of Electronic Medical Records includes three benefits, including economic, clinical, and access to information benefits.¹⁶ However, of the 27 articles reviewed, only 6 of them discussed all aspects of the benefits of implementing Electronic Medical Records.

DISCUSSION

The Benefits of implementing electronic medical records that can be felt by hospitals is as follows:

Economic Benefits

The economic benefits of the application of Electronic Medical Records are the impact felt by the institution in this case hospitals on the application of Electronic Medical Records in terms of economics or related to the financial condition of the institution. The economic benefits of implementing Electronic Medical Records include cost savings, cost efficiency, and cost-effectiveness.^{14,16,17,19,20} The application of Electronic Medical Records can reduce the use of paper that is usually used in Conventional Medical Records.¹⁴ Furthermore, the use of EMR is a reduction in the cost of services or maintenance that is not needed.²⁰ The implementation of EMR can also improve the accuracy of billing service fees with its ability to record all service requests, medicines, and resources used.²¹ In addition, the application of Electronic Medical Records provides benefits to hospital management by facilitating monitoring and evaluation activities and increasing organizational efficiency.^{20,22}

Benefits of Clinical

The clinical benefits of applying Electronic Medical Records are the impact felt by institutions

(hospitals), users of Electronic Medical Records, and patients on the application of Electronic Medical Records in terms of health observations or related to the quality of health services of the hospital. Some of the benefits of implementing Electronic Medical Records, are that they can reduce medical errors.^{20,30} Electronic Medical Records can reduce medical errors by up to 55%, due to drug allergy warnings, appropriate dosages or interactions, suggested treatments for certain conditions, or recommended preventive treatments done via computerization.³⁴ When the application of Medical Records can reduce medical errors, it will improve patient safety.⁴¹

Then, the application of Electronic Medical Records in terms of documentation can improve the readability of data.^{20,22} When documentation activities are carried out using a computer or digitally, it will minimize data reading errors or data loss. This has an impact on improving the continuity of care and reporting, accuracy, patient evaluation processes, medical research, and policy analysis including the clinical decision-making process.^{17,20,30,31,32,41}

And then, the completeness and accuracy of the data will make it easier for professionals to provide care in monitoring, evaluating, and improving services. The application of Electronic Medical Records in hospitals is included in the good category, because it can provide benefits to users, such as making work faster to complete.^{7,14,25,26} The application of Electronic Medical Records can also have an impact on increasing the performance and productivity of medical personnel^{24,38}. The improvement in performance and productivity can be seen from 81% of respondents in this case users of Electronic Medical Records stated that the application of Electronic Medical Records can increase their productivity. In addition, respondents also replied that the implementation of Electronic Medical Records makes them complete tasks faster saving time, and simplifying their work.^{7,14,25,26,38} These things will have an impact on improving service quality, patient satisfaction, and efficiency.^{17,18,21,22,32,33,35,36,37}

Benefits of Access to Clinical Information

The benefits of accessing clinical information on the application of Electronic Medical Records are the impact felt by institutions, users, and patients on the application of Electronic Medical Records in terms of the ease of obtaining health data and information. The application of Electronic Medical Records can improve the accessibility of patient history information.^{19,20,22,37} The use of electronic medical records called My Kanta is useful for managing prescriptions and viewing examination results as well as medical records.³⁴ So that doctors can more easily understand the patient's medical history, make early diagnoses, and reduce treatment errors.²⁰ This convenience can also help in terms of reporting and certain research.²¹ In addition, the application of Electronic Medical Records can contain information ranging from patients and patients' families, so that it can be easier to find information related to patients.¹⁴ Furthermore, the application of Electronic Medical Records can be an effort to improve communication between medical personnel,³⁰ this is because the application of Electronic Medical Records also brings convenience and speed in sharing information, thereby improving the workflow of fellow medical personnel.³⁹

Among the ease of access to information provided from the application of Electronic Medical Records also pay attention to security aspects, where Electronic Medical Records can increase patient confidentiality because not everyone knows access to EMR.^{30,31} Obtained the result that 19 out of 21 respondents or equivalent to 90.4% considered that the application of Electronic.³⁰ Medical Records could improve patient confidentiality by recording and enabling password protection and patient confidentiality data could only be accessed by the doctor who handled it. By keeping patients confidential, they don't worry about using EMR.⁴⁰

This research is focus on analyzing the problem that can solved by The Advance of Medical Record Technology and explore the benefits of them. So, the topic that explained by

author are focusing the explanation in benefits of Advance technology of medical record from economic side, clinical, and informational of clinic that can be accessed by user . if there any topics that explained on this research, is only to complete for the main topics.

CONCLUSION

From the results of the literature acquisition related to the benefits of implementing Electronic Medical Records, there are many benefits, including: (1) economic benefits, including cost savings, cost efficiency, and cost-effectiveness, (2) clinical benefits of application, including reducing medical errors, improving data readability, improving the quality of health services, and increasing the productivity of medical personnel, and (3) the benefits of accessing clinical information, including increasing the accessibility of patient history information, improve patient confidentiality, and assist with the decision-making process.

According to the explanation of benefits from advance technology of medical record, the hospital can make this article for basic guidelines to optimalizing the advance of medical record technology wisely. The management, can consider to concern of service quality for the patients and the procedural system of hospital, because with the advance of technology in healthcare can solve the problem and make the easily to accelerate the process of workflow.

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