



Chapter 18

Electronic Health Record

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A. Overview of Electronic Health Record

During today's technological advances, information spreads quickly and becomes an advantage for people who use it. Moreover, technology is used to disseminate useful information to the community, one of which is in the world of health. Health information available in hospitals is very important for public safety. Therefore, it is necessary to have a health information system such as electronic health records. Electronic Health Records (EHRs) can be broadly defined as representing longitudinal data (in electronic format) that are collected during routine delivery of healthcare (Jackson et al., 2016). Electronic Health Records (EHRs) provide opportunities to enhance

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patient care, embed performance measures in clinical practice, and facilitate clinical research (Cowie et al., 2017).

Legally, the data in the EHRs is a legal record of patient services and the hospital has the right to store such data. EHRs generally contain demographic, vital statistics, administrative, claims, clinical, and patient-centered data. EHRs can be accessed and owned by patients and the data can be used in other healthcare centers for subsequent treatment purposes. EHRs emerged largely to improve healthcare quality and capture billing data. EHRs may be used to assess study feasibility, facilitate patient recruitment, streamline data collection, and conduct entirely EHR-based observational, embedded pragmatic, post-marketing randomized registry studies, or comparative effectiveness studies. EHRs are mostly used for observational studies, safety surveillance, clinical research, and regulatory purposes.

B. The Benefits

There are several benefits of using EHRs: general benefit, operational benefits, and organizational benefits. For the general benefits, EHRs will improve the professionalism and performance of hospital management. Stakeholders such as patients will enjoy the convenience, speed, and convenience of health services. Furthermore, EHRs makes each unit work according to its functions, responsibilities, and authorities. Operational Benefits, when EHRs are implemented, at least four operational factors will be felt. The first factor is the completion speed of administrative tasks. This speed has an impact on increasing work effectiveness. The second is the accuracy factor, especially data accuracy. In the past with manual systems, people had to check one file at a time, but now with the manual system. For example, if the same patient is registered twice at different times, the system will reject it. EHRs will warn if the same action for the same patient is recorded two times. This keeps the data more accurate and more thorough. The third is the efficiency factor. Because the speed and accuracy of data increases, the time needed to do administrative work is reduced considerably so that employees can focus more on their main work.

Fourth is the ease of reporting, the number of reporting cases could be more because the data is in non-physical form.

Organizational Benefits, because Hospital Information System (HIS) requires discipline in data entry, timeliness and correctness of data, the work culture that previously suspended such things has changed. For example, a drug prescription written in the EHRs will be very much needed by the drug department, while all actions taken at the hospital will be required. So EHRs create increased coordination between units. Often people claim that with the computerization of administrative costs increased.

In Indonesia, EHRs have been used since the late 2000s. The use of technology in the health care system in Indonesia was initially limited to recording patient data. In addition, EHRs are also used in communication and exchange of information between health facilities, such as in Central Java, where each puskesmas (Public Health Center) can access integrated electronic medical records to track the history of patients who come for treatment. Not infrequently patients have to undergo various examinations from the beginning again because of the unavailability of health data first.

C. Function

Accordingly, an EHRS system should offer the following basic functions. First, Health Information and Data. It should store and provide access to patient's health information such as patient's history, allergies, laboratory reports, diagnosis, current medications, and so on to healthcare providers for appropriate clinical decisions for better patient care. It should integrate data from various sources and make it available to the people involved in patient care. The second is to Replicate the Workflow. It should be able to work in sync with the original workflow of the healthcare organization. The third is Efficient Interaction. It should be able to work effectively, saving care providers' time by keeping things concise.

Fourth is Clinical Decision Support (CDS). It should support the provision of reminders, prompts, and alerts. Such features help improve clinical and preventive practices and reduce the frequency of adverse events. Fifth is Patient Support. It should empower patients to access their health information, enabling them to be involved in their healthcare. Sixth is Messaging and Data Processing Capability. It should allow an exchange of data in known/standard formats for the interoperability of healthcare applications.

Additionally, it should enable the processing of incoming data in known/standard formats. Seventh is Administrative Tools. It should provide administrative tools, such as scheduling systems, to improve clinical practices' efficiency and timely patient services.

1. Significance of EHR

In addition, there is significance in the EHR. First, Ease of Maintaining Health Information of Patients. The EHR system minimizes the use using paper in storing data and has good backups, reducing operating, upgrading, and maintaining costs. Second, Efficient in Complex Environments. EHRs help improve work processes and efficiency in healthcare. For example, quickly finding patient data, overcoming patient problems, and making it easier for researchers to analyze the efficacy of drugs in patients. Next, Better Patient Care. Most of the time, multiple healthcare providers are involved in the treatment of a patient.

Moreover, it enables point-in-time data insertion, retrieval, and update. Thereby, providing immediate access to patient data from any specialty center whenever required. Availability of health information, such as past medical history, family medical history, and immunization through EHR helps take preventive measures and manage chronic diseases more effectively.

The Fourth is Improve Quality of Care. EHR helps decrease reporting and charting time during treatment, hence, improving care quality. EHR also helps improve risk management and accurate diagnosis, improving the quality of care. Fifth, is Reduce Healthcare

Delivery Costs. Due to the availability of health information data from all healthcare organizations, a healthcare provider can refer to the required test reports, thus avoiding the repetition of expensive tests. Next is Accelerates Research and Helps Build Effective Medical Practices. EHR provides an extensive database in one place, promoting its use for disease surveillance for providing preventive measures. It also helps analyze treatment patterns of medicine in decision support with EHR enabling effective medical practices. The last is Better Safety. An EHR system provides safer patient health records than paper based system through access, audit, and authorization control mechanisms.

2. Factors Affecting Implementation of EHR

There are also several factors affecting the implementation of EHR. First, the design of the system needs the involvement of clinical staff with the to include the organization's policies and workflow processes. Then, an EHR system must also meet the privacy and security regulations for health data imposed by regulatory bodies in the country. It provides assures patients and providers that the health data is securely stored and privacy is maintained while healthcare applications deliver appropriate services. Next, the duplication of EHR records of a patient in the same EHR system is an important issue in EHR usage. In the process, different organizations assign different identifiers to the same patient.

EHR system consolidates patients' healthcare data generated from various healthcare systems. Hence, it should be capable of integrating data from all such systems. Additionally, these applications usually do not consistently use security and data integrity standards. An EHR system must, therefore, consistently use standards and upgrade to newly developed standards for addressing these issues. An EHR system must also carefully handle ethical and legal issues linked to the accuracy, confidentiality, and access rights of healthcare data. These include improved quality and patient care, patient safety, more efficient patient data tracking, improved documentation, and better audit of accessed information. Indeed, an EHR system also provides

some financial ROI, such as increased income with expanded patient load due to time efficiency and reduced material costs, such as paper, charts, and printing supplies. Some healthcare providers find it more difficult and time-consuming to use computers for data entry than handwriting. Additionally, paper-based records have some advantages over EHR. Also, reading text on paper is 40% faster than reading on a computer screen.

The system's speed is reported to be the most important, with sub-second (screen flips) recommended. Users' familiarity with computer systems affects the ease of use, perhaps favoring younger users in developed countries. When training staff uses EHR system, it has been reported that educational efforts should ensure that staff understands why the system is being implemented and how to use all relevant features. Problems with EHR integration arose when staff training started too late in the implementation phase. It is important to address infrastructure issues earlier, such as identifying appropriate spaces for computer installment and use and ensuring that sufficient backup and technical support exists in case of computer malfunctions.

Even after the implementing EHR system, significant use was still made of paper documentation. Despite access to computers in these hospitals, nurses still relied on paper documentation and personalized scraps of paper to organize nursing activities. Thus documentation was fragmented (Baumann et al., 2018). However, there are some evidences from studies that over a more-extended period with full implementation of the system, documentation time may ultimately decrease, accompanied by improved work and information flow, significant decreases in multitasking, and improved patient safety.

D. Some Cases Using EHR in Indonesia

Based on research, Budiyantri et al. (2018) talk about the development of EHR using cloud-based HER. Cloud based-electronic medical record (cloud-based-EHR) has been developing in Indonesia. These services have some benefits, such as lower costs, more user-friendly features, potential for data sharing, and support for clinical decision-

making. Nevertheless, the implementation has implications for ethical and legal issues such as data and network security, cloud service provider, data sharing procedures, and medical privacy.

Research conducted by Andriani et al. (2017) on satisfaction with EHR implementation at Gadjah Mada University Hospital found that satisfaction with information from EHR had a positive effect on overall satisfaction with performance expectations and attitudes that had an impact on overall benefit satisfaction. For further development of the EHR, the output of the report produced by the EHR needs to be adjusted to the format of the Ministry of Health. In addition, IT staff also need to provide training for new employees.

In Indonesia, various techniques are used in the implementation of EHR. One of them is using data security techniques that can be done using cryptographic methods, firewalls, access control, and other security techniques. This method has been proven to be very promising and successful in keeping privacy and security from EHR (Ningtyas & Lubis, 2018).

From a legal aspect in Indonesia, there is no special law about electronic medical records. However, at this moment, preparation for using EHR can be enforced based on regulations legislation and policies among others; Law No. 29 of 2004 concerning Medical Practice, Law No.36 of 2009 concerning Health, Law No. 11 of 2008 concerning Electronic Information and Transactions, and Regulation of Ministry of Health (Permenkes) No. 269 of 2008. However, several laws and regulations governing electronic medical records can be retrieved show that that EHR can also be used as evidence in court related to problems in health services (Gunawan & Christianto, 2020).

E. Some Cases using EHR in The World

Baumann et al.'s research (2018) shows that pooled meta-analysis results indicated that pre-EHR interns had the largest proportion of total workload spent on documentation tasks, followed by physicians, and nurses who had the smallest proportion out of all hospital

staff examined. Post-EHR, physicians had the largest proportion of total workload spent on documentation tasks, by interns, and nurses. The large variation in documentation times between studies could be partly explained by the varying allocation of tasks between medical staff in different countries. For example, the role played by nurses in the coordination and planning of patient care may differ between Europe, Australia, and the US.

Differences in national guidelines around documentation about patient safety and quality standards and varying definitions of tasks defined as documentation tasks between studies could also contribute to variations in results. EHR implementation use of paper and electronic documentation was frequently observed, suggesting duplication of work processes. In contrast, full implementation of EHR for documentation appeared to be associated with decreased time in documenting. Thus, after an initial transition phase, exclusive utilization of electronic records rather than paper records could potentially lead to a more efficient system, allowing improved information flow between different disciplines and medical institutions and more time for direct patient care and communication.

A finding of concern is that over one-fifth of physicians' and almost half of the nurses' workload is spent multitasking in pre-EHR settings. In addition, physicians were reported to be frequently interrupted in their work. Multitasking and interruptions may adversely affect patient safety by increasing the possibility of mistakes in documentation and prescription, staff cognitive overload, and medical errors. Interestingly, time spent multitasking was only 9% for physicians in the one post-EHR study that examined multitasking.

In the USA, while EHR adoption has increased steadily since 2010, it is unclear how providers that have not yet adopted will fare now that federal incentives have converted to penalties. Finally, hospitals most often reported up-front and ongoing costs, physician cooperation, and complexity of meeting meaningful-use criteria as challenges. Our findings suggest that nationwide hospital EHR adoption is in reach but will require attention to small and rural hospitals

and strategies to address financial challenges, particularly now that penalties for lack of adoption have begun (Adler-Milstein et al., 2015).

F. Conclusion and Recommendations

EHR, or electronic health record, is a valuable technology in the medical field. EHR is beneficial because it allows healthcare workers to focus more on their work. Doctors who focus on patient diagnosis, for example, do not need to be bothered with many physical documents that may differ in type depending on the test site. If doctors must check document formats, they should focus on this less important task. The EHR can assist in the standardization of patient reporting.

Several Indonesian hospitals have attempted to deploy EHR. The use of an EHR has several advantages for hospitals, including lower costs, more user-friendly features, the ability to share data, and support for clinical decision-making. However, in Indonesia, the adoption of EHR technology is not going so well. Data and network security, cloud service providers, data sharing processes, and medical privacy were among the ethical and legal challenges. This issue arises because EHR development in Indonesia is still in its early stages.

Through this chapter we expect a widespread response from many sectors to ensure that EHR is fully implemented in Indonesia as soon as possible. We hope all hospitals in Indonesia use EHR since technology advancements in Indonesia are relatively rapid. To do this, specifically, we need (1) more operational government legislation addressing EHR, (2) network cooperation between Internet Service Provider (ISP), the government, and hospitals, and (3) the realization of Indonesia's "Satu Data" dream. "One Data" is a government program to unify (integrated) data so as to reduce data redundancy, data loss, and be more structured.

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