Governance of Online Electronic Patient Medical Records Distribution

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Abstract

The distribution of medical records at Kebonjati Hospital, particularly for online patients, still relies on a manual system, which hampers the data retrieval process. Therefore, the implementation of a computerized system is necessary. This study aims to design an information system for efficiently distributing outpatient medical records to online patients. The research methodology employed is descriptive qualitative, involving data collection through interviews and case studies. The system development approach utilized is Agile Software Development, encompassing planning, implementation, testing, documentation, deployment, and maintenance stages. The implementation was carried out using Microsoft Visual Studio 2012 and the Visual Basic programming language. The research successfully designed an information system for distributing outpatient medical records online at Kebonjati Hospital, tailored to the specific needs of medical record management. This information system applies the concept of clinical governance by enhancing service quality and developing effective work plans to support hospital management objectives.

Keywords: agile software development, clinical governance, medical records distribution, information systems

1. Introduction

Hospital is an individual health service institution that provides inpatient, outpatient, and emergency services (Government Regulation of the Republic of Indonesia Concerning the Implementation of the Hospital Sector, 2021). Kebonjati Hospital was founded in 1943 which is located at Kebonjati No. 152, Bandung City, West Java.

A medical record is a document that contains patient identity data, examinations, treatment, actions, and other services that have been given to patients. Distribution of Electronic Medical Record data is an activity of sending Electronic Medical Record data from one service unit to another service unit in Health Service Facilities (Regulation of the Minister of Health of the Republic of Indonesia Regarding Medical Records, 2022).
The procedure of distributing a medical record starts with borrowing it and continues until it is delivered back to the medical record unit (Putri et al., 2022).

The flow of medical record distribution for patients who register online in the Kebonjati Hospital registration application is still manual, medical recorders retrieve patient data that have registered and input it into Microsoft Excel. The medical records that have been taken are marked with color in Microsoft Excel, then the medical records are distributed to the designated polyclinics. After the patient is confirmed by coming to the hospital, the medical record is borrowed again in the queuing system and the medical recorder checks with the data in Microsoft Excel. The queue system for distributing medical records is only for patients who register directly with the hospital. The management of online patient medical record distribution is still inefficient which can take more time and result in delays in medical record services.

To address these issues, the researchers conducted a literature review to identify similar studies and their respective solutions. The study conducted by Nilam Islamiati, Yuda Syahidin, and Meira Hidayati resulted in a medical record borrowing system that facilitates medical recorders in more efficient and controlled documentation to reduce patient data loss (Islamiati et al., 2021). Another study conducted by Hendra Nusa Putra, Riris Santia produced by the electronic expedition application can assist staffs in tracking file searches, because it is not done manually (Putra & Santia, 2020).

All literature studies have the same goal in a system designed to solve problems that occur from inefficient and inaccurate manual data processing to computerization. Of course, to increase service quality as the modernization period progresses, the hospital as a provider of healthcare services today needs information technology. One of the concepts of clinical management is to ensure that clinical service efficiency results in quality clinical performance. Clinical Governance is an established framework for healthcare quality improvement (Poscia et al., 2018).

In order creating medical services that are superior Medical systems must not only be backed by equipment that is technologically advanced, but also by information support systems that ensure efficient medical services. Consequently, a medical records distribution information system for Kebonjati Hospital was developed in an effort to enhance healthcare.

The Agile Software Development method is used in the development of an online patient medical record distribution information system, a method which is a simple approach proposed to bypass the limitations of the convolution development method, reduce overhead costs and be flexible in every change (Al-Saqqaa et al., 2020).
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Raharjana stated that the Agile methodology has become a trend because it facilitates the development of information systems that enable collaboration and mutual correction, in a short period of time and quickly adapt to development changes without compromising quality (Anwar et al., 2020).

2. Research Method

The method used in this research is descriptive qualitative, according to Subandi qualitative method is described in words according to the conditions in the field (Lestari et al., 2021). The data collection technique was carried out by means of field work practice in the medical record section which aims to observe and know the description of the distribution of medical records at Kebonjati Hospital, then interview the head of medical records and outpatient medical recorders, as well as literature studies on previous studies.

Agile Software Development (ASD) is used in the development process. Pereira and Russo said ASD can accelerate managing priority changes and increase productivity (Mulyani et al., 2021). The stages in this design are contained in Figure 1 planning, implementation, testing, documentation, deploying, and maintenance.

![Figure 1. Stages of Agile Software Development](source: Mulyani et al., 2021)

2.1. Planning

At this stage a system design is created that will be developed through data collected in the form of direct interviews to find out what the user wants.

2.2. Implementation

Development of electronic systems with the Visual Basic programming language and implemented with Visual Studio 2012. This programming language has a relatively high level of security, considering the high level of risk involved in hospitals.
2.3. Software Test
At this stage, each development iteration is tested using a black box approach to avoid system errors and validate input and output as required by the user.

2.4. Documentation
Information system modules and functions are documented as minutes during construction and to facilitate further development.

2.5. Deployment
The stages of system deployment for use by end-users are the Kebonjati Hospital medical recorder. They undergo training and receive guidance to ensure effective utilization and seamless integration of the deployed system into their workflow.

2.6. Maintenance
Stages of system maintenance are carried out regularly to protect it from system bugs. Stages of system maintenance are carried out regularly to protect it from system bugs. This includes performing routine updates, bug fixes, and ensuring the system's security and stability.

3. Results and Analysis
An information system will be designed so that the distribution of medical records can proceed with speed, accuracy, and precision. Software design uses the DFD tool with several items, flowchart, context diagram, data flow, and Entity Relationship Diagram. Figure 2 shows the course of the designed distribution process.

![Flowchart of Medical Record Distribution System](image-url)

Source: Research Result (2023)

Figure 2. Flowchart of Medical Record Distribution System
Figure 3. Context Diagram of Medical Record Distribution System

The first step in designing the system is to create a context diagram that is at the highest level (Amijaya et al., 2019). Figure 3 is a context diagram used for system requirements and output by the system created. Context diagrams further explained using DFD level 1 (Suryati et al., 2020). An overview of the overall system flow in a structured manner, the result of which is a design document in the form of a DFD as shown in Figure 4.

Figure 4. Data Flow Diagram level 1 of Medical Record Distribution System

Source: Research Result (2023)
The purpose of database design is to create a place to store data on a storage medium. Figure 5 shows the ERD used in the development of a system of relationships between data entities and relationships between files.

Source: Research Result (2023)

Figure 5. Entity Relationship Diagram of Medical Record Distribution System

Interface design is a design that relates directly to the user. The following is the interface design used in the medical record distribution system for online patients. The login page in Figure 6 is for accessing the system using the username and password for the staffs at Kebonjati Hospital.

Source: Research Result (2023)

Figure 6. Login Form of Medical Record Distribution System
The main page of the medical record distribution system is shown in Figure 7. After logging in, this main page will appear, consisting of patient identity data, staffs’ data, polyclinic data, medical record distribution, and reports that will be generated.

Source: Research Result (2023)

Figure 7. Master Data Form of Medical Record Distribution System

The staffs page contains information on staffs working at Kebonjati Hospital. The staff form in Figure 8 can add, edit, delete, and save to the database.

Source: Research Result (2023)

Figure 8. Staff Data Form
Based on Figure 9 displays the identity data of patients treatment at Kebonjati Hospital. Officers can add, edit, delete, store, and search for patient data.

Source: Research Result (2023)

Figure 9. Patient Identity Data Form

On Figure 10 is the polyclinic data in Kebonjati Hospital.

Source: Research Result (2023)

Figure 10. Polyclinic Form

The distribution page in Figure 11 is a list of requests for online patient medical records to be sent to the intended poly. Staff borrow and return medical records.
Source: Research Result (2023)

Figure 11. Online Patient Medical Record Distribution

Figure 12 shows the medical record distribution report page. Reports that can be displayed are reports by period as in Error! Reference source not found..

Source: Research Result (2023)

Figure 12. Medical Record Distribution Report
4. Conclusion

The distribution of online patient medical records at Kebonjati Hospital is currently done manually using Microsoft Excel. To improve efficiency and enhance the quality of service, an electronic-based medical record distribution information system for online patients is being designed. The Agile Software Development method is employed, along with flowchart design, context diagram, DFD level 1, and ERD. The system design is implemented using Visual Studio 2012 with the Visual Basic programming language.

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Author Contributions

Alzeta Rosdyana proposed the topic; Alzeta Rosdyana and Kamila Najmil Khaira conceived models and designed the experiments; Alzeta Rosdyana and Kamila Najmil Khaira conceived the optimisation algorithms; Alzeta Rosdyana, Kamila Najmil Khaira, Yuda Syahidin and Yuyun Yunengsih analysed the result.
Conflicts of Interest

The authors declare no conflict of interest.

References


