Electronic, Business, Management and Technology Journal
Vol. 3 No. 1, June 2025, 41 – 51
E ISSN: 3025-8707, DOI:10.55208/ebmtj

Web-Based Patient Medical Record Application for Independent Midwives Using the Codeigniter Framework

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ABSTRACT

The medical record application in healthcare has evolved as an innovative approach to improve the administration and accessibility of patient medical information. The patient medical record system currently used by Bidan Sri Wahyuni relies on a notebook for documenting patient information and medical records, making it vulnerable to damage or loss. This conventional approach complicates data retrieval, frequently resulting in duplication and poorly coordinated data storage, which in turn causes discrepancies.

The new system's development utilizes Object-Oriented Programming (OOP) to structure software as a compilation of objects that encompass pertinent data and functions. The study uses Unified Modelling Language (UML) for modelling, facilitating the description and design of the software system created using an object-oriented methodology. The application utilises MySQL for database management, providing a user-friendly query language that facilitates data access for developers.

The project seeks to address current challenges by enabling the digital administration of patient medical records through the development of an application. The CodeIgniter framework facilitates the development process, providing a systematic and efficient method for application construction. This framework is open-source and employs the MVC (Model-View-Controller) architectural pattern, enhancing the application's capabilities.

The system testing procedure entails detecting vulnerabilities and verifying adherence to established requirements. The deployment of the patient medical record application constitutes a substantial enhancement for Bidan Praktek Mandiri, converting traditional management into a digital format. This shift streamlines medical record management, reducing the risk of data loss and thereby enhancing healthcare delivery.

Keywords: Application, Medical records, Codeigniter, Midwife, MySQL, UML

INTRODUCTION

Medical record applications in healthcare have evolved into unique instruments for enhancing the administration and accessibility of patient medical information. (Khalil et al., 2024) These programmes offer diverse functionalities for the storage and management of patient health information. The ongoing advancement of information technology enables medical record systems to facilitate the electronic collection of patient data by medical personnel, encompassing health history, diagnoses, prescriptions, test results, laboratory analyses, and other critical information. This data is readily accessible to physicians, nurses, and patients, facilitating enhanced coordination in service delivery and medical decision-making.

Subiyakto et al., 2025) defines a medical record as a documented account, either written or recorded, of the client's name, assessment outcomes, and all medical services and interventions administered to the patient. A medical record file possesses substantial documentary significance, since its contents relate to memory sources that require documentation and serve as accountability and reporting resources for healthcare services. (Alfiansyah et al., 2021; Chandra et al., 2022) This thorough documentation is crucial for maintaining continuity of care and minimising the risk of treatment mistakes.

Experts emphasize the importance of electronic medical records (EMRs) in enhancing patient care. Adamu et al., (2020) a specialist in healthcare technology, asserts, "The shift to electronic records has revolutionised the operations of healthcare providers, allowing for swifter, more informed decision-making." For example, when a patient consults various doctors, each can access the same medical history and treatment protocols, ensuring continuity of care and minimizing unnecessary tests.

Furthermore, the deployment of EMR systems has demonstrated a substantial enhancement in patient outcomes. A 2022 study by the National Institute of Health revealed that hospitals employing electronic medical records had a 30% decrease in prescription mistakes. This illustrates the significant impact that effective medical record management

can have on patient safety and the overall quality of healthcare. The ongoing evolution of technology, particularly the use of telemedicine and artificial intelligence in medical record apps, assures significant improvements in patient care.

Application

The Great Dictionary of the Indonesian Language (KBBI) defines an application as the execution of a system design for data processing utilising specified programming language rules or standards. An application is a software programme designed to accomplish specific tasks for the user. (Budi et al., 2024)

The term "application" derives from the word "application," signifying implementation, utilisation, or use. An application is a pre-configured programme meant to perform a specific function for the user and can be employed for its designated purpose (Arnoldus & Suprihadi, 2021).

Medical Records

Article 46, paragraph (1) of Law No. 29 of 2004 about Medical Practice defines medical records as files that encompass notes and documentation about the patient's identity, examinations, treatments, interventions, and other services rendered to the patient (Farlinda et al., 2023). The Minister of Health Regulation No. 749a/Menkes/Per/XII/1989 defines medical records as files comprising notes and documentation about the patient's identity, examinations, treatments, and additional services rendered to patients in healthcare facilities.

This was revised by Minister of Health Regulation No. 269/MENKES/PER/III/2008, which defines medical records as files containing notes and documents, including the patient's name, examination findings, administered treatments, and other services rendered to the patient. The two definitions of medical records highlight a distinction: The Minister of Health Regulation No. 749a/Menkes/Per/XII/1989 specifically addresses healthcare facilities, although the Medical Practice Law does not. This signifies that the regulation of medical records under the Medical Practice Law is more comprehensive, encompassing both healthcare facilities and other entities. Nonetheless, the promulgation of Minister of Health Regulation No. 269/MENKES/PER/III/2008 has rendered this distinction obsolete.

Web

A website comprises a compilation of pages that present diverse forms of information, such as text, data, photographs, videos, or a mix thereof, which may be either static or dynamic (Alfiansyah et al., 2021). This theory posits that the web is defined as a system that enables information retrieval by presenting text, images, multimedia, and other content on the internet.

Framework Codeigniter

Afriadi & Sunardi (2022) state that CodeIgniter is one of the frameworks utilised in the design of this final project. CodeIgniter is a framework built with the PHP programming language, designed to aid web developers in creating and developing web-based applications. CodeIgniter is an open-source framework that utilizes the MVC (Model-View-Controller) architectural paradigm.

A solution is needed to develop a system capable of managing patient data, medical records, and other relevant information. The author intends to employ advanced information technology to develop a more effective and efficient system by designing a web-based medical record application utilising the CodeIgniter framework.

METHOD

The technique for creating the medical record application begins with a comprehensive evaluation of the existing system used by Bidan Sri Wahyuni, which relies on physical notebooks for recording patient information. This traditional method presents hazards of damage and loss, hindering data retrieval and frequently resulting in duplication and errors. The project will collect requirements via interviews and surveys with healthcare providers to ensure the new system fulfils their demands. The design phase will utilize Unified Modelling Language (UML) to produce comprehensive models that delineate the software's capabilities. The project will utilise the CodeIgniter framework, employing Object-Oriented Programming (OOP) principles to organise the application efficiently.

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Upon completion of the application, it will utilise MySQL for effective database management, enabling seamless access to patient data. The testing step will be crucial, as it will involve identifying vulnerabilities and verifying that the application meets the specified criteria through unit, integration, and user acceptance testing. Upon successful testing, the system will be implemented in the Bidan Praktek Mandiri environment, shifting from conventional management to a digital format. Training sessions will be held to help users become familiar with the new system. Subsequently, continuous assessment and feedback will be collected post-deployment to evaluate the application's efficacy and pinpoint areas for improvement, thereby enhancing healthcare delivery through optimized medical record administration.

DISCUSSION

System Design Analysis

a) Business Process Analysis

The subsequent delineation illustrates the existing business process flow:

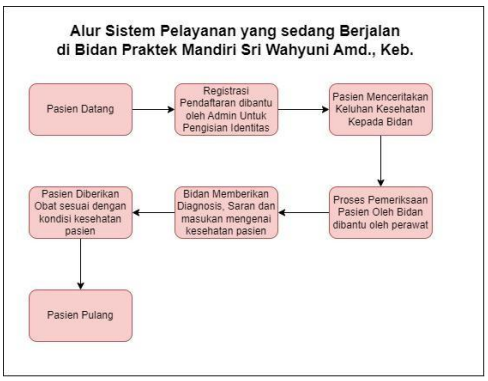

Figure 1. Business Process Analysis

b) SWOT Analysis

SWOT analysis is a traditional method for rapidly assessing the strategic circumstances of an organisation or location. The premise is that successful strategies must originate from the congruence between the company's internal resources (strengths and weaknesses) and its external environment (opportunities and dangers). An effective strategy will optimise the company's strengths and prospects while mitigating its weaknesses and dangers (Wiarto, 2022).

The current SWOT analysis of the Independent Midwife Practice is as follows:

1. Strength

   The utilisation of a traditional medical record system facilitates enhanced personal engagement with patients. This method allows midwives and staff to participate directly in the recording and processing of patient data, hence enhancing accuracy and meticulousness. Furthermore, the personnel at Bidan Praktek Mandiri can acquire a more profound comprehension of individual patient data management, hence augmenting the quality of treatment delivered to patients.

2. Weakness

   The management of patient data through a conventional system generally requires more time than an integrated system, leading to prolonged wait times for patients and diminishing the efficiency of midwives in independent practice. Moreover, a manual system may struggle to handle a growing amount of data. The viability of independent midwives utilising manual medical records frequently hinges on the availability and particular competencies of the personnel, hence exacerbating the administration of patient information.

3. Opportunity

   They can create a comprehensive medical record application that automates the medical record process and facilitates expedited access to patient information. The new application enables independent midwives to offer technology instruction to their staff and patients, thereby improving overall efficiency and expertise within the practice.

4. Threat

   The implementation of the new system may encounter opposition from personnel and patients familiar with traditional methods. Moreover, the development and implementation of an integrated application necessitate substantial expenditures and resources, which may provide obstacles to the move towards a more efficient system.

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Proposed System Analysis

i. Usecase

Figure 2. Usecase

ii. Table Scenario

Table 1. Table Scenario

Use Case Name	Login
Actor	Admin, Midwife
Description	That is the process of logging in admin dan bidan
Precondition	Displaying Login
PostCondition	Displaying the Dashboard
Main Flow of Event	
Actor Action	**System Response**
1. Accessing the System	Displaying the login form
2. Enter Validate the user username 1. If the password is verified, the main menu will appear.	2. If it is not verified, an error message will appear.

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iii. Activity Diagram

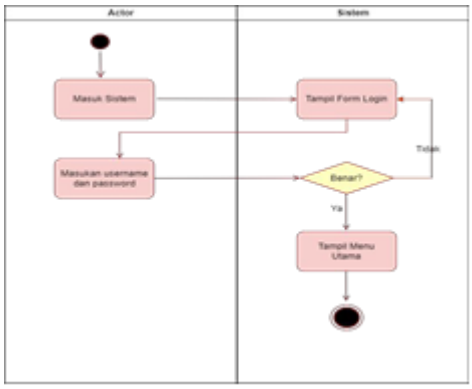

Figure 3. Activity Diagram

System Design

i. Database System Design

Figure 4. Database System Design

ii. Interface System Design

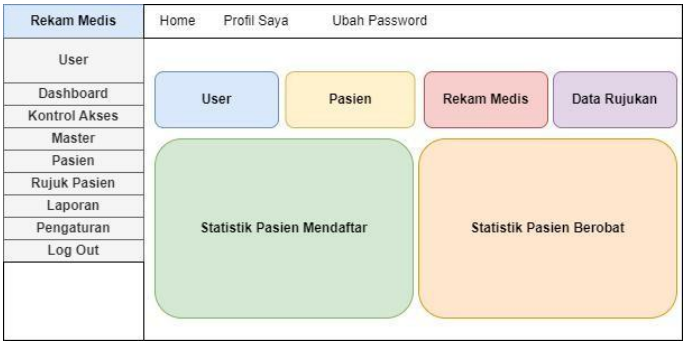

Figure 5. Interface System Design

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iii. System Implementation

The implementation phase entails detailing an application system to confirm its readiness for operation.

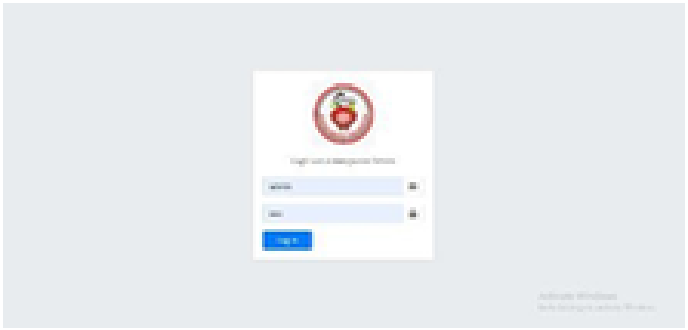

Figure 6. Login Page View

Figure 7. Home Page/Dashboard View

Figure 8. Medical Record Input Page Display

Figure 9. Print View of Medical Record Report

CONCLUSION

The findings of this study indicate that the utilisation of medical records can supplant traditional data management methods with digital or application-based systems. The study was performed at the Independent Midwifery Practice Amd., Keb., to develop a non-existent medical record application, thereby facilitating the management and preservation of patient medical records. This programme would streamline the storage of patient papers, mitigating the risk of misplacement that could result in loss or damage.

A multitude of recommendations may provide guidance and consideration for prospective researchers. This medical record application is anticipated to facilitate the management of patient medical records by storing all data in a database, hence ensuring comprehensive documentation of information. Furthermore, data security must be upheld, and regular data backups should be performed to mitigate risks in the event of a system breakdown. Future advancements should focus on enhancing the existing system and incorporating additional functionalities to improve its overall performance.

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