

DIGITIZATION OF MEDICAL RECORD SERVICES AT ANANDA CLINIC THROUGH A WEB-BASED INFORMATION SYSTEM

MIKHAEL YOSAFAT¹, SRI NURHAYATI^{1,*},
MUHAMMAD IDRIS¹, FEBHI ADITIYA¹, RIFALDI MAULANA¹,
HIDAYAT HIDAYAT¹, SHAROFAT IBODULLAYEVA²

¹Universitas Komputer Indonesia, Indonesia

²Chirchik State Pedagogical University, Uzbekistan

*Corresponding Author: sri.nurhayati@email.unikom.ac.id

Abstract

Clinics are considered key players in healthcare. They need to offer services that utilize the advancement of science and technology. One such service is medical records. This service is very important because it keeps key data on the health history of the patient. However, the process still relies on manual records, creating several problems. There are often errors; retrieving data takes too much time, and managing information becomes complex. This study aims at developing a web-based medical record system. This helps in promoting digital health options. This setup will be able to handle patient data storage and management, showing information in a faster and more accurate way. Everything remains connected in one place. The work includes analysing requirements and designing the system. In this research, the system design used a structured method along with data flow diagram tools. The system was web-based. System testing was conducted using functional testing using a black-box approach. Ultimately, the system met user expectations. This significantly helped to manage digital medical records at Ananda Clinic.

Keywords: Clinic, Data flow diagram (DFD), Digital health services, Electronic medical records, Web-based information system.

1. Introduction

Current developments in the healthcare sector have shown significant progress, both in developed and developing countries. Clinics, as one of the service units in the healthcare sector, are also encouraged to improve the quality of their services. Along with advances in science and technology (IPTEK) in the health sector, health service providers are obliged to provide effective and efficient services as an important prerequisite for achieving optimal service. An example of such technological use in health is in the form of an electronic, web-based information system [1-5]. A medical record is a record that contains information on the state of the patient's condition, including medical history and treatment.

Medical record documentation documents findings and observations related to the health condition of the patient. It can be concluded that medical records represent all forms of care given to patients, including all other important aspects of healthcare delivery [5, 6]. In the current status, the process of medical records in Ananda Clinic is still recorded conventionally, causing several problems to occur, among others: in terms of efficiency, accuracy, and data security. In a manual system, the process of searching for patient data is very difficult because it wastes much time. In addition, the reporting of medical record data is disrupted. Thus, it can be concluded that this manual system is an obstacle to the smooth operation of healthcare [7, 8].

At the healthcare level, for example, clinics, one of the healthcare services is medical record systems. The recording process for medical data and the preparedness of hospitals in Indonesia to implement an electronic medical record system. The result of this study found that the implementation of a medical record system is not solely dependent on technology but has a close relationship with organizational habits, managerial support, and acceptance of users [9]. The system was made through an approach using structured DFDs and testing with black-box methods. This study finds that the system developed was working and meeting the needs of the user [10]. From these two studies, it can be concluded that the development of digital medical record systems is very important because it can enhance quality and efficiency in healthcare services.

However, the development of medical record systems must pay attention to challenges during implementation, such as infrastructure readiness, organizational culture, and user readiness. In terms of developing systems, a structured approach in the development of systems, for instance, using DFDs and testing using black-box methods, has been proven very effective in developing a system that meets user needs. Therefore, research on the web-based medical record digitization system at Ananda Clinic is relevant and answers the actual needs of current health care practices.

Based on these issues, this study developed a web-based medical record digitization system. This system is designed to facilitate structured, fast, and secure medical record data management. System requirements analysis was conducted using a structured approach using data flow diagrams (DFDs). DFD is a tool for logically describing the flow of data in a system that will be created starting from user input to output from the system [11]. This study aims to create a web-based medical record data processing system to be implemented at Ananda Clinic to support the digitalization of healthcare services.

2. Method

This study employs a qualitative approach with a descriptive method, aiming to objectively describe a phenomenon or condition being studied. The research was carried out through several main stages that were systematically designed to produce an information system that meets user needs, particularly in the context of medical recording documentation in clinics. The stages of the research are illustrated in Fig 1.



Fig. 1. The stages of the research.

The analysis of the problem in the first stage ascertained issues occurring in the field, such as problems with the process of medical records done manually. After identifying the issues, data collection was performed by way of direct observation, interviews with clinic staff, and documentation of the existing flow of processes. The data collection step also involved recording the major functions of the medical record service. System analysis and design involved analysing the functional requirements of the system to be developed and designing the system [12, 13]. The functional requirements analysis mapped out the system functions using a structured approach using a data flow diagram (DFD) tool that models data flow in a system [14-18]. The design was performed by designing the system interface and database. After the completion of this stage, the next procedure was the implementation of the system in a real application. The system was developed in web-based programming languages like PHP, HTML, and JavaScript. Data is stored in a MySQL database. The last stage of research was system testing, which aimed to ensure that all functions operated according to the requirements analysed. Testing is performed using the black box testing method, in which each function in the system was tested using correct and wrong data [19-22].

3. Results and Discussion

The designed system consists of several interacting entities within the information system. System users include administrators, doctors, staff, and pharmacists. To obtain an overview of the overall system flow, the visualization can be reviewed through the context diagram shown in Fig 2. Based on Fig. 2, the processes within the system consist of:

- (i) Login: This process is used to log into the system, where each user must enter their registered username and password.
- (ii) Patient Examination: This process is used to record and monitor patient examination activities. This process includes inputting examination data, patient complaints, diagnostic results, and treatment provided.
- (iii) Reports and Medical Records: This process is used by the administration to generate reports related to patient data and medical record history. The reports may include monthly summaries, examination reports, or information on medications used.
- (iv) Patient Registration: This process is used to enter new patient data, including patient identity, address, age, and other relevant information.

- (v) Manage medicine data: This process is used to manage drug data available at the clinic, including drug name, stock quantity, unit, and price. It also includes reducing stock when medication is dispensed.

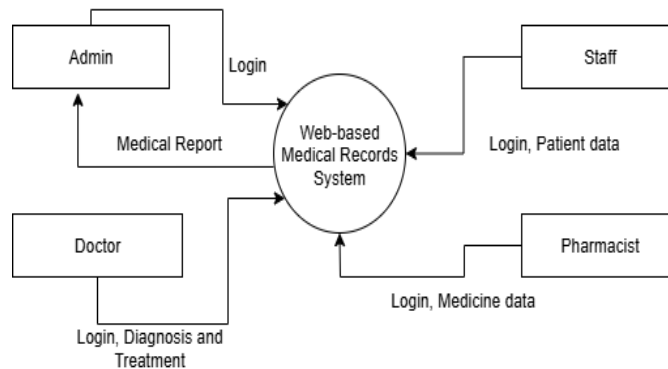


Fig. 2. Context diagram of the system.

Based on the functional requirements analysis, the web-based medical records system will be implemented with minimum hardware specifications of an Intel Core i5 processor or equivalent and 8GB of RAM. The minimum software specifications are a Windows 10 operating system, a MySQL database, and a Google Chrome or Microsoft Edge browser. Figures 3 and 4 show the interface of the system. Figure 3 displays the dashboard after the user successfully logs in, which serves as a summary of important information and provides quick access to various features.

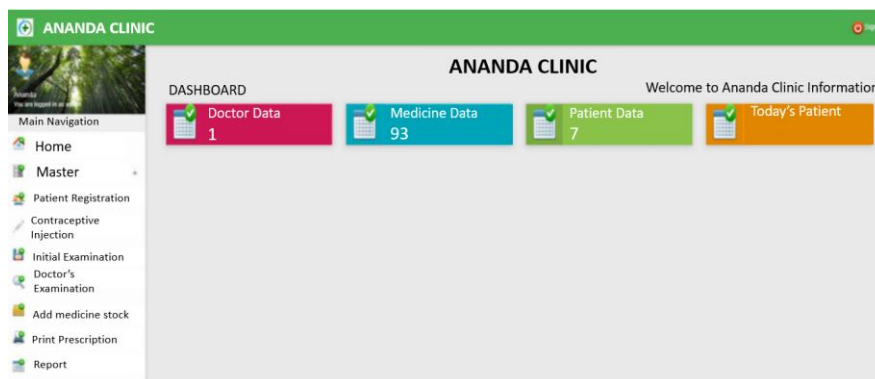
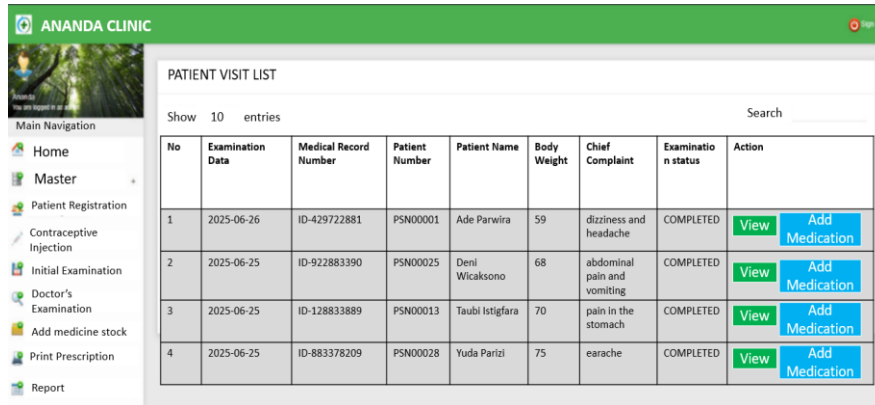


Fig. 3. Dashboard.

Figure 4 shows doctor's exam interface. This page lists patients currently undergoing or having completed treatment. It is also the main interface whereby a doctor manages the process of examining patients. The following information is shown on this page: exam date, medical record number, patient name, weight, complaints, and status of the exam. In each patient line, there are options to act upon them: there is a 'View' button for viewing details of the exam, and another button '+Medication' to list or prescribe medications. Search is also enabled, with an option to set entries per page to make it easier to navigate through patients.



No	Examination Date	Medical Record Number	Patient Number	Patient Name	Body Weight	Chief Complaint	Examination status	Action
1	2025-06-26	ID-429722881	PSN00001	Ade Parwira	59	dizziness and headache	COMPLETED	View Add Medication
2	2025-06-25	ID-922883390	PSN00025	Deni Wikaksono	68	abdominal pain and vomiting	COMPLETED	View Add Medication
3	2025-06-25	ID-128833889	PSN00013	Taubi Istigfara	70	pain in the stomach	COMPLETED	View Add Medication
4	2025-06-25	ID-883378209	PSN00028	Yuda Parizi	75	earache	COMPLETED	View Add Medication

Fig. 4. Patient examination interface.

Testing was carried out by evaluating the system's functionality using Alpha testing. This Alpha testing was conducted internally before the system was implemented for end users, to ensure that the developed system is free from usage failures. Alpha testing serves as a step to verify optimal performance and the absence of errors or bugs in the application being tested. The overall testing results indicate the system functions properly and can be used by each user according to their roles and needs. All test items produced valid results, indicating that there were no functional errors in the implementation of the features.

The functional medical records system at Ananda Clinic has been able to support the digitalization of healthcare services. After undergoing testing using the black box method with valid results, the system has successfully carried out important processes such as user login, patient registration, patient examination, medication data management, and medical record report generation. The test results indicate that each core functional component of the system operates as expected according to predefined requirements. The login feature functions properly to ensure secure access for authorized users, while the patient registration module effectively records and manages patient demographic data. In addition, the patient examination feature supports the documentation of clinical findings, enabling healthcare providers to input and retrieve examination data accurately within the system.

Furthermore, the management of medication data and the generation of medical record reports were also validated successfully. These features play a crucial role in improving data accuracy, service efficiency, and information accessibility. Overall, the valid outcomes across all testing indicators demonstrate that the web-based information system is reliable and suitable for supporting the digitalization of medical record services at Ananda Clinic, thereby enhancing the quality and effectiveness of healthcare service delivery. In general, the medical records system created can strengthen the results of previous studies regarding the effectiveness of using a web-based medical records system in improving the quality of healthcare services [8, 9, 23, 24]. With the right approach to meeting user functional needs, obstacles commonly found in literature, (such as resistance and organizational readiness), can be minimized, proving the system's success [25-30]. From this study, it can be concluded that the process of needs analysis, structured system

design, and system testing before implementation, are important to ensure the success of the digitalization of healthcare services.

4. Conclusion

Based on the development process and testing results, the system that has been built has covered all the main requirements for recording medical records, from user login, patient registration, examinations, medication management, to medical record reporting. Each user can carry out their respective roles according to their access rights: administration, doctor, officer, and pharmacist, with testing results showing all features are valid. Thus, this system successfully met the research objectives, namely, not only to build a web-based medical records application, but also to ensure that the system can be used effectively and efficiently in real-world practice.

References

1. Hidayat, H.; and Al-Farisi, M.S. (2025). Design and implementation of android-based diet and jogging recommendation application to overcome obesity. *Journal of Engineering Science and Technology*, 20(1), 324-335.
2. Febrianti, E.C.; Nurmawati, I.; and Muflihatin, I. (2020). Evaluasi rekam medis elektronik di tempat pendaftaran pasien gawat darurat dan rawat inap RSUD KRMT Wongsonegoro Kota Semarang. *J-REMI: Jurnal Rekam Medik dan Informasi Kesehatan*, 1(4), 537-544.
3. Rahmatya, M.D.; and Wicaksono, M.F. (2021). Infant development monitoring application. *IJIS-Indonesian Journal on Information System*, 6(2), 101-111.
4. Syahrul, S.; Nurhayati, S.; and Wicaksono, M.F. (2025). Internet of things-based child stunting detection system for supporting sustainable development goals. *Journal of Engineering Science and Technology*, 20(2), 510-519.
5. Afrianto, I.; Mainusar, R.; and Atin, S. (2024). Integration of wireless sensor networks with wireless mesh networks in IoT-based patient monitoring systems. *Journal of Engineering Science and Technology*, 19(5), 1660-1671.
6. Uslu, A.; and Stausberg, J. (2021). Value of the electronic medical record for hospital care: update from the literature. *Journal of Medical Internet Research*, 23(12), e26323-e26338.
7. Chishtie, J.; Sapiro, N.; Wiebe, N.; Rabatach, L.; Lorenzetti, D.; Leung, A.A.; and Eastwood, C.A. (2023). Use of Epic electronic health record system for health care research: scoping review. *Journal of Medical Internet Research*, 25, e51003-e51016.
8. Sintha, F.; Maimun, N.; and Ricardo, R. (2025). Tinjauan kesiapan penerapan rekam medis manual ke rekam medis elektronik di Instalasi Rawat Jalan RSIA Annisa Tahun 2024. *Jurnal Rekam Medis (Medical Record Journal)*, 4(1), 115-125.
9. Weiner, S.J.; Wang, S.; Kelly, B.; Sharma, G.; and Schwartz, A. (2020). How accurate is the medical record? A comparison of the physician's note with a concealed audio recording in unannounced standardized patient encounters. *Journal of the American Medical Informatics Association*, 27(5), 770-775.
10. Hossain, M.K.; Sutanto, J.; Handayani, P.W.; Haryanto, A.A.; Bhowmik, J.; and Frings-Hessami, V. (2025). An exploratory study of electronic medical record implementation and recordkeeping culture: the case of hospitals in Indonesia. *BMC Health Services Research*, 25(1), 1-20.

11. Wardhana, E.S.; Suryono, S.; Hernawan, A.; and Nugroho, L.E. (2023). Design and development of web-based dental electronic medical records according to Ministry of Health standards. *Odonto: Dental Journal*, 10, 15-23.
12. Suwita, F.S.; Sholihat, S.A.; and Dewi, N.P. (2021). Web-based information system sales. *Journal of Physics*, 1764(1), 012189-012198.
13. Suryana, T.; Oktaviany, I.; and Dewi, N.P. (2021). Website-based Al-Quran memorization monitoring and evaluation system design. *Journal of Physics*, 1764(1), 012188-012196.
14. Wijaya, T.; Safitri, D.; Madani, N.S.; Zalzabila, I.; and Novita, D. (2023). Analisis metode perancangan sistem informasi pelayanan dan administrasi kesehatan: Systematic literature review. *Device: Journal of Information System, Computer Science and Information Technology*, 4(2), 146-157.
15. Rachmat, Z.; Wahyuddin, S.; Irfan, A.; and Suwandi, I.A. (2023). Rancang bangun sistem informasi pengelolaan data penduduk berbasis web pada Desa Palangiseng Kabupaten Soppeng. *Jurnal Minfo Polgan*, 12(1), 1022-1031.
16. Setiyani, L.; Rostiani, Y.; and Ratnasari, T. (2020). Analisis kebutuhan fungsional sistem informasi persediaan barang perusahaan general trading (Studi kasus: PT. Amco Multitech). *Owner: Riset dan Jurnal Akuntansi*, 4(1), 288-295.
17. Zhilin, L.I.; Gong, X.; Chen, J.; Mills, J.; Songnian, L.I.; Zhu, X.U.; and Hao, W.U. (2020). Functional requirements of systems for visualization of sustainable development goal (SDG) indicators. *Journal of Geovisualization and Spatial Analysis*, 4(1), 15-26.
18. Benfell, A. (2021). Modeling functional requirements using tacit knowledge: A design science research methodology informed approach. *Requirements Engineering*, 26(1), 25-42.
19. Rahman, M.A.; and Lubis, R. (2022). Sistem informasi perbaikan kualitas layanan laundry di UMKM Baby Dear Karawang. *Jurnal Penelitian Mahasiswa Teknik dan Ilmu Komputer (JUPITER)*, 2(2), 93-101.
20. Maspupah, A. (2024). Literature review: advantages and disadvantages of black box and white box testing methods. *Jurnal Techno Nusa Mandiri*, 21(2), 151-162.
21. Syakuran, R.A.; and Afrianto, I. (2022). Implementation of gamification in mathematics m-learning application to creating student engagement. *International Journal of Advanced Computer Science and Applications*, 13(7), 542-556.
22. Sholeh, M.; Gisfas, I.; and Fauzi, M.A. (2021). Black box testing on ukmbantul.com page with boundary value analysis and equivalence partitioning methods. *Journal of Physics*, 1823(1), 012029-012029.
23. Pane, M.D.; and Pudjiastuti, D. (2021). The functionalization of law and criminal procedures to confront health care fraud in hospitals. *Padjadjaran Jurnal Ilmu Hukum (Journal of Law)*, 8(3), 332-355.
24. Joseph, B.; Gadzama, W.A.; and Agu, E.O. (2020). Design and Implementation of a secured web based medical record management system: A case study of Federal University WUKARI (FUW) clinic. *International Journal of Computer Applications*, 177(41), 27-33.

25. Almatrodi, I.; Li, F.; and Alojail, M. (2023). Organizational resistance to automation success: How status quo bias influences organizational resistance to an automated workflow system in a public organization. *Systems*, 11(4), 191-206.
26. Rahman, M.A.; and Jyoti, S.N. (2022). A systematic literature review of user-centric design in digital business systems: Enhancing accessibility, adoption, and organizational impact. *Review of Applied Science and Technology*, 1(04), 01-25.
27. Balasubramanian, S.; Shukla, V.; Sethi, J.S.; Islam, N.; and Saloum, R. (2021). A readiness assessment framework for blockchain adoption: A healthcare case study. *Technological Forecasting and Social Change*, 165, 120536-120552.
28. Pham, L.; Williamson, S.; Lane, P.; Limbu, Y.; Nguyen, P.T.H.; and Coomer, T. (2020). Technology readiness and purchase intention: role of perceived value and online satisfaction in the context of luxury hotels. *International Journal of Management and Decision Making*, 19(1), 91-117.
29. Uren, V.; and Edwards, J.S. (2023). Technology readiness and the organizational journey towards AI adoption: An empirical study. *International Journal of Information Management*, 68, 102588-102604.
30. Aini, Q.; Manongga, D.; Rahardja, U.; Sembiring, I.; and Li, Y.M. (2025). Understanding behavioral intention to use of air quality monitoring solutions with emphasis on technology readiness. *International Journal of Human-Computer Interaction*, 41(8), 5079-5099.
31. Paculaba, A.M.C.; Bathan, M.A.S.; and Niego, E.L. (2022). Log monitoring system using quick response (QR) code: A state university's covid – 19 contact tracing system. *International Journal of Informatics, Information System and Computer Engineering (INJIISCOM)*, 3(2), 209-218.
32. Setiawan, E.B.; and Wijaksono, R.M.A. (2024). Security service monitoring using face recognition, near field communication and geolocation technology. *International Journal of Informatics, Information System and Computer Engineering (INJIISCOM)*, 6(1), 70-81.
33. Rashid, I. (2026). The role of big data in development of e-government and dangers to privacy. *International Journal of Informatics, Information System and Computer Engineering (INJIISCOM)*, 7(1), 131-142.