

Design of a web-based medical check-up recording and reporting system at Prof. H. Muhamad Yamin Regional Hospital, Pariaman

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ABSTRACT

Medical check-up is a comprehensive health examination used to determine a person's health condition. At Prof. H. Muhammad Yamin Regional Hospital in Pariaman, the recording and reporting of medical check-up results were still performed manually, and preparing a report required approximately 15–30 minutes after all examination results were complete. This study aimed to design a web-based medical check-up information system to improve the effectiveness and efficiency of patient data management. A Research and Development method with a Prototype model was applied from January to July 2026, involving one physician, six health workers, and three patients. Data were collected through observation and interviews, using a user response questionnaire, an expert validation sheet, and a system trial form. The system was modeled using a flowchart, a use case diagram, an activity diagram, and a mockup. Black box testing achieved 90%, expert validation 100%, field trials 100%, staff response 100%, and patient response 88%, indicating that the system was highly feasible. Report preparation time was reduced from 15–30 minutes to approximately 5 minutes. Integration with the hospital management information system and a result notification feature were recommended.

Keywords : Medical check-up; web based; recording; prototype; health information.



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INTRODUCTION

The development of information technology has had a major impact on the health sector. Information technology enables large volumes of data to be stored and managed quickly, improves accuracy, and makes the analysis of medical data easier than manual methods, so that health service planning and evaluation can be carried out more effectively and efficiently. The Regulation of the Minister of Health of the Republic of Indonesia Number 24 of 2022 on Medical Records requires all health care facilities, including hospitals, to move from manual recording to electronic medical records in order to improve service quality through more accurate and more accessible data [1][2].

One service affected by this digitalization is the medical check-up (MCU), a series of comprehensive health examinations that includes physical, laboratory, and radiological examinations as well as other supporting tests [3][4]. MCU has also become an important hospital service line whose management has received growing attention [5]. Ramadhani *et al.* [6] found that in several health care facilities MCU recording was still performed manually, which led to duplicate data and delayed report preparation. As a result, medical personnel and hospital management find it difficult to obtain health information quickly and accurately.

Previous studies show that web-based MCU systems have a positive effect on service effectiveness. Arisandi and Nurhadi [7] reported that a web-based system shortened patient waiting time and allowed management to generate monthly reports without manual recapitulation, while also reducing human error in data management. Gunawan *et al.* [8] showed that the design of a web-based MCU information system at Brebes Regional Hospital accelerated MCU services and improved the effectiveness of patient data management. These findings reinforce the need for similar systems in other facilities that still rely on manual recording.

Observations at Prof. H. Muhammad Yamin Regional Hospital in Pariaman showed that the MCU service still involved largely manual stages, from registration, examination orders by the physician, and payment, to supporting examinations at the laboratory and radiology units and the preparation of the MCU result certificate by medical record staff. A preliminary survey conducted on 18 December 2025 through an interview with the Head of the Medical Record Installation found that patient data on the MCU result request form were re-entered into Microsoft Excel, which increased staff workload and produced data entry errors (human error) of approximately 15%. Consequently, preparing an MCU report took about 15–30 minutes after all examination results were complete.

This situation reveals a gap between the ideal MCU service, which is fast and integrated, and actual practice, which still depends on manual recording and repeated data entry. Even though the laboratory and radiology units are already computerized, their systems are not directly connected to the MCU service, so results from each unit must still be collected manually before a report can be prepared. This gap underlines the need for a web-based MCU information system that integrates all service processes in a single database.

Therefore, this study aimed to design and develop a web-based MCU information system at Prof. H. Muhammad Yamin Regional Hospital in Pariaman to improve operational efficiency and the accuracy of health data management, and to test the feasibility of the system through expert validation, functional testing, and user response assessment.

RESEARCH METHODS

This study used the Research and Development (R&D) method with a Prototype development model, a software development approach that focuses on quickly building an initial model of the system so that users can test it before it is fully developed or implemented [9][10]. The output was a functional web-based application to optimize MCU recording and reporting.

The study was conducted at Prof. H. Muhammad Yamin Regional Hospital in Pariaman from January to July 2026. The subjects were 10 people: one physician, one MCU officer (nurse), one nurse, one medical record officer (admission), one head of medical records (reporting and administrator), one laboratory officer, one radiology officer, and three patients. Data were collected through direct observation of the MCU unit to map the workflow and existing obstacles, and through interviews with the administrator, nurses, and physician to determine the medical parameters and system features needed by users. The prototype development stages consisted of user requirement analysis, prototype design (database structure and interface), prototype construction, user evaluation, and final revision and testing. The system was modeled using a flowchart, a use case diagram, an activity diagram [11], and a mockup, and was developed with reference to earlier web-based medical record development [12].

The research instruments were a user response questionnaire using a Likert scale (Good = 4, Fair = 3, Poor = 2, Very Poor = 1), a system trial form with dichotomous scoring (1 = functioning, 0 = not functioning), and an expert validation checklist. Data were analyzed descriptively by calculating percentages with the formula $P = F/N \times 100\%$, and the results were categorized as very feasible (76–100%), feasible (51–75%), not feasible (26–50%), and very not feasible (0–25%).

RESULTS AND DISCUSSION

Problem Identification

The observations and interviews showed that MCU recording and reporting at the hospital was still performed manually and was not integrated across units. Staff had to collect examination results from the physician, laboratory, radiology, and electrocardiography (EKG) before preparing a report, which caused repeated recording, difficulty in searching for data, and a reporting time of about 15–30 minutes. Based on these conditions, a web-based MCU information system with a centralized

database was needed to integrate examination data, reduce repeated recording, simplify patient data searches, and accelerate reporting so that services could be delivered more effectively and efficiently.

System Design and Development

The requirement analysis showed that the MCU information system needed features for patient data management, MCU registration, input of physician, laboratory, radiology, and EKG examination results, physician validation, MCU history, and MCU report generation. Based on these requirements, the system was designed as a web-based application with a centralized database and role-based access rights. Examination data from various units could therefore be managed in one system, recording became more structured, and each user could perform functions according to his or her authority.

The requirements were then developed into a web-based MCU information system using PHP and PostgreSQL. The development process consisted of system structure design, interface design, feature implementation, and system testing. The system comprises several integrated main pages that support MCU recording and reporting, from patient registration and examination data management to physician validation and report preparation.

System Implementation

The login page is the initial access point, where users enter a username and password according to their access rights (Figure 1). After successful authentication, users are directed to the dashboard that corresponds to their role. The dashboard is the main page of the system and displays menus according to user access rights, which allows officers to reach patient data management, MCU registration, examination, validation, and MCU result reports easily (Figure 2).

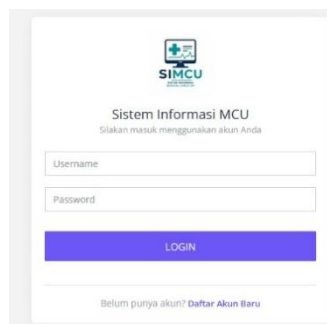


Figure 1. Login Form Display

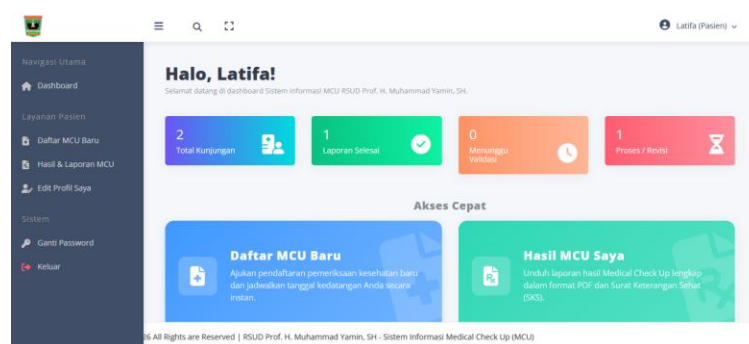


Figure 2. Dashboard Display

The patient data page is used to enter and store patient identity and MCU registration data (Figure 3). Stored data can be reused in the examination process, which reduces repeated recording. The physician validation page is used to review and approve MCU examination results before a report is issued (Figure 4). Validation is performed digitally so that examination results are documented within the system.

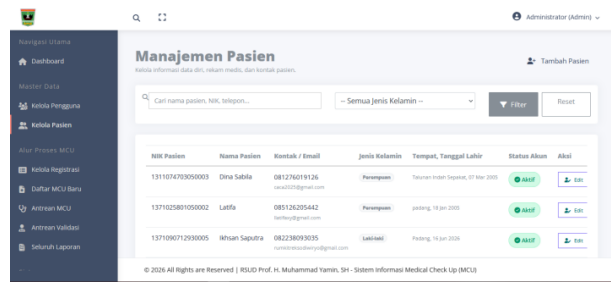


Figure 3. Patient Data Display

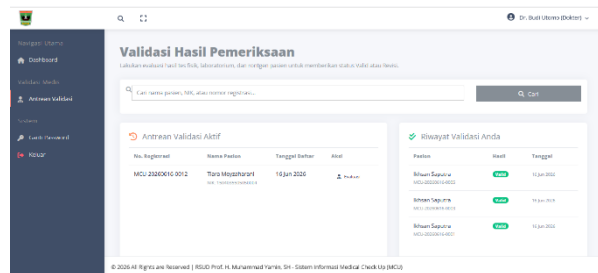


Figure 4. Physician Validation Display

The report page displays MCU results that are complete and validated (Figure 5). The system combines patient identity data and examination results from each unit into a single report that can be printed or downloaded as a PDF file.

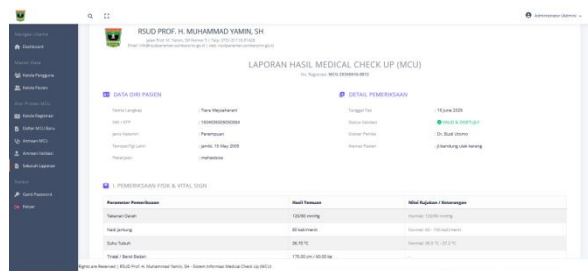


Figure 5. MCU Result Report Display

System Testing

System testing was conducted in four stages: an expert validation checklist completed by the hospital IT staff; black box testing by the head of the medical record unit, a nurse, and a physician; a field trial of the system; and a user response assessment by staff and patients. The results are summarized in Table 1.

Table 1. Summary Of System Feasibility Test Results For The Web-Based MCU Information System

No.	Testing Aspect	Respondents/Testers	Percentage	Category
1	Expert validation	Hospital IT staff	100%	Very feasible
2	Black box testing	Head of medical records, nurse, physician	90%	Functional
3	Field system trial	Physician, MCU officer, head of medical records	100%	Functioned well
4	Staff user response	7 health workers	100%	Very good
5	Patient user response	3 patients	88%	Good

Source: processed data from the system trials, 2026.

Discussion

Overall, the results show that the web-based MCU information system was easy to understand and use, and that it supported recording, data management, validation of examination results, and reporting more effectively and efficiently. Report preparation, which previously took about 15–30 minutes, was shortened to about 5 minutes because all examination data were already stored and integrated in one database. This means that the main problems identified at the beginning of the study, namely repeated data entry and the collection of results from each unit, were addressed by the centralized design. These findings are consistent with Gunawan *et al.* [8], who stated that the implementation of a web-based MCU information system improves the effectiveness of patient data management, accelerates services, and simplifies the preparation of examination reports. They are also in line with Maulana *et al.* [13], who explained that a web-based MCU information system integrates patient and examination data so that administration becomes more effective than in a manual system. Integrated health information systems play an important role in accelerating data exchange between service units and in supporting more accurate clinical and managerial decision making [14].

The need for data integration is also evident in similar studies in other health facilities. Hidayat and Ardiansyah [15] found that the development of a computer-based health service information system accelerated polyclinic workflow and reduced duplicate recording, while Khairuddin and Waluyo [16] reported that a digital patient information system increased the speed of data access between hospital units. Mocodompis and Papilaya [17] confirmed that web-based systems make it easier to present health service data in real time, and Nancy and Hendra Putra [10] showed that system development with the Prototype model is effective in adjusting the initial design to user needs in the field, as was also applied in this study.

Despite these benefits, interviews with users indicated that further development is still needed, such as adding a result notification feature, integration with the Hospital Management Information System (SIMRS), and improving data security. The EKG upload feature also showed functional problems in black box testing, which explains why this test reached 90% rather than 100%, and it should be prioritized in the next development stage. Several limitations should also be noted. The study was conducted at a single hospital with a small number of respondents, including only three patients, and it measured feasibility and user acceptance immediately after development rather than long-term use. The reduction of the reporting time to about 5 minutes was also based on the system trial, and the data entry error rate of about 15% was measured only in the previous manual process, so the effect of the system on error reduction still needs to be verified in future studies. Nevertheless, the results indicate that the web-based MCU information system is feasible for use because it can improve the effectiveness, efficiency, and quality of the MCU service at Prof. H. Muhammad Yamin Regional Hospital.

CONCLUSION

The design of a web-based MCU information system at Prof. H. Muhammad Yamin Regional Hospital in Pariaman successfully addressed the need for MCU data management that was previously performed manually. Observations and interviews with seven staff respondents showed that the MCU unit needed a system that integrates patient registration, input of physician, laboratory, radiology, and EKG results, physician validation, patient data search, and report generation in a single database. This need was met through a system design based on a flowchart, use case diagram, activity diagram, and mockup that describes the entire MCU service flow from registration to report presentation.

The testing results showed that the system performed well and was feasible for use: black box testing reached 90%, the field trial 100%, expert validation 100%, staff response 100%, and patient response 88%. The system shortened MCU report preparation time from about 15–30 minutes to

about 5 minutes and reduced dependence on physical documents, which in the manual process had been accompanied by data entry errors of about 15%. The results also confirm that the R&D approach with the Prototype model is effective in producing a health information system that fits real user needs. Future researchers are advised to add a result notification feature, improve data security, and fix the EKG upload feature, which did not function optimally in this test. The hospital is advised to implement the system fully and integrate it with SIMRS so that patient data management, service efficiency, and the digitalization of health services can be more optimal and sustainable.

REFERENCES

- [1] M. of H. of the R. of Indonesia, *Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022 tentang Rekam Medis*. Jakarta, Indonesia, 2022.
- [2] A. Pratama, "Strategi Implementasi Rekam Medis Elektronik dalam Meningkatkan Mutu Pelayanan," *J. Manaj. Inf. Kesehat. Indones.*, 2024.
- [3] A. Manan, "Peran Medical Check-Up terhadap Deteksi Dini Risiko Kelelahan dan Penyakit Akibat Kerja," *Complement. Heal. Care Journals*, vol. 2, no. 2, pp. 137–143, 2025.
- [4] N. I. Rauf, M. N. Abdillah, A. M. Sari, S. Fakhruddin, and E. HB, "Medical Check Up (MCU)," *Locus Penelit. dan Abdimas*, vol. 2, no. 1, pp. 1–6, 2022, [Online]. Available: <https://journal.tritunas.ac.id/index.php/LoA/article/view/234>
- [5] M. T. Saadi, N. A. Zuhdi, R. A. Pertiwi, and W. Sulistiadi, "Pemasaran Layanan Medical Check-Up Rumah Sakit Pasca Covid-19: Scoping Review," *J. Kesehat. Tambusai*, vol. 6, no. 1, pp. 377–387, 2025, doi: 10.31004/jkt.v6i1.38494.
- [6] S. Ramadhani, "Analisis Pelaksanaan Program Medical Check Up (MCU) pada Fasilitas Pelayanan Kesehatan," *J. Kesehat. Masy. Indones.*, vol. 18, no. 1, 2023.
- [7] D. Arisandi and A. Nurhadi, "Perancangan Sistem Informasi Pencatatan dan Pelaporan Medical Check Up Berbasis Web," *J. Kesehat.*, 2021.
- [8] I. Gunawan, F. Agushybana, and M. I. Kartasurya, "Perancangan Sistem Informasi Medical Check Up Guna Mempercepat Pelayanan MCU di RSUD Brebes," *J. Kesehat.*, vol. 8, no. 1, pp. 39–54, 2020, doi: 10.25047/j-kes.v8i1.140.
- [9] M. Y. H. Setyawan and D. A. Pratiwi, *Membuat Sistem Informasi Gadai Online Menggunakan CodeIgniter*. Yayasan Prima Agus Teknik, 2022. [Online]. Available: <https://books.google.co.id/books?id=0pZ3EAAAQBAJ>
- [10] M. S. Nancy Margareta and S. Hendra Putra, "Sistem Informasi Pengolahan Data Pasien pada Klinik Essiva Berbasis Web dengan Metode Prototype," *Remik Ris. dan E-Jurnal Manaj. Inform. Komput.*, vol. 6, no. 2, pp. 330–339, 2022, doi: 10.33395/remik.v6i2.11562.
- [11] H. Pramana Putra, H. Maulana, E. Triandini, and P. Firdaus Nuryananda, "Relational Activity Diagram Design Travel Agent Information System," in *Prosiding Seminar Nasional Teknologi dan Sistem Informasi*, 2022, pp. 10–11.
- [12] A. Sutrisno, "Rancang Bangun Sistem Informasi Rekam Medis Berbasis Web Menggunakan Metode Waterfall," *J. Teknol. Inf. dan Komun.*, 2023.
- [13] L. H. Maulana, N. L. Azizah, and A. Eviyanti, "Perancangan Sistem Informasi Medical Check Up Berbasis Web dengan Framework CodeIgniter 4 Menggunakan Metode Waterfall," *J. Tek. Inf. dan Komput.*, vol. 6, no. 1, pp. 97–108, 2023, doi: 10.37600/tekinkom.v6i1.760.
- [14] J. Tummers, B. Tekinerdogan, H. Tobi, C. Catal, and B. Schalk, "Obstacles and features of Health Information Systems: A systematic literature review," *Comput. Biol. Med.*, vol. 137, p. 104785, 2021, doi: 10.1016/j.combiomed.2021.104785.
- [15] F. Hidayat and M. Ardhiyansyah, "Pengembangan Sistem Informasi Pelayanan Kesehatan Menggunakan Model Waterfall (Studi Kasus: Poliklinik PUSDIKLAT),"

- Sci. Sacra J. Sains*, vol. 2, no. 2, pp. 545–554, 2022.
- [16] M. D. Khairuddin and A. F. Waluyo, “Pengembangan Sistem Informasi Pasien Berbasis Mobile pada RSUD Sunan Kalijaga Demak dengan Metode Waterfall,” *Rabit J. Teknol. dan Sist. Inf. Univrab*, vol. 9, no. 1, pp. 79–90, 2023, doi: 10.36341/rabit.v9i1.4049.
- [17] J. Y. Mocodompis and F. S. Papilaya, “Analisis dan Perancangan Sistem Informasi Kesehatan Sebaran Penyakit Berbasis WEB-GIS,” *KLIK Kaji. Ilm. Inform. dan Komput.*, vol. 3, no. 6, pp. 612–620, 2023, doi: 10.30865/klik.v3i6.811.