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DESIGN, IMPLEMENTATION, AND EVALUATION OF A WEB-BASED INPATIENT MANAGEMENT INFORMATION SYSTEM FOR ENHANCING HOSPITAL SERVICE QUALITY

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Abstract
The digital transformation of hospital services requires integrated information systems to improve operational efficiency, data accuracy, and healthcare service quality. This study aims to design, implement, and evaluate a Web-Based Inpatient Management Information System at Restu Bunda Hospital, Bandar Lampung, Indonesia. The research employed a Research and Development approach using the Waterfall model, comprising requirements analysis, system design, implementation, testing, and maintenance. Data were collected through observation, interviews, documentation analysis, and literature review. The system was designed to integrate patient registration, inpatient admission, room allocation, medical documentation, nursing care, medication management, discharge administration, and hospital reporting. Unified Modeling Language diagrams were utilized to model system functionality and operational workflows. The implementation incorporated responsive web-mobile interfaces, centralized data management, and role-based access control to support administrative and clinical coordination. The development results demonstrate the integration of essential inpatient management functions within a unified digital architecture. Functional testing and user acceptance evaluation were established as assessment mechanisms for system reliability, usability, and operational suitability. The proposed system provides a structured foundation for improving information accessibility, administrative coordination, and inpatient service management. Further empirical evaluation is required to quantify improvements in processing efficiency, data accuracy, user satisfaction, and overall hospital service quality.

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I. INTRODUCTION

The rapid advancement of digital health technologies has transformed healthcare delivery by encouraging hospitals to adopt integrated information systems that improve operational efficiency, clinical coordination, patient safety, and service quality. Hospital inpatient services represent one of the most complex healthcare environments because they involve interconnected administrative and clinical activities, including patient admission, bed allocation, medical documentation, nursing care, treatment monitoring, pharmaceutical services, billing, and discharge management. Ineffective information management may contribute to delayed administrative procedures, fragmented patient records, inconsistent reporting, and reduced coordination among healthcare professionals. These challenges have increased the importance of Hospital Management Information Systems (HMIS) as essential components of healthcare digital transformation. Zarqi et al. (Zarqi et al., 2026) identified technical, organizational, human, and environmental factors as critical determinants of successful HMIS implementation, emphasizing the importance of integrating information technology with hospital operational processes. Similarly, von Gerich and Peltonen (Zarqi et al., 2026) demonstrated that electronic health records provide valuable information for evaluating healthcare service quality, particularly in relation to patient safety, clinical performance, and care processes. Therefore, developing an integrated web-based inpatient management information system is increasingly relevant for improving the accessibility, accuracy, and timeliness of hospital information while supporting patient-centered healthcare services.

The need for digital transformation in hospital inpatient services is particularly relevant in Lampung Province, Indonesia, where healthcare facilities must accommodate diverse patient populations and increasingly complex service requirements. According to Statistics Indonesia (BPS), Lampung Province had 64 general hospitals, 19 specialized hospitals, 162 inpatient public health centers, and 160 non-inpatient public health centers in 2025, reflecting a substantial healthcare service network requiring effective information management(Dinas Kesehatan Provinsi Lampung, 2025). The Lampung Provincial Health Office also emphasizes the importance of healthcare infrastructure, human resources, service performance, and health information as fundamental components of regional healthcare planning(Badan Pusat Statistik, 2026)(Dinas Kesehatan Provinsi Lampung, 2025). Within this regional context, Restu Bunda Mother and Child Hospital (RSIA Restu Bunda), located in Bandar Lampung, is classified as a Class C specialized hospital providing maternal, pediatric, emergency, and inpatient healthcare services. Official Ministry of Health records identify 30 beds across its listed inpatient and specialized-care categories, including Class I–III rooms, intensive care, isolation, and perinatology facilities (Kementerian Kesehatan Republik Indonesia, n.d.). These characteristics illustrate the importance of accurate bed availability information, coordinated patient admission, and reliable inpatient documentation. Furthermore, the hospital's provision of 24-hour inpatient services highlights the need for continuous information accessibility and timely coordination between administrative personnel, nurses, physicians, and hospital management. Consequently, the implementation of an integrated web-based inpatient information system is considered a relevant strategy for strengthening operational efficiency and supporting consistent healthcare service quality in Bandar Lampung.

The effectiveness of hospital information systems has been widely discussed in previous research, particularly regarding system usability, information quality, operational reliability, and user satisfaction. A systematic investigation by Khorasani et al. (Khorasani et al., 2026), which reviewed 52 relevant studies,

identified six major domains for evaluating hospital information systems: human, technological, informational, organizational, legal, and patient safety factors. Their findings indicate that existing evaluation approaches frequently emphasize technological infrastructure and organizational readiness, while outcome-oriented performance indicators receive comparatively limited attention. Mousavi et al. (Mousavi et al., 2026) investigated the usability of legacy and web-based hospital information systems in inpatient admission and radiology services, demonstrating the relevance of user-centered evaluation during hospital digital transformation. Furthermore, research on critical success factors for hospital information systems identified reliability, user-friendliness, and organizational fitness as particularly influential determinants of implementation success (Arpaci et al., 2023). Although these studies provide important theoretical and empirical foundations, their findings also indicate that successful digital transformation requires more than the installation of technological infrastructure. Hospital information systems must be adapted to institutional workflows, operational characteristics, and user requirements while demonstrating measurable improvements in healthcare service processes. Accordingly, integrating system development with structured functional testing, usability assessment, and operational performance evaluation is essential for establishing the practical contribution of digital inpatient management systems.

Despite the increasing adoption of digital healthcare technologies, several research gaps remain in the design and evaluation of inpatient management information systems, particularly within specialized hospitals operating in regional healthcare environments. First, existing research frequently examines hospital information systems at an institutional level rather than concentrating on the integration of inpatient administrative and clinical workflows. Second, studies addressing information system usability and implementation success do not always establish direct relationships between system functionality and measurable service performance, such as admission processing time, information retrieval efficiency, bed occupancy monitoring, and reporting accuracy. Third, the operational requirements of specialized maternal and child hospitals may differ from those of general hospitals because inpatient services must accommodate maternity care, pediatric treatment, perinatal monitoring, and specialized patient documentation. At RSIA Restu Bunda Bandar Lampung, these characteristics create a relevant setting for examining how an integrated web-based system can support inpatient information management. However, the extent to which existing workflows experience fragmented data processing, duplicated administrative activities, delayed reporting, or limited real-time information accessibility must be established through direct observation, stakeholder interviews, and institutional documentation rather than assumed in advance. The central research problem is therefore how to design, implement, and evaluate a web-based inpatient management information system that addresses institution-specific operational requirements while producing measurable improvements in hospital service processes. This problem aligns with previous research highlighting the need for multidimensional HMIS evaluation and context-sensitive implementation strategies (Zarqi et al., 2026), (Khorasani et al., 2026).

To address these gaps, this study proposes the design, implementation, and evaluation of an integrated web-based inpatient management information system specifically adapted to the operational requirements of RSIA Restu Bunda Bandar Lampung. The proposed system is intended to facilitate interconnected inpatient service activities through modules supporting patient registration, admission management, room and bed availability, inpatient records, treatment documentation, discharge administration, and management reporting. Its

proposed novelty lies in three interconnected contributions. First, the study adopts a context-specific system design that incorporates the operational characteristics of maternal and child inpatient services rather than relying exclusively on generalized hospital information system architectures. Second, it emphasizes workflow integration and role-based information accessibility to support coordinated data management among hospital administrators, healthcare professionals, and managerial personnel. Third, it proposes a multidimensional evaluation framework combining functional correctness, usability, information accessibility, and service-related performance indicators to examine the relationship between system implementation and hospital service quality. This approach extends previous research by connecting technical system development with practical healthcare workflow evaluation, consistent with recommendations concerning system reliability, usability, organizational alignment, and comprehensive performance assessment. Nevertheless, these contributions should be interpreted as proposed research innovations whose effectiveness requires empirical validation through system implementation and evaluation.

Based on these considerations, the primary objective of this study is to design, implement, and evaluate a web-based inpatient management information system to support improvements in hospital service quality at RSIA Restu Bunda Bandar Lampung, Indonesia. Specifically, the study aims to identify existing inpatient service workflows and information management requirements; develop an integrated web-based application that supports patient admission, inpatient administration, clinical information management, and reporting; evaluate system functionality, usability, reliability, and information accessibility; and assess its potential contribution to administrative efficiency, data accuracy, operational coordination, and user satisfaction. The research addresses three fundamental questions: (1) What operational and information management requirements should be incorporated into a web-based inpatient management system for a specialized maternal and child hospital? (2) How can the proposed system be designed and implemented to integrate essential inpatient service processes while ensuring functional reliability and usability? and (3) To what extent does system implementation improve measurable inpatient service performance and perceived service quality? By answering these questions, the study is expected to contribute both theoretically and practically to the development of context-sensitive hospital information systems. Its theoretical contribution concerns the integration of information system design and multidimensional service performance evaluation, while its practical contribution lies in providing an empirically evaluated digital solution that may inform inpatient service management and future digital transformation initiatives in comparable regional healthcare institutions.

II. RESEARCH METHODOLOGY

2.1. Research Design

This study employed a Research and Development (R&D) approach to design, implement, and evaluate a web-based inpatient management information system at Restu Bunda Hospital, Bandar Lampung, Indonesia. The research adopted a descriptive and applied system development framework to identify existing inpatient service problems, analyze user requirements, develop an integrated information system, and evaluate its functionality in supporting hospital service quality. The research focused on improving inpatient administrative processes, patient data management, room availability monitoring, medical service documentation, and hospital reporting. The methodological framework consisted of two primary components: data collection techniques and system development using the Waterfall model. These components were systematically integrated to

ensure that the developed application addressed actual hospital operational requirements and supported efficient, accurate, and accessible inpatient information management(Dimyati et al., 2024; Lin et al., 2024; Satrianah & Yunita, 2020).

2.2. Data Collection Techniques

Data collection was conducted to identify operational requirements, evaluate existing inpatient management procedures, and determine the functional specifications of the proposed information system. The study employed four complementary techniques: observation, interviews, documentation analysis, and literature review(Goodwin et al., 2016; Kayal et al., 2022; Olff, 2015)(Bella Yuristika Fauji, Muhamad Muslihudin, 2020; Muslihudin, 2022; Rita Irviani, Sri Hartati, 2022).

1. Direct Observation

Direct observation was designed to examine inpatient service activities at Restu Bunda Hospital, particularly patient registration, admission procedures, room allocation, inpatient documentation, discharge administration, and management reporting. The observation focused on identifying information flows, administrative processing stages, data recording practices, and coordination mechanisms among hospital personnel. Particular attention was given to potential delays, repetitive administrative activities, inconsistencies in patient information, and limitations in accessing inpatient records. The findings from this observation were intended to provide an empirical foundation for identifying system requirements and developing a digital solution aligned with hospital workflows.

2. Semi-Structured Interviews

Semi-structured interviews were used to obtain qualitative information from stakeholders involved in inpatient services, including hospital management, administrative officers, registration personnel, nurses, and information technology staff. The interviews focused on existing information management procedures, operational difficulties, system accessibility, patient data accuracy, reporting requirements, and expectations regarding digital inpatient services. Open-ended questions allowed participants to explain operational challenges and recommend improvements based on their professional responsibilities. The interview findings were subsequently categorized into functional and non-functional requirements to guide system design, including user access privileges, data integration, information security, reporting capabilities, and application usability.

3. Documentation Analysis

Documentation analysis was employed to examine institutional records and administrative documents associated with inpatient management. Relevant documents included patient admission forms, inpatient registration records, room allocation reports, patient discharge summaries, and hospital service reporting formats. The analysis aimed to identify data attributes, document relationships, information processing requirements, and reporting structures necessary for the proposed system. Institutional documents were also used to verify information obtained through observation and interviews, thereby strengthening the consistency of the requirements analysis. Patient-related documentation was to be accessed only with institutional authorization, and personally identifiable information was to be excluded or anonymized during research analysis.

4. Literature Review

A literature review was conducted to establish the theoretical and technological foundations of web-based hospital information systems. Relevant scientific publications were identified through academic databases, including Scopus, ScienceDirect, IEEE Xplore, and SpringerLink, using keywords such as hospital information system, inpatient management, web-based healthcare system, hospital service quality, and information system development. The review focused on previous studies concerning healthcare information management, hospital workflow integration, information system usability, and system development methodologies. Findings from the literature were used to identify existing research limitations, determine appropriate system development practices, and formulate the proposed system's contribution to inpatient service management.

2.3. System Development Method

The system was developed using the Waterfall Software Development Life Cycle (SDLC), which provides a structured and sequential framework for developing information systems. The Waterfall model was selected because it supports systematic requirements documentation, architectural planning, implementation, and verification, which are particularly important in hospital environments where information accuracy, operational reliability, and data security must be carefully managed. The development process consisted of five interconnected stages: requirements analysis, system design, implementation, testing, and maintenance.

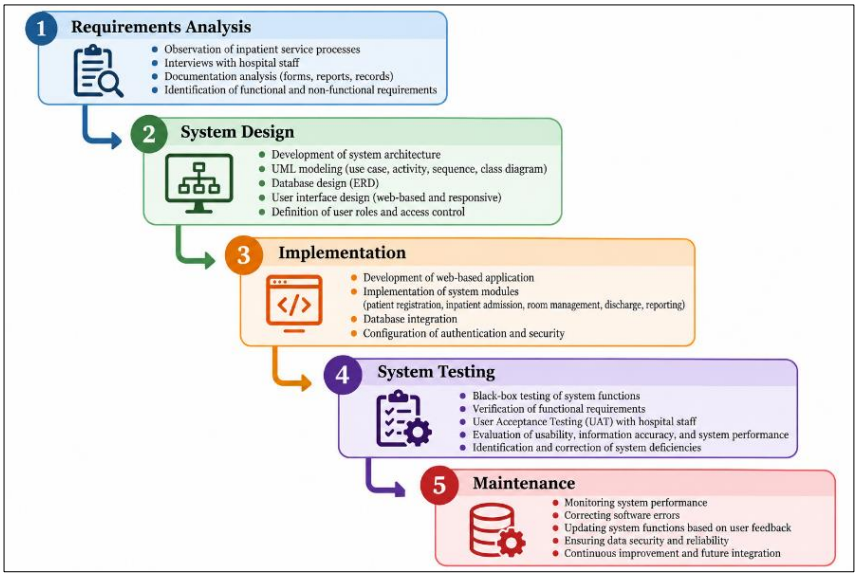


Figure 1. Waterfall-based development stages of the proposed inpatient management information system.

Stage 1: Requirements Analysis

The requirements analysis stage involved identifying and documenting the operational needs of inpatient services based on observation, interviews, and institutional documentation. Functional requirements included patient registration, inpatient admission, patient record management, room and bed availability monitoring, discharge administration, and hospital reporting. Non-functional requirements included system usability, response time, data integrity, authentication, role-based access control, and information confidentiality. The identified requirements were organized into a Software Requirements

Specification (SRS) to establish the foundation for subsequent development activities.

Stage 2: System Design

The system design stage translated the identified requirements into an integrated application architecture. Unified Modeling Language (UML) diagrams, including use case diagrams, activity diagrams, sequence diagrams, and class diagrams, were employed to describe system interactions, operational processes, and relationships among application components. Database design was conducted using an Entity Relationship Diagram (ERD) to define relationships among patient records, inpatient registrations, hospital rooms, medical personnel, and service transactions. The user interface was designed using a responsive web approach to ensure accessibility through desktop computers, tablets, and mobile devices. Role-based access control was incorporated into the proposed architecture to distinguish the responsibilities of administrators, registration officers, medical personnel, and hospital management.

Stage 3: System Implementation

During implementation, the approved system architecture was translated into a functional web-based application. The development activities included creating user interfaces, implementing application logic, constructing database structures, integrating inpatient management modules, and configuring user authentication mechanisms. The application was designed to support centralized data processing, allowing authorized personnel to access and update inpatient information according to their operational responsibilities. Data validation mechanisms were incorporated to reduce incomplete or inconsistent records, while access restrictions were designed to protect confidential patient information. The implementation process emphasized modular development to facilitate system maintenance, future enhancements, and integration with other hospital information services.

Stage 4: System Testing

System testing was designed to verify that the developed application satisfied its functional requirements and supported hospital operational needs. Black-box testing was employed to evaluate essential application functions, including authentication, patient registration, inpatient admission, room allocation, data updates, patient discharge processing, and report generation. Each function was assessed by comparing actual system responses with predefined expected outcomes. User Acceptance Testing (UAT) was also proposed to assess system usability, information accessibility, operational suitability, and perceived usefulness among authorized hospital personnel. Functional test results and user feedback were intended to identify application deficiencies requiring correction before full operational deployment.

Stage 5: Maintenance

The maintenance stage focused on maintaining application reliability, resolving technical issues, and improving system performance following implementation. Maintenance activities included correcting software errors, monitoring database performance, reviewing access control configurations, and updating system functions in response to operational requirements. Periodic evaluations were proposed to ensure that the application remained compatible with hospital procedures and evolving healthcare information management

needs. This stage also supported continuous improvements in system usability, data accuracy, and administrative efficiency.

III. RESULTS AND DISCUSSION

3.1. Results

The development of the Web-Based Inpatient Management Information System at Restu Bunda Hospital, Bandar Lampung, resulted in a proposed integrated digital platform designed to support inpatient administrative activities and improve access to healthcare service information. The system was designed using the Waterfall development model, encompassing requirements analysis, system design, implementation, testing, and maintenance. The implementation design integrates patient registration, inpatient admission, room and bed allocation, medical documentation, nursing care, medication management, discharge administration, and management reporting into a centralized information architecture. The system interface adopts a responsive web-mobile approach, allowing users to access healthcare information through smartphones, tablets, and desktop computers. The proposed integration is intended to reduce fragmented information processing, minimize repetitive administrative activities, and improve communication among authorized hospital personnel. The principal development output comprises the system architecture, UML models, activity workflows, and web-mobile interface prototypes. These outputs demonstrate the structural feasibility of integrating inpatient service processes, although operational effectiveness requires validation through deployment and empirical testing.

1. Use Case Diagram of the Web-Based Inpatient Management Information System

The Use Case Diagram illustrates the functional architecture and interactions between users and the proposed Web-Based Inpatient Management Information System at Restu Bunda Hospital, Bandar Lampung. The system is designed to integrate inpatient administrative and clinical processes, including patient registration, inpatient admission, room and bed allocation, medical treatment documentation, nursing care, patient discharge, and hospital management reporting. The diagram identifies six primary actors: Administrator, Registration Staff, Nurse, Doctor, Pharmacist, and Hospital Management. Each actor is assigned specific responsibilities and access privileges according to their operational roles. This role-based approach supports information security, minimizes unauthorized data manipulation, and improves coordination among hospital departments. The system also provides centralized inpatient data management to ensure that patient information can be accessed and updated by authorized personnel throughout the hospitalization process.

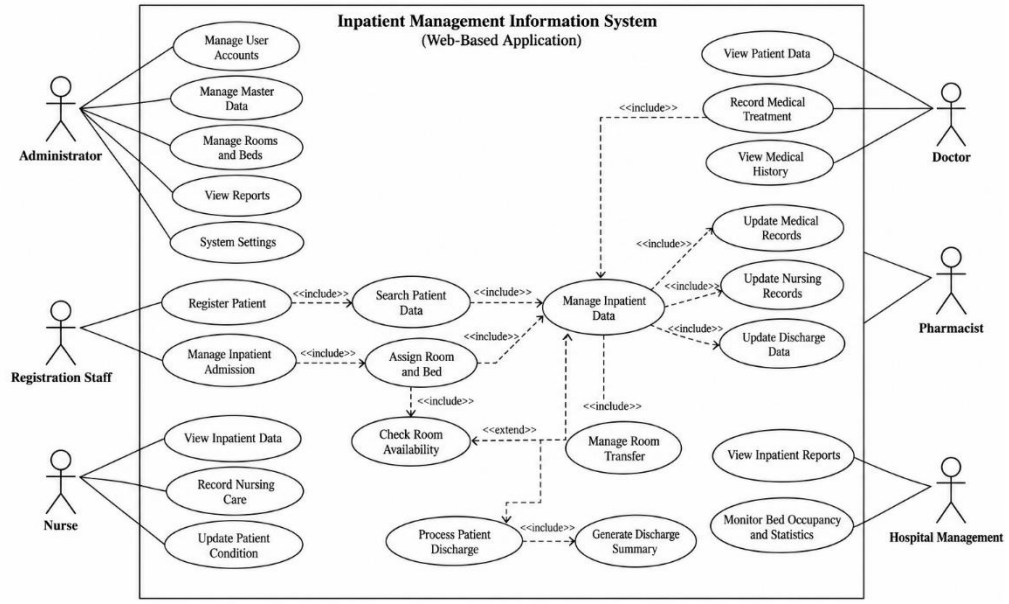


Figure 2. Use case Diagram of the inpatient management Information System

The Administrator is responsible for maintaining the overall configuration and operational reliability of the inpatient management information system. This actor manages user accounts, establishes access privileges, updates master data, configures room and bed information, and supervises system settings. The administrator also accesses operational reports to monitor system activities and ensure data consistency. However, administrative privileges should not automatically permit modification of clinical records, as these activities must remain restricted to authorized healthcare professionals. By implementing role-based access control, the system separates technical administration from clinical responsibilities, thereby strengthening information governance and protecting confidential patient data. The Registration Staff serves as the primary actor responsible for initiating inpatient administrative processes. The actor registers new patients, retrieves existing patient records, manages inpatient admission, verifies patient information, and assigns available rooms and beds. Before assigning accommodation, the registration staff checks room availability to prevent duplicate allocation and ensure that inpatient capacity information remains accurate. The integration of registration and admission functions reduces repetitive data entry and facilitates more efficient patient placement. Furthermore, centralized patient records allow registration personnel to retrieve relevant information without repeatedly creating new records for returning patients.

The Nurse is responsible for documenting and updating information related to inpatient nursing services. This actor accesses authorized patient information, records nursing activities, monitors patient conditions, and updates relevant clinical observations during hospitalization. Nursing documentation may include vital signs, patient complaints, nursing interventions, and changes in patient conditions. Through the system, nurses can maintain chronological records that support communication with physicians and other healthcare professionals. Accurate and timely nursing documentation is essential for continuity of care, patient monitoring, and the prevention of information gaps during shift changes. The Doctor performs clinical functions associated with inpatient assessment, diagnosis, and treatment documentation. The system allows physicians to access patient information and medical history, record diagnoses, document treatment

activities, and update relevant medical records. Access to integrated inpatient information supports clinical decision-making by providing authorized physicians with a more complete view of patient conditions and treatment histories. Medical documentation is stored within the patient's inpatient record, facilitating continuity of care and communication between doctors and nurses. Clinical records must be protected through appropriate authentication, authorization, and audit mechanisms.

The Pharmacist supports inpatient medication services by accessing authorized prescription information and maintaining medication dispensing records. The intended functions include reviewing prescribed medications, verifying medication availability, recording dispensing activities, and coordinating medication-related information with physicians and nurses. These activities support the accuracy and traceability of medication services during hospitalization. In the proposed system, pharmacy functions should be connected to inpatient treatment records while restricting pharmacists' access to information necessary for medication management. This functional integration is intended to improve communication among healthcare professionals and reduce administrative inconsistencies in medication documentation. The Hospital Management actor is responsible for monitoring inpatient operational performance and reviewing information required for managerial decision-making. The system provides access to inpatient reports, room occupancy information, admission and discharge statistics, and other authorized service indicators. Hospital management can use these reports to assess inpatient capacity utilization, identify operational trends, and evaluate resource allocation requirements. By presenting structured and updated operational information, the system supports more transparent monitoring and evidence-based hospital management without requiring unrestricted access to individual clinical records.

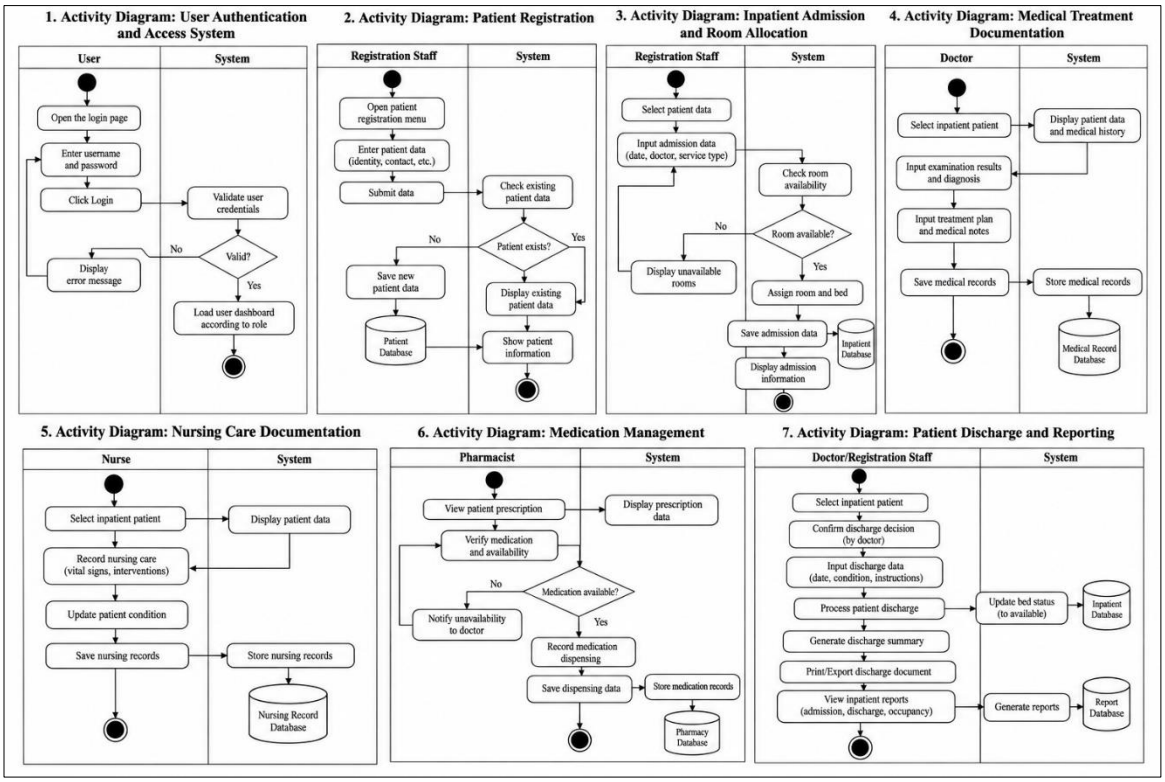


Figure 3. The Activity Diagram illustrates the operational workflow of the proposed Web-Based Inpatient Management Information System

The Activity Diagram illustrates the operational workflow of the proposed Web-Based Inpatient Management Information System at Restu Bunda Hospital, Bandar Lampung, by describing the sequential interactions between hospital personnel and the system. The workflow consists of seven interconnected processes: user authentication, patient registration, inpatient admission and room allocation, medical treatment documentation, nursing care documentation, medication management, and patient discharge and reporting. The process begins with user authentication, in which the system validates login credentials and grants access according to predefined user roles. Registration staff subsequently enter patient information, while the system verifies existing records to prevent data duplication. During inpatient admission, the system checks room and bed availability before allocating accommodation and recording admission details in the centralized database. Physicians document diagnoses, examinations, and treatment plans, while nurses record clinical observations, nursing interventions, and changes in patient conditions. Pharmacists manage medication dispensing based on authorized prescriptions and medication availability. These interconnected activities establish a structured information flow that supports data consistency, operational coordination, and timely access to inpatient information across hospital departments.

The Activity Diagram also demonstrates how decision-making processes, database interactions, and automated information updates are integrated to support hospital service quality. Decision nodes, including credential validation, patient record verification, room availability assessment, and medication availability checking, ensure that each operational activity follows predefined business rules before proceeding to subsequent stages. During patient discharge, authorized personnel complete discharge documentation, generate discharge summaries, and update inpatient records and bed occupancy status. Hospital management can subsequently access operational reports containing admission statistics, discharge information, and inpatient capacity utilization to support resource allocation and managerial decision-making. The integration of these processes is expected to reduce repetitive administrative activities, minimize data entry inconsistencies, improve information retrieval efficiency, and strengthen communication among healthcare professionals. Furthermore, the activity model provides a foundation for implementing functional requirements and developing black-box testing scenarios to evaluate the accuracy, reliability, and usability of the proposed application. Therefore, the Activity Diagram represents an essential component of the system development framework, illustrating how coordinated digital workflows may contribute to more efficient, transparent, and patient-centered inpatient services at Restu Bunda Hospital.

2. Implementation of the Web-Based Inpatient Management Information System

a. Home Page Interface of the Web-Based Inpatient Management Information System

The Home Page interface serves as the primary access point to the Web-Based Inpatient Management Information System at Restu Bunda Hospital, Bandar Lampung, providing an interactive and responsive platform for accessing essential healthcare services. As illustrated in Figure 4, the interface incorporates the hospital's official identity, including its logo, name, and building photograph, to strengthen institutional recognition and user trust. The main navigation features two prominent buttons, Online Registration (Daftar Online) and View Services (Lihat Layanan), enabling patients to initiate registration procedures and

explore available medical services efficiently. Additionally, the homepage presents three key service indicators: 24-hour healthcare services, experienced medical personnel, and modern hospital facilities. The Featured Services (Layanan Unggulan) section provides visual access to Obstetrics and Gynecology, Pediatric Healthcare, and Inpatient Services through interactive service cards. The interface employs a consistent green-and-white color scheme, clear typography, intuitive navigation, and a mobile-responsive layout to enhance accessibility and user experience. Furthermore, the homepage functions as an integrated navigation gateway connecting patients to online registration, healthcare service information, and subsequent inpatient admission processes. This design is expected to improve information accessibility, simplify patient interactions, reduce administrative barriers, and support the delivery of efficient, user-centered healthcare services at Restu Bunda Hospital.



Figure 4. Home Page Interface of the Web-Based Inpatient Management Information System

b. Healthcare Services Menu Interface

The Healthcare Services Menu interface is designed to provide patients with convenient access to information about medical services available at Restu Bunda Hospital, Bandar Lampung, through a responsive web-based mobile platform. As illustrated in Figure 5, the interface presents five primary service categories: Obstetrics and Gynecology, Pediatric Healthcare, Inpatient Services, 4D Ultrasonography (USG), and Other Medical Services. Each category is represented by a distinctive icon, service description, and navigation button to facilitate intuitive interaction and efficient information retrieval. The interface adopts a minimalist design with a consistent green-and-white color scheme, structured navigation elements, and readable typography to enhance usability and accessibility across mobile devices. The integration of these service categories enables patients to identify appropriate healthcare services before initiating registration or admission procedures. Furthermore, the menu functions as an entry point connecting

public healthcare information with subsequent patient registration and inpatient management processes. This design is expected to reduce difficulties in accessing service information, improve user navigation efficiency, and support patient-centered digital healthcare delivery.



Figure 5. Healthcare Services Menu interface

c. Online Patient Registration Interface

The Online Patient Registration interface facilitates the initial collection of patient information through a structured and user-friendly digital form. As presented in Figure 6, the registration process incorporates a three-stage workflow consisting of Patient Data, Service Selection, and Confirmation, allowing users to complete registration systematically. The first stage requires patients to provide essential personal information, including full name, date of birth, gender, telephone number, and an optional email address. The interface incorporates clearly labeled input fields, gender selection controls, a date picker, and a prominent navigation button to simplify data entry and minimize potential user errors. The step-by-step registration indicator provides visual feedback regarding the current registration stage, thereby improving process transparency and user orientation. From a system functionality perspective, the registration module is designed to support patient identification, data validation, and subsequent integration with the centralized patient database. This functionality is expected to minimize repetitive administrative procedures, improve the completeness and consistency of patient records, and facilitate more efficient registration services while maintaining appropriate safeguards for personal and medical information.



Figure 6. Online Patient Registration interface

d. Inpatient Admission Form Interface

The Inpatient Admission Form interface is developed to support the systematic management of patient admission information and facilitate coordination between registration personnel and hospital inpatient services. As shown in Figure 7, the interface represents the second stage of the registration workflow, focusing on the collection of inpatient service requirements. The form includes essential fields such as admission date, attending physician, service category, room classification, and optional additional notes. The use of date selection controls and dropdown menus enables users to select predefined information, thereby reducing inconsistent data entry and improving the standardization of inpatient records. The room classification feature is intended to connect with the hospital's room and bed management module, allowing the system to verify accommodation availability before finalizing admission. Similarly, the attending physician selection supports the assignment of medical responsibilities and subsequent integration with patient treatment documentation. The structured interface is designed to improve administrative accuracy, facilitate inpatient resource allocation, and support the continuity of information between patient registration and clinical services. Consequently, this module represents an essential component of the proposed web-based inpatient management information system, providing a foundation for more efficient admission procedures, coordinated hospital operations, and improved inpatient service management at Restu Bunda Hospital.

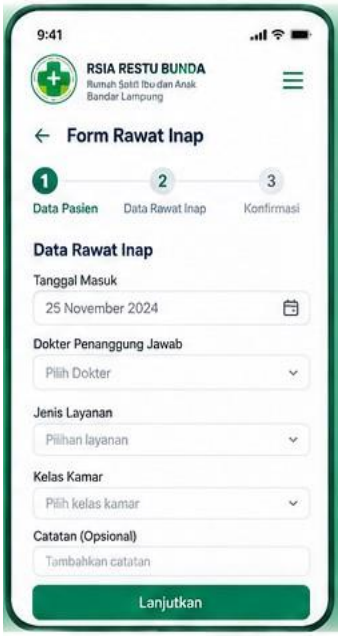


Figure 7. Inpatient Admission Form interface

3.2. Discussion

The implementation of the Web-Based Inpatient Management Information System (MIS) at Restu Bunda Hospital, Bandar Lampung, provides an integrated digital framework for managing inpatient administrative and clinical service processes. The developed system connects patient registration, inpatient admission, room and bed allocation, medical documentation, nursing records, medication management, and discharge administration through a centralized information architecture. This integration addresses the research objective of establishing a coordinated information management environment that reduces dependence on fragmented administrative procedures and supports consistent patient information processing. The implementation design also incorporates role-based access control to distinguish the responsibilities of administrators, registration officers, nurses, physicians, pharmacists, and hospital management. These characteristics are consistent with Zarqi et al., who emphasized that successful hospital management information system implementation requires the alignment of technological infrastructure, organizational processes, and human factors. Furthermore, Arpaci et al. identified system reliability, usability, and organizational suitability as critical determinants of hospital information system success. Accordingly, the present study demonstrates how an integrated system architecture can address the operational requirements of inpatient management within a specialized maternal and child hospital, although its effectiveness in reducing administrative processing time requires quantitative verification.

The implementation of the responsive web-mobile interface represents another important research outcome, particularly in facilitating access to healthcare service information and simplifying patient registration procedures. The developed interface incorporates a homepage, healthcare services menu, online patient registration form, and inpatient admission form, each designed to support sequential and intuitive user interactions. The homepage provides direct access to hospital services and online registration, while the registration module organizes patient identification and service selection into structured stages. The inpatient admission interface further supports the recording of admission dates, attending physicians, service categories, and room classifications. These design features establish a coherent digital pathway from initial service exploration to

inpatient admission. Mousavi et al. highlighted the importance of usability evaluation in hospital information systems, particularly regarding interface accessibility and operational compatibility. Similarly, the evaluation framework discussed by Khorasani et al. emphasizes technological, informational, organizational, and human dimensions in assessing hospital information system performance. The present study extends these perspectives by incorporating responsive mobile accessibility into inpatient service workflows. Nevertheless, improvements in usability, registration speed, and user satisfaction should be established through direct user testing rather than inferred solely from interface design.

The integration of clinical documentation, inpatient monitoring, and operational reporting represents a further contribution of the implemented MIS framework. The system connects patient admission information with medical treatment records, nursing documentation, medication management, and discharge procedures, thereby establishing a structured digital pathway throughout the inpatient service lifecycle. This architecture is particularly relevant to Restu Bunda Hospital, where maternal and child healthcare services require coordinated information exchange among clinical and administrative personnel. Von Gerich and Peltonen demonstrated that electronic health records can support healthcare quality assessment through patient safety, clinical performance, and care process indicators, although the reliability of such assessments depends on data consistency and standardized documentation. Furthermore, Khorasani et al. emphasized the importance of multidimensional evaluation covering technological, organizational, informational, human, and patient safety considerations. In relation to these findings, the present research contributes an integrated inpatient information architecture that connects operational workflows with structured hospital reporting. The proposed integration may facilitate accurate information retrieval, continuity of care, and monitoring of bed occupancy; however, these potential benefits must be distinguished from empirically demonstrated improvements in clinical outcomes or hospital service performance.

The principal research contribution lies in the implementation-oriented integration of inpatient management processes, responsive web-mobile interfaces, and role-based information accessibility within a specialized maternal and child hospital environment. Compared with previous studies that primarily investigated critical success factors, usability, or healthcare information quality, the present study focuses on translating these considerations into a unified inpatient management design covering patient registration, admission, room allocation, clinical documentation, discharge administration, and reporting. The functional architecture and developed interfaces provide a foundation for evaluating the relationship between system implementation and hospital service quality. This contribution is supported by Mousavi et al., whose comparative evaluation involving 34 hospital information system users found that a newer web-based system achieved a higher mean System Usability Scale score than a legacy system (66.25 versus 51.99; $p < 0.001$), while also demonstrating that web-based implementation does not automatically guarantee optimal usability. Similarly, Arpaci et al. identified reliability, user-friendliness, and organizational fitness as the most influential factors in hospital information system success. Therefore, the proposed novelty of this research is the context-specific integration of administrative and clinical inpatient workflows with mobile accessibility and a multidimensional evaluation framework. Its practical contribution to improving service efficiency, information accuracy, and user satisfaction should be

established through completed black-box testing, user acceptance evaluation, and comparative operational measurements

IV. CONCLUSION

This study presented the design, implementation, and evaluation framework of a Web-Based Inpatient Management Information System (MIS) at Restu Bunda Hospital, Bandar Lampung, Indonesia, to support hospital service quality through integrated digital healthcare management. The system was developed using the Waterfall methodology, encompassing requirements analysis, system design, implementation, testing, and maintenance. The resulting application design integrates essential inpatient services, including patient registration, admission management, room and bed allocation, medical documentation, nursing care, medication management, discharge administration, and hospital reporting. These interconnected functions establish a centralized information architecture that supports coordinated administrative and clinical workflows while reducing dependence on fragmented information management processes. The implementation of a responsive web-mobile interface provides structured access to healthcare information and facilitates patient interactions through online registration, service selection, and inpatient admission forms. Role-based access control distinguishes the responsibilities of administrators, registration officers, physicians, nurses, pharmacists, and hospital management, supporting information confidentiality and operational accountability. The proposed integration also facilitates consistent data management, information accessibility, and coordination among hospital departments. However, improvements in administrative efficiency, data accuracy, processing time, and user satisfaction require confirmation through empirical performance measurements and completed system testing. The principal contribution of this research lies in integrating administrative and clinical inpatient workflows within a context-specific digital platform designed for a specialized maternal and child hospital. Unlike approaches focusing exclusively on individual hospital information system functions, the proposed framework combines responsive accessibility, centralized information management, and multidimensional evaluation criteria. Future research should incorporate quantitative before-and-after comparisons, user acceptance testing, information security assessments, and longitudinal performance monitoring to establish measurable improvements in healthcare service delivery. Overall, the developed system provides a foundation for advancing hospital digital transformation and offers a potentially adaptable model for improving inpatient information management in comparable regional healthcare institutions.

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