Jurnal Penelitian dan Kajian Ilmiah Kesehatan
Politeknik Medica Farma Husada Mataram
Volume 12 Issue 1 2026
DOI : 10.33651/jpkik.v12i1.713
Website : https://jurnal.unbim.ac.id/index.php/JPKIK/
© 2026 by author. This is an open access article under the CC BY-NC-SA license

Designing A Prototype Application of Completeness Analysis of Filling Out in Inpatient Electronic Medical Records at Syarif Hidayatullah Hospital

Arina Salsabila[1*], Angga Eko Pramono [2]
Diploma IV Health Information Management, School of Vocational in Universitas Gadjah Mada, Indonesia
*Authors Correspondence: arinasalsabila@mail.ugm.ac.id

ARTICLE INFO

Article History:
Received
Accepted
Published online

Keywords:
KLPCM;
SDLC;
Electronic Medical Records;
Designing;
Prototyping

ABSTRACT
A hospital has an obligation to organize an electronic medical record to support health service efforts as PMK No. 24 in 2022 about Medical Records. The important role of medical records is as to measurement of quality indicators of health service in a hospital. The indicator that would be measured in medical records is the completeness of medical record forms, have fulfilled legal requirements, on time, and the accuracy. Syarif Hidayatullah Hospital have organized medical records for inpatients in 2022 still used manual medical records, because of that, to preparing the electronic medical records for inpatients then it is needed to make an application instrument planning that could analyze the completeness of inpatient medical records as the control of the quality of electronic medical records. The aim of this research is designing an application instrument of the completeness of the electronic inpatient medical records in Syarif Hidayatullah Hospital. The concept of the design was used as a Systems Development Life Cycle (SDLC). The technique of collecting data was done by field observation, study documentation, and interview. The technique of testing and evaluation system used by Focus Group Discussion (FGD). The prototype application design for analyzing the completeness of electronic medical records aligned with the needs analysis and could be used to assess and display the results and percentage of completeness of the electronic medical records. The results of the system evaluation by users were acceptable, approved, and agreed upon, indicating that the application could represent the quality of electronic medical record content and had the potential to be implemented in hospitals. The results of the prototype application for analyzing electronic medical records, based on user evaluations, were appropriate for the data requirements and could generate a report as output that reflects the quality of the electronic medical record content.

INTRODUCTION

The electronic medical record referred to is a recorded note in an electronic system containing patient identity data, examinations, treatments, actions, and other services, which in its implementation is managed by the Medical Record and Health Information Profession (Kemenkes RI, 2022).

The important role of medical records in health service activities in hospitals is, among others, as an indicator of the quality of the hospital in providing health services to the community. The quality of hospital services referred to the end result of the interaction and reciprocal relationship between component aspects in the hospital system (Amaliah *et al.*, 2018).

The quality of medical records is measured using several indicators. According to research conducted by Khusnawati (Khusnawati, 2021) the indicators measured include the completeness of medical record forms, compliance with legal requirements, timeliness, and accuracy.

The quality of medical record services is further assessed on aspects such as direct evidence assessment, reliability, responsiveness, assurance, and empathy. These factors can influence patient satisfaction perceptions of the quality of medical record services because patients have the right to know their medical history to increase awareness and vigilance about their health condition (Sugiarto *et al.*, 2020).

The important role of measuring the quality of the contents of medical records in supporting the quality of health services in hospitals is also related to the legal aspect of medical records as legal evidence, one of which is related to malpractice activities (Abduh, 2021) and the financial aspect, namely in health insurance financing (Apriyanti, 2016).

The activity of measuring the quality of the contents of medical records in the implementation of electronic medical records have been included and explained in the Ministry of Health Regulation No. 24 of 2022 concerning Medical Records (Kemenkes RI, 2022). In Article 18, paragraph 1, point c, it is stated that the processing of electronic medical record information involves analytical activities, which are further explained in paragraph 4 that these activities are carried out both quantitatively and qualitatively.

Based on the results of a preliminary study during the Praktek Kerja Lapangan (PKL) activity at Syarif Hidayatullah Hospital, the quantitative analysis of the contents of medical records has been running well. The measurement activities of medical record quality, which are related to the completeness of medical record filling, timeliness, and compliance with legal requirements, are carried out by the Medical Record Filling Completeness Analysis.

Based on field data, the results of the Kelengakapan Pengisian Catatan Medis (KLPCM) analysis recap for the last three months, namely September-November 2023, still found incomplete inpatient medical records. The average completeness of inpatient medical record documentation is calculated at 99.3%, meaning that 0.7% of medical records are still incomplete. The activity of measuring the quality of medical records up to the time of this research is still using manual instruments.

The instrument used is the KLPCM analysis form in the Microsoft Excel application. The KLPCM analysis instrument has been evaluated during the Comprehensive Field Practice activities conducted by the author. The evaluation revealed that there is no special classification of instrument types based on patient types or disease specialist cases, there is other item information that has not been identified, and the recapitulation results cannot yet show the completeness percentage per item and per doctor.

Based on the evaluation results and the need to transition to electronic technology in accordance with government regulations, there is a need for the design and system for measuring the quality of medical records in the activity of analyzing the completeness of inpatient electronic medical record notes at Syarif Hidayatullah Hospital.

MATERIAL AND METHOD

This type of research is a primary qualitative analytic Research and Development (RnD) design. The chosen design theme is the design of a prototype application instrumentsystem for analyzing the completeness of inpatient electronic medical record entries.

The subjects of this research are the analysis officers represented by medical record officers, the medical team of doctors represented by the head of the inpatient installation, the nursing team represented by the medical and nursing quality committee, and the IT team represented by the

head of the IT unit. The data collection techniques used include field observations, documentation studies, and in-depth interviews with resource persons which will undergo data triangulation in the analysis process.

RESULTS and DISCUSSION

The first process carried out in this design was the analysis of data and user requirements. Here are the results of the needs analysis for building the application system based on field findings and interviews with respondents.

Table 1. System Functional Requirements Analysis

No	System Functions	Administrator	User
1	Sign Up	Yes	Yes
2	Log In	Yes	Yes
3	Managing user access	Yes	No
4	Managing the number and types of patients, forms, and standard items	Yes	No
5	Analysis of the completeness of each patient's records	No	Yes
6	Completeness reports based on patient types, forms, and standard items	No	Yes

Source: Primary Data, 2025

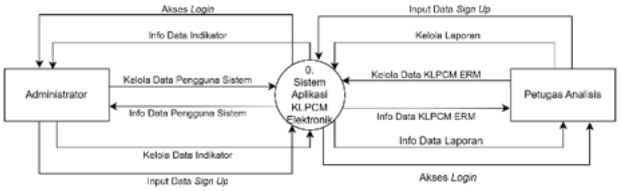
This needs analysis activity is one of the design stages that has been used by several researchers, such as those conducted by (Naranjo-Rojas *et al.*, 2022) who identified the needs and perspectives of several officers involved in the design and development of a mobile application to monitor oxygen therapy. The purpose of this process is to describe the main characteristics of the application based on the opinions and experiences of the end users.

The second process is the design stage, which involves several steps as follows:

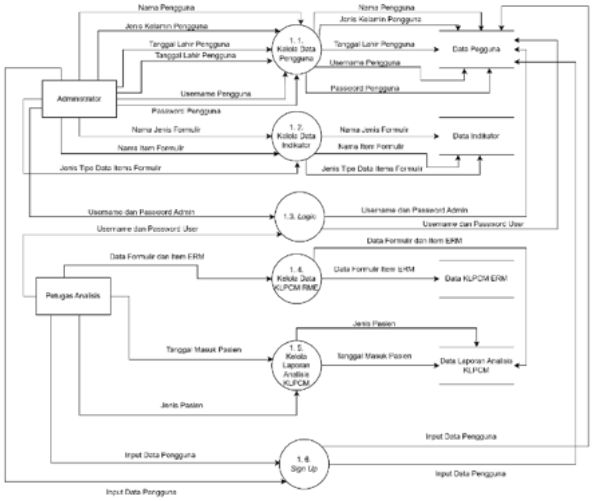
1. Data Flow Diagram (DFD)

This diagram aims to understand the workflow of the system after receiving commands from the user and the flow of data entering the database storage system. The Data Flow Diagram (DFD) starts with the simplest level and the progresses to the highest level, showing the detailed workings of the system with the activities of the built application. In this design, Data Flow Diagrams (DFDs) are used from level 0 to level 2.

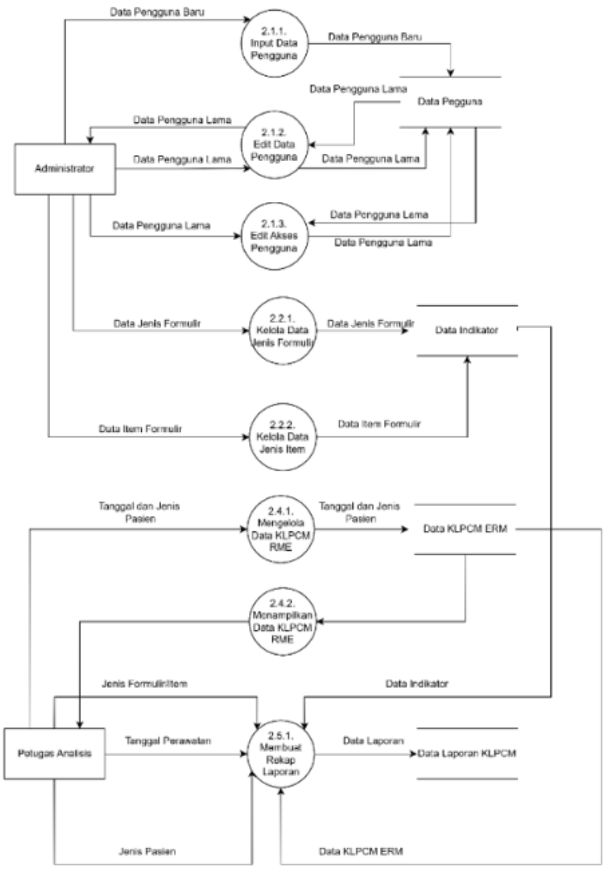
The resulting DFD diagram aligns with the existing theory, specifically the use of DFD symbols as explained by (Amrina *et al.*, 2024). According to the Yourdon and De Marco model, external entity symbols are represented by rectangles, process symbols are represented by circles, data flow symbols are indicated by one-way arrow symbols, and data storage symbols are depicted by open-ended rectangles on the right and left sides.



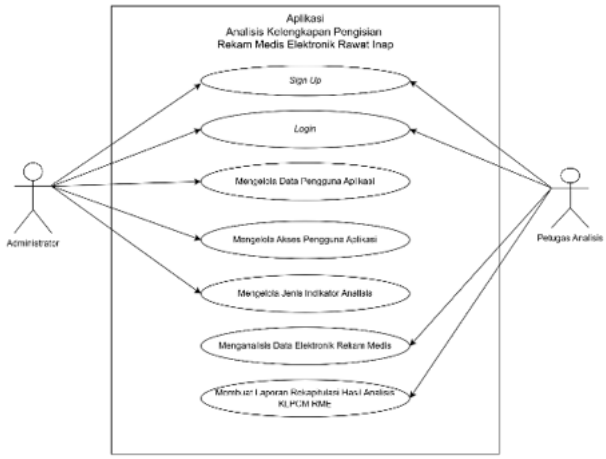
Source: Primary Data, 2025
Figure 1. DFD Level 0



Source: Primary Data, 2025
Figure 2. DFD Level 2



Source: Primary Data, 2025
Figure 3. DFD Level 1



Source: Primary Data, 2025
Figure 4. Use Case Diagram

2. Unified Modeling Language (UML)

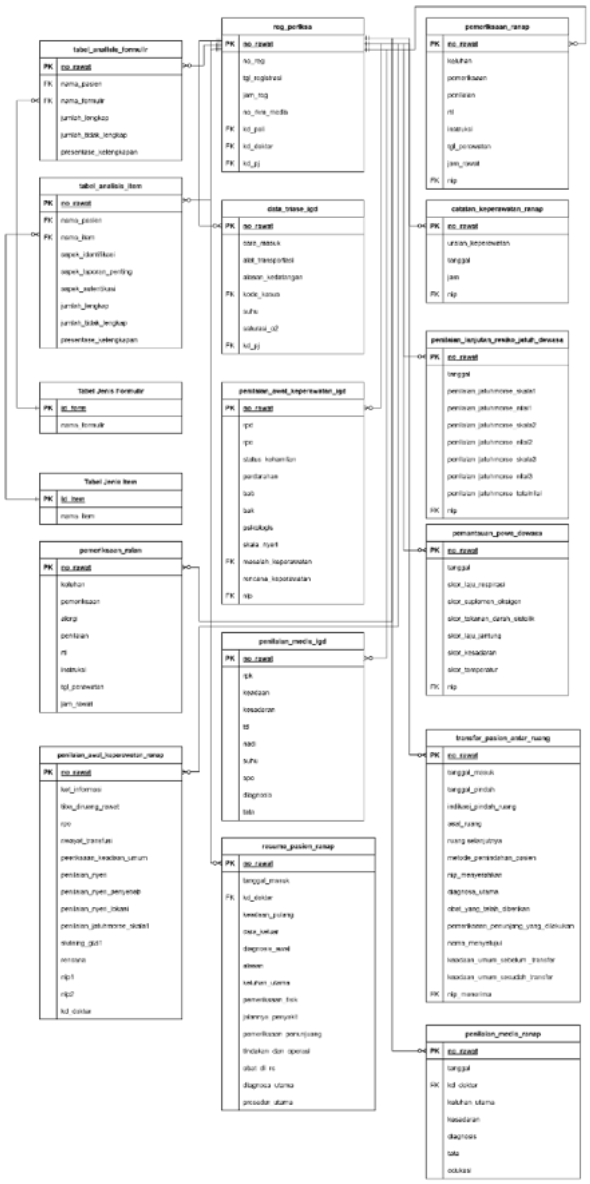
In this design, there are two types of users, each capable of performing more than one type of functional activity. The administrator user can perform functions such as sign-up, login, managing application user data, managing application user access, and managing analysis indicator types. The next type of user is the analysis officer, who can perform functions such as sign-up, login, analyzing electronic medical record data, and creating summary reports of the analysis results of KLPCM electronic medical records.

The design of this activity diagram aligns with the research study conducted by (Yildirim *et al.*, 2020) which explains that this model illustrates various inputs, outputs, and controls. Rounded rectangles represent actions in the system, while inputs and outputs are referred to as tokens, representing units of information, material, or energy. Tokens are placed on pins, which are object nodes for input and output actions, connecting them to actions. The output token can serve as input for the subsequent action.

3. Entity Relationhsip Diagram

Based on the data from the Hospital Management Information System at Syarif Hidayatullah Hospital at the time of this study, data on the types and number of forms in the non-surgical adult patient category amounted to 12 examination forms.

The relationships between data entities in this database store and manage data in table form, with data placed in columns. This relational structure describes table structure, data types, and constraints, adhering to the principles of Atomicity, Consistency, Isolation, Durability (ACID) to ensure transaction integrity (Roy-Hubara *et al.*, 2020).



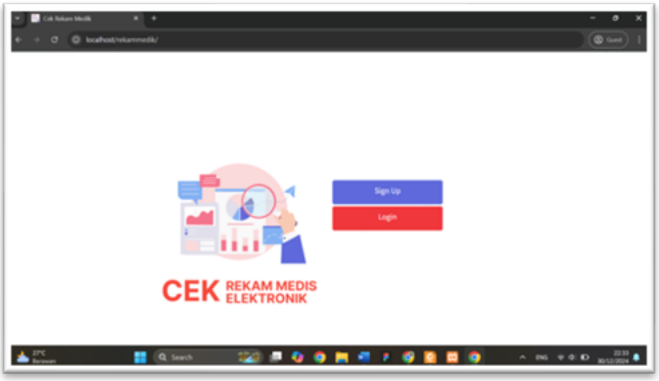
Source: Primary Data, 2025

Figure52. Entity Relationship Diagram

4. Prototyping

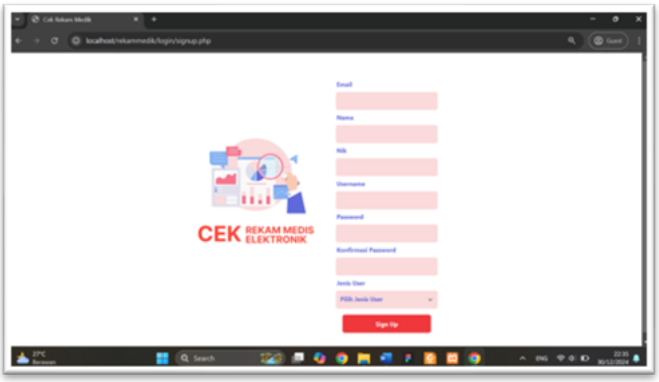
In the prototype design of the electronic medical record analysis application, a simple wireframe sketch is made prior to the UI design to understand the structure of feature components and their layout. This aligns with the study by Alazemi (Alazemi *et al.*, 2020), which states that a wireframe is designed by selecting simple visual components with specific functions and determining their layout to facilitate user interaction.

The interface design results are used by programmers to build the web application system prototype. There are several different prototype designs by programmers, especially in the dashboard, indicator management, and form bundles based on patient types. This presents a limitation in designing the application system for analyzing the completeness of electronic medical records for inpatients.



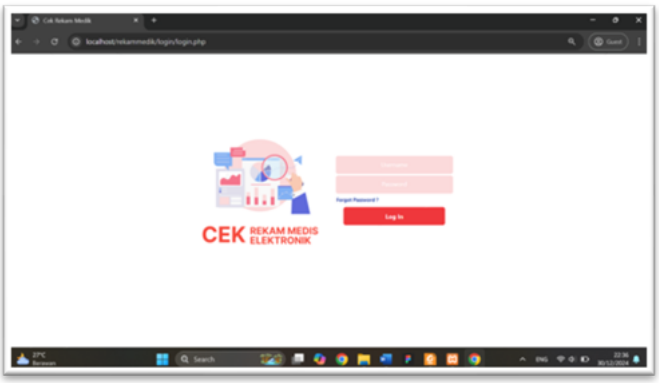
Source: Primary Data, 2025

Figure 3. First Page of The Application



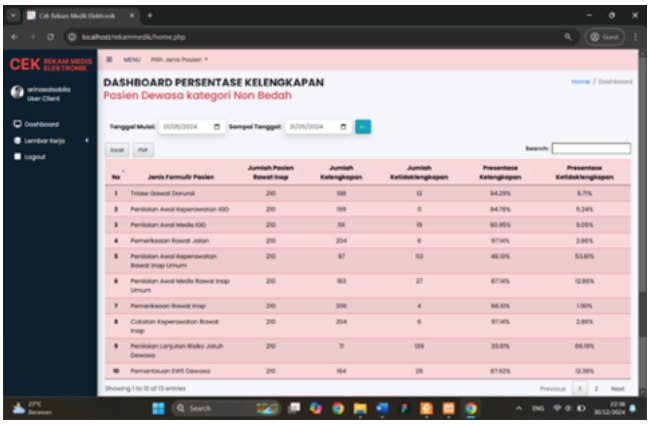
Source: Primary Data, 2025

Figure 4. Sign Up Page

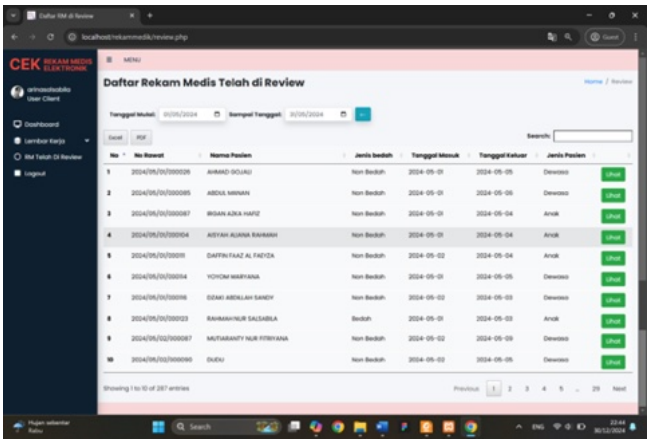


Source: Primary Data, 2025

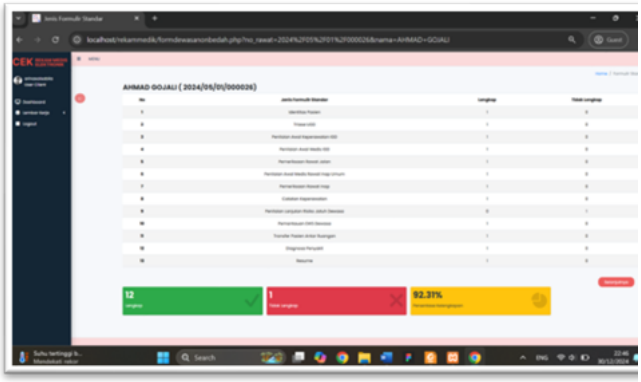
Figure 5. Login Page



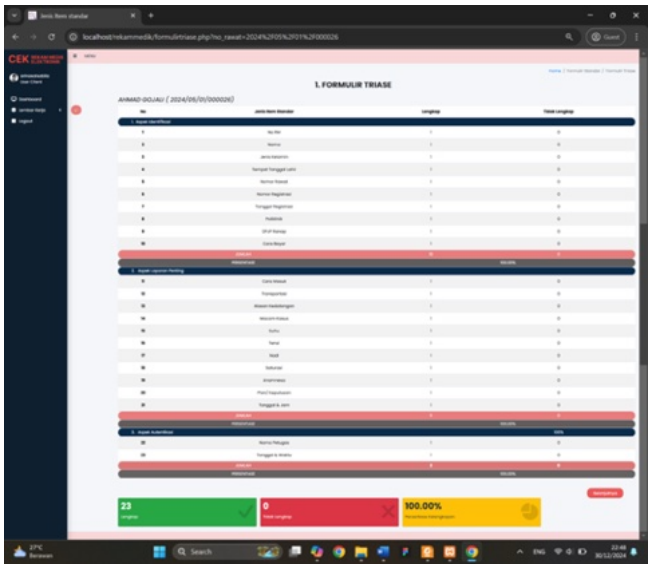
Source: Primary Data, 2025
Figure 6. Dashboard Page



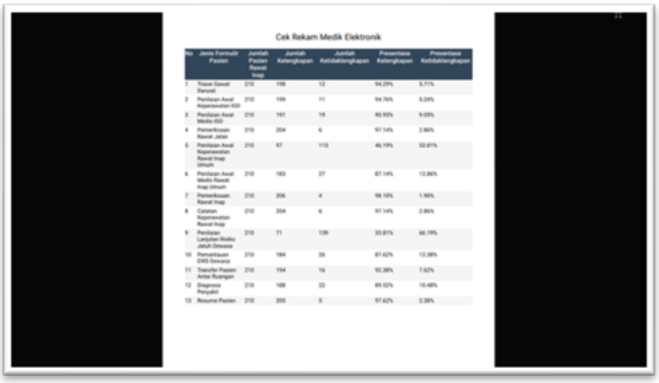
Source: Primary Data, 2025
Figure 7. Patient List to Review



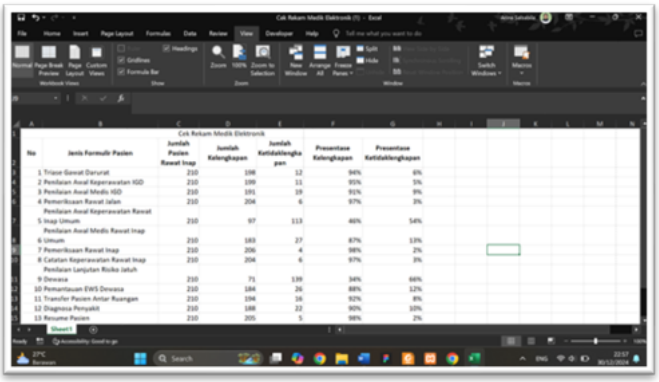
Source: Primary Data, 2025
Figure 8. Review Result by Form Indicators



Source: Primary Data, 2025
Figure 9. Review Result by Item Indicators



Source: Primary Data, 2025
Figure 10. Report Result in PDF



Source: Primary Data, 2025
Figure 11. Report Result in Ms Excel

The user interface design uses 17 general UI principles based on Deborah J. Mayhew's theory, as applied in the study by Mastra (Mastra *et al.*, 2018). Here is a summary of these principles in the prototype application UI design:

1. User Compatibility

   Shown in the prototype's color scheme, using attractive red and blue colors.

2. Product Compatibility

   The dashboard page shows the application's output, including completeness scores and percentages for each form type.

3. Task Compatibility

   The initial page displays the application logo, reflecting its functional task of analyzing electronic medical record data.

4. Workflow Compatibility

   Simplified workflow for users, illustrated by the process of reviewing completeness calculations, referring to a single patient and specific form indicators.

5. Consistency

   Consistent use of indicators as set parameters for evaluation across all patient types.

6. Familiarity

   The design is adapted from conventional analysis processes, making the prototype familiar and similar to the manual concept, particularly in completeness and incompleteness tables.

7. Simplicity

   The user interface is designed simply by minimizing unnecessary icons or buttons, maintaining user intention to use the analysis application.

8. Direct Manipulation

   Shown in features like filtering data based on patient admission dates to sort patient data as needed.

9. Control

   Shown in data search features, giving users control to instruct the application to find required data.

10. What You See is What You Get

    Shown in the result view for analyzing the completeness of forms and items for a single patient.

11. Responsiveness

    Seen in menu icons that respond to expand and shrink actions, showing or hiding sidebars or sub-menus.

12. Flexibility

    Seen in the administrator user interface, allowing configuration of indicators as evaluation parameters.

13. Invisible Technology

    Applied in the cumulative results report feature, which hides the calculation process from the user, making it easier to understand the results.

14. Robustness

    Designed to prevent user errors that may cause system errors, such as notifying users if incorrect username or password is entered during login.

15. Protection

    Also seen in the login process, protecting application access with notifications for incorrect access codes, preventing unauthorized access.

16. Ease of Learning

    The application is based on user data and adapted from existing manual activities, motivating users to easily learn the application.

17. Ease of Use

    The successful application of these principles in the prototype design facilitates easy use of the application

The third and final process is the evaluation of the prototype application design results by several respondent sources. The purpose of the FGD evaluation method is to understand each user's perception when interacting directly with the application prototype and to gather suggestions and recommendations for improvements from the perspective of each user type, aiming to enhance the application's quality (Auliansyah *et al.*, 2019).

Based on the FGD results, it can be concluded that the informants, after seeing the application demo and its output, responded very positive and agreed that the application meets the needs for assessing the quality of healthcare services based on medical record content evaluation.

Several recommendations from the informants included adding a feature that prevents saving or submitting if any data items or forms are incomplete in the Hospital Management Information System (SIMRS). This is intended to ensure that healthcare providers (PPAs) properly fill in all data items on the electronic inpatient forms.

The second recommendation was to add a parameter that can measure the completeness and incompleteness based on the name and type of PPA providing care to patients during treatment. This suggestion aims to help analysis officers remind PPAs to complete medical records before patients are discharged and to provide performance quality indicators for each PPA.

CONCLUSION AND RECOMMENDATION

The prototype design of the application instrument for analyzing the completeness of inpatient electronic medical record entries aligns with data and user requirements, enabling analysis and display of completeness and incompleteness percentages.

The application has been successfully designed and functionally executed, involving various design stages such as DAD, use case diagram, activity diagram, wireframe and user interface, database and relationships, and program code development.

The evaluation process, conducted using the FGD method with future users at RS Syarif Hidayatullah, resulted in approval and satisfaction, indicating the prototype's potential for hospital implementation.

Here are some development suggestions:

1. Future application development is expcted to improve features not yet built in this design, specifically the administrator user interface for managing user data and indicators.
2. Indicator item evaluations can be extended to all types of forms, providing comprehensive data on each form item, which varies by patient type.
3. Future developments should include summary reports that display the total scores and completeness percentages based on the profession and name of the healthcare providers.

ACKNOWLEDGMENTS

I extend my deepest gratitude to everyone who contributed to the writing of this research and development article. Special honor and thanks to Syarif Hidayatullah Hospital for providing valuable suggestions and feedback on this work.

REFERENCES

1. Abduh, R. (2021) 'Kajian Hukum Rekam Medis Sebagai Alat Bukti Malpraktik Medis', *Jurnal Ilmu Hukum*, 6(1), pp. 221–234.
2. Alazemi, T., Chen, Y. and Kutar, M. (2020) 'Towards a unified model of HCI and ISB for user interfaces', *Heliyon*, 6(9). Available at: https://doi.org/10.1016/j.heliyon.2020.e04662.
3. Amaliah, R. and Tamri (2018) 'Hubungan Kualitas Rekam Medis Dengan Mutu Pelayanan Rawat Jalan Pasien Di Poli Kebidanan Rsia Satya Bhakti Di Depon Tahun 2017', *Jurnal Kesehatan Masyarakat*, 2(1), pp. 65–77. Available at: http://ejournal.urindo.ac.id/index.php/jukmas/article/view/565/591.
4. Amrina, A. *et al.* (2024) 'Web-Based Complaints Service Information System at Dewantara District Office', *International Journal of Engineering, Science and Information Technology*, 4(1), pp. 33–38. Available at: https://doi.org/10.52088/ijesty.v4i1.490.
5. Apriyanti, D. (2016) 'Analisis Hubungan Kelengkapan Pengisian Resume Medis Terhadap Kesesuaian Standar Tarif INA-CBG's Instalasi Rawat Inap Teratai RSUP Fatmawati Jakarta Analysis of Correlation of Medical Record Fulfilling and INA-CBG'S costing at Teratai Inpatient Instalatio', *Jurnal Arsi*, 2(3), p. 10. Available at: https://journal.fkm.ui.ac.id/arsi/article/view/2201.
6. Auliansyah, F.E., Wijoyo, S.H. and Az-Zahra, H.M. (2019) 'Evaluasi website ngalup.co working space menggunakan user experience questionnaire (UEQ) dan focus group discussion (FGD) untuk meningkatkan user experience', *Jurnal Pengembangan Teknologi Informasi dan Ilmu Komputer*, 3(7), pp. 7150–7158. Available at: https://j-ptiik.ub.ac.id/index.php/j-ptiik/article/view/5886.
7. Kemenkes RI (2022) *Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022*. Indonesia. Available at: https://www.who.int/news-room/fact-

sheets/detail/autism-spectrum-disorders.
8. Mastra, K.N.L. and Dharmawan, R.F. (2018) 'Tinjauan User Interface Design Pada Website E-Commerce Laku6', *Narada*, 5(1), pp. 83–94.
9. Naranjo-Rojas, A., Perula-de-Torres, L.Á. and Molina-Recio, G. (2022) 'Patients, caregivers, and healthcare professionals' needs when designing the content of a mobile application for the clinical monitoring of patients with chronic obstructive pulmonary disease and home oxygen therapy: A user-centered design', *Internet Interventions*, 29(January). Available at: https://doi.org/10.1016/j.invent.2022.100552.
10. Roy-Hubara, N. and Sturm, A. (2020) 'Design methods for the new database era: a systematic literature review', *Software and Systems Modeling*, 19(2), pp. 297–312. Available at: https://doi.org/10.1007/s10270-019-00739-8.
11. Sugiarto, P., Aprilistiyani, D.W. and Yudianti, S.A. (2020) 'Analisis Hubungan Persepsi tentang Mutu Pelayanan Rekam Medis dengan Tingkat Kepuasan di Rumah Sakit', *Jurnal Rekam Medis dan Informasi Kesehatan*, 3(2), pp. 91–98. Available at: https://doi.org/10.31983/jrmik.v3i2.6433.
12. Yildirim, U. and Campean, F. (2020) 'Functional modelling of complex multi-disciplinary systems using the enhanced sequence diagram', *Research in Engineering Design*, 31(4), pp. 429–448. Available at: https://doi.org/10.1007/s00163-020-00343-8.