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Analysis and Design of it Service Users in Problem Management and Incident Management in Hospitals

Ali Imron[1], Zena Lusi[2], Putri Intan Avita[3], Fahri Rahman[4]

[1,2,3,4]Faculty of Science and Technology, Institut Teknologi dan Bisnis Nasional, Banyuasin, Indonesia,

Abstract: Utilization of Information Technology (IT) in the healthcare sector plays a vital role in improving service quality, operational effectiveness, and patient satisfaction. The Banyuasin Regional Hospital (RSD Banyuasin) faces challenges in managing incidents and IT service-related problems that may disrupt both medical and administrative services. This study aims to analyze and design IT service governance processes for Incident Management and Problem Management based on the ITIL V4 framework. The research method involves observations, interviews, and analysis of supporting documents to identify the current conditions, user needs, and gaps through a gap analysis against ITIL best practices. The analysis results indicate that incident handling processes are not systematically documented and lack a structured escalation mechanism, while problem management remains reactive without proper root cause documentation. Based on these findings, an IT service design model was developed that integrates the workflows of Incident Management and Problem Management in accordance with ITIL V4 principles, including identification, recording, classification, escalation, and continuous improvement. This design is expected to enhance the responsiveness of incident handling, reduce the recurrence of problems, and support the continuity of IT services at RSD Banyuasin.

Keywords: Hospital; Incident Management; ITIL V4; Management IT services; Problem.

Correspondence:
Ali Imron
imron111992@gmai.com

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1. Introduction

The development of information technology (IT) has brought about major changes in the world of healthcare. The use of IT in hospitals is not only limited to administration, but also includes the management of electronic medical records, hospital management information systems, to digital-based services for patients and medical personnel. IT is a key factor in improving operational efficiency, accelerating service processes, and supporting data-driven decision-making. Therefore, the continuity of reliable IT services is an absolute necessity for hospitals.

The Banyuasin Regional Hospital (RSD) as one of the public health service institutions has a high dependence on IT in supporting daily activities. However, in practice, various obstacles are still found such as system disruptions, delays in handling incidents, and recurring problems that are not immediately resolved. The absence of a standard incident management mechanism and the lack of recording the root cause of the problem cause these disturbances often have a significant impact on patient services and employee work efficiency. This condition shows the need for more systematic and standardized incident management and problem management.

The Information Technology Infrastructure Library (ITIL) framework version 4 is present as a global reference in IT service governance. ITIL V4 offers a service value system approach with the principles of flexibility, collaboration, and continuous improvement. The implementation of ITIL V4 in the Incident Management process allows organizations to manage disruption handling in a fast, measurable, and documented manner, thereby minimizing the impact on services. Meanwhile, in Problem Management, ITIL V4 helps organizations identify the root cause of the problem and prevent similar incidents from happening in the future.

Previous research on the implementation of ITIL in the healthcare sector has shown a positive contribution in improving operational efficiency and quality of IT services. However, each organization has different characteristics and needs, so it is necessary to analyze existing conditions and design IT services in accordance with the context of Banyuasin Hospital. By conducting analysis and design based on the ITIL V4 framework, it is hoped that hospitals can have guidelines for managing incidents and problems that are more structured, responsive, and support the achievement of the hospital's vision in providing quality health services for the community.

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2. Materials and Methods

This study uses a qualitative descriptive approach with a case study method at the Banyuasin Regional Hospital (RSD). This approach was chosen to obtain an in-depth overview of the existing conditions of Incident Management and Problem Management, as well as to design an IT service improvement model based on the ITIL V4 framework. The author conducts a review, on books, field studies and digs into information from experts or experts in their field to get an idea of the problem to be researched. The author is looking for references regarding information about ITIL Version 4. The steps taken to take the process domain in ITIL Version 4 can be done by looking at the circumstances or problems that exist in the Banyuasin regional hospital. The interview technique is a data collection technique using interview guidelines (Iskandar, 2008). In this study, an interview was conducted with the head of the IT service management section at the Banyuasin regional hospital. Primary Data: obtained through interviews with IT staff, unit heads, and IT service users (employees and medical personnel) related to incident and issue management. Secondary Data: in the form of supporting documents, reports of IT service interruptions, internal hospital policies, and literature on ITIL V4. Analysis of existing conditions: identify the current incident management and problem management processes. Gap analysis: comparing existing conditions with ITIL V4 best practices.

3. Results and Discussion

After analyzing the needs of the system, the researcher will create a flowchart of the helpdesk system, to find out the flow of the system created. The flowchart image can be seen in Figure 1. as follows:

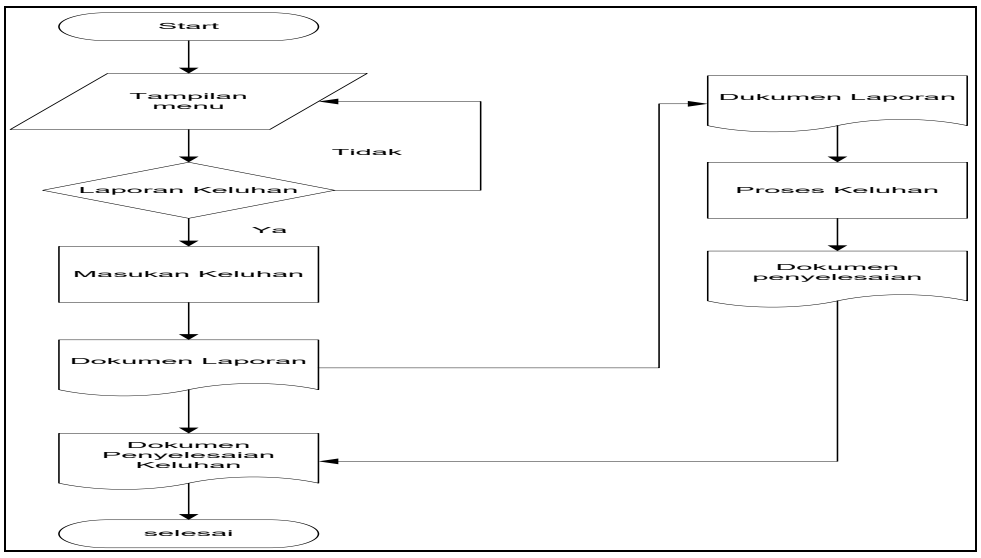

Figure 1. Flowchart Helpdesk System

After analyzing the needs of the system, the researcher will make a diagram of the context of the helpdesk system, to find out the flow of the system created. The context diagram can be seen in Figure 2. as follows:

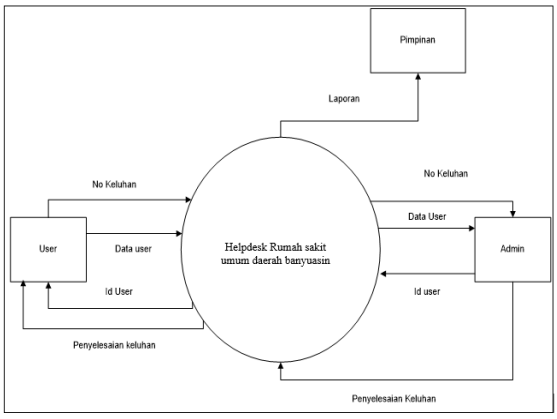

Figure 2. Diagram Helpdesk System

After analyzing system needs, the researcher will create a DFD Level 0 for the helpdesk system, to find out the flow of the system created. The DFD Level 0 image can be seen in Figure 3. as follows:

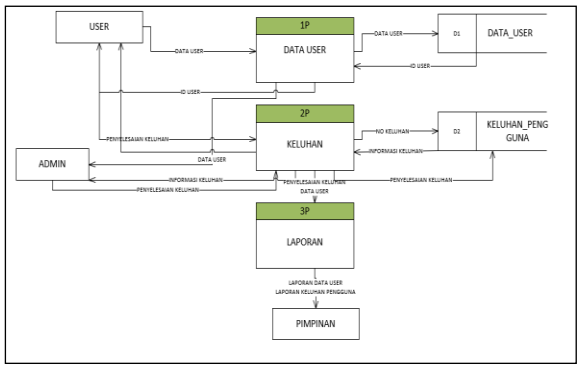

Figure 3. Diagram Level 0 Helpdesk System ERD

ERD aims to see how the relationship between the existing tables in the tables is related to each other, the table relationship image can be seen in figure 4.

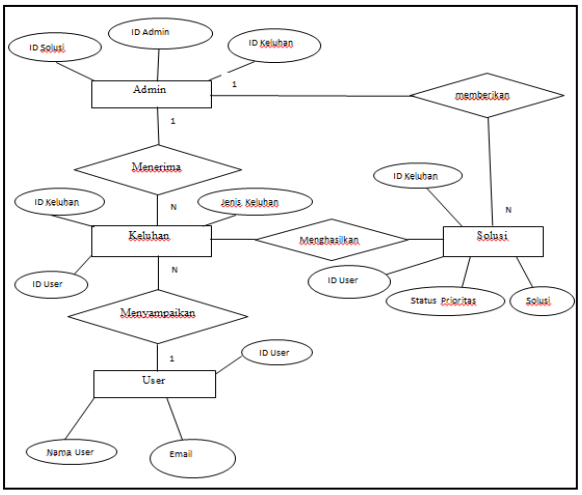

Figure 4. ERD System Proposal

3.1. Impairment Level Assessment

The level of disruption is determined by how many users are restricted from the work being performed, with the following assessment:

Table 1. Incident Prioritization based on ITIL V4

Priorities	Impact	Urgency
P1 – Critical	Height	Height
P2 – High	Height	Medium
P3 – Medium	Medium	Medium

3.2. Target Time for Handling Disturbances

Incident support for existing services is provided 24 hours per day, 7 days per week, and 365 days per year. The following are the current targets for response and resolution for incidents based on priority.

Table 2. Interference Handler Time

Priorities	Impact	Urgency	Maximum Response Time
P1 – Critical	Height	Height	< 30 minutes
P2 – High	Height	Medium	< 2 jam
P3 – Medium	Medium	Medium	< 4 jam
P4 – Low	Low	Low	< 1 weekdays

3.3. Incident Handling Relationships

The handling of the incident was carried out to see how big the threat occurred due to this incident and how quickly the handling had to be carried out in order to run the business process at the Banyuasin Regional General Hospital.

Table 3. Incident handling relationships

Incident Description	Impact	Priorities	Recovery Time
The patient registration system is not accessible	Patient Engagement Is Hindered	Height	2 jam
Medical record printer not working	Delayed patient administration	Medium	45 menit
Jaringan Wi-Fi Poly Kids Cut Off	Doctors do not can access SIMRS	Height	3 jam
Internal emails not being sent	Communication barriers between units	Medium	1,5 jam
Slow billing system during peak hours	Delayed payment process	Height	2-3 jam

Troubleshooting relationship table, The handling of the problem is carried out to see how big the threat is due to this problem and how quickly the handling must be carried out in order to run the business process at the Banyuasin regional general Hospital.

Table 4. Problem and Incident Relationships

Problem Description	Related Incidents
SIMRS servers are often overloaded due to limited hardware capacity	Insiden No.1
Older printer drivers are not compatible with the latest OS	Insiden No.2
Access point poly child too many users, no load balancing	Insiden No.3
Not optimal mail server configuration (DNS MX record is problematic)	Insiden No.4

Billing database is not indexed properly → slow queries	Insiden No.5

3.4. Fact Search Engine

The incident table is used to declare several problems that are often reported by users, so that later this incident table will be used as a reference in solving existing problems.

Tabel 6. Incident

Incident	Kode
The patient registration system is not accessible	I01
Medical record printer not working	I02
Poly child Wi-Fi network disconnected	I03
Internal emails not being sent	I04
Slow billing system during peak hours	I05

The complaint handling table will be used as a formula that will be given to the incident that has occurred, so that later from this complaint handling table a solution will be obtained for handling the problem.

Table 7. Complaint Handling Table

Solution	Kode
Restart server saat overload	S01
Reinstall old drivers	S02
Reset access point	S03
Send via webmail	S04
Restart DB before peak hours	S05

The table of the relationship between complaints and solutions is a fact-finding basis in order to find solutions in every complaint that occurs.

Table 8. Incidents and Solutions

No	Aturan
1	IF I01 THEN S01
2	IF I02 THEN S02
3	IF I03 THEN S03
4	IF I04 THEN S04
5	IF I05 THEN S05
6	IF I01 AND I02 THEN S01 AND S02
7	IF I01 AND I03 THEN S01 AND S03
8	IF I01 AND I04 THEN S01 AND S04
9	IF I01 AND I05 THEN S01 AND S05
10	IF I02 AND I03 THEN S02 AND S03
11	IF I02 AND I04 THEN S02 AND S04
12	IF I02 AND I05 THEN S02 AND S05
13	IF I03 AND I04 THEN S03 AND S04
14	IF I03 AND I05 THEN S03 AND S05
15	IF I04 AND I05 THEN S05 AND S05
16	IF I01 AND I02 AND I03 THEN S01 AND S02 AND S03

17	IF I01 AND I02 AND I04 THEN S01 AND S02 AND S04
18	IF I01 AND I02 AND I05 THEN S01 AND S02 AND S05
19	IF I02 AND I03 AND I04 THEN S02 AND S03 AND S04
20	IF I02 AND I03 AND I05 THEN S02 AND S03 AND S05
21	IF I03 AND I04 AND I05 THEN S03 AND S04 AND S05
22	IF I01 AND I02 AND I03 AND I04 THEN S01 AND S02 AND S03 AND S04
23	IF I01 AND I02 AND I03 AND I05 THEN S01 AND S02 AND S03 AND S05
24	IF I01 AND I02 AND I04 AND I05 THEN S01 AND S02 AND S04 AND S05
25	IF I01 AND I02 AND I03 AND I04 AND I05 THEN S01 AND S02 AND S03 AND S04 AND S05

4. Conclusions

Based on the results of the research conducted, it can be concluded that the current condition of IT service management at Banyuasin Hospital still faces several significant challenges. Incident handling is generally reactive or ad-hoc due to the absence of a clear Service Level Agreement (SLA), resulting in inconsistent responses and resolution times that often exceed user expectations. In addition, the problem management process has not been properly implemented, as indicated by the absence of root cause analysis (RCA), a known error database, and documentation of permanent solutions. Consequently, similar incidents frequently recur without effective long-term prevention measures. he gap analysis conducted using the ITIL V4 framework demonstrates substantial discrepancies between existing practices and recommended standards. These gaps are evident in incident logging procedures, escalation mechanisms, role and responsibility definitions through the RACI model, and issue documentation practices. Furthermore, the principle of continuous improvement has not yet been systematically implemented, resulting in the absence of structured evaluations and service improvement initiatives within the hospital's IT management processes. he results of risk identification and incident prioritization indicate that incidents affecting critical systems such as the Hospital Management Information System (SIMRS), billing systems, and core network infrastructure are categorized as high-priority incidents because they directly impact patient services and operational continuity. Meanwhile, less critical disruptions, such as printer or email issues, are categorized as lower-priority incidents. The risk analysis also reveals that most critical incidents occur repeatedly, suggesting unresolved underlying problems within the IT infrastructure and management processes. Validation of the proposed design with stakeholders shows positive responses from both IT management and service users. Hospital IT management considers the proposed ITIL V4-based model capable of improving service responsiveness, accountability, and transparency. Service users also believe that the implementation of SLAs and incident priority classifications will help ensure more predictable and timely resolution of service disruptions. However, several implementation challenges remain, particularly limitations in IT human resources and the need for stronger support from hos-

pital management to ensure successful and sustainable implementation. The implementation of the proposed ITIL V4-based IT service management model is expected to reduce recurring incidents, accelerate service recovery times, and increase user trust in hospital IT services. In addition, this research provides practical contributions in the form of workflow designs, SLA structures, and documentation models that may serve as guidelines for implementing IT service management in other hospitals with similar organizational conditions and challenges.

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