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Abstract
Minister of Health of the Republic of Indonesia Regulation Number 82, 2013, chapter 3, states that hospitals must organize a Hospital Management Information System (SIMRS). SIMRS is a collection of processes aimed at improving the efficiency and effectiveness of health organizations in carrying out their functions and achieving their goals. This research employed a qualitative research method with case studies using in-depth interviews. The study was conducted at Manembo Nembo General Hospital, Bitung City, North Sulawesi, from March to July 2022. The sample consisted of 5 informants, including the hospital director, head of medical support, and head of SIMRS installation, operators, and recipients of health services. Data analysis used content analysis from Miles and Huberman, with research results validated through triangulation of sources and methods. The implementation of SIMRS from the infrastructure component shows the availability of hardware, but it has yet to be entirely installed in all existing sections (outpatient, inpatient, and nutrition). The network component is available but has yet to be connected to all areas (pharmacy, radiology, and laboratory). The application system already uses open source, but its integration with all installations must still be completed. The human resource component has been fulfilled, but the qualifications for competencies need to be increased to develop open-source applications for the section. Procedures have been implemented well based on the main tasks and functions. The implementation of SIMRS from the infrastructure component is exemplary but has yet to reach all sections. The network component is available but has yet to connect to all units fully, and the application system uses open source but has yet to be optimally developed. The human resource component has been fulfilled, but the qualifications for competencies need to be improved for developing open-source applications. Procedures have been implemented well based on the main tasks and functions in implementing SIMRS at Manembo-nembo Bitung General Hospital.
Keywords: SIMRS, infrastructures, network components, application system, human resources, procedures.

1. Introduction

The hospital is in the service sector, explicitly providing comprehensive individual health services. As a crucial part of the healthcare field, hospitals must ensure that data information, processing, distribution, and security are accessible, accurate, fast, and efficient. These measures aim to maintain the trust of patients who rely on hospital services, as stated in the Law of the Republic of Indonesia Number 44 of 2009 concerning hospitals. According to the Regulation of the Minister of Health of the Republic of Indonesia Number 4 of 2018, *hospitals* are defined as health service institutions that offer inpatient, outpatient, and emergency services. Hospitals are vital in providing swift medical treatment to those in need.

In 2013, the Regulation of the Minister of Health of the Republic of Indonesia Number 82 made it mandatory for all hospitals to implement a Hospital Management Information System (SIMRS). The SIMRS is designed to enhance the efficiency and effectiveness of health organizations in achieving their objectives and delivering improved healthcare services.

Data from the Program and Information Section of the Ministry of Health in 2017 revealed that out of 2734 hospitals in Indonesia, 1432 hospitals were actively using SIMRS, while 1177 hospitals still needed to adopt it. Additionally, 134 hospitals had implemented

SIMRS but were facing functionality issues. SIMRS is essential for daily health service operations. To assess the benefits and address potential problems faced by users and hospitals, evaluating the implementation of SIMRS is crucial. This evaluation can be a reference for further improvements and enhancements to ensure that SIMRS aligns with the hospital's goals, vision, and mission.

Several research studies conducted on the implementation of SIMRS highlighted specific challenges. For instance, Mutia Sari's research in 2016 on the General Surgery Polyclinic of Dr. M. Jamil Padang Hospital indicated issues related to personnel shortages, the absence of a comprehensive implementation guidebook, and network disruptions in the SIMRS software. Similarly, Muhammad Agung Surya's study in 2019 on Padang Panjang City Hospital revealed shortcomings in human resources and inadequate software, hardware, and network resources (Surya, 2019). In addition, Demiawan Rachmatta Putro Mudiono's 2018 research on Dr. H. Koesnadi Bondowoso Hospital found suboptimal SIMRS implementation with modules that needed to meet user expectations, leading to information errors (Mudiono, 2018).

Based on these observations, it is evident that proper integration of work systems across different sections and divisions within hospitals is essential. Ensuring seamless data sharing between patient registration, inpatient, outpatient, polyclinic, emergency department, pharmacies, medical records, and cashiers can significantly reduce delays and enhance efficiency. Considering the significance of SIMRS in healthcare operations, researching the Implementation of the Hospital Management Information System (SIMRS) at Manembo Nembo Hospital, Bitung City, in 2022 becomes highly valuable. Such research is expected to contribute to developing and improving SIMRS services.

2. Methods

This qualitative study uses a case study approach, utilizing in-depth interview methods to analyze the Implementation of Hospital Management Information Systems at the Manembo Nembo Regional General Hospital in Bitung City. The research will be conducted at the Manembo Nembo Regional General Hospital in Bitung City, North Sulawesi Province, from March to July 2022. The primary research method involves conducting in-depth interviews with key informants who play significant roles and are involved in the Hospital Management Information System at the hospital. These informants include the hospital director, head of medical services, head of SIMRS installation, system operators, and recipients of health services.

The researcher will employ various instruments during the research, including a list of questions for interviews, recording devices (such as tape recorders or cellphones), writing instruments, and observation data. The researcher's understanding of the research methods, expertise in the subject area, and readiness to engage in the research area are essential aspects of validation and ensuring the reliability of research instruments. Data collection will strictly follow health protocol procedures, including wearing masks and maintaining a safe distance between researchers and informants.

Data collection in this study will primarily involve in-depth interviews and direct observation. The interview data will be recorded and later transcribed for analysis. The analysis of observation results aims to evaluate the potential efficiency and effectiveness of SIMRS at RSUD Manembo-nembo Bitung. Data analysis will follow the content analysis approach by Miles and Huberman (2014), involving the following steps:

a) Data Collection: Data will be gathered through in-depth interviews and recorded using tape recorders/cellphones, along with field notes that will be transcribed.

b) Data Reduction: This step involves making codes and categories to sharpen, classify, direct, and organize the data. Symbols will be created to represent meaningful topics, sentences, or paragraphs from each interview transcript.

c) Data Presentation (Data Display): The data will be presented in a narrative form, providing a clear and descriptive representation of the findings.

d) Data Validity Check: To ensure the validity of the data, the researcher will use source triangulation and method triangulation, cross-referencing information from multiple sources and employing various research methods.

e) Analyzing the Components of Research Results: This step will involve comparing the research results with existing theories in the literature, adopting a content analysis approach.

By following these rigorous steps, the research aims to provide valuable insights into implementing Hospital Management Information Systems at the Manembo Nembo Regional General Hospital, Bitung City, and contribute to the existing body of knowledge in this field.

3. Results and Discussion

Table 1
Characteristics of Informants

Informant	Age	Gender	Position	Profession	Education
Informant 1 NCT	52 Years	Man	Director	Doctor	S3 Doctor
Informant 2 Mr	48 Years	Man	Head of Medical Services	Informatics Power	S1 Informatics Engineering
Informant 3 YL	32 years	Man	Head of SIMRS Installation	Computer Informatics Expert	S1 Computer Engineering
Informant 4 E	32 years	Man	SIMRS operator	Informatics Power	Senior High School
Informant 5 RSA	33 Years	Man	Recipients of Health Services	Patient	S1

Five informants considered to have mastered the questions regarding SIMRS analysis, constraints, application, and others were selected in this study. The results of data collection through the depth interview method with the answers that the researchers have reduced are presented in a content analysis based on the following topics:

a) Infrastructure for improving the quality of SIMRS at the Manembo-Nembo Bitung Regional General Hospital.

b) Network and Application Systems, SIMRS elements in its implementation include physical, network, and application systems.

c) HR and SIMRS procedures at the Manembo-Nembo Bitung Regional General Hospital.

Infrastructure

The obstacle in implementing SIMRS at the Manembo-Nembo Bitung Regional General Hospital was the limited funds from hospital revenue so that in the future, it could be further increased in achieving standardization of hospital accreditation. SIMRS can be achieved; it requires excellent and complete infrastructure, competent human resources, and ongoing training. In addition, management has implemented a SIMRS improvement policy to prioritize going forward.

The informant provided information that the facilities and infrastructure were sufficient, and the number of computer units and the access network and applications had been integrated into each room. Budgeting and procurement are expected to be considered and prioritized again to meet the increase in service class from type C to type B.

Infrastructure is an essential component of the physical organization of a structural system. This term generally refers to the technical or physical infrastructure that supports network structures, such as computer equipment, cable connectors, servers, and other infrastructure components. Management information systems are critical in the health sector, especially hospitals, to improve service quality. It has strategic significance and is essential for organizational competitiveness and critical competencies in the information age.

The research of Suyanto (2015) showed that almost all aspects of SIMRS are constrained if infrastructure requirements are not met, such as infrastructure, including computers, cable connectors, wifi networks, and other facilities and infrastructure. This term refers to the technical or physical infrastructure that supports network structures such as computer equipment, cable connectors, servers, and other infrastructure components. Management information systems are critical in the health sector, especially hospitals, to improve service quality. It has strategic significance and is essential for organizational competitiveness and critical competencies in the information age.

Quality factors and system use have an impact on the successful implementation of SIMRS, system quality at Talaud Hospital has a unidirectional (positive) relationship with system use, meaning that system quality affects how the SIMRS system is implemented at Talaud Hospital, including system quality and the existence of adequate infrastructure devices (Larinse, et.al., 2015).

According to researchers, the constraints that occur from the infrastructure component in the implementation of SIMRS at the Manembo-Nembo Bitung Regional General Hospital are limited funds and budget priorities for developing SIMRS infrastructure if the hospital is to improve service class, as stated in the Regulation of the Minister of Health of the Republic of Indonesia Number 24, 2016, concerning Technical Requirements for Hospital Buildings and Infrastructure that procurement of computer equipment and improving the quality of SIMRS depends on hospital revenue seen based on bed occupancy rate, length of service and others.

Management hopes to fulfill its budget commitments, especially in setting aside emergency funds to mitigate incidents in the event of damage or the need for additional infrastructure, such as computer equipment, cable connector, and additional wifi capacity to ensure smooth application access and to protect wifi passwords from being used carelessly because the available wifi capacity is quite large. An in-depth examination of all aspects of the hospital is needed to analyze infrastructure procurement planning, including developing SIMRS software that meets the needs of the Manembo-Nembo Bitung Regional General Hospital and implementing SIMRS, as well as developing a budget for the overall procurement of SIMRS goods and software if needed at any time.

The goal is to achieve quality and quantity development in hospitals to overcome obstacles to improving service quality (Regulation of the Minister of Health of the Republic of Indonesia, 2016). An additional wifi capacity ensures smooth application access and protects passwords from being used carelessly because the available wifi capacity is quite large. An in-depth examination of all aspects of the hospital is needed to analyze infrastructure procurement planning, including developing SIMRS software that meets the needs of the Manembo-Nembo Bitung Regional General Hospital and implementing SIMRS, as well as developing a budget for the overall procurement of SIMRS goods and software if needed at any time.

Network and Application Systems

Observational reviews and in-depth interviews revealed that the implementation of SIMRS from network components and application systems was exemplary. However, there was a need for physical security from SIMRS so that irresponsible parties did not misuse data and information about hospitals. The Regulation of the Minister of Health of the Republic of Indonesia Number 82 of 2013 concerning Hospital Management Information Systems states that network security in computer networks is critical to monitor network access and prevent

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unauthorized misuse of network resources (Regulation of the Minister of Health, 2013). The network administrator must control network security tasks. Information (data) can only be accessed and modified by authorized parties. Information is available only to authorized parties when needed. The sender of information can be identified correctly, and there is a guarantee that the identity obtained is not false. Neither the sender nor the recipient of the information can deny sending and receiving messages.

Application security must support and implement security protocols in transferring data (such as SSL, TLS); applications must allow each user to be identified uniquely in terms of name and role. Access via remote access methods can function properly through client applications (i.e., via VPN, modem, wireless, and the like). The application can function adequately with the anti-virus software currently used.

An application can interact with other applications through a mutually agreed protocol through various communication lines, including data communication with the following applications:

a) Standardization of SIMAK BMN (for government-owned hospitals). At a minimum, the coding of goods uses the code contained in the SK BMN. If not, a mapping must be made between the SK BMN and the hospital's coding.

b) Hospital Information System (SIRS). Data communication between SIMRS and the Ministry of Health for SIRS reporting can occur.

c) Casemix system (specifically those implementing the National Health Insurance program). Data communication can occur between SIMRS and the Ministry of Health to implement the National Health Insurance program. Other applications that support hospital performance.

HR and SIMRS Procedures

Observation-based reviews and in-depth interviews revealed the existence of SOPs and job responsibilities. This is indicated by the information provided by the key informants (head of the SIMRS installation, SIMRS staff, and SIMRS operators) that the SOPs used as work guidelines and job duties are by the job descriptions.

This study shows that most of the informants understand that there are procedures from SIMRS that serve as guidelines or references in carrying out tasks or work based on technical, administrative, and procedural indicators and documents related to the procedures carried out. Chronologically to complete a job that aims to achieve the best results. Informants know the duties and responsibilities of officers, which include the main goals or jobs given to each SIMRS employee to achieve maximum work results; appreciation and sanctions are needed as motivation for employees to work even harder in implementing SIMRS at the Manembo Regional General Hospital-Nembo Bitung.

The management information system is an information technology-based data processing procedure integrated with manuals and other procedures to produce timely and practical information to support management decision-making, thereby gradually creating several procedures according to applicable standards and regulations. In governance, the hospital must have an information and technology unit/installation consisting of the Head of SIMRS Installation and Functional Information and Technology Staff. Information and technology human resources consist of staff with qualifications in System Analyst Staff, Programmer Staff, Hardware Staff, and Network Maintenance Staff so that SIMRS implementation can run optimally, adequately organized, and neatly (Regulation of the Minister of Health, 2013).

This research is in line with the findings of Muryanti (2018) that there is a relationship between HR and procedures for SIMRS routine activities such as SIMRS control and supervision, which shows that the maintenance of hospital assets and the resource requirements to run the system must constantly be monitored. The maintenance scale must always be done to ensure the system's accuracy (Muryanti et al., 2018).

In addition, this research is also in line with the findings of Suyanto (2015) that the need for SOP in SIMRS is to ensure that every performance is adequately controlled, as a reference when carrying out specific activities for colleagues and superiors, to avoid failures or mistakes (thus avoiding and reducing conflicts), doubts, duplication, and waste during the process of implementing activities, parameters for assessing service quality, and ensuring that each performance is adequately controlled (Suyanto et al., 2015).

According to researchers, HR and procedures include SIMRS processing activities in line with performance and development targets that can complete and improve SIMRS by the objectives so that SIMRS can be used. In increasing the speed of connected services, complete technological requirements, such as wifi and network, must be met. For performance, there is expected to be a division of special responsibilities for SIMRS processing by computer management capabilities. In the procedure, it is stated that performance must pay attention to SIMRS conditions to ensure activity the process runs smoothly and according to plan in order to be able to determine the extent to which the implemented process follows the predetermined process and can produce the desired results (Tangkuman, 2019).

Management must provide appreciation and motivation as a form of concern for employees in achieving success in implementing SIMRS. Triangulation informants (recipients of health services) stated that the Operators were always there. Swift in carrying out their duties, but the constraints faced, besides the large number of patients performing services in crowded conditions, caused the network to become problematic. As a result, patients had to wait 10-20 minutes to be served again, even though the procedure the hospital staff had conveyed. This research is by Suyanto (2015) research that the role of HR as SIMRS users is vital in determining acceptance of new technology. Adaptation is a natural part of human behavior and is crucial for successfully implementing SIMRS (Suyanto et al., 2015).

The effectiveness of SIMRS officers and operators can improve the quality of management information systems. If the management information system is effective, it will increase employee productivity. This shows that having adequate and easily accessible infrastructure improves staff performance, such as servers that do not crash and allow officers to complete tasks on time (Astianurdin et al., 2017).

By the Regulation of the Minister of Health of the Republic of Indonesia, Number 3 of 2020 Concerning Hospital Classification and Licensing, SIMRS personnel and education needs can be adjusted to the hospital's needs if needed for individual improvement and development in carrying out their responsibilities. In addition, to ensure the quality and competence of staff, hospitals must hold routine training or require those who take part in a training held outside the hospital to have the authority to share information with other human resources (Regulation of the Minister of Health of the Republic of Indonesia, 2020).

4. Conclusion

This study concludes that the implementation of SIMRS from the infrastructure component is already available, namely hardware, but has not yet reached all existing sections (patient in and out installations and nutrition installations), so it has not been implemented effectively and efficiently. Implementation of SIMRS from the network component is available but not yet connected to all sections (pharmacy, radiology, and laboratory) and application systems that use open source but have not been developed optimally to support services and administration and integrated into several other applications because human resources competent in these fields are still limited. To maximize open source applications, namely registration, barcode, staffing and payroll, telemedicine, pharmacy, lab inventory, medical record inventory assets, medical record reports, parking management, medical actions and services, tariffs, finance and accounting, and bridging to other applications. The implementation of SIMRS from the HR component has been fulfilled, but for qualifications incompetence, has not been able to develop

open source applications to the maximum, including registration, barcode, staffing and payroll, telemedicine, pharmacy, lab inventory, medical record inventory assets, medical record reports, parking management, medical actions, and services, tariffs, finance and accounting as well as applications that are integrated (bridging) to other applications such as dispute, sirs, rs online, BPJS Kesehatan casemix, Satu Sehat, e-KTP, SIMDA finance and regional goods and e-Catalogue. Otherwise, the procedures have been implemented well based on the main tasks and functions in implementing SIMRS at Manembo-nembo Bitung General Hospital.

5. References

Astianurdin, A., Samsualam, S., & Haeruddin, H. (2017). Pengaruh Sistem Informasi Manajemen Terhadap Efektivitas Kerja Pegawai Rekam Medik (Kajian Pada Rumah Sakit Umum Daerah Lasinrang Kabupaten Pinrang Tahun 2017). *Jurnal Ilmiah Kesehatan Diagnosis, 11*(4), 456–460.

Kementerian Kesehatan Republik Indonesia. 2009. Tentang Pedoman Penyelenggaraan Rumah Sakit. Jakarta: Kementerian Kesehatan Republik Indonesia. http://hukor.kemkes.go.id/uploads/produk_hukum/KMK_No._058-MENKES-SK-I-2009_ttg_Pedoman_Penyelenggaraan_RS_Bergerak_.pdf

Larinse, D. S., Papilaya, S., & Fibriani, C. (2015). Evaluasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) Menggunakan Metode HOT-Fit Pada Pengguna Akhir SIMRS di RSUD-Talaud. https://repository.uksw.edu/bitstream/123456789/11528/2/T1_682011022_Full%20text.pdf

Miles, M, B., Huberman, A, M., and Saldana, J. (2014). Qualitative data analysis, a Sourcebook of Methods, 3rd Edition. USA: Sage Publications.

Mudiono, D. R. P. (2018). Analisis penerapan sistem informasi manajemen rumah sakit dengan model human organization technology (HOT)-fit di RSU Dr. H. Koesnadi Bondowoso. Jember: Universitas Jember

Muryanti, T., Pinilih, M., & Oktavian, L., D. (2018). Evaluasi sistem informasi manajemen rumah sakit (SIMRS) di RSIA Bunda Arif Purwokerto menggunakan framework COBIT 5. *Jurnal Pro Bisnis, 11*(1), 59-75. https://dx.doi.org/10.35671/probisnis.v11i1.690

Peraturan Menteri Kesehatan Republik Indonesia Nomor 4 Tahun 2018. Tentang Kewajiban Rumah Sakit dan Kewajiban Pasien. https://peraturan.go.id/files/bn416-2018.pdf

Peraturan Menteri Kesehatan No. 82 Tahun 2013. Tentang Sistem Informasi Manajemen Rumah Sakit. https://yankes.kemkes.go.id/unduhan/fileunduhan_1589529567_846923.pdf

Peraturan Menteri Kesehatan Republik Indonesia No. 43 Tahun 2016. Tentang Standar Pelayanan Minimal Bidang Kesehatan. http://hukor.kemkes.go.id/uploads/produk_hukum/PMK_No._43_ttg_Standar_Pelayanan_Minimal_Bidang_Kesehatan_.pdf

Peraturan Menteri Kesehatan Republik Indonesia Nomor 3 Tahun 2020. Tentang Klasifikasi dan Perizinan Rumah Sakit. https://bandikdok.kemkes.go.id/assets/file/PMK_No__3_Th_2020_ttg_Klasifikasi_dan_Perizinan_Rumah_Sakit.pdf

Rohaeni. N., (2014). Analisis Implementasi Sistem Informasi Rekam Medis Rumah Sakit Jiwa Provinsi Jawa Barat. Bandung: Universitas Padjajaran. http://pustaka.unpad.ac.id/wp-content/uploads/2014/10/Analisis-Penerapan-Sistem-Informasi-Rekam-Medis-Di-Rumah-Sakit-Jiwa-Provinsi-Jawa-Barat.pdf

Sekretariat Kementerian Kesehatan RI. (2017). Bagian Program dan Informasi Kementerian Kesehatan Republik Indonesia.

https://www.kemkes.go.id/downloads/resources/download/pusdatin/profil-kesehatan-indonesia/Profil-Kesehatan-Indonesia-tahun-2017.pdf

Sari, M. (2016). Analisis Implementasi Sistem Informasi Manajemen (SIM) di Poliklinik Bedah Umum RSUP Dr.M.Djamil Padang Tahun 2016. Padang: Universitas Andalas. Indonesia. https://scholar.unand.ac.id/id/eprint/12025

Surya, M., A. (2019). Evaluasi Implementasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) di RSUD Kota Padang Panjang Tahun 2018. Padang: Universitas Andalas. https://scholar.unand.ac.id/id/eprint/42119

Suyanto, Taufik, H., & Indiati. (2015). Faktor-Faktor Penghambat Penerapan Sistem Informasi Manajemen Rumah Sakit di RSUD Blambangan Banyuwangi. *Jurnal kedokteran Brawijaya*, 28(2), 141-147. https://doi.org/10.21776/ub.jkb.2015.028.02.5

Tangkuman, V., Y., Ratag, G., & Posangi, J. (2019). Penerapan Sistem Informasi RumahSakit X Kota Manado Dalam Perencanaan Ketenagaan Peralatan Medis. *Jurnal KESMAS, 8*(6). https://ejournal.unsrat.ac.id/v3/index.php/kesmas/issue/view/2415.