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The Effect of Hospital Information Systems (SIMRS) on Service Quality in The Outpatient Department and Its Implications for Patient Satisfaction at Robert Wolter Monginsidi Hospital, Manado

Edgar Irvin Raranta[1]*, Vip Paramarta[2], Etty Sofia Mariati Asnar[3], Farida Yuliaty[4], Kosasih[5]
[1*2345]Master of Management Study Program, Universitas Sangga Buana Bandung, Indonesia

**Corresponding Author: edgarirvinraranta@email.com*

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ABSTRACT

The implementation of Hospital Management Information System (SIMRS) represents a strategic initiative in the digital transformation of healthcare services aimed at enhancing operational efficiency and service quality. This study aims to analyze the influence of SIMRS implementation on service quality and its implication for patient satisfaction at the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado. This study adopted an explanatory quantitative approach utilizing Structural Equation Modeling - Partial Least Squares (SEM-PLS). The research sample comprised 99 respondents, calculated using the Slovin formula from the total outpatient population. Data were collected using structured questionnaires based on a 5-point Likert scale. The structural analysis revealed that SIMRS implementation has a positive and significant effect on service quality (path coefficient = 0.776; t = 11.390; $p < 0.05$). Service quality also exerts a positive and significant influence on patient satisfaction (path coefficient = 0.466; t = 6.095; $p < 0.05$). Furthermore, SIMRS directly impacts patient satisfaction (path coefficient = 0.490; t = 6.238; $p < 0.05$). Additionally, service quality partially mediates the relationship between SIMRS implementation and patient satisfaction with an indirect effect of 0.362 (t = 5.374; $p < 0.05$). The coefficient of determination (R^2) indicates that SIMRS implementation and service quality jointly account for 76.2% of the variance in patient satisfaction. Practical implications highlight the necessity of system infrastructure maintenance and continuous staff training to optimize outpatient care delivery.

Keywords: SIMRS, Service Quality, Patient Satisfaction

INTRODUCTION

Hospitals are healthcare institutions that play a strategic role in improving public health through integrated promotive, preventive, curative, and rehabilitative services. As public service organizations, hospitals are required to provide high-quality, safe, and patient-oriented services. The complexity of healthcare delivery, which involves various health professions and

work units, makes hospitals highly dependent on effective and coordinated information management systems (Evans et al., 2021). In this context, the implementation of a reliable information system serves as an essential foundation for the sustainability of quality healthcare services.

The primary functions of hospitals are not limited to the provision of medical services but also encompass education, research, and efficient resource management. The implementation of these functions requires the availability of accurate, timely, and cross-unit accessible data and information. Fragmented information often leads to delays in service delivery as well as administrative and clinical errors, which ultimately affect service quality and patient safety (Handiwidjojo, 2009). Therefore, strengthening information management systems has become an integral requirement of modern hospital operations.

The quality of hospital services is a key indicator for assessing the success of healthcare delivery. Dimensions of service quality include the speed of service access, the accuracy and precision of medical procedures, and the reliability of service support systems. Research has shown that low service quality is often caused by delays in information access and insufficient data integration among service units (Putra et al., 2017). This condition demonstrates that improving service quality cannot be separated from the utilization of information technology that supports the overall service process.

Rapid access to information is a crucial aspect of hospital services, particularly in outpatient departments, which generally handle a high volume of patients. The Hospital Management Information System (SIMRS) is designed to accelerate registration, examination, and medical decision-making processes by providing real-time patient data. An international study conducted by Sanjuluca et al. (2022) in Angola demonstrated that limited access to and utilization of hospital information systems resulted in slower and less optimal services, thereby affecting the effectiveness of healthcare delivery.

In addition to access speed, service accuracy is strongly influenced by the quality of data generated by SIMRS. Inaccurate or incomplete clinical data may potentially lead to diagnostic and medical treatment errors. A study by Samra et al. (2019) in Saudi Arabia found that an integrated hospital information system was capable of improving the accuracy of clinical data and supporting medical services for patients. This finding confirms that service accuracy depends not only on the competence of healthcare professionals but also on the quality of the information system being used.

Another important aspect of hospital service quality is the storage and management of patient data. SIMRS plays a role in storing medical records digitally, securely, and in an integrated manner, thereby facilitating the retrieval of patients' medical histories. Research by Rampisheh et al. (2020) in Iran showed that the development of a national minimum data set within hospital information systems could improve the consistency and reliability of clinical data storage. Proper data storage provides an important foundation for continuity of care in hospitals.

The Hospital Management Information System (SIMRS) is an important technology designed to improve the efficiency and effectiveness of healthcare services in hospitals. In the digital era, challenges in healthcare data management have become increasingly complex, requiring an integrated platform to support these processes. The implementation of SIMRS at Robert Wolter Monginsidi Hospital, Manado (R.W. Monginsidi Hospital, Manado), is expected to improve information access and reduce the time required for diagnosis, thereby enhancing the quality of patient services. Rahmaddian T. et al. (2023) noted that efficient healthcare data management can increase awareness of chronic diseases that often remain undetected in their early stages. In addition, the development of integrated management dashboards in hospitals is expected to address issues related to ineffective medical services. Therefore, this study aims to explore the impact of SIMRS implementation on service quality at R.W. Monginsidi Hospital, Manado.

The Hospital Management Information System (SIMRS) is a crucial tool for managing various operational and administrative aspects of hospitals, ensuring the effectiveness and efficiency of healthcare services. SIMRS functions to integrate patient data, medical information, resource management, and administrative processes that support improved healthcare delivery (Rahmaddian T. et al., 2023). By utilizing information technology, SIMRS not only accelerates access to information but also improves the accuracy of data used in patient care (Molly R. et al., 2021). Furthermore, the system enables more comprehensive data analysis, providing valuable and reliable insights for managerial decision-making processes (Laila L. et al., 2024). Overall, the implementation of SIMRS is expected to support hospital performance, reduce medical errors, and promote better collaboration among medical teams, thereby contributing to the overall improvement of healthcare service quality (Sari NJ et al., 2025).

Service quality and patient satisfaction are among the most important aspects of healthcare, particularly in the context of implementing the Hospital Management Information System (SIMRS) at R.W. Monginsidi Hospital, Manado. Appropriate decision-making can improve the quality of care provided to patients and reduce the risk of medical errors. Qasim D. et al. (2025) demonstrated that information management strategies, such as data accuracy and information system integration, significantly influence the effectiveness of decision-making. In addition, organizational culture also plays a crucial role in this relationship. Other studies have highlighted how individual characteristics and technological factors influence the use of healthcare support systems, as well as the importance of hospital management in adopting such systems (Gilbert Y. et al., 2015). Thus, a comprehensive understanding of healthcare service decision-making, supported by an effective information system, provides a foundation for improving the effectiveness of care at R.W. Monginsidi Hospital, Manado, in line with the organization's objective of providing optimal healthcare services.

The development of information technology in healthcare, particularly the implementation of Hospital Management Information Systems (SIMRS), has revolutionized the way hospitals operate and provide services to patients. As the complexity of healthcare data

increases, SIMRS serves as an essential tool for integrating various clinical and administrative information, enabling faster and more factual healthcare services. This is particularly significant in healthcare delivery, where accurate and timely information can directly influence patient outcomes. However, despite substantial evidence that SIMRS can improve the efficiency and effectiveness of healthcare services, challenges remain in its utilization, particularly regarding the level of adoption among healthcare professionals (Banwell E. et al., 2023). By understanding the relationship between SIMRS and healthcare service decision-making, hospitals are expected to improve the quality of healthcare services they provide while contributing to the overall improvement of the healthcare system (Z Agha et al., 2013; Taslima S. et al., 2024; R Kirkham et al., 2017). In the era of digital transformation, integrating SIMRS into the core of hospital operations has become more important than ever, not only for efficiency but also for developing more sustainable healthcare practices that are responsive to patients' needs.

Robert Wolter Monginsidi Hospital Class II, Manado, is a hospital owned by the Indonesian Army and operates under the supervision of Kesdam XIII/Merdeka. The hospital plays a strategic role in providing healthcare services to Indonesian Army personnel, Ministry of Defense and Security civil servants (PNS Hankam), their families, and the general public. Operationally, the hospital also provides referral services for patients from various regions under Kodam XIII/Merdeka, including areas outside the region such as Ternate and Ambon. Its operations are supported by a clear legal basis, including the Chief of Army Staff Regulation (Peraturan Kasad) Number 27 of 2018 and an operational license issued by the Provincial Government of North Sulawesi.

Problem Identification and Research Questions

Based on the background described above, the problems identified in this study include: (1) a gap between the potential of SIMRS as a healthcare service support system and its actual utilization, which has not yet been optimal in practice; (2) delays in information access that reduce service quality; (3) problems concerning the accuracy and completeness of clinical data; (4) lack of information integration among work units; (5) limitations in user competencies and resistance to technology adoption; (6) technical constraints related to application and network stability; (7) behavioral factors and compliance with procedures; (8) prolonged waiting times for outpatients; and (9) the operational implications of SIMRS for patient satisfaction levels.

The research questions are formulated as follows:

1. How is the Hospital Management Information System (SIMRS) implemented in the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado?
2. To what extent does the implementation of the Hospital Management Information System (SIMRS) affect service quality in the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado?
3. To what extent does service quality affect patient satisfaction in the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado?

4. To what extent does the direct implementation of the Hospital Management Information System (SIMRS) affect patient satisfaction in the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado?
5. To what extent does the indirect implementation of the Hospital Management Information System (SIMRS) affect patient satisfaction through patient service quality in the Outpatient Department of Robert Wolter Monginsidi Hospital, Manado?

RESEARCH METHOD

This study employed a quantitative explanatory research approach to examine the hypotheses concerning causal relationships among the variables (Creswell, 2018; Sugiyono, 2022). The research was conducted in the Outpatient Department of Class II Robert Wolter Monginsidi Hospital, Manado, from February to June 2026.

Population and Sample

The population of this study consisted of all outpatients at R.W. Monginsidi Hospital, Manado, with an average monthly number of 7,112 patients. The sample size was calculated using the Slovin formula with a margin of error (e) of 10% (0.1):

$n = N / (1 + N(e^2)) = 7,112 / (1 + 7,112 \times 0.01) = 7,112 / 72.12 = 98.6 \approx 99$ respondents.

Therefore, the sample size was determined to be 99 outpatients, who were selected using an accidental sampling technique.

Variable Operationalization

The operationalization of the variables was comprehensively formulated as follows:

Table 2. Variable Operationalization

Variable	Operational Definition	Dimensions	Main Indicators	Scale
SIMRS Implementation (X)	The implementation of an integrated IT system for processing clinical and administrative hospital data.	1. System Quality 2. Information Quality 3. Accessibility 4. Organizational Support	System reliability, data accuracy, access speed, network stability, and user training	Likert 1–5
Service Quality (Z)	The level of service excellence in meeting the expectations of outpatients.	1. Tangibles 2. Reliability 3. Responsiveness 4. Assurance 5. Empathy	Physical cleanliness, diagnostic reliability, response speed, staff competence, and empathetic attention	Likert 1–5
Patient Satisfaction (Y)	Patients' cognitive and emotional evaluation of the services received.	1. Expectation Conformity 2. Service Experience 3. Loyalty / Recommendation	Overall satisfaction, intention to return for treatment, and willingness to recommend the hospital	Likert 1–5

Data Analysis Method (SEM-PLS)

The data were analyzed using the Structural Equation Modeling–Partial Least Squares (SEM-PLS) method through two stages of evaluation:

Measurement Model Evaluation (Outer Model)

The outer model was evaluated by examining convergent validity (Outer Loading ≥ 0.70 and AVE ≥ 0.50), discriminant validity (Fornell-Larcker criterion and HTMT < 0.90), and construct reliability (Cronbach's Alpha ≥ 0.70 and Composite Reliability ≥ 0.70).

Structural Model Evaluation (Inner Model)

The inner model was evaluated by examining collinearity (VIF < 5), coefficient of determination (R^2), effect size (f^2), and path hypothesis testing (Path Coefficients, t-statistics > 1.96, and p-value < 0.05) using 5,000 bootstrap resamples.

RESULT AND DISCUSSION

Measurement Model Evaluation (Outer Model)

The convergent validity test showed that all variable indicators had Outer Loading values > 0.70, except for X12 (0.667) and Z8 (0.697), which were retained because the AVE values of their respective constructs exceeded 0.50. The results of the reliability and AVE evaluations are presented in the following table:

Table 3. Reliability and AVE evaluations

Latent Construct	Cronbach's Alpha	Composite Reliability	AVE	Conclusion
SIMRS Implementation (X)	0.941	0.949	0.609	Valid & Reliable
Service Quality (Z)	0.950	0.955	0.587	Valid & Reliable
Patient Satisfaction (Y)	0.922	0.935	0.617	Valid & Reliable

Discriminant validity was fully established, with the Heterotrait-Monotrait Ratio (HTMT) values between constructs remaining below the threshold of 0.90: HTMT (X→Z) = 0.798; HTMT (X→Y) = 0.879; and HTMT (Z→Y) = 0.872.

Structural Model Evaluation (Inner Model)

The Inner VIF value of 2.324 (< 5.00) confirms that there was no multicollinearity among the predictor variables. The Coefficient of Determination (R^2) and Effect Size (f^2) values are presented below:

Endogenous Variable	R-Square (R^2)	Adjusted R^2	R^2 Category	f^2 Effect Size
Service Quality (Z)	0.570	0.565	Moderate (57.0%)	f^2(X→Z) = 1.324 (Very Large)
Patient Satisfaction (Y)	0.762	0.757	Strong (76.2%)	f^2(X→Y) = 0.401; f^2(Z→Y) = 0.383

Hypothesis Testing

The results of the structural hypothesis testing using the bootstrapping procedure are presented in the following table:

Hypothesis	Effect Path	Path Coefficient (β)	t-Statistics	p-Values	Decision
H1	SIMRS (X) → Service Quality (Z)	0.776	11.390	0.000	Accepted (Significant)

H2	Service Quality (Z) → Patient Satisfaction (Y)	0.466	6.095	0.000	Accepted (Significant)
H3	SIMRS (X) → Patient Satisfaction (Y) [Direct]	0.490	6.238	0.000	Accepted (Significant)
H4	SIMRS (X) → Z → Patient Satisfaction (Y) [Mediation]	0.362	5.374	0.000	Accepted (Partial Mediation)

Discussion of Research Findings

Implementation of SIMRS at R.W. Monginsidi Hospital, Manado

The implementation of SIMRS in the Outpatient Department of Class II R.W. Monginsidi Hospital, Manado, was generally categorized as very good, structured, and digitally integrated. In terms of system quality, the application was found to be stable and easily accessible to users, reflecting perceived ease of use (Aprilianingsih et al., 2022). Information quality was demonstrated to be accurate and error-free through the implementation of Electronic Medical Records (EMR) (Khalisha et al., 2025). Real-time data accessibility helped streamline bureaucratic processes (Laila et al., 2024), while strong organizational support from management minimized staff resistance to technology adoption (Ichsan & Sari, 2024).

The Effect of SIMRS Implementation on Service Quality (H1 Accepted)

The path coefficient of 0.776 (t = 11.390; p = 0.000) demonstrates that SIMRS implementation has a positive and highly significant effect on Service Quality, with an effect size of $f^2 = 1.324$ (very large). The automation of medical record data and the integration of the polyclinic network minimize administrative delays and improve the reliability of physicians' diagnoses. This finding is consistent with the results reported by Pratiwi et al. (2025), Utama & Damanik (2024), and Sanjuluca et al. (2022).

The Effect of Service Quality on Patient Satisfaction (H2 Accepted)

The path coefficient of 0.466 (t = 6.095; p = 0.000) confirms that Service Quality has a positive and significant effect on Patient Satisfaction. The SERVQUAL dimensions—particularly staff responsiveness, empathy, and the physical cleanliness of facilities—play a dominant role in determining the subjective satisfaction of outpatients. This finding reinforces the Service-Profit Chain theory and is consistent with the findings of Kosasih & Paramarta (2020) and Farida Yuliati et al. (2025).

The Direct Effect of SIMRS Implementation on Patient Satisfaction (H3 Accepted)

The direct path coefficient of 0.490 (t = 6.238; p = 0.000) demonstrates that SIMRS has a significant direct effect on Patient Satisfaction. The convenience of digital queuing systems and the clarity of administrative information provide patients with a more efficient transaction experience, reflecting perceived usefulness. This finding is consistent with Davis's TAM framework and the studies conducted by Laila et al. (2024) and Putra et al. (2017).

The Indirect Effect / Mediation of Service Quality (H4 Accepted)

The indirect effect of SIMRS on Patient Satisfaction through Service Quality was 0.362 (t = 5.374; p = 0.000), demonstrating the role of Service Quality as a partial mediating variable. This finding indicates that investments in sophisticated SIMRS technology are likely to generate more optimal patient satisfaction when accompanied by improvements in the quality of functional interactions and the attentiveness of healthcare staff (Salahuddin et al., 2020; Rampisheh et al., 2020).

CONCLUSION

Based on the results of the data analysis and discussion, the following conclusions can be drawn:

1. The implementation of SIMRS in the Outpatient Department of R.W. Monginsidi Hospital, Manado, has been demonstrated to operate very well, in a structured manner, and with full digital integration.
2. SIMRS implementation has a positive and significant effect on outpatient Service Quality (b = 0.776; t = 11.390).
3. Service Quality has a positive and significant effect on Patient Satisfaction (b = 0.466; t = 6.095).
4. SIMRS implementation has a direct, positive, and significant effect on Patient Satisfaction (b = 0.490; t = 6.238).
5. Service Quality partially mediates the relationship between SIMRS and Patient Satisfaction, with an indirect effect of 0.362 (t = 5.374). SIMRS and Service Quality jointly explain 76.2% of the variance in Patient Satisfaction ($R^2 = 0.762$).

Recommendations

Practical Recommendations (For the Management of R.W. Monginsidi Hospital)

1. Infrastructure Maintenance:
   Conduct regular maintenance of hardware, software, and network stability to anticipate technical disruptions during peak registration hours.
2. Continuous Staff Training:
   Provide regular digital literacy training for doctors, nurses, and administrative staff to improve the speed of EMR data entry, thereby allowing more time for empathetic interaction with patients.
3. Development of Self-Service Features:
   Develop integrated mobile-based online registration and self-service kiosks to permanently reduce the accumulation of physical queues.

Academic Recommendations (For Future Research)

1. Expansion of Research Units:
   Expand the sample coverage to include the Inpatient Department, Emergency Department (ED), and Supporting Units such as the Laboratory and Radiology Departments.
2. Addition of Variables:

Incorporate additional variables such as Organizational Culture, Human Resource Competence, Transformational Leadership, or Hospital Image.

3. Mixed-Methods Approach:
   Complement quantitative questionnaire instruments with in-depth interviews to further confirm the sociotechnical factors influencing SIMRS adoption.

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REFERENCES

Alsyouf, A., et al. (2022). The Determinants of Healthcare Practitioners' Acceptance of Hospital Information Systems. International Journal of Environmental Research and Public Health, 19(15), 9245.

Anggraini, D., et al. (2022). Analisis Pengaruh SIMRS Terhadap Kualitas Layanan dan Kepuasan Pasien. Jurnal Manajemen Informasi Kesehatan Indonesia, 10(1), 45-56.

Caroline, A., et al. (2025). Strategic Hospital Management in the VUCA Era. International Journal of Healthcare Management, 18(1), 112-124.

Creswell, J. W. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.). SAGE Publications.

Davis, F. D. (1989). Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3), 319-340.

Evans, L., Smith, J., & Brown, T. (2021). Hospital Management Information Systems and Healthcare Service Quality Improvement. Journal of Health Management, 23(2), 145–158.

Farida Yuliati, Paramarta, V., Kosasih, & Asnar, E. S. M. (2025). Analisis Kualitas Pelayanan Kesehatan dan Implikanya terhadap Kepuasan serta Loyalitas Pasien di Rumah Sakit. Jurnal Manajemen Wahana Kontemplasi, 4(2), 115–128.

Farhiyah, N. L., Faizah, H., Hartono, B., & Daud, A. G. (2025). Implementasi Sistem Informasi Manajemen Rumah Sakit (SIMRS) dalam Pemenuhan Pelayanan Kesehatan. RIGGS Journal, 4(3), 1716-1720.

Ghozali, I. (2021). Partial Least Squares: Konsep, Teknik dan Aplikasi Menggunakan Program SmartPLS 3.2.9. Badan Penerbit Universitas Diponegoro.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2022). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (3rd ed.). SAGE Publications.

Handiwidjojo, W. (2009). Sistem Informasi Manajemen Rumah Sakit. Jurnal Sistem Informasi, 4(2), 45–56.

Harst, L., et al. (2022). Technology Acceptance Models in Health Informatics: A Systematic Review. BMC Medical Informatics and Decision Making, 22(1), 78.

Kemenkes RI. (2013). Peraturan Menteri Kesehatan Republik Indonesia Nomor 82 Tahun 2013 tentang Sistem Informasi Manajemen Rumah Sakit. Kementerian Kesehatan RI.

Khalisha, F., Khoirunnisa, R. A., & Purba, S. H. (2025). Pengaruh Penerapan Sistem Informasi Manajemen Rekam Medis Elektronik Terhadap Keakuratan Data. ZAHRA: Journal of Health and Medical Research, 5(1), 35-52.

Kosasih, & Paramarta, V. (2020). Peningkatan Kualitas Pelayanan Kesehatan dan Pengaruhnya terhadap Peningkatan Kepuasan Pasien di Puskesmas. Jurnal Riset Manajemen dan Bisnis, 10(2), 145–158.

Kotler, P., & Keller, K. L. (2016). Marketing Management (15th ed.). Pearson Education.

Laila, L., Rahmaddian, T., & Putri, A. R. (2024). The Impact of Health Information Systems on Patient Satisfaction and Service Efficiency. Health Information Management Journal, 53(1), 22–31.

Laudon, K. C., & Laudon, J. P. (2020). Management Information Systems: Managing the Digital Firm (16th ed.). Pearson.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A Multiple-Item Scale for Measuring Consumer Perceptions of Service Quality. Journal of Retailing, 64(1), 12-40.

Pratiwi, A. D., Purba, S. H., & Farhiyah, N. L. (2025). Optimalisasi Sistem Informasi Manajemen Rumah Sakit Dalam Meningkatkan Mutu Pelayanan Kesehatan Rawat Jalan. Journal of Business and Management Review, 3(1), 45–58.

Purwadhi, A., et al. (2024). Operational Efficiency and Hospital Management Performance. Journal of Hospital Administration, 12(3), 88-97.

Putra, D. S. H., Seosetidjo, A., & Bukhori, S. (2017). Penerapan Kualitas Informasi Terhadap Kepuasan Pengguna Sistem Informasi Rumah Sakit Dengan Metode DeLone & McLean. Jurnal Kesehatan, 5(3), 129–137.

Rampisheh, Z., et al. (2020). Developing a National Minimum Data Set for Hospital Information Systems in the Islamic Republic of Iran. Health Information Management Journal, 49(2–3), 117–126.

Salahuddin, L., et al. (2020). Healthcare Practitioner Behaviours That Influence Unsafe Use of Hospital Information Systems. Health Informatics Journal, 26(4), 3023–3037.

Samra, H. E., Li, A. S., Soh, B., & Zain, M. (2019). Utilisation of Hospital Information Systems for Medical Research in Saudi Arabia. Health Information Management Journal, 49(2–3), 117–126.

Sanjuluca, T. H., de Almeida, A. A., & Cruz-Correia, R. (2022). Assessing the Use of Hospital Information Systems to Support Decision-Making: A Cross-Sectional Study in Southern Angola. BMC Medical Informatics and Decision Making, 22(1), 1–11.

Sugiyono. (2022). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Alfabeta.

Utama, S., & Damanik, B. N. (2024). Evaluating Hospital Information Systems: A Systematic Review of Effectiveness, Implementation, and Impact on Health Services Administration. Systematic Literature Review Journal, 1(2), 12–24.