GLOBAL JOURNAL OF HEALTH ADMINISTRATION
UNIVERSITAS MUHAMMADIYAH SURABAYA

# IMPACT OF NURSING KPIS AND ELECTRONIC MEDICAL RECORDS ON SERVICE QUALITY IN A TYPE B HOSPITAL

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| INFORMATION | ABSTRACT |
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| **Correspondence:**<br>dwiuntarifa@gmail.com<br><br>**Keywords:**<br>*KPI, Electronic Medical Records, Service Quality, Nursing Performance, Hospital Management* | *Objective : This study aims to analyze the effect of nursing Key Performance Indicator (KPI) implementation and Electronic Medical Record (ERM) utilization on service quality improvement in a Type B Hospital in Surabaya.*<br><br>*Methods: This study employed a quantitative cross-sectional design involving 100 registered nurses selected through purposive sampling. Data were collected using a structured questionnaire consisting of 10 items for KPI implementation, 8 items for EMR utilization, and 12 items for service quality, measured using a 5-point Likert scale. Data were analyzed using multiple linear regression to examine the relationships between variables.*<br><br>*Result : There was a considerable favorable impact on service quality from implementing KPIs ($\beta = 0.427$; $p < 0.001$), and ERM utilization also had a significant influence ($\beta = 0.365$; $p < 0.001$).The results highlight the importance of digital documentation systems and organized performance assessment in improving the quality of healthcare services.*<br><br>*Conclusion : Healthcare services are made more efficient, accurate, and responsible by the combination of KPI and ERM.Based on the results of this research, healthcare facilities should enhance their performance management systems and maximize the use of health information technology in order to facilitate long-term quality improvement.* |

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| **Korespondensi:**<br>dwiuntarifa@gmail.com<br><br>**Kata kunci:**<br>KPI, Rekam Medis Elektronik, Kualitas Layanan, Kinerja Keperawatan, Manajemen Rumah Sakit | Tujuan : Studi ini bertujuan untuk menganalisis pengaruh implementasi Key Performance Indicator (KPI) keperawatan dan pemanfaatan Electronic Medical Record (ERM) terhadap peningkatan kualitas pelayanan di Rumah Sakit Tipe B di Surabaya.<br><br>Metode: Penelitian ini menggunakan desain kuantitatif dengan pendekatan cross-sectional yang melibatkan 100 perawat yang dipilih melalui teknik purposive sampling. Pengumpulan data dilakukan menggunakan kuesioner terstruktur yang terdiri dari 10 pertanyaan untuk variabel implementasi KPI, 8 pertanyaan untuk pemanfaatan ERM, dan 12 pertanyaan untuk kualitas pelayanan, yang diukur menggunakan skala Likert 5 poin. Analisis data dilakukan menggunakan regresi linier berganda untuk menguji hubungan antar variabel.<br><br>Hasil: Terdapat dampak positif yang cukup besar terhadap kualitas pelayanan dari implementasi KPI ($\beta = 0,427$; $p < 0,001$), dan pemanfaatan ERM juga memiliki pengaruh yang signifikan ($\beta = 0,365$; $p < 0,001$). Hasil ini menyoroti pentingnya sistem dokumentasi digital dan penilaian kinerja yang terorganisir dalam meningkatkan kualitas pelayanan kesehatan.<br><br>Kesimpulan: Pelayanan kesehatan menjadi lebih efisien, akurat, dan bertanggung jawab dengan kombinasi KPI dan ERM. Berdasarkan hasil penelitian ini, fasilitas kesehatan hendaknya meningkatkan sistem manajemen kinerja dan memaksimalkan penggunaan teknologi informasi kesehatan untuk memfasilitasi peningkatan kualitas jangka panjang. |

## INTRODUCTION

With the complexity of healthcare systems continuing to increase and the demand for high-quality healthcare services on the rise hospitals are under intense pressure to satisfy the expectations of their patients.According to recent studies (Nabovati et al., 2023; Novitri et al., 2024) hospitals are obligated to prioritize clinical efficacy, accountability, efficiency, and patient safety by using digital health technology and structured management systems. Therefore a vital approach for increasing the overall quality of hospital services is strengthening performance management systems alongside digital transformation.

Using Key Performance Indicators (KPIs) is a common strategy in hospital administration Key performance indicators (KPIs) are a great way for businesses to measure their progress towards goals and make sure that their operational operations are in line with their strategic objectives.Key performance indicators are crucial in healthcare settings for tracking service efficiency, patient safety, and adherence to clinical documentation requirements (Magedanz et al., 2024; Mehrolhassani et al., 2025). Yuniar et al. (2024) cites prior research showing that organized KPI deployment may increase service delivery consistency and organizational accountability.On top of that, research has shown that dashboards based on key performance indicators help managers make better faster decisions based on data (Nabovati et al., 2023; Raaphorst, 2024).

At the same time EMR systems have been rapidly adopted by hospitals because to the fast progress of digital health technology.According to recent studies (Putri et al., 2024; Sowan & Ha, 2024), electronic medical records (EMR) provide for integrated clinical documentation that is accurate and updated in real-time. This helps to decrease medical mistakes and improve communication among healthcare workers.Noviti et al (2024) and Purba et al (2025) found that optimizing hospital information systems, such as SIMRS leads to better organizational performance and more efficient service delivery.The significance of digital technology in bolstering quality improvement efforts inside healthcare organizations is underscored by these results.

Although there is an increasing amount of research, the majority of studies have looked at KPI implementation and EMR use independently There is a lack of data that examines how these factors interact to affect the quality of hospital services especially from the point of view of frontline healthcare workers like nurses.The absence of nurses in these systems poses a serious threat, as they are essential to the delivery of direct patient care as well as the quality of clinical documentation.

Despite several studies that have looked at key performance indicator systems (KPIs) and ERM implementation separately there is a lack of research that combines the two to examine how they affect service quality from the standpoint of frontline nurses especially in Type B hospitals in Indonesia (Yuniar et al., 2024;

Mehrolhassani et al., 2025; Putri et al., 2024; Sowan & Ha, 2024).So to fill this need this research looks at how hospital service quality is affected when nurses use ERM and apply KPIs.

Several studies have emphasized the importance of KPIs in evaluating hospital performance, including operational efficiency, patient safety, and service satisfaction (Clancy et al., 2022). At the same time, the effectiveness of performance measurement systems is highly dependent on the quality of data recording and reporting processes. Adeshina (2025) found that performance indicators can only be effectively utilized when supported by systematic and integrated electronic documentation systems. This underscores the importance of aligning performance measurement tools with digital health technologies.

From a strategic perspective, the role of KPIs is closely aligned with the Balanced Scorecard approach, which incorporates patient-related indicators as a key dimension of organizational performance. Customer-based performance monitoring has been shown to be an important tool for assessing service efficiency, documentation accuracy, and patient satisfaction in healthcare settings (Samadbeik et al., 2024). Moreover, the use of real-time data strengthens the function of KPIs as an objective managerial control mechanism that supports decision-making and performance improvement (Fallahnezhad et al., 2025).

Hospital service quality is also closely linked to patient safety, particularly in relation to the completeness and accuracy of medical record documentation. According to national hospital accreditation standards, timely and accurate medical record completion is a mandatory indicator of patient safety (Kementrian Keshatan RI, 2022). Therefore, EMR should be understood not only as an administrative tool but also as a critical clinical instrument that supports patient safety, reduces the risk of incidents, and facilitates interprofessional coordination.

The study presented by Adeshina (2025) In the context of American hospitals, the implementation of a predictive analytics-based digital monitoring system significantly assisted hospital directors in responding to indicators that deviated from KPI targets, including service speed, nurse workload, and bed occupancy. This demonstrates that digital transformation in performance management not only

increases efficiency but also improves the quality of clinical and managerial interactions.

The integration of digital monitoring systems has further demonstrated its potential in improving hospital management responsiveness. Adeshina (2025) reported that predictive analytics-based monitoring systems enable hospital leaders to identify and respond promptly to deviations from KPI targets, including delays in service delivery, nurse workload imbalances, and bed occupancy issues. This indicates that digital transformation contributes not only to efficiency but also to the quality of clinical and managerial processes.

Furthermore electronic medical record systems are very effective in managing risks in both clinical and administrative settings.Internal audits service issue root cause analysis and trustworthy legal documentation are all made easier with structured electronic data (Adeshina, 2025). In order to foster openness and sound administration in healthcare facilities, these features emphasize the need of combining performance management and digital information systems.

Organizational level success in implementing key performance indicator and electronic medical record systems depends on buy-in from upper management and buy-in from healthcare providers.Type B Hospital in Surabaya, as one of the referral hospitals in East Java has considerable potential to optimize the integration of these systems in order to improve service effectiveness accelerate response times, and reduce patient waiting times. However, achieving this requires not only technological readiness but also the development of human resource competencies and organizational culture.

Key performance indicators (KPIs) provide quantifiable markers to evaluate the efficacy and efficiency of healthcare services and they are,conceptually speaking,an essential part of hospital strategic management Wait times,patient satisfaction,infection rates,and patient safety problems are all examples of process indicators (Adeshina, 2025). Continuous monitoring of KPIs has been shown to improve nursing performance through transparent and objective evaluation mechanisms.

However effective KPI implementation is highly dependent on the availability of reliable information systems.Without adequate system integration KPI monitoring may become an administrative burden rather than a tool for performance improvement (Asmoro & Nazar, 2024). Therefore collaboration among healthcare units is essential to ensure that KPIs are relevant and reflect actual clinical needs.

On the other hand EMR serves as a digital solution designed to enhance the quality, security, and efficiency of health information management. EMR enables the integration of patient data across multiple service units allowing healthcare professionals to access comprehensive and up-to-date clinical information (Nugroho & Pramudita, 2024). Additionally EMR systems can support clinical decision-making through the implementation of Clinical Decision Support Systems (CDSS) which contribute to reducing medical errors and improving treatment outcomes (Sowan & Ha, 2024).

The optimal use of EMR has been associated with reduced medical errors, improved service flow and increased patient satisfaction Novitri et al., (2024). EMR also supports audit processes and facilitates data collection for quality reporting, thereby enhancing organizational performance evaluation (Y. W. Putri et al., 2024).

The integration of KPIs and EMR provides a comprehensive framework for managing hospital service quality.KPIs function as performance measurement tools while EMR serves as a platform for recording and reporting performance data. Hospitals that successfully integrate both systems tend to experience improvements in documentation accuracy and service efficiency (Raaphorst, 2024).This integration also supports the principles of CQI where improvements are driven by objective and continuously updated data (Nabovati et al., 2023).

Finally the success of KPI and EMR implementation is strongly influenced by organizational readiness including human resource capacity, infrastructure availability, and organizational culture (Danang et al., 2024).Leadership commitment plays a crucial role in encouraging compliance with digital systems through supervision, incentives, and performance-based evaluation (Harris et al., 2025).In addition nurses knowledge and attitudes significantly affect the consistency of EMR utilization (Wan et al., 2025).Without adequate understanding,

digital documentation may be treated merely as a formality rather than as a tool for improving service quality.

Based on the identified research gap this study aims to examine the combined effect of nurse KPI implementation and EMR utilization on hospital service quality in a Type B hospital in Surabaya. Unlike previous studies that analyzed these variables separately this study emphasizes their integrated role in supporting service effectiveness, patient safety and data-driven decision-making.The findings are expected to contribute to the development of evidence-based management strategies and support hospital accreditation processes through the optimization of performance management and digital health systems.

## METHODS

Nurses use of KPIs EMR usage and the quality of hospital services were the subjects of this quantitative research which used a cross-sectional correlational technique.To evaluate the strength and direction of correlations between variables in an uncontrolled environment, this approach was thought to be suitable (Yuniar et al., 2024). By employing this approach the data obtained were expected to reflect real conditions in hospital practice thereby increasing the relevance and applicability of the findings.

The study was conducted over a three-month period, from January to March 2025, which included stages of research preparation, data collection, data analysis, and reporting. All procedures were carried out systematically to ensure methodological rigor, data validity, and analytical accuracy. The study population consisted of all nurses working in a Type B Hospital in Surabaya who were actively involved in clinical services, nursing documentation using ERM, and the implementation of performance indicators at the unit level. Based on internal hospital data, the total population was approximately 134 active nurses distributed across various service units (Putri, F., & Erianti, 2025).

A purposive sampling technique was employed to select respondents who met specific inclusion criteria. These criteria included nurses with a minimum of two years of work experience, active access to the ERM system, and direct involvement

in nursing service delivery. In addition, participants were required to provide informed consent and demonstrate willingness to participate in the study. Nurses who were on leave or not actively working during the data collection period were excluded from the study.

The final sample consisted of 100 respondents. Taking into account the possible response rates, statistical needs for multivariate analysis, and the Slovin method with a 5% margin of error, the sample size was estimated. In order to do multiple linear regression analysis with acceptable statistical power, this sample size was considered suitable.

A standardized questionnaire was electronically distributed via Google Forms to collect primary data from 100 respondents. The instrument was designed to assess three main variables: perceived service quality, EMR utilization, and KPI implementation. The KPI implementation variable was measured using 10 questionnaire items, covering aspects such as performance monitoring, target achievement, and compliance with clinical standards. The EMR utilization variable consisted of 8 items, which evaluated system usage, ease of use, data accessibility, and perceived usefulness. Meanwhile, the service quality variable was measured using 12 items, reflecting dimensions such as responsiveness, reliability, assurance, empathy, and tangibles in nursing services. A Likert scale was used to systematically measure respondents' perceptions for each variable, ranging from 1 (strongly disagree) to 5 (strongly agree) (Novitri et al., 2024).

In addition to the main data, secondary data was gathered by reviewing documents, such as quality reports from hospitals, audit records of ERM use, and internal performance reports on key performance indicators.In order to have a better grasp of how systems are implemented in hospitals, this triangulation technique was used to strengthen the reliability of the results.

Furthermore, in order to evaluate the real application of nursing documentation procedures, direct observations were carried out in certain service units. This stage was used to ensure that self-reported data aligns with real-world practices and to assess how much ERM usage helps accomplish KPIs (Novitri et al., 2024).

Theory and prior research served as the basis for the research instrument's development. Criteria for hospital accreditation and national healthcare performance standards served as the basis for key performance indicator adaptations.At the same time the ERM variable was built utilizing the TAM, which centers on the idea that two important factors that impact system adoption are how valuable and easy the system is considered to be used (Purba et al., 2025).

The statistical package for social science research was used for data analysis. To describe the characteristics of the respondents and the distributions of the variables, descriptive statistics were used. To investigate the impact of independent factors on service quality, inferential analysis was performed using multiple linear regression. To guarantee the regression model was valid, traditional assumption tests were run before hypothesis testing. These tests included checking for normality (Kolmogorov-Smirnov), autocorrelation (Durbin-Watson), heteroscedasticity (Heuer), and multicollinearity (Variance Inflation Factor). According to Danang et al. (2024), a p-value less than 0.05 was used for significance.

To demonstrate the extent of KPI adoption ERM use, and perceived service quality, descriptive analysis findings were given as percentages, mean scores, and frequency distributions. In order to bolster the debate, these data were further analyzed by comparing them with relevant literature.

Health Research Ethics Committee approval (No. 57/Dep.Kep/XII/2025) was sought for this investigation. Prior to their participation in the research, all individuals gave their informed permission. Throughout the study, we made sure that the respondents' identities and confidentially were protected. There was strict adherence to academic data storage and usage policies (Ellis & Taylor, 2024). Additionally, all procedures followed the institutional research rules and were carried out in compliance with well-established ethical standards (Levitt et al., 2018).

## RESULTS

The purpose of this research is to examine how a Type B hospital in Surabaya, Indonesia, managed to improve service quality after implementing nurse Key

Performance Indicator (KPI) and EMR systems.Findings are offered in terms of respondent characteristics descriptive statistics of variables and multiple linear regression analysis based on data obtained from 100 nurse respondents.

According to the breakdown of respondent characteristics 62% of the participants were female and 38% were male.Considering the duration of their job, the majority of respondents (55%) with a total of more than 5 years of experience were followed by 30% with 3-5 years and 15% with less than or equal to 2 years.While 46% of respondents obtained a Diploma (D3) in Nursing, 54% held a Bachelor's degree in Nursing.

**Table 1.** Distribution of Respondent Characteristics

| Characteristics | Frequency (n) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| - Male | 38 | 38 |
| - Female | 62 | 62 |
| **Years of Employment** | | |
| - >2 years | 15 | 15 |
| - 3–5 years | 30 | 30 |
| - > 5 years | 55 | 55 |
| **Last Education** | | |
| - D3 in Nursing | 46 | 46 |
| - S1 in Nursing | 54 | 54 |

The results of the descriptive analysis show that nurse KPI implementation was categorized as high, with a mean score of 4.12 (SD = 0.51). ERM utilization was categorized as fairly high, with a mean score of 3.95 (SD = 0.63). Meanwhile, service quality had the highest mean score of 4.20 (SD = 0.47), which falls into the high category.

These findings suggest that, overall, respondents perceived service quality to be well-established, supported by relatively strong KPI implementation and ERM utilization, although there is still room for improvement, particularly in optimizing digital system usage.

**Table 2.** Average Scores for KPI Implementation, ERM Usage, and Service Quality

| Variable | Mean | SD | Category |
|---|---|---|---|
| KPI Implementation | 4.12 | 0.51 | High |
| ERM Usage | 3.95 | 0.63 | Fairly High |
| Service Quality | 4.20 | 0.47 | High |

According to the multiple linear regression analysis there is a substantial relationship between service quality and both the independent variable of KPI implementation and the dependent variable of ERM use.

A strong correlation between improved KPI implementation and greater service quality has been shown (B = 0.427; t = 5.221; p < 0.001) suggesting that KPI implementation positively and significantly impacts service quality.It may be inferred that better usage of electronic medical records leads to higher quality healthcare services since ERM utilization likewise has a positive and statistically significant impact on service quality (B = 0.365; t = 4.879; p < 0.001).

This baseline level of service quality is shown by the constant value (B = 1.147; p = 0.027) when the independent variables are not included.It is greatly increased when KPI implementation and ERM use are included.

**Table 3.** Multiple Linear Regression Results

| Variable | B | t | Sig |
|---|---|---|---|
| KPI | 0.427 | 5.221 | <0.001 |
| ERM | 0.365 | 4.879 | <0.001 |
| Constant | 1.147 | 2.231 | 0.027 |

## DISCUSSION

This study set out to examine how nurse Key Performance Indicator (KPI) implementation and the use of Electronic Medical Records (ERM) contribute to service quality in a Type B hospital in Surabaya.According to the results these factors significantly affect the final product of the service Several issues were noted before the deployment, such as the fact that performance evaluations were uneven and that nursing documentation was delayed both of which might have an impact on the quality of service provided.Although both aspects are statistically significant, it seems that KPI implementation has a somewhat greater impact (β = 0.427) than ERM usage (β = 0.365). When taken as a whole these factors account for a large 54.7% of the variance in service quality ($R^2$ = 0.547) in the field of healthcare service research.

Implementing key performance indicators (KPIs) is crucial in increasing service quality according to one of the study's main discoveries Key performance indicators, or KPIs are useful because they allow organizations to turn their lofty objectives into quantifiable day-to-day practises. Along with following clinical standards, nurses are also urged to be consistent in their documentation, responsiveness, and use of established processes. Accordingly, key performance indicator (KPI) implementation does double duty as a monitoring tool and a behavioral shaper for nurses in the workplace by promoting the use of quantifiable performance criteria in routine clinical work. Yuniar et al (2024) found that accountability is strengthened and healthcare outcomes are improved when performance indicators are well-designed. In addition, key performance indicator dashboards enable managers to make faster, evidence-based choices while keeping performance under closer scrutiny (Nabovati et al., 2023; Raaphorst, 2024).

Interesting, key performance indicator (KPI) effects were marginally greater than enterprise risk management (ERM) effects which may indicate that basic clarity in performance goals is more important than technology.Put simply digital systems are often at their peak performance when they are integrated within a well-defined performance framework. Since some nurses may still have trouble adjusting to EDSs, the efficacy of ERM usage may differ according on users level of digital literacy and the ease of the system.It is possible that ERM systems will be used more for administrative compliance than to enhance the quality of care provided, given the absence of established criteria An important practical point is brought up by this finding technology is not enough on its own the effectiveness of technology is dependent on how well it is integrated with performance management systems.

Although this is the case there is no denying that ERM implementation improves service quality.Better clinical decision-making is enabled by the use of digital records which provide more accurate and accessible patient information. Electronic documentation has been highlighted in prior research as a means to enhance coordination among healthcare professionals decrease the likelihood of mistakes, and shorten wait times (Putri et al., 2024; Sowan & Ha, 2024).These enhancements are strongly associated with essential aspects of service quality such as dependability and responsiveness in everyday practice (Novitri et al., 2024).

When considered together KPI implementation and ERM utilization reflect a broader shift toward data-driven management in healthcare.Hospitals that combine structured performance indicators with integrated digital systems are generally better positioned to monitor service delivery identify gaps and respond more quickly to emerging issues (Fallahnezhad et al., 2025). The relatively high explanatory power of the model in this study further supports the idea that these two components are strategically important for sustaining service quality improvements.

However it is equally important to recognize that nearly half of the variation in service quality (45.3%) is influenced by factors not captured in this model This suggests that elements such as leadership style, organizational culture, workload balance, and even patient characteristics may also play a significant role As highlighted in previous research the success of digital transformation in healthcare is often closely tied to leadership commitment and organizational readiness (Harris et al., 2025).Therefore strengthening KPI and ERM integration should go hand in hand with broader organizational development efforts.

The results of this study have obvious consequences for managers.Instead of implementing KPI systems independently hospitals should integrate them directly with ERM platforms The use of digital records for real-time performance monitoring may facilitate quicker decision-making by increasing transparency.Additionally it is critical to provide nursing staff with continual training so they can become proficient with the technologies and apply them successfully in clinical practice.

A substantial addition to the literature is also provided by this research From the point of view of frontline nursing personnel in particular this study emphasizes the combination and complementary benefits of KPI implementation and ERM usage, while many other studies have focused on these factors alone.For healthcare facilities aiming to enhance quality improvement programs and fulfill accreditation requirements this holistic approach offers useful insights.

There are a number of caveats that must be considered notwithstanding these advancements Because of its cross-sectional design and the fact that it was carried

out in only one hospital the research cannot be utilized to draw any conclusions about cause and effect.To get a better grasp of the dynamics of service quality future research may use a longitudinal approach and include other factors like leadership effectiveness organizational culture or patient happiness.

The results show that using ERM and implementing KPIs both greatly improve the quality of healthcare services Instead than concentrating on organized performance assessment like KPI does ERM improves the precision and availability of clinical data used in everyday practice.Depending on staff consistency and system integration across units, aligning performance indicators with digital documentation is not always easy in real circumstances More evidence-based decision-making in healthcare services is made possible via the integration of key performance indicators (KPIs) and enterprise resource planning (ERP).This complementary approach allows for performance monitoring to be backed by accurate and real-time data In the long run, this connection helps with CQI by letting hospitals better track performance and react quickly to service issues.

## CONCLUSION

This study demonstrates that the implementation of nursing Key Performance Indicators (KPIs) and the utilization of Electronic Medical Records (ERM) have a statistically significant effect on improving hospital service quality. KPI implementation showed a stronger influence, indicating that structured performance measurement plays a critical role in guiding nursing practices. Meanwhile, ERM contributes by enhancing the accuracy, timeliness, and completeness of clinical documentation, which supports better service delivery.

These findings highlight that the integration of KPI-based performance management with digital health systems is essential for achieving sustainable quality improvement. Hospitals are therefore encouraged to strengthen KPI implementation and optimize ERM utilization through continuous training, system integration, and organizational support to ensure more effective, efficient, and data-driven healthcare services..

## REFERENCES

Adeshina, Y. T. (2025). Strategic implementation of predictive analytics and business intelligence for value-based healthcare performance optimization in the US health sector. International Journal of Computer Applications Technology and Research. https://doi.org/10.7753/IJCATR1212.1014

Clancy, C., Shine, C., & Hennessy, M. (2022). Hospital performance: An analysis of HSE key performance indicators.

Danang, F., Asmoro, D., & Ningtiyas, S. (2024). The effect of key performance indicators and management control systems on employee performance. Journal of Management Studies, 2(3), 817–823.

Ellis, A., & Taylor, M. (2024). A qualitative analysis of the role of the Hospital in the Home registered nurse in Australia. Collegian, 32(1), 1–8. https://doi.org/10.1016/j.colegn.2024.09.004

Fallahnezhad, M., Langarizadeh, M., & Vahabzadeh, A. (2025). Key performance indicators of hospital supply chain: A systematic review. BMC Health Services Research. https://doi.org/10.1186/s12913-024-11954-5

Farantos, G. I., & Dounias, G. (2024). Key performance indicators in occupational health and safety of hospitals: A systematic review with meta-analysis protocol. Academic Journal of Business, Administration, Law and Social Sciences, 10(1), 1–15. https://doi.org/10.2478/ajbals-2024-0001

Harris, R., Sims, S., & Leamy, M. (2025). Leadership and organizational readiness in nursing performance improvement: A realist review. International Journal of Nursing Studies, 165, 105016. https://doi.org/10.1016/j.ijnurstu.2025.105016

Kementerian Kesehatan Republik Indonesia. (2022). Peraturan Menteri Kesehatan Republik Indonesia Nomor 24 Tahun 2022.

Lilianti, A. (2024). Service quality optimization: A review of quality function deployment implementation. Journal of Health Management, 4(3), 1242–1253.

Magedanz, L., Lêdo, H., Dayani, S., Fernando, G., & Llimos, F. (2024). Clinical pharmacy key performance indicators for hospital inpatient settings: A systematic review. International Journal of Clinical Pharmacy, 46(3), 602–613. https://doi.org/10.1007/s11096-024-01717-x

Mehrolhassani, M. H., Behzadi, A., & Asadipour, E. (2025). Key performance indicators in emergency department simulation: A scoping review. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine. https://doi.org/10.1186/s13049-024-01318-7

Nabovati, E., Farrahi, R., Sadeqi Jabali, M., Khajouei, R., & Abbasi, R. (2023). Identifying and prioritizing key performance indicators for hospital management dashboards. Health Informatics Journal, 29(4). https://doi.org/10.1177/14604582231221139

Novitri, A., Hasibuan, R., Harahap, J. W., Agustina, D., & Hasibuan, S. R. (2024). Strategies for optimizing healthcare services through hospital information system implementation. Jurnal Kesehatan, 7(5). https://doi.org/10.56338/jks.v7i5.5075

Purba, S. H., Khairani, C., & Wanny, N. (2025). Optimization strategies for hospital information systems to improve hospital performance. Journal of Health Systems, 3, 1–12.

Putri, Y. W., Saragih, T. R., Purba, S. H., et al. (2024). Implementation and impact of electronic medical record systems in healthcare services. Sehat Rakyat Journal. https://doi.org/10.54259/sehatrakyat.v3i4.3449

Raaphorst, N. (2024). Frontline enablement through performance management: An empirical conceptualization. Public Management Review, 26(6), 1658–1683. https://doi.org/10.1080/14719037.2023.2212255

Samadbeik, M., Engstrom, T., Lobo, E. H., Kostner, K., Austin, J. A., & Pole, J. D. (2024). Healthcare dashboard technologies and data visualization: A scoping review.

Situmeang, W. Y., Sumampow, M., Chain, V., Lestari, P., & Handiyani, H. (2023). Strategic planning of nursing management information systems in urban hospitals. International Journal of Nursing Studies. https://doi.org/10.58467/ijons.v3i1.49

Sowan, A., & Ha, B. (2024). Maximizing the impact of smart pump–EHR interoperability in critical care. Intensive and Critical Care Nursing, 85, 103809.

Wan, T., Wang, C., Shi, J., & Wu, S. (2025). The effect of nursing decision implementation on emergency patients with acute myocardial infarction.

Yuniar, V. R., Zabina, K. A., Zakiah, M. N., et al. (2024). The role of key performance indicators in improving hospital service quality: A literature review.