

Improving Healthcare Quality Through Lean Management: Best Practices in Hospital Operations

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Abstract

Transforming healthcare quality requires a systematic approach to optimizing hospital operational efficiency amidst resource constraints and increasing patient expectations. The global healthcare industry currently faces significant challenges in balancing service quality improvement with optimal operational efficiency. This study aims to identify and analyze optimal lean management implementation practices to improve hospital operational quality through a comprehensive, structured, systematic literature review employing rigorous methodological standards. The research methodology uses the PRISMA protocol with an in-depth analysis of five high-quality articles from 2020-2024 sourced from leading academic databases such as PubMed, Scopus, Web of Science, and Google Scholar. The article selection process comprised three comprehensive stages: title screening, abstract evaluation, and full-text analysis, to ensure the validity and reliability of the research findings. Inclusion and exclusion criteria were strictly applied to ensure the quality of the articles analyzed. The results show that the implementation of lean instruments such as value stream mapping, kaizen, and 5S resulted in significant multidimensional improvements in various aspects of hospital operations. Waiting time reductions reached 30-50%, patient satisfaction amplification by 15-25%, operational cost reductions by up to 80%, and process cycle duration reductions by up to 60%. Determining factors for success include consistent transformational leadership, comprehensive and ongoing staff education, the establishment of a culture of continuous improvement, and a holistic, participatory approach involving all levels of the organization from management to operational staff. Key identified barriers included resistance to organizational change and workload intensification, which required specific mitigation strategies. The study concluded that lean management is an effective strategy in transforming the healthcare ecosystem when implemented through a systematic approach that simultaneously integrates technical, managerial, and organizational dimensions to achieve sustainable quality improvement and long-term impact on hospital performance.

Keywords: Healthcare Quality, Lean Management, Hospital Operation

1. Introduction

The global healthcare industry is currently facing significant challenges in improving the quality of services while optimizing operational efficiency amid limited resources and increased patient expectations. Hospitals as primary healthcare providers are required to carry out comprehensive management transformations to achieve competitive advantage and long-term sustainability (Wang et al., 2025). In this context, *Lean Management* has emerged as a promising systematic approach to addressing the complexity of modern hospital operational

challenges. This methodology derived from Toyota's production system focuses on the elimination of waste (*Waste*), maximizing value for patients, and creating a culture of continuous improvement in healthcare organizations. A review of the literature shows that the implementation of *Lean Management* has significant potential to improve hospital quality in various domains, including patient flow efficiency, reduced wait times, increased patient satisfaction, and optimized utilization of medical resources (Talero-Sarmiento et al., 2024). Research (Zepeda-Lugo et al., 2020) confirms that the approach *Lean* can have a positive impact on inpatient care through reduced length of stay and improvement *Throughput* patient.

Several leading hospitals have reported success in applying the principles *Lean* to improve their operational performance. Previous research has explored various aspects of implementation *Lean* in the context of hospitals. (Shortell et al., 2021) found that the level of implementation *Lean* comprehensively, correlated with a decrease in hospitalization costs per admission, a reduction in the rate *Readmissions* unplanned in 30 days, and a significant improvement in patient experience scores. Study (Mahmoud et al., 2021) disclose that the practice *Lean Management* It is increasingly being adopted in hospitals, but its impact on frontline staff and organizational culture has not been comprehensively synthesized. Despite this, most studies still focus on implementation *Lean* in specific departments rather than a comprehensive transformation at the hospital organizational level. *Gap research* identified in the literature shows limitations of a comprehensive synthesis of best practices (*Best practices*) implementation *Lean Management* in hospital operations that include the dimensions of efficiency, quality, cost, and satisfaction simultaneously. There is a knowledge gap related to the determinants of success and obstacles in maintaining implementation *Lean* in the long term, especially in the context of hospitals with different organizational characteristics.

Novelty (*Novelty*) This research lies in the *Systematic Literature Review* that integrates the latest empirical findings from the 2020-2024 period to identify, analyze, and synthesize implementation best practices *Lean Management* in improving the quality of health services in hospitals. (Tierney et al., 2022) emphasizing the importance of connecting management systems *Lean* with a quality improvement maintenance management process to achieve optimal results. Based on this background, the formulation of this research problem is: (1) How is the best practice of implementation *Lean Management* in hospital operations?; (2) How to influence *Lean Management* to the dimension of health service quality?; (3) What are the factors that support and inhibit the success of implementation *Lean Management* in the hospital?

The purpose of this study is to identify and analyze best practices for the implementation of *lean management* in hospital operations through a systematic review of the literature, evaluate its impact on improving the quality of health services, and identify key factors that facilitate or hinder the success of its implementation. The benefit of this study is theoretically to enrich the literature on healthcare operational management by providing a comprehensive evidence-based synthesis of lean implementation in hospitals. Practically, the results of this study are expected to provide strategic guidance for hospital managers, health policy makers, and *lean* practitioners in designing, implementing, and maintaining effective *lean management* programs to improve the quality of health services in a sustainable manner.

2. Literature Review

2.1 Concepts and Principles of Lean Management in Healthcare

Concept *Lean Management* In the context of health services, it is an adaptation of a

management philosophy that is oriented towards creating maximum value for patients through the systematic elimination of various forms of waste in the service process. Wang et al. (2024) explain that the *Lean* Focuses on identifying and eliminating activities that don't add value, such as excessive wait times, unnecessary movements, redundant processes, and preventable medical errors. Fundamental principles *Lean* includes the setting of values from the patient's perspective, the mapping of value streams (*Value Stream*), creation of a smooth process flow, traction system (*Pull System*), and the pursuit of perfection through continuous improvement. (Talero-Sarmiento et al., 2024) affirms that the implementation of *Lean* Successful requires a profound transformation of the organization's culture, consistent leadership commitments, and the empowerment of frontline staff to be actively involved in problem identification and the development of innovative solutions.

2.2 Implementation of Lean Tools and Techniques in Hospitals

Various *Tools* and engineering *Lean* It has been widely applied in various hospital departments with varying but generally positive results. (Shortell et al., 2021) identifies that *Tools* like *Value Stream Mapping* used to visualize and analyze patient flow from admission to *Discharge*, while the 5S technique (*Sort, Set in order, Shine, Standardize, Sustain*) is applied to organize clinical workspaces to improve efficiency and safety. (Zepeda-Lugo et al., 2020) reports that *Kaizen Events* or a quick fix workshop has successfully reduced the process cycle time in the emergency department and operating room. (Pakdil et al., 2020) In his study, it was found that the implementation of *Visual Management Boards* facilitate more effective team communication and transparency of operational performance *Real-time*, thus allowing for a quick response to deviations from established standards.

2.3 The Impact of Lean Management on Service Quality and Efficiency

Empirical evidence shows significant impact of implementation *Lean Management* to various hospital performance indicators. (Mahmoud et al., 2021) In a systematic review they revealed that *Lean* Contributing to a reduction in patient waiting time by 30-50%, an increase in patient satisfaction by 15-25%, and a reduction in operational costs through more optimal resource utilization. (Tierney et al., 2022) demonstrate a positive correlation between the maturity of the management system *Lean* with improved clinical quality indicators, including a decrease in nosocomial infection rates, a reduction in medication errors, and increased adherence to evidence-based clinical protocols. (Henrique et al., 2016) emphasizes that long-term benefits *Lean* It is not only limited to operational efficiency, but also includes the formation of organizational capabilities to adapt to changes in the external environment and increasingly complex regulatory demands in the contemporary healthcare industry.

3. Research Method

3.1 Research Design

This study uses the *Systematic Literature Review* (SLR) to identify, evaluate, and synthesize empirical findings related to implementation *Lean Management* in improving the operational quality of the hospital. The SLR method was chosen for its ability to provide a comprehensive and objective analysis of the available literature, resulting in reliable evidence-based conclusions (Kraus et al., 2022).

3.2 Literature Search Strategy

Literature searches are carried out systematically on reputable electronic databases including

PubMed, Scopus, Web of Science, and Google Scholar with a publication time range of 2020-2025. The keywords used include a combination of "lean management", "lean healthcare", "hospital operations", "quality improvement", and "best practices" using Boolean AND/OR operators. Inclusion criteria include journal articles published in English or Indonesian, empirical and conceptual research that discusses the implementation of *lean* in hospitals, and articles indexed in reputable journals. Exclusion criteria include editorial articles, conference papers without peer review, and research outside the hospital context.

3.3 Data Selection and Extraction Process

The article selection process is carried out through three stages: title screening, abstract evaluation, and complete text analysis. Each article is evaluated for quality using standardized assessment protocols to ensure the validity and reliability of the findings. The data extracted included study characteristics, *lean implementation methods*, tools used, measured performance indicators, and implementation results on the quality of health services.

3.4 Data Analysis and Synthesis

The collected data were analyzed using a thematic approach to identify patterns, trends, and best practices for implementing *lean management*. Narrative synthesis was conducted to integrate findings from various studies and develop a comprehensive conceptual framework regarding the factors influencing the successful implementation of *lean* in the hospital context.

4. Findings and Discussions

4.1 Results

4.1.1 Article Screening

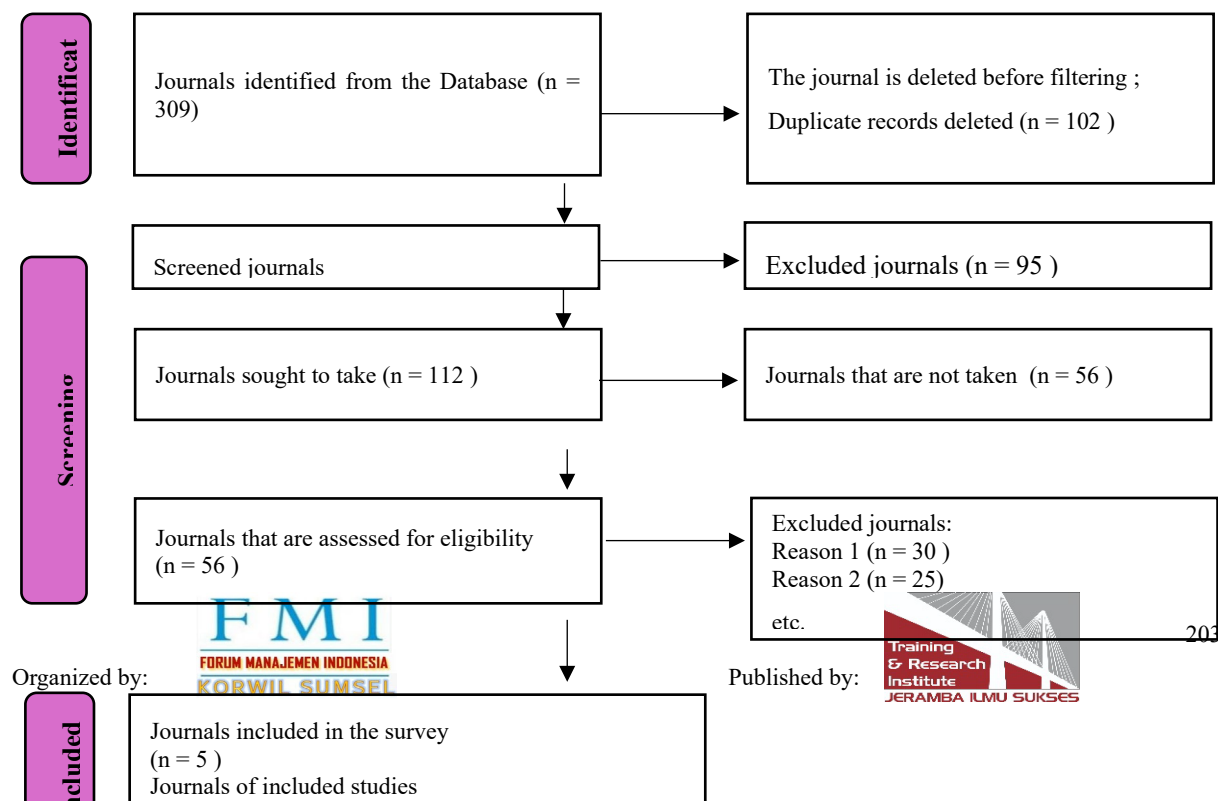


Figure 1. PRISMA flowchart

The article selection process follows PRISMA guidelines to ensure transparency and reproducibility of systematic reviews. The identification stage resulted in 309 articles from various electronic databases which were then filtered to eliminate 102 duplicates. The screening process for titles and abstracts left 207 articles which were further reduced to 112 articles for the evaluation of the completeness of the text. Of these, 56 articles were assessed for in-depth feasibility and 53 articles were excluded because they did not meet inclusion criteria such as the context of research outside the hospital, inappropriate methodology, or low research quality. The final results show 5 high-quality articles that meet all inclusion criteria and are relevant to answer research questions regarding the best practices of implementing lean management in improving the quality of hospital operations.

4.1.2 Summary of Key Findings

Table 1. Synthesis

N o.	Author & Year	Heading	Research Focus	Subject	Method	Key Findings	Implication	Relevance to Research
1	(Rooslanda & Ayunin gtyas, 2023)	Implementation of Lean Management for Hospital Service Quality Improvement	Implementation of <i>lean management</i> to improve the quality of hospital services	Journal article for the period 2018-2023	<i>Systematic Literature Review</i> with PRISMA	Quality improvement is focused on maximizing value-added activities and eliminating non-value-added	Provide lean <i>implementation guidance</i> for healthcare quality optimization	Become the main reference for the SLR methodology and focus on improving quality through <i>lean</i>

						activities ; <i>Lean</i> effectivel y maximiz es resources		
2	(Victori a, 2024)	Impleme nting Lean Managem ent Principles to Optimize Healthcar e Facility Operation s	Optimiza tion of health facility operation s using <i>lean</i> <i>principle</i> s	Health care institut ions	Critical literatur e review	<i>Value</i> <i>stream</i> <i>mapping</i> , <i>kaizen</i> , and 5S are effective in reducing wait times and improvin g patient flows; the main obstacle is change resistanc e	The importan ce of leadershi p commit ment, staff training, and a culture of continuo us improve ment	Identify specific <i>lean</i> <i>tools</i> and impleme ntation barriers in hospitals
3	(Ayaad et al., 2022)	Adopting Lean Managem ent in Quality of Services, Cost Containm ent, and Time Managem ent	The role of <i>lean</i> adoption in service quality, cost control, and time manage ment	360 respon dents at King Hussei n Cancer Center, Jordan	<i>Cross-</i> <i>section</i> <i>al</i> with questio nnaire	Lean adoption had a significa nt impact on service quality (3.84±0. 56), cost control (3.40±0. 76), and time manage ment (3.73±0. 75); organizat ional, departme	<i>Lean</i> is shown to simultan eously improve all three dimensio ns of performa nce in oncology settings	Demonst rate the quantitati ve impact of <i>lean</i> on efficienc y, quality, and cost

						ntal, and individua l factors had a substanti al influence		
4	(Prado- Prado et al., 2020)	Increasing Competiti veness through the Impleme ntation of Lean Managem ent in Healthcar e	Participat ory methodol ogy of <i>lean</i> impleme ntation for competiti ve advantag e	Sleepi ng units of public hospita ls in Spain	<i>Action research</i>	Impleme ntation of <i>holistic lean</i> (people, process, and KPI pillars) results in increased effective ness, efficienc y, patient flow quality, and <i>lean culture transfor mation</i>	Participa tory approach involvin g staff across the entire service value chain improves impleme ntation sustainab ility	Provide a compreh ensive <i>lean</i> impleme ntation methodol ogy framework
5	(Abdallah, 2020)	Healthcar e Engineering: A Lean Managem ent Approach	Lean impleme ntation in healthcar e with a focus on success factors and barriers	18 hospita ls in Jordan	Statistic al surveys and analysis	Organiza tional leadershi p is the dominant factor of success; educatin g physician s on <i>lean</i> is crucial; impleme ntation results in a 60% reduction in cycle time and	The importan ce of involvin g doctors in the improve ment team and developi ng a complete impleme ntation framework	Identify the key success factors and barriers to <i>lean impleme ntation</i>

80% in
operation
al costs

4.2 Discussion

4.2.1 Best Practices for Implementing Lean Management in Hospital Operations

The results of the literature synthesis identified some of the best practices that are consistently applied in the implementation of lean management in hospitals. Rooslanda et al. (2023) emphasize the importance of focusing on maximizing value-added activities while eliminating activities that do not provide value to patients. Tretiak (2024) revealed that specific tools such as value stream mapping, kaizen, and 5S have proven to be effective in reducing wait times and optimizing patient flows in various hospital departments. Prado-Prado et al. (2020) added that a holistic approach that integrates three main pillars—personnel, processes, and key performance indicators (KPIs)—results in more sustainable transformation than partial implementation. Best practices also include the use of participatory methodologies that involve all staff in the service value chain to increase ownership and long-term commitment to lean initiatives.

4.2.2 The Impact of Lean Management on the Dimension of Healthcare Quality

The findings of the study show the multidimensional impact of the implementation of lean management on the quality of hospital services. Ayaad et al. (2022) reported significant improvements in three key dimensions: service quality with a score of 3.84 ± 0.56 , time management reaching 3.73 ± 0.75 , and cost control with a score of 3.40 ± 0.76 . Abdallah (2020) demonstrated more dramatic results with a 60% reduction in process cycle time and an 80% reduction in operational costs after a comprehensive lean implementation in Jordanian hospitals. (Mahmoud et al., 2021) Identify the positive impact of lean on staff morale, motivation, and job satisfaction, although it also notes potential negative effects such as work intensification and stress if implementation is not managed properly. These findings confirm that lean management is able to simultaneously improve operational efficiency, clinical quality, and stakeholder satisfaction when applied with a structured, evidence-based approach.

4.2.3 Supporting Factors and Inhibiting Successful Implementation

An analysis of the factors that influence the success of implementation reveals the crucial role of organizational leadership and medical staff engagement. Abdallah (2020) identifies organizational leadership as the dominant factor that determines success, followed by education and training of staff on lean principles. Tretiak (2024) highlights that resistance to change is a major obstacle that must be overcome through consistent leadership commitment and the development of a culture of continuous improvement. Zehir & Zehir (2023) added that organizational, departmental, and individual factors have a substantial influence on lean adoption and optimal performance achievement. These findings indicate that successful lean implementation requires a systemic approach that considers technical, human, and organizational dimensions simultaneously to achieve a sustainable transformation and have a significant impact on the quality of healthcare.

5. Conclusion

A systematic review confirms the effectiveness of *lean management* in transforming hospital operations through the elimination of non-value activities, process flow optimization, and

human resource empowerment. The implementation of *tools* such as *value stream mapping*, *kaizen*, and 5S resulted in a significant reduction in service cycle duration, operational costs, and amplification of patient and staff satisfaction. Successful implementation depends on a commitment to strategic leadership, the development of a culture of continuous improvement, the active involvement of medical personnel, and a holistic approach that integrates the technical-managerial-organizational dimensions simultaneously to achieve a sustainable transformation in the contemporary healthcare ecosystem.

References

- Abdallah, A. A. (2020). Healthcare Engineering: A Lean Management Approach. *Journal of Healthcare Engineering*, 2020. <https://doi.org/10.1155/2020/8875902>
- Ayaad, O., Al-Dewiri, R., Kasht, L., Qaddumi, B., & Ayyad, M. (2022). Adopting Lean Management in Quality of Services, Cost Containment, and Time Management. *Asian Pacific Journal of Cancer Prevention*, 23(8), 2835–2842. <https://doi.org/10.31557/APJCP.2022.23.8.2835>
- Henrique, D. B., Rentes, A. F., Filho, M. G., & Esposto, K. F. (2016). A new value stream mapping approach for healthcare environments. *Production Planning and Control*, 27(1), 24–48. <https://doi.org/10.1080/09537287.2015.1051159>
- Kraus, S., Breier, M., Marc, W., & Dabić, M. (2022). Literature reviews as independent studies: guidelines for academic practice Sascha. *Review of Managerial Science*, 2577–2595. <https://doi.org/10.1007/s11846-022-00588-8>
- Mahmoud, Z., Angelé-Halgand, N., Churruca, K., Ellis, L. A., & Braithwaite, J. (2021). The impact of lean management on frontline healthcare professionals: a scoping review of the literature. *BMC Health Services Research*, 21(1), 1–11. <https://doi.org/10.1186/s12913-021-06344-0>
- Pakdil, F., Harwood, T. N., & Kurtulmusoglu, F. B. (2020). *Implementing lean principles in the healthcare industry: a theoretical and practical overview*. 167–186. https://doi.org/10.1007/978-3-030-17347-0_19
- Prado-Prado, J. C., Fernández-González, A. J., Mosteiro-Añón, M., & García-Arca, J. (2020). Increasing competitiveness through the implementation of lean management in healthcare. *International Journal of Environmental Research and Public Health*, 17(14), 1–26. <https://doi.org/10.3390/ijerph17144981>
- Rooslanda, E., & Ayuningtyas, D. (2023). Implementation of Lean Management for Hospital Service Quality Improvement: Literature Review. *Journal of Social Research*, 2(8), 2488–2496.
- Shortell, S. M., Blodgett, J. C., Rundall, T. G., Henke, R. M., & Reponen, E. (2021). Lean Management and Hospital Performance: Adoption vs. Implementation. *Joint Commission Journal on Quality and Patient Safety*, 47(5), 296–305. <https://doi.org/10.1016/j.jcjq.2021.01.010>
- Talero-Sarmiento, L. H., Escobar-Rodríguez, L. Y., Gomez-Avila, F. L., & Parra-Sanchez, D. T. (2024). A literature review on Lean healthcare: implementation strategies, challenges, and future research directions. *Cogent Engineering*, 11(1).

<https://doi.org/10.1080/23311916.2024.2411857>

- Tierney, A. A., Shortell, S. M., Rundall, T. G., Blodgett, J. C., & Reponen, E. (2022). Examining the Relationship between the Lean Management System and Quality Improvement Care Management Processes. *Quality Management in Health Care*, 31(1), 1–6. <https://doi.org/10.1097/QMH.0000000000000318>
- Tretiak, O. A., Khmelnykov, A. O., Batrymenko, O. V., Karashchuk, M., & Husieva, N. (2024). Paradigmatic dimensions of local public management research: The path to reliable managerial decisions. *Amazonia Investiga*, 13(76), 228–235. <https://doi.org/10.34069/AI/2024.76.04.18>
- Victoria, T. (2024). Implementing Lean Management Principles To Optimize Healthcare Facility Operations. *Economy And Society*, 62. <https://doi.org/10.32782/2524-0072/2024-62-84>
- Wang, J., Lv, H., Chen, M., Liu, C., Ren, W., Jiang, H., & Zhang, L. (2025). A Systematic Review of Lean Implementation in Hospitals: Impact on Efficiency, Quality, Cost, and Satisfaction. *International Journal of Health Policy and Management*, 14, 8974. <https://doi.org/10.34172/ijhpm.8974>
- Zehir, C., & Zehir, S. (2023). Strategic management: Concepts and cases in a competitive environment (5th ed.). Pearson Education.
- Zepeda-Lugo, C., Tlapa, D., Baez-Lopez, Y., Limon-Romero, J., Ontiveros, S., Perez-Sanchez, A., & Tortorella, G. (2020). Assessing the impact of lean healthcare on inpatient care: A systematic review. *International Journal of Environmental Research and Public Health*, 17(15), 1–24. <https://doi.org/10.3390/ijerph17155609>

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