

The Influence of Lean Management on Worker Safety and Patient Safety Culture at Bhayangkara Brimob Kelapadua Hospital, Depok

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Abstract

In the modern era, hospitals are required to enhance worker safety and patient safety culture to provide optimal healthcare services. One approach used is *Lean Management*, which aims to reduce waste and improve efficiency in healthcare service processes. However, the implementation of *Lean Management* in hospitals still faces various challenges, particularly regarding its impact on worker safety and patient safety culture. This study aims to analyze the effect of *Lean Management* on worker safety and patient safety culture at Bhayangkara Brimob Kelapadua Depok Hospital. This research employs a quantitative method with an analytical survey design and a *cross-sectional* approach. Data were collected from healthcare workers in the inpatient unit using a validated and reliable questionnaire. Data analysis was conducted using linear regression to examine the relationships between variables. The results indicate that *Lean Management* has a positive and significant effect on worker safety ($p = 0.000$) and patient safety culture ($p = 0.000$). Additionally, worker safety acts as a mediator in the relationship between *Lean Management* and patient safety culture. These findings confirm that effective implementation of *Lean Management* can improve worker safety, which ultimately contributes to enhancing the patient safety culture. This study provides insights for hospital management on optimizing *Lean Management* implementation to create a safer work environment and improve healthcare service quality. It is recommended that hospitals strengthen training and safety policies to support more effective *Lean Management* implementation.

Keywords: *Lean Management*, Worker Safety, Patient Safety Culture, Operational Efficiency, Hospital.

Abstrak

Dalam era modern, rumah sakit dituntut untuk meningkatkan keselamatan kerja petugas dan budaya keselamatan pasien guna memberikan pelayanan kesehatan yang optimal. Salah satu pendekatan yang digunakan adalah *Lean Management*, yang bertujuan untuk mengurangi pemborosan dan meningkatkan efisiensi dalam proses pelayanan kesehatan. Namun, implementasi *Lean Management* di rumah sakit masih menghadapi berbagai tantangan, terutama terkait dengan dampaknya terhadap keselamatan kerja petugas dan budaya keselamatan pasien. Penelitian ini bertujuan untuk menganalisis pengaruh *Lean Management* terhadap keselamatan kerja petugas dan budaya keselamatan pasien di Rumah Sakit Bhayangkara Brimob Kelapadua Depok. Penelitian ini menggunakan metode kuantitatif dengan desain survei analitik dan pendekatan *cross-sectional*. Data dikumpulkan dari petugas kesehatan di instalasi rawat inap dengan menggunakan kuesioner yang telah diuji validitas dan reliabilitasnya. Analisis data dilakukan menggunakan regresi linier untuk menguji hubungan antara variabel. Hasil penelitian menunjukkan bahwa *Lean Management* memiliki pengaruh positif dan signifikan terhadap keselamatan kerja petugas ($p = 0,000$) serta budaya keselamatan pasien ($p = 0,000$). Selain itu, keselamatan kerja petugas berperan sebagai mediator dalam hubungan antara *Lean Management* dan budaya keselamatan pasien. Temuan ini menegaskan bahwa penerapan *Lean Management* yang efektif dapat meningkatkan keselamatan kerja petugas, yang pada akhirnya berkontribusi terhadap peningkatan budaya keselamatan pasien.

Penelitian ini memberikan wawasan bagi manajemen rumah sakit dalam mengoptimalkan implementasi *Lean Management* guna menciptakan lingkungan kerja yang lebih aman dan meningkatkan kualitas layanan kesehatan. Diharapkan rumah sakit dapat memperkuat pelatihan dan kebijakan keselamatan kerja untuk mendukung penerapan *Lean Management* yang lebih efektif.

Kata Kunci: *Lean Management*, Keselamatan Kerja, Budaya Keselamatan Pasien, Efisiensi Operasional, Rumah Sakit.

INTRODUCTION

Every individual has the right to safe, high-quality, and affordable healthcare services, as mandated by Article 4 of Law of the Republic of Indonesia Number 17 of 2023 concerning Health. Hospitals, as advanced healthcare service facilities, are obligated to implement good governance and service quality standards (Health Law Article 184). Furthermore, hospitals must provide clear information and protect patient rights in accordance with professional standards and regulations (Article 189). According to the World Health Organization (WHO), hospitals must reflect community needs and be resilient in facing emergency situations (WHO, 2020).

Improving hospital service quality contributes to patient safety and satisfaction. Lean healthcare is applied to minimize waste in healthcare processes through a system of continuous improvement (NEJM Catalyst, 2018). Lean management in healthcare services began to develop in the early 2000s, with various studies demonstrating its positive impact. Studies by Kim et al. (2006), Weber (2006), and Black (2008) reported that the implementation of Lean in hospitals such as Virginia Mason Medical Center (VMMC) improved operational efficiency, reduced mortality rates, and decreased medication errors. At VMMC, Lean implementation reduced patient waiting times by 85%, increased productivity by 93%, and cut inventory costs by \\$1 million (Black, 2008). Other studies also showed that hospitals in the United States, Europe, and Asia, such as The day Care and St. Mary's Health Care, experienced improved efficiency and cost reduction after implementing Lean (Graban, 2016; Ward, 2019; Wellman et al., 2017).

In Indonesia, research on lean management in hospitals has discussed various aspects such as pharmaceutical unit efficiency (Zidel, 2006), emergency department optimization (Mead, Stark & Thompson, 2023), and reductions in inpatient wait times and service duration (Pyzdek, 2021). However, few empirical studies explore the relationship between lean management and healthcare worker safety and patient safety culture. These two aspects are crucial in improving service quality and minimizing risks to medical personnel and patients (Arthur, 2011; Iswanto, 2019).

As a hospital responsible for providing quality services, Bhayangkara Brimob Kelapadua Hospital in Depok faces challenges in improving worker safety and patient safety culture. Based on the Chief of Police Decree Number: Kep/484/V/2016, *Bhayangkara Brimob* Hospital was designated as a Level III *Bhayangkara* Hospital on May 9, 2016. Therefore, this study aims to analyze the influence of lean management implementation on worker safety and patient safety culture in the Inpatient Service Unit of *Bhayangkara Brimob Kelapadua* Hospital, Depok. Through an empirical study approach, this research is expected to contribute to the development of hospital management policies to improve the effectiveness and efficiency of healthcare services.

PROBLEM FORMULATION

This study is based on the need to understand the influence of lean management in hospitals, especially regarding staff and patient safety. However, based on a preliminary survey through interviews with ten nurses, the level of worker safety and patient safety culture related to lean management implementation at *Bhayangkara Brimob* Hospital was considered low. This makes the issue worthy of further investigation.

RESEARCH OBJECTIVE

To examine and analyze the influence of lean management on worker safety and patient safety culture in the Inpatient Service Unit of *Bhayangkara Brimob Kelapadua* Hospital, Depok.

RESEARCH METHOD

This study employs a quantitative research design using a survey and cross-sectional approach. The independent variable is lean management, while the dependent variables are worker safety and patient safety culture. The population consisted of 83 nurses in the hospital's inpatient unit, with total sampling technique. Data was collected using a self-administered questionnaire, validated for reliability. Analysis included validity and reliability tests, descriptive statistics, regression assumptions, multiple linear regression, correlation coefficients, coefficient of determination, and hypothesis testing using t-tests and F-tests with SPSS version 26. Path analysis was also conducted to assess direct and indirect influences among variables.

RESEARCH RESULTS

The study found that Lean Management had a significant positive influence on both worker safety (Pearson correlation = 0.490, $p = 0.000$) and patient safety culture (Pearson correlation = 0.767, $p = 0.000$). Worker safety also showed a significant correlation with patient safety culture (Pearson correlation = 0.405, $p = 0.000$).

Linear regression analysis revealed that:

- Lean Management contributes 79.0% to patient safety culture ($R^2 = 0.790$).
- Lean Management contributes 78.8% to worker safety ($R^2 = 0.788$).
- Worker safety acts as a mediating variable in the relationship between Lean Management and patient safety culture.

The path analysis showed a direct effect of Lean Management on patient safety culture (0.748), a direct effect on worker safety (0.490), and an indirect effect on patient safety culture

through worker safety (0.411), with a total effect of 1.159.

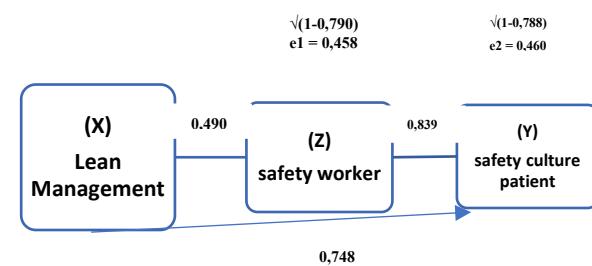
Table 1. Pearson Correlation Test

Variabel	Pearson Correlation	P-Value
Lean safety Management – patient culture	0.767**	0.000
Lean Management – safety worker	0.490**	0.000
Safety culture – safety worker	0.405**	0.000

Table 2. Result of Regresi Linear Test

Variabel Independen	B	Std. Error	Beta t	P-Value
Lean Management				
→ safety culture patient	0.748	0.079	9.107	0.000
Safety worker → safety culture patient	0.839	0.053	8.469	0.004
Lean Management → safety worker	0.490	0.143	3.455	0.000

Figure 1. Analysis Diagram Map



Based on these findings, optimal implementation of Lean Management can improve patient safety culture both directly and through improving the occupational safety of staff acting as intermediaries. Therefore, hospital management is advised to continue strengthening the implementation of Lean Management to create a safer work environment and improve the overall quality of healthcare services.

The results showed that the implementation of Lean Management contributed to improving work efficiency, occupational safety of health workers, and patient safety culture. Lean implementation that focuses on reducing waste, standardizing procedures, and optimizing workflows plays a role in creating a more structured and patient safety-oriented hospital environment.

1. The Relationship between Lean Management and Worker Safety

The results showed that the implementation of Lean Management at *Bhayangkara Brimob Hospital Kelapadua Depok* has a positive correlation with improving the occupational safety of health workers. The majority of nurses in this hospital are under 35 years old (91.57%) and have less than five years of work experience (75.90%), which poses a challenge in adapting to the new work system. However, health workers who have received Lean Management training better understand the importance of reducing non-value-added activities in their work, which in turn can reduce work fatigue and improve work safety.

The even distribution of work also contributes to the effectiveness of Lean Management in improving staff safety. Hospitals that apply Lean principles, such as the 5S method (Sort, Set in order, Shine, Standardize, Sustain), experience improvements in the management of a more organized work environment, thereby reducing the risk of accidents due to inefficient layouts.

The application of Lean Management in the occupational safety of health workers is in accordance with the Lean Thinking theory developed by Womack and Jones (1996), which focuses on the elimination of non-value-added activities and optimization of workflow. In the context of staff work safety, this principle is applied to reduce repetitive work steps and create a more ergonomic and safe working environment.

In addition, Lean Management is in line with the concept of High Reliability Organization (HRO), which emphasizes the importance of systems that can detect potential risks and proactively take preventive steps before an incident occurs (Sutcliffe & Vogus, 2021). The study of Ratnaningrum et al. (2023) found that hospitals implementing Lean experienced a 30% reduction in the incidence of workplace accidents within one year of implementation. The study of Sugiharto et al. (2022) also supported these findings by showing that standardization of work procedures in Lean increased health worker satisfaction by 25%, which had an impact on work safety as medical personnel could work with more focus without feeling burdened by inefficient processes.

Another study by Hardjo et al. (2021) highlighted that the readiness of health workers to accept system changes plays an important role in the success of Lean Management. Hospitals that provided training and mentoring on Lean showed a higher level of occupational safety compared to hospitals that only implemented the system without training. Therefore, continuous training is a key factor in ensuring that Lean principles can be effectively implemented.

This study provides novelty in analyzing the effect of Lean Management on occupational safety in hospitals with the majority of health workers who are young and have relatively short work experience. While most previous studies have highlighted service efficiency and productivity improvements, this study explores how Lean Management can influence the occupational safety of health workers in a developing work environment.

2. Relationship between Lean Management and Patient Safety Culture

The results showed that the implementation of Lean Management has a significant influence on patient safety culture, with a p value of 0.000. The better the implementation of Lean, the better the patient safety culture in the hospital. Lean Management contributes to creating a more

organized work environment through reducing waste, optimizing workflow, and standardizing procedures.

Health workers working in a Lean-based system are more disciplined in following patient safety protocols, including hand hygiene, double-checking medications, and the use of medical procedure checklists. A more systematic and structured work mechanism reduces the possibility of errors due to inefficient processes. Lean implementation is also proven to reduce patient waiting time and speed up clinical decision-making, thus reducing the risk of errors in medical services.

In the work environment, hospitals that optimally implement Lean have a higher rate of reporting patient safety incidents. This shows that the culture of patient safety is getting stronger as health workers feel more open in reporting incidents without fear of sanctions. This increased transparency contributes to continuous system improvement efforts, so that patient safety risks can be minimized over time. The application of Lean Management in patient safety is in line with the Lean Thinking theory developed by Womack and Jones (1996), which emphasizes five key principles: define value, map the value stream, create flow, establish pull, and seek perfection. In the context of hospitals, these principles are applied to reduce unnecessary steps in the healthcare process, so that errors that could potentially harm patients can be minimized.

In addition, the Lean concept is also closely related to the Patient Safety Culture theory, which emphasizes that patient safety must be part of the work culture in hospitals. According to this theory, patient safety culture is formed through several factors, such as management involvement in patient safety, an effective incident reporting system, and health workers' compliance with standard operating procedures. In this context, Lean Management plays an important role in creating a stronger safety culture by ensuring that every work process is optimized to reduce potential errors.

Several previous studies support these findings. The study of Anderson et al. (2023) found that hospitals that implemented Lean Management experienced a significant improvement in patient safety culture, with an increase in compliance with patient safety protocols of up to 40% within one year of implementation. The study by Kim et al. (2022) also showed that Lean Management contributed to reducing the incidence of adverse events in healthcare, such as incorrect drug dosing and errors in patient identification, with a 35% reduction after Lean implementation.

In addition, research by Santoso et al. (2021) in several hospitals in Indonesia showed that the success of Lean in improving patient safety culture is strongly influenced by the involvement of hospital management. Hospitals that had proactive leadership in implementing Lean

experienced improvements in incident reporting systems and strengthening patient safety culture compared to hospitals that only implemented Lean in the aspect of work efficiency. This study provides novelty by highlighting the importance of the incident reporting aspect in measuring the effectiveness of Lean on patient safety culture. The results show that a Lean-based work system encourages health workers to be more active in reporting incidents and making systematic improvements to errors that occur, thus creating a more open and transparent safety culture.

3. The Role of Work Safety in Mediating Lean Management on Patient Safety Culture

The results showed that staff work safety has a significant influence on patient safety culture, with a $p=0.000$ value. Factors such as compliance with safety procedures, use of personal protective equipment (PPE), and a safe and ergonomic work environment contribute to creating a better patient safety culture.

The study data showed that hospitals with an optimized work safety system had a higher level of health workers' compliance with patient safety procedures. Staff who feel safe at work are more likely to perform their duties with focus and minimal errors.

In addition, the study found that hospitals with strict safety programs had higher rates of reporting patient safety incidents, indicating an improved safety culture.

The relationship between staff job safety and patient safety culture can be explained through the High Reliability Organization (HRO) theory, which emphasizes that high-risk organizations, such as hospitals, should have systems that proactively prevent errors. In addition, Safety Climate theory (Zohar, 1980) highlights that work safety is not only influenced by policy but also by the workforce's perception of management's commitment to creating a safe work environment. The Swiss Cheese Model concept (Reason, 1990) also suggests that errors in patient care can be prevented by ensuring workforce safety.

Several previous studies support this finding. Tucker et al. (2022) found that staff safety had a significant impact on patient safety, with hospitals that had safety policies in place experiencing a 30% reduction in medical incidents within one year. Clarke et al. (2021) also revealed that a safe working environment for health workers increases discipline in carrying out patient safety procedures. Santoso et al. (2023) found that health workers who felt safe at work had lower stress levels, which contributed to improving the quality of patient care.

4. Challenges of Lean Management Implementation in Health Services

The results of this study show that staff job safety acts as a significant mediating variable in the relationship between Lean Management and patient safety culture. From the results of path analysis, it was found that the direct effect of Lean Management on patient safety culture had a coefficient of 0.748. Meanwhile, the indirect effect through staff safety has a value of 0.411, which is obtained from multiplying the path coefficient of Lean Management on staff safety (0.490) and the coefficient of staff safety on patient safety culture (0.839). Although this indirect effect is smaller than the direct effect,

this finding suggests that staff safety plays an important role in strengthening the relationship between Lean Management and patient safety culture. In theory, the Lean Management concept emphasizes operational efficiency by reducing waste, improving service quality, and creating a more structured work environment. Safety Climate theory states that the occupational safety of health workers is an important factor in building a patient safety culture. In addition, the High Reliability Organizations (HRO) theory asserts that high-risk organizations, such as hospitals, need to ensure that workforce safety is a top priority to achieve a sustainable safety culture.

CONCLUSION

Lean Management has a significant direct effect on officer safety with a coefficient of 0.490, indicating that Lean principles applied in operational efficiency and work system optimization can improve the safety of medical personnel. In addition, Lean Management also has a direct effect on patient safety culture with a coefficient of 0.748, indicating that Lean implementation in hospitals not only improves efficiency but also minimizes medical errors and improves patient safety standards. Staff safety itself has a direct effect on patient safety culture with a coefficient of 0.839, indicating that safe working conditions contribute to increased compliance with patient safety procedures.

In addition to the direct effect, Lean Management also has an indirect effect on patient safety culture through staff work safety with a value of 0.411, which indicates that Lean strategies combined with good work safety policies will further strengthen patient safety culture in hospitals.

RECOMMENDATIONS

Hospitals should continue to develop and strengthen the implementation of Lean Management with a focus on operational efficiency and work system optimization to improve the safety of medical personnel. In addition, it is important for management to actively integrate work safety policies as part of the Lean strategy, as a safe work environment has been shown to directly contribute to patient safety culture. Periodic training, increased

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adherence to standard procedures, and continuous evaluation of Lean implementation can be concrete steps to ensure that operational efficiency not only improves productivity, but also minimizes medical risks and strengthens overall patient safety.

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