



Determinants of Patient Loyalty: The Role of Hospital Logistics, Quality of Care and Patient Satisfaction

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Abstract

This study investigates the effect of hospital logistics on patient loyalty, with quality of care and patient satisfaction serving as mediating variables, among patients receiving services at the Executive Polyclinic of the Dental and Oral Hospital, Universitas Indonesia. Efficient hospital logistics are increasingly recognized as a critical component of healthcare management because they ensure the availability of medical supplies, improve service timeliness, enhance operational efficiency, and ultimately contribute to the quality of patient care. A quantitative cross-sectional design was employed, and data were collected from 255 patients using structured questionnaires. The data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM). The findings indicate that hospital logistics significantly improves the quality of care ($\beta = 0.817$, $p < 0.001$) and patient satisfaction ($\beta = 0.176$, $p < 0.05$), but has no significant direct effect on patient loyalty ($\beta = 0.076$, $p > 0.05$). Furthermore, quality of care significantly enhances patient satisfaction ($\beta = 0.547$, $p < 0.001$) and patient loyalty ($\beta = 0.523$, $p < 0.001$), while patient satisfaction also positively influences patient loyalty ($\beta = 0.231$, $p < 0.001$). Mediation analysis demonstrates that quality of care and patient satisfaction jointly mediate the relationship between hospital logistics and patient loyalty. These findings suggest that hospital logistics strengthens patient loyalty indirectly by improving the quality of care and increasing patient satisfaction. Therefore, healthcare organizations should integrate logistics management with quality improvement initiatives to foster patient trust, satisfaction, and long-term loyalty.

Keywords

hospital logistics;
patient loyalty;
patient satisfaction;
PLS-SEM;
quality of care.

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Introduction

In 2015, United Nations (UN) member states adopted the Sustainable Development Goals (SDGs) consisting of 17 global goals targeted to be achieved by 2030. One of the main goals is SDG 3 (Good Health and Well-being), which emphasizes improving the quality of health services and equitable access for people (United Nations, 2015). The latest global progress report indicates that

strengthening resilient health systems remains essential for achieving SDG 3 by 2030 (United Nations, 2024). As part of this global commitment, Indonesia continues to strive to strengthen the health service system through improving the quality of patient-oriented services (World Health Organization, 2024).

In this context, hospitals have a strategic role as health service providers. The development of the number of hospitals in Indonesia, which will reach 3,194 units in 2023, shows a significant increase in health service capacity. Along with increasing patient expectations, various service innovations were developed, one of which is an executive polyclinic that offers fast, comfortable, and personalized services. This service is expected to be able to increase patient satisfaction and hospital competitiveness.

However, efforts to improve the quality of hospital services still tend to focus on clinical aspects, while supporting aspects such as hospital logistics have not received optimal attention (Alfarizi & Ngatindriatun, 2022). In fact, hospital logistics, which includes the management of medicines, medical devices, distribution, and inventory systems, plays a crucial role in ensuring operational efficiency and maintaining the quality of healthcare services delivered to patients (de Assis et al., 2022; Neve & Schmidt, 2022). Effective logistics management also contributes to patient safety by ensuring the timely availability of essential medicines and medical supplies while minimizing operational disruptions. Efficient inventory management and healthcare supply chain systems improve operational performance, reduce shortages of critical medical resources, and support continuity in healthcare delivery (Balkhi et al., 2022; de Assis et al., 2022; Neve & Schmidt, 2022).

Various problems such as long wait times, inefficient service processes, and limited facilities indicate that hospital logistics and operational management contribute significantly to the patient experience (Alfarizi & Ngatindriatun, 2022; Hasibuan, 2025). In this case, the quality of care and patient satisfaction are the main indicators in assessing the success of health services, which in turn affects patient loyalty as a form of sustainability of the relationship between patients and hospitals (Shie et al., 2022).

However, research examining the relationship between hospital logistics, quality of care, patient satisfaction, and patient loyalty simultaneously remains limited, particularly in the context of executive polyclinics in teaching hospitals. Previous studies have generally examined only partial relationships among these variables, such as the influence of service quality on patient satisfaction, the effect of service quality and patient satisfaction on patient loyalty (Aliyah et al., 2024; Singarimbun et al., 2025), while studies focusing on hospital logistics have mostly emphasized operational efficiency and inventory management rather than their implications for patient satisfaction and loyalty. This indicates that the existing literature has largely considered operational and patient-oriented dimensions separately, leaving limited understanding of how hospital logistics may translate into patient loyalty through patients' perceptions of care quality and satisfaction. Therefore, a research gap remains in integrating these variables into a comprehensive conceptual model that considers the mediating roles of quality of care and patient satisfaction in shaping patient loyalty.

The novelty of this study lies in integrating hospital logistics with patient-oriented outcomes (quality of care, patient satisfaction, and patient loyalty) within a single empirical model, thereby connecting the operational dimension of hospital management with the patient experience dimension. Rather than examining logistics solely as an operational or inventory-related function, this study positions hospital logistics as an upstream factor that may influence patient loyalty both directly and indirectly through quality of care and patient satisfaction. This approach provides a more comprehensive perspective on the mechanisms through which hospital operational management can contribute to patient-oriented outcomes. The study further extends this perspective to an executive polyclinic within a teaching hospital, a setting characterized by the simultaneous functions of healthcare service, education, and research. Teaching hospitals have unique characteristics because

they integrate healthcare services, education, and research functions, creating additional managerial complexity that may influence service quality and patient experience. In this context, the Executive Polyclinic of the Dental and Oral Hospital, Faculty of Dentistry, Universitas Indonesia, faces challenges in maintaining service quality, particularly regarding waiting times and patient satisfaction. This setting therefore provides an appropriate empirical context for examining whether and how hospital logistics are associated with patient-oriented outcomes beyond conventional assessments of operational efficiency.

Based on this background and the identified research gap, this study aims to analyze the influence of hospital logistics on patient loyalty by considering the mediating roles of quality of care and patient satisfaction. Theoretically, an effective hospital logistics system supports the continuity of healthcare operations through the timely availability of medicines, medical devices, and other essential resources, thereby improving service efficiency and enhancing the quality of care perceived by patients (de Assis et al., 2022; Neve & Schmidt, 2022). Furthermore, recent studies have demonstrated that high-quality healthcare services significantly improve patient satisfaction because the services provided meet or exceed patients' expectations (Ahmed et al., 2022; Al-Hanawi et al., 2023). Patients who experience high-quality care and greater satisfaction are more likely to develop trust, revisit the hospital, and recommend its services to others, ultimately strengthening patient loyalty (Shie et al., 2022; Singarimbun et al., 2025). Therefore, this study investigates both the direct and indirect relationships among hospital logistics, quality of care, patient satisfaction, and patient loyalty to explain the mechanisms underlying patient loyalty formation. By connecting hospital logistics with patient-oriented outcomes through these mediating mechanisms, this research is expected to contribute theoretically to the healthcare service management literature and provide practical insights for hospitals in developing integrated and sustainable strategies to improve service quality.

Materials and Methods

This study uses a quantitative approach with the positivism paradigm, which emphasizes hypothesis testing based on objectively measurable empirical data (Hair et al., 2022; Saunders et al., 2023). Paradigms are important in social research, because these assumptions can guide our decisions as researchers (Saunders et al., 2023). This approach was chosen because the research aims to test the causal relationships between variables in a research model statistically. The research design used was cross-sectional, where data were collected over a specific time period, i.e. from October to November 2024. Primary data was obtained through the distribution of questionnaires to patients who had received services at teaching hospitals in Central Jakarta.

The population in this study is all patients of the teaching hospital, with a sampling technique using purposive sampling. Respondent criteria included patients who had undergone treatment and were willing to participate in the study. The final sample number used was 255 respondents, which was assessed as adequate for analysis using the Partial Least Squares Structural Equation Modeling (PLS-SEM) method (Hair et al., 2022; Sarstedt et al., 2022). The unit of analysis in this study is the individual, namely the patient as a user of health services. The variables studied consisted of hospital logistics as independent variables, patient loyalty as dependent variables, and quality of care and patient satisfaction as mediation variables.

All constructs were measured using a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The measurement instruments were adapted from previously validated studies and modified to suit the healthcare service context. Hospital logistics was measured using 17 indicators adapted from Frichi et al. (2020), consisting of six physical abilities indicators, five waiting time indicators, three consultation time indicators, and three administrative procedure indicators. Patient satisfaction was measured using five indicators modified from Abekah-Nkrumah et al. (2020),

Akthar et al. (2024), and Liu et al. (2021). Quality of care was measured using five indicators modified from Van der Eijk et al. (2001) and Frichi et al. (2020), while patient loyalty was measured using four indicators modified from Abekah-Nkrumah et al. (2020) and Shie et al. (2022).

Data were analyzed using SmartPLS 4 through the Partial Least Squares Structural Equation Modeling (PLS-SEM) approach. The analysis consisted of evaluating the measurement model by assessing indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, followed by evaluation of the structural model through path coefficients, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), and bootstrapping procedures to test the significance of the proposed hypotheses (Hair et al., 2022; Henseler et al., 2016). The mediating effects of quality of care and patient satisfaction were examined using the specific indirect effects generated from the bootstrapping procedure.

Ethical approval for this study was granted by the Research Committee Ethic (KEP FEB), Faculty of Economics and Business, Universitas Pelita Harapan, under Ethical Approval Number 067/MARS/ECBDIX/2025, dated 15 September 2025. Ethical considerations were also observed throughout the research process. All respondents provided informed consent before participating, confidentiality and anonymity were guaranteed, participation was entirely voluntary, and respondents were informed that they could withdraw from the study at any stage without any consequences (World Medical Association, 2024).

Results and Discussions

The characteristics of the respondents in this study are shown in Table X. The majority of respondents are female (68%) and are in the age group of 21–30 years (65%). In terms of education, most of the respondents were high school graduates (59%), followed by S1 (25%). Based on marital status, respondents are dominated by singles (89%). Meanwhile, in terms of the frequency of visits, most respondents had made more than one visit, which showed that respondents had sufficient experience in using hospital services.

Table 1. Respondent Profile

Description	Categories	Quantity	Percentage (%)
Gender	Male	81	32%
	Women	174	68%
Age	< 21 years old	75	29%
	21 – 30 years old	165	65%
	31 – 40 years old	8	3%
	41 – 50 years old	5	2%
	> 50 years	2	1%
	SD	1	0%
Final Education	Junior High School	7	3%
	High School	150	59%
	Diploma	27	11%
	S1 / Equivalent	64	25%
	S2	6	2%
Status	Single	227	89%
	Married	28	11%
Hospital Visits this	Once	87	34%
	2 times	71	28%
	3 times	28	11%
	More than 4 times	69	27%

Total	255	100%
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The results of the analysis using *Partial Least Squares Structural Equation Modeling* (PLS-SEM) shows that all constructs in the research model demonstrate satisfactory measurement quality. This is evidenced by outer loading values exceeding 0.70, while composite reliability and Cronbach's alpha values meet the recommended reliability thresholds (Hair et al., 2017). Thus, the research instrument is declared valid and reliable to measure the latent variables studied.

Furthermore, structural model testing was carried out using the bootstrapping technique to evaluate the relationship between variables based on the path coefficient (β), T-statistic, and P-value values. The results of the hypothesis test are presented in the following table:

Table 2. Hypothesis Testing Results

Relationship Pathway	Original Sample (β)	T-Statistic	P-Value	Hypothetical Decision
<i>Hospital Logistic</i> $\rightarrow$ <i>Quality of care</i>	0.817	102.731	0.000	Significant
<i>Hospital Logistic</i> $\rightarrow$ <i>Patient satisfaction</i>	0.176	2.502	0.013	Significant
<i>Hospital Logistic</i> $\rightarrow$ <i>Patient loyalty</i>	0.076	1.488	0.138	Insignificant
<i>Quality of care</i> $\rightarrow$ <i>Patient satisfaction</i>	0.547	7.954	0.000	Significant
<i>Quality of</i> $\rightarrow$ <i>Patient loyalty</i>	0.523	8.878	0.000	Significant
<i>Patient</i> $\rightarrow$ <i>Loyalty</i>	0.231	3.511	0.000	Significant

Based on the table above, *Hospital Logistic* had a positive and significant effect on *Quality of care* ($\beta = 0.817$; $p < 0.001$) and *Patient satisfaction* ($\beta = 0.176$; $p < 0.05$), so that both hypotheses were accepted. However, the direct influence of *Hospital Logistic* on *Patient loyalty* was not significant ($\beta = 0.076$; $p > 0.05$), so the hypothesis was rejected.

Furthermore, *Quality of care* was shown to have a significant effect on *Patient satisfaction* ($\beta = 0.547$; $p < 0.001$) and *Patient loyalty* ($\beta = 0.523$; $p < 0.001$). In addition, *patient satisfaction* also had a significant effect on *patient loyalty* ($\beta = 0.231$; $p < 0.001$). These findings show that the quality of service and patient satisfaction are the main determinants in shaping patient loyalty.

Indirect effects analysis showed the presence of a mediating role in the research model. The effect of *Hospital Logistic* on *Patient satisfaction* through *Quality of care* was 0.490, while the chain effect of *Hospital Logistic* $\rightarrow$ *Quality of care* $\rightarrow$ *Patient satisfaction* $\rightarrow$ *Patient loyalty* was 0.221. These results confirm that the influence of hospital logistics on patient loyalty occurs indirectly through improving service quality and patient satisfaction.

Discussion

The Influence of Hospital Logistics on Quality of Care

The results showed that hospital logistics had a positive and significant influence on quality of care ($\beta = 0.817$; $p < 0.001$). The relatively strong path coefficient indicates that logistics is not merely an administrative or supporting function but is closely connected to the hospital's ability to maintain the continuity and reliability of patient care. Effective logistics ensure the continuous availability of medicines, medical devices, and other essential supplies while facilitating efficient internal distribution processes. These capabilities enable healthcare professionals to deliver timely, safe, and high-quality patient care by minimizing service disruptions and improving operational performance (de Assis et al., 2022; Kabene et al., 2023; Neve & Schmidt, 2022). Recent evidence further emphasizes that effective hospital supply chain management and the use of well-defined logistics performance indicators contribute substantially to operational efficiency, service quality, and the continuity of healthcare delivery.

This finding is consistent with previous studies emphasizing that hospital logistics and inventory management are closely associated with operational efficiency, continuity of healthcare services, and perceived quality of care (de Assis et al., 2022; Fallahnezhad et al., 2024; Neve & Schmidt, 2022). The present finding extends this perspective by demonstrating that the contribution of logistics is also reflected in the perceived quality of care at the patient level. From a healthcare management perspective, the mechanism can be understood through the ability of logistics to ensure that clinical and administrative processes are supported by the resources required at the right time and place. The timely availability of medicines and medical devices, the reduction of operational errors, and the smoothness of service processes consequently create conditions that allow healthcare professionals to provide more consistent care. Therefore, the strong relationship found in this study suggests that improvements in quality of care should not be considered exclusively as a clinical issue, but also as an outcome that is partly enabled by the reliability of hospital logistics.

The Influence of Hospital Logistics on Patient Satisfaction

The influence of hospital logistics on patient satisfaction was significant ($\beta = 0.176$; $p < 0.05$), although the relatively small coefficient indicates that logistics has a more limited contribution to satisfaction than its contribution to quality of care. This finding suggests that patients may experience the consequences of logistics through operational aspects that are visible during service delivery, such as waiting time, smooth administration, availability of drugs, and efficiency of diagnostic services. When these operational processes are well managed, patients experience greater convenience and continuity of care, which can enhance their overall satisfaction with hospital services (Ahmed et al., 2022; Al-Hanawi et al., 2023).

However, the smaller coefficient is theoretically meaningful because hospital logistics generally operates as a backstage process. Patients do not necessarily observe inventory management, internal distribution, procurement, or other logistical activities directly. Instead, they primarily evaluate the consequences of these processes through their interactions with frontline services. This interpretation is consistent with Liu et al. (2021), who emphasized the importance of patient-facing factors in explaining patient responses to healthcare services. Thus, logistics may influence satisfaction indirectly through the service conditions it creates rather than through direct patient recognition of logistics activities. The significant but relatively weak relationship found in this study therefore indicates that logistics is an important supporting factor for satisfaction, but it is unlikely to be the dominant determinant of the patient's overall service evaluation.

The Influence of Hospital Logistics on Patient Loyalty

The results showed that hospital logistics did not have a significant direct influence on patient loyalty ($\beta = 0.076$; $p > 0.05$). This finding is important because it indicates that operational efficiency alone is insufficient to generate a patient's intention to maintain a long-term relationship with the hospital. In the context of healthcare consumer behavior, loyalty is formed through a more holistic evaluation of the service experience, including emotional responses, trust, and satisfaction (Ahmed et al., 2022; Al-Hanawi et al., 2023; Singarimbun et al., 2025). Liu et al. (2021) similarly demonstrated that patient satisfaction does not necessarily translate directly into loyalty and that trust may play an important role in this relationship.

The non-significant direct effect in the present study can therefore be interpreted as evidence that patients may value logistics primarily through its consequences for the care experience rather than as an independent reason for remaining loyal to a hospital. Patients are unlikely to develop loyalty simply because medicines are available or internal distribution is efficient; these operational capabilities must first be translated into service quality and a satisfactory patient experience. This interpretation is consistent with the role of logistics as an enabler rather than a direct relational determinant of loyalty. Frichi et al. (2020) similarly highlighted the importance of healthcare supply

and operational factors in supporting broader service performance. Accordingly, the finding suggests that the contribution of hospital logistics to patient loyalty is more appropriately understood within a broader patient-oriented mechanism involving quality of care and patient satisfaction, rather than through a direct operational-to-loyalty relationship. This distinction also helps explain why the direct path was statistically non-significant despite the strong influence of logistics on quality of care.

The Effect of Quality of Care on Patient Satisfaction

Quality of care was proven to have a significant influence on patient satisfaction ($\beta = 0.547$; $p < 0.001$). The relatively substantial coefficient indicates that patients' evaluations of the quality of care are closely associated with their overall assessment of the healthcare experience. Quality of care in hospitals includes various aspects, such as the competence of medical personnel, the accuracy of diagnosis, effective communication, and patient safety. When the services provided meet or even exceed patients' expectations, satisfaction tends to increase (Nguyen et al., 2021).

This finding is consistent with previous research showing that service quality is an important determinant of patient satisfaction. It also supports the logic of SERVQUAL theory, which establishes a close relationship between perceived service quality and customer satisfaction and emphasizes service quality improvement as an important strategy for enhancing satisfaction (Prakoeswa et al., 2022). The present result further indicates that quality of care functions as a more immediate patient-facing determinant than hospital logistics. While logistics creates the operational conditions necessary for service delivery, quality of care represents the extent to which patients actually perceive those conditions as resulting in competent, reliable, safe, and responsive care. Therefore, the significant relationship between quality of care and satisfaction provides an important explanatory link between the operational and patient-oriented dimensions of hospital management.

The Effect of Quality of Care on Patient Loyalty

The effect of quality of care on patient loyalty was also positive and significant ($\beta = 0.523$; $p < 0.001$). The relatively strong coefficient indicates that quality of care has an important role not only in shaping patients' immediate evaluations of healthcare services but also in their longer-term relationship with the hospital. Patients who perceive a high quality of service tend to have greater levels of trust in the hospital, thus increasing the likelihood of revisits and recommendations to others (Shie et al., 2022). Recent evidence also indicates that perceived service quality directly strengthens patient trust and loyalty while indirectly influencing loyalty through patient satisfaction, highlighting the strategic importance of delivering consistent, patient-centered healthcare services (Purnamaningsih, 2024).

The finding is theoretically meaningful because quality of care is directly experienced by patients, making it more proximal to loyalty formation than backstage operational processes. When patients consistently perceive competent care, accurate diagnosis, effective communication, and patient safety, the hospital becomes associated with a reliable and trustworthy service experience. This interpretation helps explain why quality of care has a much stronger direct relationship with patient loyalty than hospital logistics in the present model. Thus, the result supports the view that operational resources become strategically valuable for patient retention when they are translated into quality experiences that patients can perceive and evaluate. In this context, quality of care can be considered a strategic factor in building a long-term relationship between the hospital and the patient, as well as a key determinant in the formation of patient loyalty.

The Effect of Patient Satisfaction on Patient Loyalty

Patient satisfaction was proven to have a significant effect on patient loyalty ($\beta = 0.231$; $p < 0.001$). This finding indicates that patients who evaluate their healthcare experiences positively are more likely to maintain a relationship with the hospital. Patient satisfaction reflects an emotional evaluation of the service experience received. Satisfied patients are more likely to develop trust in

healthcare providers, continue utilizing the hospital's services, and recommend the hospital to others, thereby strengthening patient loyalty (Ahmed et al., 2022; Al-Hanawi et al., 2023; Singarimbun et al., 2025).

The significant relationship is broadly consistent with the patient loyalty literature, although its coefficient is smaller than that of the direct relationship between quality of care and patient loyalty. This difference suggests that satisfaction is important but may represent only one mechanism through which patients develop loyalty. Patients may be satisfied with a particular service encounter without necessarily developing a sufficiently strong long-term attachment to the hospital. By contrast, consistently perceived quality of care may create a stronger basis for trust and continued patronage. This interpretation is also relevant when considered alongside Liu et al. (2021), who found that satisfaction does not necessarily establish a direct relationship with loyalty when other relational factors such as trust are considered. Thus, the present significant effect does not imply that satisfaction is the sole determinant of loyalty; rather, it indicates that satisfaction remains an important patient-level mechanism through which positive healthcare experiences can contribute to continued use and recommendation of hospital services.

Conclusion

This study aims to analyze the influence of hospital logistics on patient loyalty by mediating quality of care and patient satisfaction in teaching hospitals. The results of the PLS-SEM analysis showed that hospital logistics had a positive and significant effect on the quality of care and patient satisfaction, but did not have a direct effect on patient loyalty. The findings of the study confirm that quality of care is the main factor that increases patient satisfaction and patient loyalty. In addition, patient satisfaction also plays a role in strengthening patient loyalty. Thus, the influence of hospital logistics on patient loyalty occurs indirectly through improving service quality and patient satisfaction. Managerially, hospitals need to optimize logistics systems, drug and medical device management, service efficiency, and the quality of service interactions to increase patient satisfaction and loyalty. This study has limitations because it was only conducted in one teaching hospital with a cross-sectional design and limited research variables. Therefore, further research is recommended to expand the research object, use longitudinal design, and add other variables such as trust, patient experience, or service innovation so that the research results are more comprehensive.

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