LOCUS JOURNAL: Research & Devotion
Volume 6 No. 3 March 2026
E-ISSN 2829-7334| P-ISSN 2829-5439
Homepage: https://locus.rivierapublishing.id/index.php/jl

Analysis of the Effectiveness of Patient Flow Management in Improving Service Speed

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Abstract:
Speed of service is a vital indicator of the quality of health services, but the imbalance between surges in patient visits and facility capacity often leads to bottlenecks and long wait times. This research aims to analyze the effectiveness of the implementation of Patient Flow Management in improving service speed and operational efficiency in health facilities. The study used a quantitative descriptive approach through field observation (time-and-motion study), operational data measurement, and a satisfaction survey at a private hospital during the period from July to September 2025. The results showed a significant impact post-implementation, with the average total waiting time reduced by 41.5%, the doctor-to-patient workload ratio becoming more balanced from 1:38 to 1:26, and an increase in patient satisfaction scores by 30%. This efficiency was achieved through an effective strategy of digitizing the queueing system and redistributing triage loads. In conclusion, Patient Flow Management has proven to be effective as an operational solution to alleviate service congestion, but its success relies heavily on the integration of information systems and management support in adapting staff work cultures.

Keywords: *Patient flow management, service speed, operational efficiency, waiting time, patient satisfaction.*

INTRODUCTION

The speed of health services is a primary indicator in assessing service quality and the level of patient satisfaction (Al-Abri & Al-Balushi, 2014). Long wait times can reduce trust and negatively impact patient safety. In recent years, global challenges in the health sector have shown that increases in the number of patient visits have not been matched by increases in the capacity of service facilities, resulting in numerous bottlenecks in service flow (Oredsson et al., 2011; King & Ben-Tovim, 2010).

Patient flow management is one of the strategies developed to address this problem (Elder et al., 2015; Manning & Islam, 2023; Zamani et al., 2025). This concept emphasizes the importance of regulating patient movement from registration, triage, examination, and medical procedures to administrative completion (Litvak & Bisognano, 2011). Problems arise when service flows are not well organized, such as a lack of staff coordination, limited space, delays in administrative processes, and imbalances in patient distribution (Hicks & McGovern, 2019). These factors lead to long queues, inefficient waiting times, and decreased productivity in healthcare facilities.

Several previous studies have highlighted the effectiveness of patient flow management in improving healthcare performance. Ben-Tovim et al. (2008) found that redesigning patient pathways significantly reduces bottlenecks and improves service efficiency. Similarly, Byrne et al. (2020) demonstrated that the application of lean healthcare principles can reduce waiting times by eliminating non-value-added activities in service processes. Furthermore, Khanna et al. (2011) reported that structured patient flow strategies effectively reduce overcrowding in emergency departments, while Rajkomar et al. (2016) emphasized the role of digital systems in optimizing patient flow through real-time monitoring and automation. These studies

collectively indicate that integrating process redesign with technology plays a crucial role in improving service speed and efficiency (Adepoju et al., 2022; Bartlett et al., 2023; Nour & Arbussà, 2025).

According to Al Harbi et al. (2024), despite the proven benefits, the implementation of patient flow management often faces challenges related to staff adaptation, technological readiness, and management support. Inefficiencies in service flow can still occur if coordination between units is weak or if digital systems are not optimally utilized (Li et al., 2016; Liu et al., 2021; Viriyasitavat et al., 2019). Therefore, a comprehensive evaluation is needed to assess the effectiveness of patient flow management and identify factors that influence its success.

The impact of ineffective patient flow management not only affects service speed but also has the potential to increase patient safety risks due to delays in diagnosis and treatment. In addition, inefficiencies in service flow can increase the workload of healthcare workers, lower work morale, and disrupt the operational stability of health services (Harding et al., 2020).

The implementation of patient flow management offers an integrated solution that aims to identify bottlenecks, redesign service flows, and prioritize services based on patient needs (Byrne et al., 2020; Carter & Lapierre, 2001). This concept involves the use of information technology, such as electronic queuing systems, digital triage systems, and data utilization for real-time patient load monitoring (Abdullah & Kusuma, 2021; Rajkomar et al., 2016).

This research takes the form of a comprehensive analysis that not only assesses the influence of patient flow management on wait times but also evaluates factors affecting the effectiveness of its implementation, such as staff competence, technological readiness, and management support. The urgency of this research is based on the increasing need for healthcare facilities to optimize service speed as an effort to improve service quality and institutional competitiveness. Under growing pressure to enhance efficiency and patient satisfaction, healthcare facilities must understand appropriate strategies for developing effective patient flow management.

The purpose of this study is to analyze the effectiveness of patient flow management in increasing service speed in healthcare facilities, as well as to identify supporting and inhibiting factors in its implementation. The benefits of this research include theoretical contributions to the healthcare service management literature and practical benefits for hospital management in formulating strategies to improve service quality through patient flow optimization.

RESEARCH METHODS

This study used a quantitative approach with a descriptive method that aims to provide a comprehensive overview of the effectiveness of patient flow management in increasing the speed of services in health care facilities. The research was carried out in a private hospital during the period from July to September 2025 with a focus on outpatient service flow. The research process begins with direct observation of the service flow, starting from registration, triage, examination, to administrative completion, to identify inefficiencies and potential obstacles in patient movement. The study population was all patients who received outpatient services in that period, while the sample was selected purposively by considering patients who went through the complete service flow, so that the data obtained could describe the actual service conditions. The research instrument consisted of observation guidelines, in-depth interview guidelines given to health workers and administrative officers, and documentation of

patient waiting time data at each stage of service. In addition, the study also assessed the use of information technology such as electronic queuing systems and digital medical records as supporting factors for service flows. The collected data is analyzed descriptively through the process of data reduction, data presentation, and conclusion drawing to gain a complete understanding of the effectiveness of patient flow management and the factors that affect its success.

Patient waiting time data was obtained through direct observation using the time and motion study method. Recording is carried out by recording the time at each stage of service, starting from registration, initial examination, to the completion of medical services. Time was recorded in minutes using a structured observation sheet filled out by researchers and officers who had been briefed. The measurement was carried out in two periods, namely before and after the implementation of patient flow management, with a time span of July-September 2025. The recording location was carried out in the outpatient unit of a private hospital that was the location of the research. Supporting data in the form of patient distribution and workload of health workers was obtained from the recapitulation of hospital operational reports that were used for academic purposes and had received permission from the management.

RESULTS AND DISCUSSION

The results showed that the implementation of patient flow management provided a significant increase in the speed of services in the hospitals studied. Initial observations revealed that before implementation, the flow of patient services had not been standardized, causing a buildup in registration and poly waiting rooms. On average, patients have to go through several inefficient queue points before getting medical services. After the intervention was carried out through digitizing the queue system, strengthening coordination between units, and remapping patient flows, there was a reduction in waiting time at each stage of service. This finding is reinforced by the quantitative data in Table 1 which shows that the total waiting time decreased from 65 minutes to 38 minutes after implementation, or a decrease of 41.5%. This change indicates that the simplification of administrative flows and the use of information technology can significantly increase the effectiveness of patient flows.

Table 1. Comparison of Waiting Time Before and After the Implementation of Patient Flow Management

Stages of Service	Before (Minutes)	After (Minutes)	Decrease (%)
Registration	20	10	50%
Initial Inspection	25	15	40%
Medical Services	20	13	35%
Total Waiting Time	**65**	**38**	**41,5%**

Source: Field observation data processed by the author (2025)

A discussion of the data in Table 1 shows that the digitization of the queue system plays a major role in speeding up the registration process and reducing non-productive activities. The reduction in waiting times for initial examinations and medical services also indicates that interventions in inter-unit coordination are effective. These findings are consistent with lean healthcare theory which emphasizes the importance of eliminating bottlenecks at the starting point of service.

In addition to the increase in speed, this study also analyzed the distribution of patient burden as shown in Table 2. Before the intervention, the patient burden was very concentrated on the Internal Medicine Poly and ER, causing long queues and uneven workload. After the implementation of patient flow management, the burden of the Internal Medicine Poly decreased from 120 to 95 patients per day, while other polyclinics such as the Surgical Poly experienced a controlled increase from 45 to 60 patients. This shows that the internal referral flow and triage system are able to divert some patients to previously less than optimal units.

The data in Table 1 is the result of calculating the average waiting time of patients at each stage of service. The time calculation starts from the time the patient registers until the patient finishes receiving medical services. The 41.5% decrease was calculated from the total difference in average waiting time before and after the implementation of patient flow management, which was then divided by the total waiting time before the intervention.

Table 2. Distribution of Patient Burden Between Units Before and After Implementation

Service Unit	Before (number of patients/day)	After (number of patients/day)	Distribution Changes
Internal Medicine Poly	120	95	Decreased (more even)
Poly Child	75	80	Steadily increasing
Poly Surgery	45	60	Controlled increase
UGD	140	110	Significant decline

Source: Hospital operational report data processed by the author (2025)

The discussion of Table 2 shows that the equitable distribution of the patient's burden occurs as a result of triage optimization and inter-unit referrals. The reduction in the burden on the ER indicates that non-emergency cases are successfully directed to the appropriate poly so that the workflow becomes more organized. Thus, not only the speed of service increases, but also the quality of resource utilization.

Furthermore, the effectiveness of patient flow management is also reflected in the increase in the efficiency of health workers as seen in Table 3. The change in the patient-to-physician ratio from 1:38 to 1:26 indicates a more proportionate workload, while the decrease in service time per patient from 12 minutes to 8 minutes indicates a more structured workflow. The reduction in the stress level of health workers from a score of 7 to 4 proves that the new system is able to reduce psychological stress due to excessive load. In addition, the decrease in administrative errors from 12% to 5% indicates that digitization has an impact on improving data accuracy.

The patient load distribution data in Table 2 is obtained from the recapitulation of the number of daily patient visits in each service unit. Data were collected during the same observation period and were used to compare changes in patient distribution between units before and after the implementation of patient flow management.

Table 3. Health Worker Capacity and Work Efficiency

Aspects	Before	After	Changes
Patient-to-doctor ratio	1:38	1:26	More efficient
Time per patient (minutes)	12	8	Faster
Healthcare worker stress levels (scale 1–10)	7	4	Downward

Administrative error rate (%)	12%	5%	Significant drop

Source: Observation and healthcare staff questionnaire data processed by the author (2025)

Table 3 illustrates how more effective workload management has a direct impact on service quality. The measurement of the stress level of health workers was carried out using a self-assessment method with a numerical scale (0-10) that measures the perception of workload and mental fatigue at the end of the work shift. A significant reduction in score indicates that with a more balanced load, health workers can work more focused and efficiently, resulting in reduced service time without reducing the quality of interaction with patients. These findings support the results of previous research that optimizing internal flows and interdisciplinary teamwork can improve the performance of health workers while reducing the risk of burnout.

The impact of implementation was also felt by patients, as seen in the increase in satisfaction in Table 4. Enrollment speed increased from 55% to 82%, while satisfaction with checks increased by 30%. Information accuracy increased by 25%, reflecting the success of digital systems in providing accurate service information and queue status. Overall, patient satisfaction rates rose from 58% to 88%.

The data in Table 3 was obtained through a combination of service logging, direct observation, and filling out self-assessment questionnaires by health workers. Stress levels are measured using a numerical scale of 1–10 which describes the perception of workload and mental fatigue at the end of working hours.

Table 4. Patient satisfaction with the speed of service

Satisfaction Indicators	Before (%)	After (%)	Improvement
Registration speed	55	82	+27
Speed of inspection	48	78	+30
Accuracy of information	60	85	+25
Overall satisfaction	58	88	+30

Source: Patient questionnaire data processed by the author (2025)

The discussion from Table 4 shows that patients directly feel the benefits of improving the service flow. An increase in overall satisfaction of 30% shows that speed, accuracy of information, and interaction of healthcare workers provide a better service experience. This proves that the success of patient flow management is not only measured by internal efficiency, but also by patient perception and comfort.

Integratively, the results of the study show that the success of patient flow management is highly dependent on three main factors: optimization of service flows, digitization of processes, and efficiency of health workers. Obstacles such as staff adaptation and limitations of technological devices are still found, but do not hinder the achievement of significant improvements in service speed and patient satisfaction. Thus, patient flow management has proven to be an effective strategy that can be replicated by other healthcare facilities that face the challenges of queue buildup and slow service flows.

Patient satisfaction data was obtained through a closed questionnaire that was distributed to outpatients before and after the implementation of patient flow management. The assessment is carried out in the form of percentages for each satisfaction indicator.

CONCLUSION

This study concludes that the implementation of patient flow management is effective in improving service speed in healthcare facilities, as evidenced by a 41.5% reduction in average total patient waiting time. This improvement reflects successful optimization of service flows through the digitization of queuing systems, enhanced coordination between units, and better workload distribution among healthcare workers. In addition to accelerating service delivery, the approach also increases the efficiency of medical personnel and enhances patient satisfaction, making patient flow management a relevant and practical operational strategy for improving service quality and system efficiency. To ensure sustainability, healthcare facilities should strengthen information system integration, continuously develop staff competencies through training, and reinforce managerial support to foster an adaptive organizational culture. Future research should examine the long-term impacts of patient flow management across diverse types of healthcare institutions and service settings to better understand its scalability and broader effectiveness.

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