# The Influence of Application-Based Service Integration, Service Time Discipline, and Patient Flow Design on Outpatient Waiting Time with Perceived Service Fairness as a Moderating Variable: A Study at Karang Tengah Medika Hospital, Tangerang, Banten

**By**

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*Abstract*

*This study aims to analyze the effect of application-based service integration, service time discipline, and patient flow design on outpatient waiting time, with perceived service fairness as a moderating variable at Karang Tengah Medika Hospital, Tangerang, Banten. This research is grounded in Healthcare Service Management Theory, Service Design Theory, Service Waiting Time Theory, and Justice Theory, which emphasize the importance of service process efficiency and perceived fairness in improving hospital service quality. A quantitative approach with an explanatory research design was employed. Data were collected through structured questionnaires distributed to 286 outpatient respondents and analyzed using Structural Equation Modeling based on Partial Least Squares (SmartPLS). The results indicate that application-based service integration, service time discipline, and patient flow design significantly affect outpatient waiting time. Furthermore, perceived service fairness acts as a moderating variable that strengthens the relationship between the independent variables and patient waiting time, and also has a direct effect on perceived waiting time. Theoretically, this study contributes to the healthcare service management literature by integrating technological aspects, organizational behavior, and fairness perception into a single empirical model. Practically, the findings provide managerial implications for hospitals in designing strategies to improve outpatient service efficiency through optimizing digital applications, enforcing service time discipline, improving patient flow design, and enhancing service fairness for all patients. This study is expected to serve as a reference for hospital managers in improving fast, efficient, and equitable healthcare services.*

*Keywords: application-based service integration, service time discipline, patient flow design, perceived service fairness, patient waiting time.*

## 1. Introduction

The transformation of healthcare services is currently characterized by increasing public demand for fast, efficient, and equitable services. Globally, hospitals are required not only to provide medical facilities but also to ensure the speed of service processes as an integral part of service quality (Maahury & Basabih, 2025). One of the primary indicators of hospital service quality is outpatient waiting time, which reflects the responsiveness dimension of service performance (Kristina Supriyati & Indriati Kusumaningsih, 2023). Along with the advancement of healthcare digitalization, application-based service integration has become a key strategy to accelerate administrative procedures, queue management, and coordination across service units (Sofianto, 2020; Rohman & Marsilah, 2022). At the same time, service time discipline among healthcare personnel represents an organizational behavior factor that determines the smoothness of service flow (Haryadi et al., 2025). In addition, efficient patient flow design plays a major role in minimizing process barriers and reducing service bottlenecks (Subburaman et al., 2023; Wang et al., 2025). However, service speed is not assessed solely based on actual waiting duration but is also influenced by patients' perceived service fairness, encompassing procedural, interactional, and outcome aspects of service delivery (Giwang, 2025). This perception of fairness determines the extent to which patients accept or tolerate waiting time during service encounters.

Karang Tengah Medika Hospital in Tangerang, Banten, operates 24 hours a day and serves general, insurance, and national health coverage (BPJS) patients (hellosehat, 2025). Although healthcare facilities are available, preliminary observations indicate that outpatient services still experience relatively long waiting times from registration to medical consultation, particularly in general and pediatric clinics (hellosehat, 2025). This condition highlights the need for a more systematic and empirical evaluation of outpatient service processes. The primary issue lies in the gap between the waiting time standard established by regulators and the actual conditions of outpatient service delivery. The Ministry of Health stipulates a maximum outpatient waiting time standard of ≤60 minutes (Azmi et al., 2024). However, various studies show that many hospitals in Indonesia have not yet met this standard (Santalia et al., 2023; Maretha et al., 2025). At Karang Tengah Medika Hospital, there is no publicly available published data regarding outpatient waiting time, resulting in a lack of local empirical evidence (hellosehat, 2025). Moreover, the dominant internal factors contributing to service delays whether related to service system integration, service time discipline, or patient flow design remain unclear.

Nationally, only 58.4% of hospitals in Indonesia meet the ≤60-minute outpatient waiting time standard (Maretha et al., 2025). A study at RSUD dr. Adnan WD Payakumbuh found that 88.7% of patients waited more than 60 minutes (Santalia et al., 2023). Similarly, at RSUD Abdul Wahab Sjahranie Samarinda, the average waiting time reached 72.4 minutes (Maretha et al., 2025).

Preliminary observations at Karang Tengah Medika Hospital indicate waiting times ranging from 75 to 90 minutes from registration to physician consultation (hellosehat, 2025). These findings confirm a clear gap between the ideal standard and the actual conditions of outpatient service delivery. The waiting time problem can be explained through the SERVQUAL Service Quality Theory, which positions waiting time as part of the responsiveness and reliability dimensions of service performance (Azmi et al., 2024). The Donabedian Model (Structure–Process–Outcome) further explains that service system structure and internal processes determine outcomes in the form of waiting time and patient satisfaction (Nggule et al., 2025). In addition, operations management theory and lean healthcare emphasize that process efficiency, work discipline, and digital system integration play crucial roles in reducing time waste in healthcare services (Astiena et al., 2022; Subburaman et al., 2023). Meanwhile, Justice Theory explains that perceived service fairness influences how patients evaluate the quality of services received (Giwang, 2025).

Previous studies have confirmed that service digitalization significantly reduces waiting time (Astiena et al., 2022; Rohman & Marsilah, 2022; Setiatin, 2025). Service time discipline among healthcare personnel has also been proven to be a significant predictor of patient waiting time (Janna et al., 2022; Angelina Lontaan et al., 2025). Furthermore, optimization of patient flow design has been shown to

effectively decrease outpatient waiting time (Wang et al., 2025; Waiman et al., 2023). However, most prior studies were conducted in public hospitals or large-scale hospitals. Research on medium-scale private hospitals such as Karang Tengah Medika Hospital remains limited (hellosehat, 2025). Additionally, few studies have simultaneously examined the effects of application-based service integration, service time discipline, and patient flow design on outpatient waiting time while incorporating perceived service fairness as a moderating variable. This constitutes the scientific gap addressed by the present study.

Practically, this study provides empirical evidence for the management of Karang Tengah Medika Hospital in designing strategies to improve outpatient service efficiency through digital service optimization, enforcement of service time discipline, enhancement of patient flow design, and strengthening of fair service delivery (hellosehat, 2025). Theoretically, this research enriches the healthcare service management literature by integrating technological service perspectives, organizational behavior, service process design, and fairness perception into a single empirical model (Maretha et al., 2025; Giwang, 2025). Thus, this study contributes to the development of a comprehensive model for improving outpatient service quality in hospitals.

## 2. Research Elaborations

Health service management theory explains that planning, organizing, implementing, and evaluating health services are essential to achieving quality and efficiency in hospital operations (WHO, 2021; Faeni & Nabila, 2024). In hospital settings, integrated service systems and the use of information technology play a crucial role in ensuring fast, accurate, and patient-centered care (Faeni & Nabila, 2024). This perspective provides the foundation for application-based service integration, where digital systems connect registration, medical records, queue management, and inter-unit coordination to optimize service flow, reduce process duplication, and shorten outpatient waiting time (Harahap et al., 2023). Alongside technological integration, work discipline theory emphasizes that staff punctuality and adherence to service schedules significantly influence the continuity and effectiveness of healthcare delivery (Haryadi et al., 2025). In outpatient services, delays in physician attendance, nursing services, or administrative processes directly contribute to longer waiting times, confirming that service time discipline is a critical determinant of operational performance.

From a process perspective, service design theory highlights that effective structuring of service systems, interactions, and patient pathways reduces congestion and prevents service bottlenecks (Morales et al., 2024). In healthcare organizations, well-designed patient flow ensures smoother transitions between registration, consultation, and pharmacy services, thereby minimizing waiting duration and improving overall service experience. Furthermore, service waiting time theory explains that waiting time reflects not only system efficiency but also patients' perceptions of service quality (Zhang et al.,

2023). In this study, waiting time is measured as perceived waiting time, as patient perceptions of delay have a stronger influence on service evaluation and satisfaction than actual recorded waiting time. Complementing these theories, justice theory posits that patients assess fairness by comparing their efforts and expectations with the service outcomes they receive (Pérez-Arechaederra et al., 2025). In healthcare contexts, fairness perception arises from transparent procedures, respectful interactions, and equitable treatment, and such perceptions may strengthen or weaken the influence of operational service factors on perceived waiting time. Therefore, perceived service justice is positioned as a moderating variable in this study.

Empirical evidence from previous studies consistently confirms that prolonged waiting time reduces patient satisfaction and perceived service quality (Narulitha & Batara, 2025; Maahury & Basabih, 2025; Nggule et al., 2025; Zhang et al., 2023). Research also demonstrates that digital service integration and electronic medical record implementation significantly improve service efficiency and reduce delays (Sofianto, 2020; Rohman & Marsilah, 2022; Salsabila, 2025), while staff work discipline remains a decisive factor in ensuring timely service delivery (Haryadi et al., 2025). In addition, optimized patient flow design has been shown to minimize congestion and waiting duration in outpatient departments (Morales et al., 2024; Wang et al., 2025). However, most prior studies focus on single predictors or are conducted in large public hospitals, leaving limited evidence from medium-scale private hospitals. Moreover, few studies simultaneously examine technological integration, work discipline, and patient flow design in one comprehensive model, and even fewer incorporate perceived service justice as a moderating variable influencing perceived waiting time. This reveals a contextual, theoretical, and methodological research gap that justifies the present study.

To address these gaps, this study develops a holistic empirical framework in which application-based service integration, service time discipline, and patient flow design directly influence perceived outpatient waiting time, while perceived service justice moderates these relationships. The study employs a quantitative explanatory research design, collecting primary data from 286 outpatient respondents at Karang Tengah Medika Hospital, Tangerang, Banten. Data analysis is conducted using Partial Least Squares–Structural Equation Modeling (PLS-SEM) with SmartPLS 4, enabling simultaneous examination of measurement and structural models to test the proposed hypotheses. By integrating technological, organizational, process, and psychological perspectives in one empirical model, this research offers a comprehensive explanation of outpatient service performance. The conceptual framework of this study is presented in Figure 2.1, illustrating the structural relationships among all research variables.

Based on the above discussion, this study aims to analyze the effects of application-based service integration, service time discipline, and patient flow design on outpatient waiting time,

with perceived service fairness as a moderating variable at Karang Tengah Medika Hospital, Tangerang, Banten.
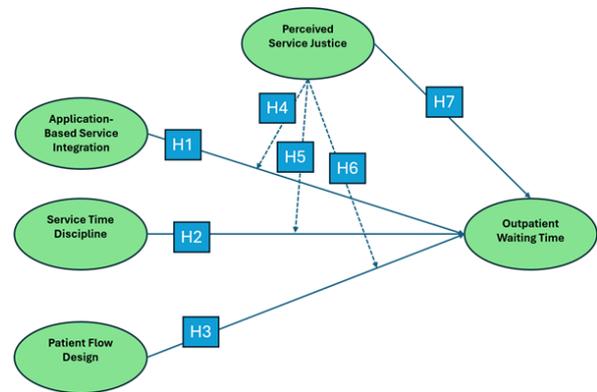


**Figur 2.1 Research Framework**

## 3. Results or Finding

The following section describes the demographic characteristics of the study respondents to provide context for interpreting the empirical results.

**Table 3.1 Demographic Characteristics of Respondents (N = 286)**

| Demographic Variable | Category | Number of Respondents |
|---|---|---|
| Gender | Female | 151 |
| | Male | 135 |
| Age | 15–24 years | 41 |
| | 25–34 years | 88 |
| | 35–44 years | 92 |
| | 45–54 years | 48 |
| | 55–64 years | 16 |
| | $\geq$ 65 years | 1 |
| Educational Level | Elementary/Junior High School | 11 |
| | Senior High School | 56 |
| | Diploma | 62 |
| | Bachelor's Degree | 132 |
| | Postgraduate | 25 |
| Outpatient Visit Frequency | First visit | 42 |
| | 2–5 visits | 165 |
| | > 5 visits | 79 |

| Demographic Variable | Category | Number of Respondents |
|---|---|---|
| Total Respondents | | 286 |

**Source: Google Form**

The demographic profile shows that the majority of respondents were female (151 respondents), slightly higher than male respondents (135 respondents). This indicates that female patients were more dominant in utilizing outpatient services at Karang Tengah Medika Hospital during the study period. In terms of age distribution, most respondents were in the productive age group of 25–44 years, with 88 respondents aged 25–34 years and 92 respondents aged 35–44 years. This suggests that outpatient services were primarily accessed by individuals in economically active and health-conscious age groups. Meanwhile, respondents aged 55 years and above represented a smaller proportion, indicating lower outpatient visit intensity among elderly patients during the observation period. Regarding educational background, respondents with a bachelor's degree constituted the largest group (132 respondents), followed by diploma holders (62 respondents) and senior high school graduates (56 respondents). This profile suggests that most patients had relatively high educational attainment, which may influence their awareness of service quality, digital health applications, and expectations of efficient hospital services. Based on visit frequency, most respondents (165 respondents) had visited the outpatient clinic between 2–5 times, while 79 respondents had visited more than five times. Only 42 respondents were first-time visitors. This indicates that the majority of respondents were repeat patients, implying familiarity with hospital service procedures and experience in evaluating waiting time and service fairness. Overall, the demographic distribution confirms that the sample of 286 respondents adequately represents outpatient service users at Karang Tengah Medika Hospital and provides a solid basis for interpreting the subsequent empirical analysis.

## 3.2 Outer Model Evaluation

### 3.2.1 Outer Loading Test

The outer loading results are presented to assess the validity of indicators representing each latent variable in the measurement model.
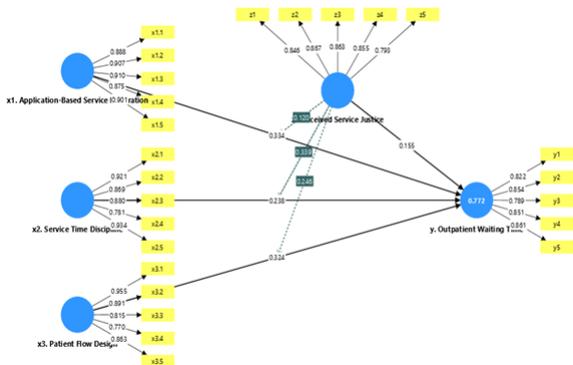


**Figure 3.2 Outer Loading Diagrams**

**Source: Statistical Data Processing**

**Table 3.2 Outer Loading**

| Variable | Indicator | Outer Loading |
|---|---|---|
| Application-Based Service Integration (X1) | X1.1 | 0.878 |
| | X1.2 | 0.872 |
| | X1.3 | 0.883 |
| | X1.4 | 0.840 |
| | X1.5 | 0.872 |
| Service Time Discipline (X2) | X2.1 | 0.900 |
| | X2.2 | 0.894 |
| | X2.3 | 0.880 |
| | X2.4 | 0.870 |
| | X2.5 | 0.902 |
| Patient Flow Design (X3) | X3.1 | 0.892 |
| | X3.2 | 0.867 |
| | X3.3 | 0.866 |
| | X3.4 | 0.865 |
| | X3.5 | 0.855 |
| Outpatient Waiting Time (Y) | Y.1 | 0.869 |
| | Y.2 | 0.898 |
| | Y.3 | 0.856 |
| | Y.4 | 0.900 |
| | Y.5 | 0.878 |
| Perceived Service Fairness (Z) | Z.1 | 0.867 |
| | Z.2 | 0.867 |
| | Z.3 | 0.843 |
| | Z.4 | 0.885 |
| | Z.5 | 0.895 |
| Moderating Variables | Z × X1 | 1.000 |
| | Z × X2 | 1.000 |
| | Z × X3 | 1.000 |

**Source: Statistical Data Processing**

The outer loading results show that all indicators load strongly on their respective constructs, with values ranging from 0.840 to 0.902. This confirms that each indicator reliably measures its intended variable. The moderating interaction constructs also show perfect loadings (1.000), indicating proper specification. Overall, all loading values exceed the 0.70 threshold, confirming that the measurement model meets convergent validity requirements.

### 3.2.2 Composite Validity and Reliability Results

This section presents the composite validity and reliability results to evaluate the internal consistency and overall reliability of the measurement model constructs.

**Table 3.2 Composite Validity and Reliability**

| Variable | Cronbach's Alpha | Composite Reliability (ρa) | Composite Reliability (ρc) | VE |
|---|---|---|---|---|
| Application-Based Service Integration (X1) | 0.920 | 0.935 | 0.939 | .756 |
| Service Time Discipline (X2) | 0.944 | 0.937 | 0.950 | .791 |
| Patient Flow Design (X3) | 0.921 | 0.928 | 0.940 | .759 |
| Outpatient Waiting Time (Y) | 0.928 | 0.925 | 0.945 | .775 |
| Perceived Service Fairness (Z) | 0.922 | 0.933 | 0.940 | .759 |

**Source: Statistical Data Processing**

The results indicate that all constructs demonstrate excellent internal consistency and reliability. Cronbach's Alpha values range from 0.920 to 0.944, exceeding the recommended threshold of 0.70. Composite Reliability values (ρa and ρc) are also above 0.90, confirming strong construct reliability. Additionally, all AVE values exceed 0.50, indicating adequate convergent validity. Therefore, the measurement model satisfies both validity and reliability criteria.

### 3.2.3 Discriminant Validity Results

This section presents the discriminant validity results to assess whether each construct is empirically distinct from other constructs in the measurement model.

**Table 3.3 Discriminant Validity Results**

| Variable | X1 | X2 | X3 | Y | Z | Z×X1 | Z×X2 | Z×X3 |
|---|---|---|---|---|---|---|---|---|
| X1. Application-Based Service Integration | — | | | | | | | |
| X2. Service Time Discipline | 0.056 | — | | | | | | |
| X3. Patient Flow Design | 0.062 | 0.034 | — | | | | | |
| Y. Outpatient Waiting Time | 0.225 | 0.238 | 0.253 | — | | | | |
| Z. Perceived Service Fairness | 0.049 | 0.070 | 0.080 | 0.195 | — | | | |
| Z × X1 | 0.085 | 0.023 | 0.124 | 0.276 | 0.014 | — | | |
| Z × X2 | 0.029 | 0.068 | 0.014 | 0.162 | 0.056 | 0.010 | — | |
| Z × X3 | 0.118 | 0.030 | 0.123 | 0.433 | 0.090 | 0.038 | 0.093 | — |

**Source: Statistical Data Processing**

The HTMT results show that all inter-construct correlation values are below the recommended threshold of 0.85. This indicates that each construct is empirically distinct and measures a unique concept within the model. Therefore, the measurement model satisfies the discriminant validity criterion, confirming that no multicollinearity or construct overlap exists among the variables.

## 3.3 Structural Model Evaluation

### 3.3.1 R-Square Test

This section presents the R-square ($R^2$) results to evaluate the explanatory power of the structural model in predicting the endogenous construct.

**Table 3.3.1 R-Square Test**

| Endogenous Variable | $R^2$ | Adjusted $R^2$ |
|---|---|---|
| Y. Outpatient Waiting Time | .414 | 0.399 |

**Source: Statistical Data Processing**

The R-square results indicate that Application-Based Service Integration, Service Time Discipline, Patient Flow Design, and Perceived Service Fairness collectively explain 41.4% of the variance in Outpatient Waiting Time. The adjusted $R^2$ value of 0.399 confirms a stable explanatory power after accounting for model complexity. This suggests that the structural model has a moderate predictive capability in explaining patients' perceived waiting time in outpatient services.

### 3.3.2 F-Square Test

This section presents the F-square ($f^2$) test results to assess the effect size of each exogenous variable on the endogenous construct in the structural model.

**Table 3.3.2 F-Square Test**

| Independent / Moderating Variable | Outpatient Waiting Time (Y) |
|---|---|
| X1. Application-Based Service Integration | 0.067 |
| X2. Service Time Discipline | 0.099 |
| X3. Patient Flow Design | 0.043 |
| Z. Perceived Service Fairness | 0.058 |
| Z × X1 (Moderating Effect of Application-Based Service Integration) | 0.104 |
| Z × X2 (Moderating Effect of Service Time Discipline) | 0.066 |
| Z × X3 (Moderating Effect of Patient Flow Design) | 0.225 |

**Source: Statistical Data Processing**

The F-square results indicate that all independent and moderating variables exhibit meaningful effect sizes on Outpatient Waiting Time. Application-Based Service Integration ($f^2 = 0.067$), Service Time Discipline ($f^2 = 0.099$), and Patient Flow Design ($f^2 = 0.043$) show small to moderate effects on waiting time. Perceived Service Fairness also demonstrates a meaningful direct effect ($f^2 = 0.058$). Furthermore, the moderating effects reveal that Perceived Service Fairness strengthens the relationships between the independent variables and waiting time, particularly for Patient Flow Design (Z × X3), which shows the largest effect size ($f^2 = 0.225$). Overall, these results confirm that both the main effects and moderation effects contribute to explaining variations in outpatient waiting time.

## 3.4 Hypothesis Testing

### 3.4.1 Direct hypotheses

This section presents the results of direct hypothesis testing to examine the direct effects of the independent variables on the endogenous variable in the structural model.
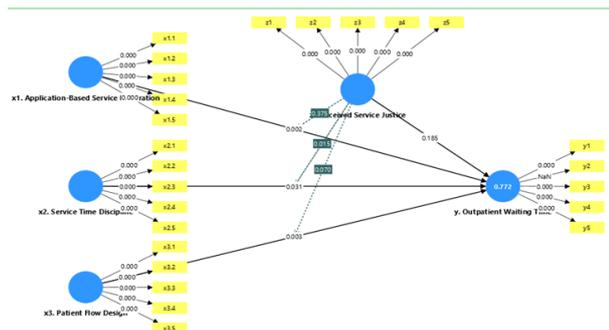


**Figure 3.4.1 Path Coefficients Diagrams**

**Source: Statistical Data Processing**

**Table 3.4.1 hypotheses**

| Hypothesis | Variable Relationship | Path Coefficient (O) | T-Statistic | P-Value | Decision |
|---|---|---|---|---|---|
| H1 | Application-Based Service Integration influencing Outpatient Waiting Time | 0.201 | 4.328 | 0.000 | Accepted |
| H2 | Service Time Discipline influencing Outpatient Waiting Time | 0.242 | 5.226 | 0.000 | Accepted |
| H3 | Patient Flow Design influencing Outpatient Waiting Time | 0.161 | 3.097 | 0.002 | Accepted |
| H4 | Perceived Service Fairness moderating the relationship between Application-Based Service Integration and Outpatient Waiting Time | 0.260 | 4.928 | 0.000 | Accepted |
| H5 | Perceived Service Fairness moderating the relationship between Service Time Discipline and Outpatient Waiting Time | 0.215 | 3.895 | 0.000 | Accepted |
| H6 | Perceived Service Fairness moderating the relationship between Patient Flow Design and Outpatient Waiting Time | 0.367 | 6.309 | 0.000 | Accepted |

| Hypothesis | Variable Relationship | Path Coefficient (O) | T-Statistic | P-Value | Decision |
|---|---|---|---|---|---|
| H7 | Perceived Service Fairness influencing Outpatient Waiting Time | 0.141 | 2.483 | 0.013 | Accepted |

**Source: Statistical Data Processing**

The hypothesis testing results demonstrate that all proposed relationships are statistically significant. Application-Based Service Integration, Service Time Discipline, and Patient Flow Design significantly influence Outpatient Waiting Time, confirming that improvements in digital service integration, punctuality of healthcare personnel, and efficiency of patient flow contribute to better waiting time performance. Perceived Service Fairness significantly moderates the relationships between the three independent variables and Outpatient Waiting Time. This indicates that when patients perceive fair treatment, the positive impact of service integration, time discipline, and patient flow design on reducing waiting time becomes stronger. The strongest moderation effect is found in the interaction involving Patient Flow Design. In addition, Perceived Service Fairness also has a significant direct influence on Outpatient Waiting Time, meaning that fair service treatment leads patients to perceive waiting time more positively. Overall, the findings confirm that both operational service factors and fairness perception jointly determine outpatient waiting time performance.

## 3.5 Discussions

### 3.5.1 Application-Based Service Integration Influences Outpatient Waiting Time

The first hypothesis confirms that application-based service integration has a positive and significant effect on outpatient waiting time. The findings show that integrating digital service systems streamlines registration, data verification, and scheduling processes, thereby reducing repeated administrative procedures and accelerating service flow. This indicates that long waiting times are not only caused by limited human resources but also by fragmented service systems, where patients must repeatedly input data across different service units. By connecting registration, medical records, and clinical services into a single integrated platform, administrative redundancy is minimized and inter-unit coordination is improved, resulting in more efficient patient flow and reduced delays. Practically, this implies that Karang Tengah Medika Hospital can enhance outpatient service efficiency through optimized digital registration, queue management, and electronic medical record integration without requiring major structural changes. This finding is consistent with previous studies on healthcare digitalization that highlight its role in improving service efficiency and reducing waiting time, while also supporting service management and service design theories that emphasize

integrated information systems as key mechanisms for minimizing service bottlenecks and enhancing overall healthcare service performance.

### 3.5.2 Service Time Discipline Influences Outpatient Waiting Time

The second hypothesis confirms that service time discipline has a positive and significant effect on outpatient waiting time. The findings indicate that better punctuality and adherence to service schedules by doctors, nurses, and administrative staff lead to more controlled and shorter waiting times. This result reflects the operational reality that delays in physician arrival, inconsistent practice hours, and irregular service schedules disrupt patient flow and cause queue accumulation in outpatient clinics. Strengthened time discipline stabilizes service operations, improves coordination among service units, and prevents bottlenecks in the care process. This finding aligns with previous studies emphasizing that internal service processes and human resource discipline are key determinants of outpatient waiting time. Practically, the result implies that Karang Tengah Medika Hospital can reduce waiting time by enforcing clear service schedules, implementing attendance monitoring systems, integrating punctuality indicators into staff performance evaluation, and providing real-time service time information to patients. From a theoretical perspective, this supports work discipline theory and service waiting time theory, which view time discipline as a critical behavioral factor influencing operational efficiency. Overall, service time discipline functions as a strategic internal mechanism for improving outpatient service flow and minimizing patient waiting time.

### 3.5.3 Patient Flow Design Influences Outpatient Waiting Time

The third hypothesis confirms that patient flow design has a positive and significant effect on outpatient waiting time. The findings indicate that a well-structured and efficient patient flow design shortens waiting time by ensuring that each stage of service runs sequentially, systematically, and with minimal unnecessary repetition. Inefficient service pathways, repeated administrative procedures, and uncoordinated movement between service units often create bottlenecks and queue accumulation in outpatient clinics. By contrast, a clearly designed and integrated patient flow allows patients to move through registration, administration, and clinical services in a predictable and streamlined manner, reducing service delays. This result is consistent with prior studies highlighting that service process design and queue management strongly influence waiting time performance. Practically, the finding implies that Karang Tengah Medika Hospital can reduce outpatient waiting time by auditing service pathways, simplifying administrative stages, optimizing inter-unit coordination, and implementing digital routing systems to regulate patient movement. From a theoretical perspective, this supports service design theory and service waiting time theory, which emphasize that effective process and system design are essential to minimizing service bottlenecks. Overall, patient flow design functions as a systemic

operational mechanism that directly enhances service efficiency and reduces outpatient waiting time.

### 3.5.4 Perceived Service Fairness Strengthens the Effect of Application-Based Service Integration on Outpatient Waiting Time

The fourth hypothesis confirms that perceived service fairness strengthens the relationship between application-based service integration and outpatient waiting time. The findings indicate that digital service integration becomes more effective in reducing waiting time when patients perceive the service process as fair, transparent, and consistent. Although integrated applications streamline registration, scheduling, and information flow, their impact is maximized when patients believe that the system treats all patients equally, follows clear procedures, and provides transparent queue information. When fairness perception is high, patients better understand and accept service mechanisms, making digital integration more effective in controlling waiting time. Conversely, when fairness perception is low, the positive impact of application-based integration weakens, as patients tend to view service processes as unclear or inconsistent despite technological support. This result aligns with justice theory, which explains that perceived fairness shapes how individuals evaluate service processes and outcomes, including waiting time. Practically, the finding implies that Karang Tengah Medika Hospital must ensure that digital service systems are not only technologically integrated but also operate under transparent procedures, equal treatment, and clear communication to patients. Overall, perceived service fairness functions as a psychological and procedural factor that amplifies the effectiveness of digital service integration in reducing outpatient waiting time.

### 3.5.5 Perceived Service Fairness Strengthens the Effect of Service Time Discipline on Outpatient Waiting Time

The fifth hypothesis confirms that perceived service fairness strengthens the relationship between service time discipline and outpatient waiting time. The findings indicate that punctual and consistent service schedules become more effective in reducing waiting time when patients perceive the service process as fair, transparent, and equally applied to all. Although disciplined adherence to service schedules improves operational flow, its impact is amplified when patients believe that queue procedures, service order, and treatment decisions are implemented consistently without favoritism. When fairness perception is high, patients are more likely to accept service mechanisms and trust the process, resulting in smoother patient flow and better control of waiting time. Conversely, when fairness perception is low, the effectiveness of time discipline weakens, as patients may still perceive waiting time negatively despite punctual service delivery. This finding supports justice theory, which emphasizes that fairness perception shapes how individuals evaluate service processes and outcomes. Practically, it implies that Karang Tengah Medika Hospital must enforce time discipline alongside transparent queue procedures, clear service information, and consistent communication to ensure patients

perceive the process as fair. Overall, perceived service fairness acts as a reinforcing psychological factor that maximizes the impact of service time discipline on reducing outpatient waiting time.

### 3.5.6 Service Fairness Perception Moderates the Effect of Patient Flow Design on Outpatient Waiting Time

The sixth hypothesis states that service fairness perception strengthens the effect of patient flow design on outpatient waiting time. The results show that an effective and well-structured patient flow design becomes more capable of reducing waiting time when patients perceive service procedures as fair, transparent, and consistently applied to all patients. When fairness perception is high, patients experience clearer service stages, less uncertainty, and greater acceptance of the queuing process, allowing the designed service flow to function optimally in accelerating administrative and clinical processes. Conversely, when fairness perception is low, unclear information, inconsistent implementation of procedures, or perceived unequal treatment weakens the effectiveness of patient flow design, causing patients to experience longer perceived waiting times despite operational improvements. These findings align with Service Design Theory and Justice Theory, which emphasize that efficient service systems must be supported by fair implementation to achieve positive user evaluations, and are consistent with Service Waiting Time Theory, which explains that waiting time perception is shaped not only by actual duration but also by perceived fairness during service delivery. Therefore, the findings confirm that service fairness perception plays a crucial moderating role in strengthening the impact of patient flow design on outpatient waiting time, indicating that RS Karang Tengah Medika must integrate improvements in service flow design with transparent procedures, clear communication, and consistent application of service rules to achieve optimal and sustainable waiting time reduction.

### 3.5.7 Perception of service fairness has a positive and significant effect on outpatient waiting time

The seventh hypothesis states that service fairness perception has a positive and significant effect on outpatient waiting time. The results show that patients' perceptions of fair, transparent, and consistent service play an important role in shaping their waiting time experience. When patients feel that procedures are applied equally and information is delivered clearly, they tend to perceive waiting time as more acceptable, even if the actual queue duration does not change. This finding supports service justice and waiting time perception theories, which emphasize that fairness influences how patients evaluate service processes. Therefore, strengthening transparent procedures, consistent service implementation, and effective communication is essential for reducing negative perceptions of waiting time and improving overall outpatient service quality.

## 4. Conclusion

This study concludes that outpatient waiting time is a multifaceted problem influenced by internal hospital system

factors. Improving waiting time requires an integrated approach involving system design, human resource behavior, and patient perception, rather than fragmented or partial interventions. Digital service integration is shown to streamline administrative processes, improve information flow, and reduce unnecessary procedural duplication, making it a fundamental component of modern healthcare management. In addition, time discipline among medical and service personnel plays a crucial role in ensuring that service flows remain efficient. Patient flow design also has a significant effect, as clear and well-coordinated pathways prevent bottlenecks and reduce queuing. The study further identifies perceived service fairness as both a moderating and direct determinant of waiting time, indicating that patients' psychological perceptions shape the effectiveness of operational improvements. Overall, reducing outpatient waiting time requires a holistic and sustainable strategy that integrates technology, organizational discipline, and patient-oriented service processes. The findings enrich theoretical understanding of waiting time management and offer practical insights for hospitals in enhancing outpatient service efficiency.

## Anknowledment

## Reference

1. Adams, J. S. (1963). Towards an understanding of inequity. *The Journal of Abnormal and Social Psychology*, *67*(5), 422–436. https://doi.org/10.1037/h0040968

2. Aeenparast, A., Farzadi, F., Maftoon, F., & Yahyazadeh, H. (2019). Patient Flow Analysis in General Hospitals: How Clinical Disciplines Affect Outpatient Wait Times. *Hospital Practices and Research*, *4*(4), 128–133. https://doi.org/10.15171/hpr.2019.26

3. Angelina Lontaan, P., G.Langi, F., & S. Kekenusa, J. (2025). Analysis of Factors Related To Waiting Time For Services In The Outpatient Department of Manado Regional Hospital. *International Journal of Health and Pharmaceutical (IJHP)*, *5*(3), 406–411. https://doi.org/10.51601/ijhp.v5i3.428

4. Antara. (2023). *Service digitalization lessens waiting time by almost an hour*. https://en.antaranews.com/news/254661/service-digitalization-lessens-waiting-time-by-almost-an-hour

5. Astiena, A. K., Hadiguna, R. A., Iswanto, A. H., & Hardisman, -. (2022). Digitalization of Outpatient Services Based on Lean Management to Reduce Waiting Time in Government Hospital. *International Journal on Advanced Science, Engineering and Information Technology*, *12*(6), 2248–2257. https://doi.org/10.18517/ijaseit.12.6.17212

6. Azmi, Z. U., Mailintina, Y., & Efkelin, R. (2024). Faktor-Faktor yang Berhubungan dengan Lama Waktu Tunggu Rawat Jalan Pasien BPJS Puskesmas Kecamatan Penjaringan. *MAHESA : Malahayati Health Student Journal*, *4*(11), 5179–5191. https://doi.org/10.33024/mahesa.v4i11.17166

7. Bao, Z., Liu, Q., Guo, Y., Ye, Z., Shen, J., Xie, S., Peng, J., Huang, X., & Wei, Z. (2024). *PIORS: Personalized Intelligent Outpatient Reception based on Large Language Model with Multi-Agents Medical Scenario Simulation* (No. arXiv:2411.13902). arXiv. https://doi.org/10.48550/arXiv.2411.13902

8. Basavanagowdappa, H. (2018). Scrub typhus: Easily treatable but often missed. *APIK Journal of Internal Medicine*, *6*(1), 7. https://doi.org/10.4103/2666-1802.260113

9. Bekker, R., Bharti, B., Lan, L., & Mandjes, M. (2023). *A queueing-based approach for integrated routing and appointment scheduling* (No. arXiv:2312.02715). arXiv. https://doi.org/10.48550/arXiv.2312.02715

10. Binus, B. (2021). Quantitative Research [Https://sis.binus.ac.id/2021/09/03/quantitative-research/]. *Quantitative Research*. https://sis.binus.ac.id/2021/09/03/quantitative-research/

11. Boodaghian Asl, A., Raghothama, J., Darwich, A. S., & Meijer, S. (2025). A dynamic nonlinear flow algorithm to model patient flow. *Scientific Reports*, *15*(1), 12052. https://doi.org/10.1038/s41598-025-96536-z

12. Busse, R., Klazinga, N., Panteli, D., & Quentin, W. (Eds.). (2019). *Improving healthcare quality in Europe: Characteristics, effectiveness and implementation of different strategies*. WHO Regional Office for Europe.

13. Capodici, A., Noci, F., Nuti, S., Emdin, M., Dalmiani, S., Passino, C., Hernandez-Boussard, T., & Giannoni, A. (2025). Reducing outpatient wait times through telemedicine: A systematic review and quantitative analysis. *BMJ Open*, *15*(1),

e088153. https://doi.org/10.1136/bmjopen-2024-088153

14. Davidson, S. R. E., Haskins, R., Ingham, B., Gallagher, R., Smith, D., Donald, B., Henderson, J., Edger, M., Barnett, C., & Williams, C. M. (2025). Service redesign for outpatient services: Strategies to improve the wait. *Public Health*, *242*, 214–219. https://doi.org/10.1016/j.puhe.2025.03.011

15. Dimas Luthfi Pambudi & Wahyu Wijaya Widiyanto. (2025). Evaluating Outpatient EMR Adoption Using the Technology Acceptance Model: A Case Study at RSAU dr. Siswanto, Indonesia. *International Journal of Health and Medicine*, *2*(3), 76–82. https://doi.org/10.62951/ijhm.v2i3.456

16. Eka, I. (2024). Pengaruh Waktu Tunggu Pelayanan dan Fasilitas Rumah Sakit Terhadap Loyalitas Pasien yang Dimediasi Kepuasan Pasien Rawat Jalan di Rumah Sakit Pelita Anugerah Demak. *Jurnal Ilmu Manajemen Terapan*, *6*(4).

17. Esa, B. (2025). *GAMBARAN KUALITAS PELAYANAN MENURUT PERSEPSI PASIEN DI PUSKESMAS PENYENGAT OLAK KECAMATAN JAMBI LUAR KOTA KABUPATEN MUARO JAMBI*.

18. Faeni & Nabila. (2024). The Role of Management Information Systems in the Healthcare Industry in E-Health and E-Hospital Programs. *JURNAL RISET MANAJEMEN DAN EKONOMI (JRIME)*, *2*(3), 130–137. https://doi.org/10.54066/jrime-itb.v2i3.2101

19. Ghasi, N. C., Ogbuabor, D. C., & Onodugo, V. A. (2020). Perceptions and predictors of organizational justice among healthcare professionals in academic hospitals in South-Eastern Nigeria. *BMC Health Services Research*, *20*(1), 301. https://doi.org/10.1186/s12913-020-05187-5

20. Giwang, Y. R. P. (2025). *PERCEPTION OF OUTPATIENT HEALTH SERVICES IN SUB RAMBAH ROKAN HULU DISTRICT HOSPITAL ROKAN HULU*.

21. Greenberg, J. (1987). A Taxonomy of Organizational Justice Theories. *The Academy of Management Review*, *12*(1), 9. https://doi.org/10.2307/257990

22. Gurusinga, R. F., Fadhlullah, M. A., Rosmini, I., Nur, N. W., & Redjeky, F. (2025). Analisis Waktu Tunggu Pelayanan dan Kepuasan Pasien Pada Fasilitas Kesehatan: Literature Review. *RIGGS: Journal of Artificial Intelligence and Digital Business*, *4*(2), 1252–1256. https://doi.org/10.31004/riggs.v4i2.642

23. Harahap, N. C., Handayani, P. W., & Hidayanto, A. N. (2023). Integrated Personal Health Record in Indonesia: Design Science Research Study. *JMIR Medical Informatics*, *11*, e44784. https://doi.org/10.2196/44784

24. Haryadi, P. M. D., Rahim, A. H., Veranita, M., & Sanjaya, U. A. R. (2025). *Pengaruh Disiplin Waktu (Frekuensi, Ketepatan Waktu, dan Durasi) Terhadap Kunjungan Pasien Rawat Jalan Kebidanan Pada RSIA X Denpasar Bali*.

25. hellosehat. (2025). *RS Karang Tengah Medika*. https://hellosehat.com/care/rumah-sakit/rs-karang-tengah-medika-859

26. hermananis. (2025). *Populasi dan Sampel Penelitian*. https://hermananis.com/populasi-dan-sampel-penelitian/

27. Himawan, D. B., & Ikrimach, I. (2024). Optimalisasi Pelayanan Pasien Melalui Aplikasi Antrian Berbasis Mobile Mengunakan Metode Agile: Optimalisasi Pelayanan Pasien Melalui Aplikasi Antrian Berbasis Mobile Mengunakan Metode Agile. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, *5*(1), 273–282. https://doi.org/10.57152/malcom.v5i1.1753

28. Janna, N. M., Sartina, A., & Elly, A. (2022). Analysis of Waiting Time for Patient Service Using Lean Concept in Outstanding Installations Stella Maris Hospital, Makassar City in 2022. *Journal of Asian Multicultural Research for Medical and Health Science Study*, *3*(1), 59–66. https://doi.org/10.47616/jamrmhss.v3i1.236

29. Kammrath Betancor, P., Boehringer, D., Jordan, J., Lüchtenberg, C., Lambeck, M., Ketterer, M. C., Reinhard, T., & Reich, M. (2025). Efficient patient care in the digital age: Impact of online appointment scheduling in a medical practice and a university hospital on the "no-show"-rate. *Frontiers in Digital Health*, *7*, 1567397. https://doi.org/10.3389/fdgth.2025.1567397

30. Kemdirim, C. J., Uduak, A., Opurum, N., Hart, D., & Ogaji, D. S. (2021). *Time-Flow Study for Receipt of Outpatient Services in Public and Private Hospitals: Implications for Lean Approach in Health Facilities in Rivers State, Nigeria*. https://doi.org/10.60787/NMJ-62-6-63

31. Kristina Supriyati & Indriati Kusumaningsih. (2023). Analisis Faktor Waktu Tunggu Pelayanan Rawat Jalan: Literature Review: The Factor Analysis of Waiting Time for Out Patient Services : Literature Review. *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, *6*(12), 2371–2380. https://doi.org/10.56338/mppki.v6i12.4174

32. Lee, H., Choi, E. K., Min, K. A., Bae, E., Lee, H., & Lee, J. (2022). Physician-Customized Strategies for Reducing Outpatient Waiting Time in South Korea Using Queueing Theory and Probabilistic Metamodels. *International Journal of Environmental Research and Public Health*, *19*(4), 2073. https://doi.org/10.3390/ijerph19042073

33. Liao, Y. K., Wu, C. Y., Truong, G. N. T., & Do, Y. T. (2022). The Roles of Service Recovery and Perceived Justice on Post-Recovery Satisfaction in M-Commerce. *Sustainability*, *14*(22), 14838. https://doi.org/10.3390/su142214838

34. Lontaan, P. A., Langi, F. G., & Kekenusa, J. S. (2025). *Analysis Of Factors Related To Waiting Time For Services In The Outpatient Department Of Manado Regional Hospital*.

35. Maahury, S. D., & Basabih, M. (2025). *ANALISIS WAKTU TUNGGU PELAYANAN RESEP PASIEN RAWAT JALAN di INSTALASI FARMASI RUMAH SAKIT SWASTA DITINJAU DARI TINGKAT KEPUASAN PASIEN: LITERATURE REVIEW*.

36. Manderson, K., Taylor, N. F., Lewis, A., & Harding, K. E. (2025). Service-level interventions to reduce waiting time in outpatient and community health settings may be sustained: A systematic review. *BMJ Open Quality*, *14*(1), e003235. https://doi.org/10.1136/bmjoq-2024-003235

37. Maretha, R., Idris, H., & Syakurah, R. A. (2025). *ANALYSIS OF OUTPATIENT WAITING TIME DETERMINANTS IN HOSPITALS BASED ON THE DONABEDIAN FRAMEWORK*. *7*(5).

38. Morales, J., Silva-Aravena, F., & Saez, P. (2024). Reducing Waiting Times to Improve Patient Satisfaction: A Hybrid Strategy for Decision Support Management. *Mathematics*, *12*(23), 3743. https://doi.org/10.3390/math12233743

39. Munggaran, R. P., Nurmalasari, M., Hosizah, H., & Krismawati, D. (2024a). Prediksi Waktu Tunggu Pelayanan Pasien Rawat Jalan dengan Algoritma Random Forest: Predicting Outpatient Service Waiting Times with Random Forest Algorithm. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, *5*(1), 35–40. https://doi.org/10.57152/malcom.v5i1.1529

40. Munggaran, R. P., Nurmalasari, M., Hosizah, H., & Krismawati, D. (2024b). Prediksi Waktu Tunggu Pelayanan Pasien Rawat Jalan dengan Algoritma Random Forest: Predicting Outpatient Service Waiting Times with Random Forest Algorithm. *MALCOM: Indonesian Journal of Machine Learning and Computer Science*, *5*(1), 35–40. https://doi.org/10.57152/malcom.v5i1.1529

41. Nabila, N., & Ayuningtyas, D. (2024). The Effectivity of Outpatient Waiting Time in Hospital through Online or Web-based Reservation (Literature Review). *Asian Journal of Engineering, Social and Health*, *3*(8), 1725–1739. https://doi.org/10.46799/ajesh.v3i8.370

42. Narulitha, A., & Batara, A. S. (2025). *HUBUNGAN WAKTU TUNGGU DENGAN TINGKAT KEPUASAN PASIEN RAWAT JALAN RUMAH SAKIT IBNU SINA YAYASAN WAKAF UNIVERSITAS MUSLIM INDONESIA*. *6*(2).

43. Nasution, S., Sri Melda Br. Bangun, & Okto Hebron. (2024). The Relationship Between Discipline Indicators and The Performance of Specialist Doctors in Outpatient Services of Hospital Dr.H Kumpulan Pane, Tebing Tinggi City in 2024. *JURNAL KESMAS DAN GIZI (JKG)*, *7*(1), 115–122. https://doi.org/10.35451/jkg.v7i1.2315

44. Nggule, Z., Antu, M. I. A., & Rahman, M. A. (2025). *HUBUNGAN WAKTU TUNGGU PELAYANAN RAWAT JALAN DENGAN TINGKAT KEPUASAN PASIEN DI RSUD D.R M.M DUNDA LIMBOTO*. *6*.

45. Pérez-Arechaederra, D., Briones, E., & García-Ortiz, L. (2025). Communication and relationships: How patients perceive informational and interactional organizational justice can improve patient-centered care, a study with samples from Spain and the U.S. *BMC Health Services Research*, *25*(1), 350. https://doi.org/10.1186/s12913-025-12461-x

46. Populix, P. (2023). *Teknik Pengumpulan Data Kualitatif & Kuantitatif yang Tepat* [Https://info.populix.co/articles/teknik-pengumpulan-data]. https://info.populix.co/articles/teknik-pengumpulan-data

47. Prasetyo Anggun Wicaksono, A. R., Vindhya Putri, A., & Melani, A. (2024). Factors Causing Outpatient Long Waiting Time at Outpatient Polyclinic of X Hospital. *Jurnal Kedokteran Brawijaya*, 10–13. https://doi.org/10.21776/ub.jkb.2024.033.01.3s

48. Purnomo, W., Hariyanti, T., & Prastowo, W. (2021). Analisa Waktu Tunggu Pelayanan Rawat Jalan di RS Universitas Brawijaya. *Jurnal Manajemen Bisnis dan Kewirausahaan*, *5*(4), 447. https://doi.org/10.24912/jmbk.v5i4.6904

49. Purwito, D., Linggardini, K., & Jaitieng, A. (2025). Barriers To Healthcare Access: Examining Travel Time, Waiting Times, And Service Costs in Indonesia Primary Health Care. *Jurnal Berita Ilmu Keperawatan*, *18*(2), 236–245. https://doi.org/10.23917/bik.v18i2.9068

50. Ramadhan, A. N., & Mujib, M. A. (2025). *PENGEMBANGAN SISTEM ANTRIAN LAYANAN KESEHATAN BERBASIS WEB DI PUSKESMAS RANCAMALAKA*.

51. Ratih Wijayanti, P. (2025). Price Fairness, Waiting Time, And Patient-Doctor Communication In Influencing Patient Satisfaction And Revisit Intention At Xyz Primary Clinic, Bandung City: SEM-PLS And IPMA. *Dinasti International Journal of Education Management And Social Science*, *6*(6).

52. Rohman, H., & Marsilah, M. (2022). Pemanfaatan Sistem Pendaftaran Online Melalui Aplikasi WhatsApp di Rumah Sakit Umum Daerah. *Indonesian of Health Information Management Journal (INOHIM)*, *10*(1), 18–26. https://doi.org/10.47007/inohim.v10i1.397

53. Rosida, F. A. (2025). *ANALISIS HUBUNGAN WAKTU TUNGGU PELAYANAN DENGAN KEPUASAN PASIEN RAWAT JALAN DI RSPAL DR. RAMELAN SURABAYA*.

54. Rusmiyati, E., & Wiharto, M. (2025). *The Relationship Between Waiting Time and Patient Satisfaction at the Nikel Polyclinic of X Hospital, East Jakarta, 2025*. *5*(06).

55. Salsabila, J. (2025). Implementation of EMR System in Indonesian Health Facilities: Benefits and Constraints. *Journal of Indonesian Health Policy and Administration*, *10*(1). https://doi.org/10.7454/ihpa.v10i1.1140

56. Santalia, G., Arif, Y., Ariany, E., & Helfiyani, H. (2023). Waktu Tunggu Pasien Rawat Jalan di RSUD Dr. Adnan WD Kota Payakumbuh. *Jurnal Keperawatan Jiwa*, *11*(3), 723. https://doi.org/10.26714/jkj.11.3.2023.723-730

57. Santhes, S., Widiyaningsih, C., Nurhayati, N., & Asmarani, U. (2025). Hubungan Waktu Tunggu, Kualitas Pelayanan Dengan Kepuasan Pasien Rawat Jalan di Poliklinik Onkologi Rumah Sakit Kanker Dharmais. *Jurnal Manajemen dan Administrasi Rumah Sakit Indonesia (MARSI)*, *9*(1), 66–75. https://doi.org/10.52643/marsi.v9i1.5903

58. SatuData. (2024). *Analisis Data Statistik Sektoral Kota Tangerang*. https://satudata.tangerangkota.go.id/public/user-content/93b685da677c78c7e51c5ab10d905472

59. Setiatin, S. (2025). *The Impact of the Use of the JKN Mobile Application on the Efficiency of Outpatient Waiting Time at RSUD Kesehatan Kerja Provinsi Jawa Barat*.

60. Setyaji, D. T., Paramarta, V., & Purwanda, E. (2024a). *Hubungan Mutu Pelayanan dan Lama Waktu Tunggu Rawat Jalan dengan Tingkat Kepuasan Pasien Rawat Jalan di Rumah Sakit Tahun 2024*.

61. Setyaji, D. T., Paramarta, V., & Purwanda, E. (2024b). *Hubungan Mutu Pelayanan dan Lama Waktu Tunggu Rawat Jalan dengan Tingkat Kepuasan Pasien Rawat Jalan di Rumah Sakit Tahun 2024*.

62. Shin, J., Lee, D. A., Kim, J., Lim, C., & Choi, B.-K. (2024). Dissatisfaction-considered waiting time prediction for outpatients with interpretable machine learning. *Health Care Management Science*, *27*(3), 370–390. https://doi.org/10.1007/s10729-024-09676-5

63. Silva, B., Pauli, G., Diringer, O., Morandi, S., Bonsack, C., & Golay, P. (2022). Perceived fairness as main determinant of patients' satisfaction with care during psychiatric hospitalisation: An observational study. *International Journal of Law and Psychiatry*, *82*, 101793. https://doi.org/10.1016/j.ijlp.2022.101793

64. Sofianto, A. (2020). INOVASI LAYANAN BERBASIS TEKNOLOGI INFORMASI PADA RUMAH SAKIT SEBAGAI BENTUK REFORMASI BIROKRASI. *Jurnal Litbang Provinsi Jawa Tengah*, *18*(1), 81–102. https://doi.org/10.36762/jurnaljateng.v18i1.811

65. Sofya, A., Novita, N. C., Afgani, M. W., & Isnaini, M. (2024). Metode Survey: Explanatory Survey dan Cross Sectional dalam Penelitian Kuantitatif. *EDU SOCIETY: JURNAL PENDIDIKAN, ILMU SOSIAL DAN PENGABDIAN KEPADA MASYARAKAT*, *4*(3), 1696–1708. https://doi.org/10.56832/edu.v4i3.556

66. Subburaman, G.-B. B., Munavalli, J. R., Ravilla, T., Mertens, H., Webers, C., Vasudeva Rao, S., & Van Merode, F. (2023). Managing Outpatient Cycle Times in Hospitals Using Integrated Closed-Loop Approaches. *Health Services Insights*, *16*, 11786329221145858. https://doi.org/10.1177/11786329221145858

67. Sugiyono, S. (2022). *METODE PENELITIAN KUANTITATIF, KUALITATIF DAN R &. D.* ALFABETA.

68. Toga-Sato, S., Tosaki, T., Kondo, M., Tsunekawa, S., Kato, Y., Nakamura, J., & Kamiya, H. (2021). Impact of actual waiting time and perceived waiting time on treatment satisfaction in patients receiving outpatient diabetes care. *Diabetology International*, *12*(3), 293–300. https://doi.org/10.1007/s13340-020-00486-y

69. Waiman, E., Achadi, A., & Agustina, R. (2023). REDUCING HOSPITAL OUTPATIENT WAITING TIME USING LEAN SIX SIGMA: A SYSTEMATIC REVIEW. *Jurnal Administrasi Kesehatan Indonesia*, *11*(1), 154–166. https://doi.org/10.20473/jaki.v11i1.2023.154-166

70. Wang, X., Zhang, R., Gao, Z., Xia, M., Zhang, S., Ge, L., Zhu, Y., Jin, H., Pan, S., Zheng, M., Chen, C., & Zhang, X. (2025). Patient-Centered Outpatient Process Optimization System Based on Intelligent Guidance in a Large Tertiary Hospital in China: Implementation Report. *JMIR Medical Informatics*, *13*, e60219–e60219. https://doi.org/10.2196/60219

71. Wildan, M. W. (2025). PENGARUH WAKTU TUNGGU TERHADAP KEPUASAN PASIEN DI UNIT RAWAT JALAN (POLI PENYAKIT DALAM) DI RSD IDAMAN BANJARBARU TAHUN 2024. *Jurnal Manajemen Pelayanan Kesehatan (The Indonesian Journal of Health Service Management)*, *27*(3), 98–102. https://doi.org/10.22146/jmpk.v27i3.15192

72. Yuniati, R., Fahrudda, A., & Suswojo, H. (2025). *Outpatient Waiting Time Acceleration: A Systematic Review of Process Improvement Interventions: Percepatan Waktu Tunggu Rawat Jalan: Tinjauan Sistematis Intervensi Peningkatan Proses*. *26*(3).

73. Zhang, H., Ma, W., Zhou, S., Zhu, J., Wang, L., & Gong, K. (2023). Effect of waiting time on patient satisfaction in outpatient: An empirical investigation. *Medicine*, *102*(40), e35184. https://doi.org/10.1097/MD.0000000000035184

74. Zhu, T., Liu, B., Song, M., & Wu, J. (2021). Effects of Service Recovery Expectation and Recovery

Justice on Customer Citizenship Behavior in the E-Retailing Context. *Frontiers in Psychology*, *12*, 658153. https://doi.org/10.3389/fpsyg.2021.658153