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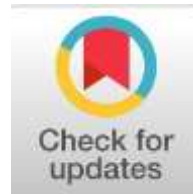
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Waiting Time and Patient Satisfaction in Mobile JKN Cardiology Services: Waktu Tunggu dan Kepuasan Pasien pada Layanan Mobile JKN Kardiologi

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Abstract

General Background: Digital health applications such as Mobile JKN are introduced to improve healthcare service efficiency, particularly in outpatient settings. **Specific Background:** Despite high utilization, outpatient waiting times at Mohammad Noer Regional General Hospital remain above the national standard, indicating persistent service delays. **Knowledge Gap:** Limited studies integrate actual waiting time (AWT) and perceived waiting time (PWT) in explaining patient satisfaction within digital health systems. **Aims:** This study examines the relationship between AWT, PWT, and patient satisfaction among Mobile JKN users in a cardiology clinic. **Results:** The average AWT reached 88.5 minutes, exceeding the national standard, with physician consultation as the main bottleneck. PWT showed a significant relationship with patient satisfaction ($p < 0.05$) and explained 44.5% of its variance. Both AWT and PWT significantly contributed to patient satisfaction, with perception playing a stronger role than objective duration. **Novelty:** This study integrates operational and experiential dimensions of waiting time within a digital health context, highlighting the dual role of objective and subjective measures. **Implications:** Improving patient satisfaction requires combining digital health systems with queue management, service optimization, and enhanced communication to align perceived and actual service performance.

Highlights

- Average service delay exceeds national outpatient standard duration
- Perception of waiting explains substantial variation in satisfaction levels
- Physician consultation identified as primary service bottleneck

Keywords

Actual Waiting Time; Mobile JKN; Perceived Waiting Time; Patient Satisfaction; Digital Health

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INTRODUCTION

The rapid advancement of digital tools, particularly mobile applications, has transformed how patients access, evaluate, and interact with healthcare services. This transformation is especially relevant in outpatient care, which often represents the first and primary point of contact within the healthcare system. In such situations, digital technologies such as Mobile JKN have been used to improve management efficiency and simplify service processes. According to previous studies, digital queuing systems can improve patient satisfaction and reduce waiting times. For example, Hasanuddin University Hospital adopted Mobile JKN by 90%, which was associated with better queue management and reduced registration delays.

However, the effectiveness of digital implementation remains inconsistent. At Mohammad Noer Regional General Hospital, outpatient waiting times still average 106 minutes, exceeding the national minimum service standard of ≤ 60 minutes as stipulated by the Indonesian Ministry of Health. This suggests that high adoption of digital systems does not necessarily translate into improved service performance. Patient satisfaction in outpatient services is influenced not only by actual waiting time (AWT), defined as the objectively measured duration, but also by perceived waiting time (PWT), which reflects patients' subjective experience. Longer waiting times are associated with negative perceptions and lower satisfaction. Nevertheless, most studies examine AWT and PWT separately, with limited evidence on how these dimensions interact within digital health systems, particularly in developing countries. At Mohammad Noer Regional General Hospital, outpatient visits continue to increase, with 46,072 BPJS visits recorded between January and October 2025, of which 85% used Mobile JKN. Outpatient services still have a relatively high complaint rate (42.2% in 2024), particularly regarding delays and waiting times. This occurs despite high utilization rates. This gap indicates a mismatch between perceived service quality and digital system usage.

In the context of digital healthcare, objective and subjective aspects of waiting time are combined to address this issue. This study investigates how patient satisfaction among Mobile JKN users is influenced by AWT, PWT, and related service factors. Beyond operational efficiency, this study situates waiting time within the broader perspective of patient-centered care and service experience, emphasizing that patient perception is as critical as actual service performance. By linking operational efficiency with patient-centered care and service experience, this study offers a more integrated perspective on outpatient service performance in the context of digital health implementation. The findings are expected to support hospital management in aligning digital systems with tangible service improvements, particularly in optimizing waiting time and enhancing overall patient experience.

RESEARCH METHOD

In November 2025, this study used a cross-sectional method and combined a time and motion study with a survey instrument, method, and participation of 108 cardiology clinic follow up patients who used Mobile JKN and are over 18 years old, and participants were chosen through purposive random sampling. The cardiology clinic was chosen from various outpatient clinics at Mohammad Noer Regional General Hospital. The survey tool was the KKM-17 17 item Patient Satisfaction Questionnaire (KKM-17) by Imaninda (2017), which is a modified version of Patient Satisfaction Questionnaire Form (PSQ-18), and a PWT survey. The 2017 KKM had an internal consistency of 0.95 and a validity coefficient of 0.800. The 2017 KKM 10-item version is more operationally defined and focuses more specifically on the patient's perceptions regarding their decisions related to the services they received at the hospital. The questionnaires were administered in two sections, the first section assessed PWT while patients were waiting to be examined by a doctor or nurse, the second section assessed patient satisfaction after they had completed their consultation.

A time and motion study was carried out based on the observation and recording of the time taken at different stages within the service delivery at Outpatient Cardiology for each patient – from the time the patient's fingerprints are taken at the registration desk to the time the patient is examined by the physician. All research participants provided written informed consent for study participation and for the publication of their data. Interviewers and family members who were accompanying participants, especially those who were blind, had reading/ writing disabilities, or were visually impaired, assisted them in completing the forms. Data were processed in steps, starting from the descriptive analysis of participant demographics. Time and motion study data were analyzed using SPSS 25 for windows. It was organized in tables to show the minimum, maximum and mean times for each service point of the outpatient cardiology flow. Multiple regression analysis was used to explain the influence of AWT and PWT on the satisfaction of Mobile JKN users.

RESULT AND DISCUSSION

A. Characteristics of Outpatient Mobile JKN Users

Table 1. Characteristics of Outpatient Mobile JKN Users at the Cardiology Clinic of Mohammad Noer Regional General Hospital, Pamekasan

Characteristic	Category	Number (N)	Percentage (%)
Age	30 – 45 years	10	9,3%
	46 – 60 years	56	51,9%
	61 – 75 years	30	27,8%
	>75 years	12	11%
Sex	Male	42	38,9%
	Female	66	61,1%
Education	Elementary School	30	27,8%

	Junior High School	7	6,48%
	Senior High School	25	23,1%
	Diploma/Bachelor	35	32,4%
Occupation	Civil Servant	21	19,4%
	Entrepreneur	12	11,1%
	Housewife	46	42,6%
	Retired	20	18,5%
	Farmer/Fisherman	9	8,3%

At the Mohammad Noer Regional General Hospital's Cardiology Clinic, most Mobile JKN users were women aged 46 to 60 years (61.1%). Most users were also highly educated. Having housewife users (42.6%) and retiree users (18.5%) is ideal as they have more time and flexibility to use a digital queuing system. Knowing the user profile and digital health service experience and familiarity helps to make sense of the influences on the user's perception of time and service design to fit user expectations. Actual Waiting Time

Looking at the Table 2 observations, total waiting time at the cardiology clinic was 88.5 minutes, which is higher than the <60-minute SPM. The longest waiting time was waiting for a doctor, while the other non-doctor processes satisfied the SPM (59.17 minutes). Although the doctor's consultation was only 4.35 minutes, there is great variability in the waiting time, which can be from 14 minutes to more than six hours. This means there is a variability in the service.

Table 2. Actual Waiting Time of Mobile JKN Users

Service Point	Time		
	Shortest	Average	Longest
Fingerprint recording	00:01:03	00:12:11	00:59:50
SEP validation	00:00:19	00:19:03	01:56:44
Nurse assessment	00:03:28	00:17:21	01:40:45
Supporting examination	00:02:37	00:06:07	00:13:25
Waiting for doctor	00:01:40	00:29:33	01:58:20
Doctor consultation	00:03:06	00:04:35	00:08:43
TOTAL	00:14:13	01:28:50 (88,50 minutes)	06:57:47
Total without waiting for doctor	00:12:33	00:59:17 (59,17 minutes)	05:51:27

Figure 1 . Distribution of Respondents' Waiting Time

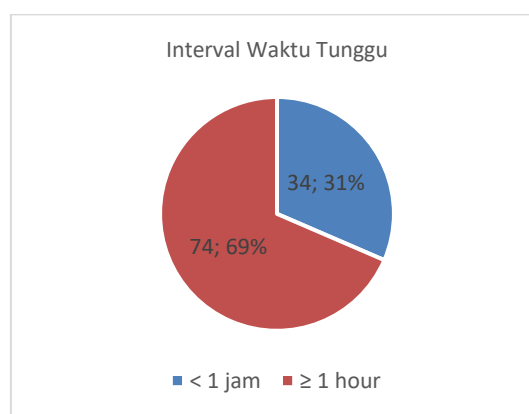
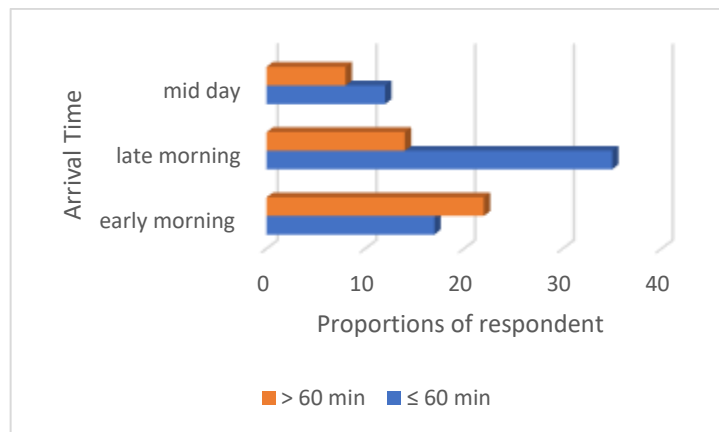


Figure 2 . *Waiting Time with The Date of Visit at Cardiology Clinic in Mohammad Noer General Hospital*



These two graphs show how long patients have to wait at the cardiology office based on what day they visit the office and what time they show up to the appointment. Most patients tend to wait longer than 60 minutes on Mondays and this is most likely because more patients show up. Tuesday and Wednesday have the best waiting times and are the best days with the least amount of patients. Most of the time, patients who arrived at the clinic the earliest end up waiting the longest. Contrarily, patients who arrive later in the morning end up waiting for a substantially shorter amount of time. Given all the above, there seems to be demand and capacity for improvement in the scheduling and the management of operational capacity.

Figure 3 . *Waiting time of the participant with their Arrival Time at Cardiology Clinic in Mohammad Noer General Hospital*



B. Perceived Waiting Time

Most people (36.1%) rated their PWT as high, Participants rated their PWT as very high and as low PWT equally (18.5%). Even smaller portions of participants rated their waiting time as moderate (15.7%) or very low (11.1%).

Table 3. *Distribution of Perceived Waiting Time Among Mobile JKN Users*

Perceived Waiting Time	N	%
Very High	20	18.5%
High	39	36.1%
Moderate	17	15.7%
Low	20	18.5%
Very Low	12	11.1%

C. Distribution of Patient Satisfaction

Most people rated patient satisfaction as moderate (35.2%). However, some people said high (26.9%) and very high (16.7%) suggesting that people view the service positively in general. One fifth of the patients reported low satisfaction (20.4%) and very few patients said very low satisfaction (0.9%).

Table 4. *Distribution of Patient Satisfaction in Mobile JKN Users*

Patient Satisfaction	N	%
Very High	18	16.7%

High	29	26.9%
Moderate	38	35.2%
Low	22	20.4%
Very Low	1	0.9%

D. Influence of Service Waiting Time on Patient Satisfaction

The multiple linear regression analysis indicated that both independent variables AWT and PWT had a significant effect on the dependent variables (patient satisfaction). AWT had a stronger impact on patient satisfaction compared to the PWT which had a stronger influence on the satisfaction. The regression equation that was derived was $Y = -6,831 + (0,554) X_1 + (0,058) X_2$. Of the total variance in patient satisfaction, AWT and PWT explained 44.5%. Therefore, it is appropriate to say that patient satisfaction is positively impacted by AWT and PWT. This indicates that the lower the patient satisfaction the lower the PWT.

Table 4. Results of Multiple Linear Regression Analysis

Variable	Regression Coefficient (B)	d. Error	Beta (β)	T _{count}	Sig	Description
(Constant)	-6,831	3,290		-2,076	0,041	
AWT	0,554	0,076	0,611	7,258	0,000	Significant
PWT	0,058	0,023	0,212	2,515	0,014	Significant
R (multiple correlation coefficient)		=0,667				
R square		=0,445				
Adjusted R Square		=0,431				
F _{count}		=31,702				
F _{table}		=3,111				
t _{table}		=1,994				
Sig. F		=0,000				
α		=0,05				

DISCUSSION

A. The Influence of Actual Waiting Time on Patient Satisfaction Among Mobile JKN Users at the Cardiology Clinic of Mohammad Noer Regional General Hospital, Pamekasan

The findings of this study indicate that the average actual waiting time (AWT) among Mobile JKN users in the cardiology clinic reached 88.5 minutes, exceeding the national service standard of 60 minutes. The longest delay was observed in the waiting time for physician consultation (29.33 minutes), identifying it as the primary bottleneck in the service flow. This is further supported by the distribution data, where 69% of patients experienced waiting times of ≥ 1 hour, indicating that prolonged waiting is not incidental but systemic. Similar patterns have been reported in previous studies, where delays in outpatient services are primarily driven by inefficiencies in physician scheduling and service coordination.

These results suggest that, despite high adoption of Mobile JKN as a digital health platform, digital registration alone has not effectively reduced total service time. Digital tools are expected to improve access and efficiency of administrative processes. However, previous studies emphasize that digitalization and optimizing of outpatient management systems, including scheduling and queue control, are necessary to reduce waiting times. From a patient perspective, prolonged AWT is particularly critical in cardiology settings, where patients are more vulnerable to anxiety and discomfort during waiting periods. This condition not only affects clinical risk but also shapes perceived waiting time (PWT), which has been shown to significantly influence patient satisfaction. The discrepancy between actual waiting time and perceived waiting time may further amplify dissatisfaction, as patients tend to evaluate service quality based on their subjective experience rather than objective duration. Empirical evidence consistently demonstrates that longer waiting times are associated with lower satisfaction and reduced trust in healthcare services.

Furthermore, a mismatch between the actual waiting time experience and the expected efficiency of digital services may lead patients to under-use digital platforms such as Mobile JKN. If the system does not provide time-saving benefits, patients may perceive the system as ineffective, which can ultimately compromise patient-centered care and service experiences. This suggests that AWT management is not only an operational issue but also an important factor in perceived service quality.

Consequently, improving AWT requires redesigning the service process, particularly at the doctor consultation stage, as well as optimizing digital access through Mobile JKN. Integrated scheduling, real-time queue management, and workload balancing has been shown to improve patient flow and reduce waiting times. To ensure better patient experience and satisfaction, it is crucial to align the use of digital health with operational improvements..

B. The Influence of Perceived Waiting Time on Patient Satisfaction Among Mobile JKN Users at the Cardiology Clinic of Mohammad Noer Regional General Hospital, Pamekasan

Perceived waiting time (PWT) plays a critical role in shaping patient satisfaction among Mobile JKN users in the cardiology clinic. Unlike actual waiting time (AWT), PWT reflects how patients subjectively experience waiting based on expectations and prior experiences. In this study, most patients reported moderate to high levels of PWT (51.8%), while only a small proportion perceived waiting as very low (11.1%). At the same time, patient satisfaction was predominantly at moderate and low levels (55.6%), suggesting that poor perceptions of waiting times may be associated with lower levels of satisfaction.

Several factors influence patient wait times, these include clear queue information, staff communication, and a comfortable waiting environment. If patients don't receive adequate information or engagement during their wait, the wait times tend to be perceived as longer. Conversely, creating a supportive atmosphere and clear communication can shorten perceived wait times. This explains why patients may be dissatisfied even when wait times are objectively acceptable or remain satisfied if longer waits are well managed. The disconfirmation paradigm assumes satisfaction depends on the difference between expected and perceived service performance.

In this study, the relatively high proportion of patients reporting elevated PWT suggests a mismatch between expected efficiency from Mobile JKN and the actual service experience. This mismatch can amplify dissatisfaction, particularly in cardiology settings where patients are more vulnerable to anxiety during waiting periods. Previous studies have shown that PWT is closely associated with perceived service quality, especially in terms of responsiveness and empathy and has a stronger influence on satisfaction than objective waiting time alone.

Digital features such as queue notifications and estimated waiting times have the potential to reduce uncertainty and improve patient experience. However, their effectiveness depends on alignment with actual service processes. Discrepancies between digital and real queues can worsen PWT and decrease satisfaction. In contrast, clear communication and transparent information can increase patient tolerance toward waiting and improve overall satisfaction.

Overall, these findings indicate that PWT has a substantial negative impact on patient satisfaction. Managing waiting perception through effective communication, system transparency, and supportive service environments is therefore essential. Without addressing PWT, improvements in actual waiting time alone may not be sufficient to enhance patient satisfaction in digital health services.

CONCLUSION

This study demonstrates that both actual waiting time (AWT) and perceived waiting time (PWT) significantly influence patient satisfaction among Mobile JKN users in the cardiology clinic of Mohammad Noer Regional General Hospital. The average AWT of 88.5 minutes, which exceeds the national standard, and the high proportion of patients experiencing waiting times ≥ 1 hour indicate systemic inefficiencies, particularly at the physician consultation stage. At the same time, the prevalence of moderate to high patient waiting times (PWT) indicates a mismatch between expected and experienced services, leading to patient dissatisfaction.

Importantly, the results show that patient satisfaction is not only influenced by actual duration of service but also by how they perceive the wait time. Factors such as poor communication, lack of information, and misalignment between digital and on-site service processes contribute to unpleasant waiting experiences, even when many people use Mobile JKN to access digital services.

These results imply that improving patient satisfaction requires a dual approach: optimizing operational efficiency to reduce AWT and actively managing patient experience to improve PWT. Hospitals should prioritize physician scheduling, patient flow management, and real-time queue systems, while simultaneously strengthening communication, transparency, and integration between digital and manual services.

Overall, the effectiveness of Mobile JKN depends not only on facilitating access but also on its ability to deliver timely and well-managed service experiences. Without addressing both AWT and PWT, digital health implementation will have limited impact on improving patient satisfaction and service quality. These methods will also strengthen the trust of people within the Mobile JKN application and the Cardiology Clinic of Mohammad Noer Regional General Hospital.

ETHIC APPROVAL

This study got Ethics Committee Approval from the Health Research Ethics Committee of the Mohammad Noer Regional General Hospital, East Java Province, under approval number 001/0284253528/102.16/X/2025, on 30 October 2025. The patients were informed in writing that their completion of the questionnaire meant consent to participate in the study.

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