

DIFFERENCES IN WAITING TIME FOR MEDICAL EXAMINATION BASED ON THE USE OF THE JKN MOBILE APPLICATION AND TYPE OF PARTICIPANT AND ITS IMPACT ON THE QUALITY OF SERVICE IN THE RESPONSIVENESS ASPECT AT THE INTERNAL MEDICINE POLYCLINIC OF PTPN VIII SUBANG REGIONAL HOSPITAL

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ABSTRACT

This study aims to analyze the differences in medical examination waiting times based on registration methods (the Mobile JKN application and manual registration) and membership categories (PBI and non-PBI), examine the interaction between these factors, and determine the relationship between waiting time and service quality in terms of responsiveness at the Internal Medicine Outpatient Clinic of RSUD PTPN VIII Subang. A quantitative approach with a comparative and analytical design was employed. The study included 100 patients who were equally distributed into four groups: Manual–Non-PBI, Manual–PBI, Mobile JKN–Non-PBI, and Mobile JKN–PBI, with 25 patients in each group. Data were analyzed using Two-Way ANOVA, the Kruskal-Wallis test, and Spearman's Rank correlation. The results showed that the mean waiting time for patients using manual registration was 34.28 minutes, compared with 137.46 minutes for Mobile JKN users, with a statistically significant difference ($p < 0.001$). Based on membership status, the mean waiting time was 94.38 minutes for Non-PBI patients and 77.36 minutes for PBI patients, with a statistically significant difference ($p < 0.001$). The interaction between registration method and membership status was also statistically significant ($p < 0.001$), with the difference in waiting time being particularly evident among Mobile JKN users. Service quality in terms of responsiveness also differed significantly among the four groups ($p < 0.001$). Spearman's correlation analysis across all groups demonstrated a very strong negative relationship between waiting time and responsiveness ($r = -0.878$; $p < 0.001$). It can be concluded that registration method, JKN membership status, and the interaction between these factors are significantly associated with medical examination waiting time. Longer waiting times are associated with lower patient perceptions of service responsiveness. These findings indicate the need to evaluate the integration of Mobile JKN with the queue management system, hospital information system, administrative processes, and medical examination workflow to improve waiting-time efficiency and service quality.

Keywords: Mobile JKN, waiting time, JKN membership, responsiveness, outpatient service.

INTRODUCTION

Healthcare is a form of public service that holds a strategic position because it is directly related to meeting the basic needs of the community. Health is not only an individual need but also a crucial element in improving the quality of life, productivity, and welfare of society. Hospitals, as healthcare facilities, have a responsibility to provide safe, high-quality, effective, efficient, accessible, and patient-centered services. According to the World Health Organization (WHO, 2021), quality healthcare services include services that are effective, safe, community-centered, timely, efficient, integrated, and equitable. This perspective demonstrates that the quality of hospital services can be assessed not only by the success of

medical procedures but also by the entire process a patient experiences from entering a healthcare facility to receiving the required care.

According to Pohan (2021), healthcare quality is the level of excellence in healthcare services provided in accordance with professional standards and service standards, using available resources efficiently and effectively. This concept places the service process as a crucial component of hospital quality. Patients not only pay attention to the results of examinations or medical procedures but also to how staff provide information, how the administrative process is conducted, how patients are guided during the service process, and how long patients must wait before receiving an examination. Therefore, the patient experience during the service process is an integral part of assessing the quality of hospital services.

Outpatient services are a highly active part of hospital services. The high number of patient visits requires hospitals to manage various processes in an integrated manner, from registration and administrative verification, initial examinations, medical services, necessary supporting examinations, and administrative completion. According to the Indonesian Ministry of Health (2021), the provision of healthcare services requires effective, efficient, quality-oriented service management that prioritizes patient safety. If any stage of the service encounters a disruption, this can lead to queues at subsequent stages. This accumulation of queues can ultimately increase patient waiting times.

Waiting time is one aspect of service that is directly perceived by patients. Patients can directly compare the time spent waiting with the time actually spent receiving medical care. According to Bustami (2020), the quality of healthcare services can be understood through various dimensions that reflect the ability of healthcare facilities to meet patient needs and expectations. One aspect that patients pay attention to is the timeliness of service. Timely service delivery demonstrates the organization's ability to effectively manage resources and service processes. Conversely, long waiting times can lead to discomfort, boredom, anxiety, and the perception that the service process is not running optimally.

From a service management perspective, waiting time is also related to the efficiency of resource use. When waiting times increase, there is a buildup of patients in certain areas, increased waiting room congestion, and increased administrative burden on staff. According to Heizer, Render, and Munson (2020), queue management is a crucial part of operations management because an imbalance between customer arrival rates and service capacity can result in long queues. This concept is relevant for healthcare because patients are viewed as service users who require certainty about the flow and timing of services. Hospitals need to manage service capacity, arrival flow, queuing systems, and workload distribution to control waiting times.

Healthcare standards also prioritize waiting time as a key indicator in outpatient care. The Indonesian Ministry of Health has established service quality indicators that encourage healthcare facilities to measure and evaluate service times. Measuring waiting times is important because it provides an overview of a healthcare facility's ability to provide timely services. Long wait times do not necessarily indicate low healthcare worker competence, but may indicate problems with administrative processes, service capacity, queuing systems, inter-unit coordination, or the use of information technology.

This becomes even more crucial in Internal Medicine clinics. Patients visiting these clinics can have diverse health conditions and require different examination procedures. The service process can include membership verification, registration, queue number collection, initial examination, waiting for a doctor, medical examination, and follow-up care. This complexity requires strong coordination between staff and the support of an information system that can streamline patient flow. If one stage is delayed, waiting times for subsequent stages can increase.

Based on initial findings at the Internal Medicine Clinic at PTPN VIII Subang Regional Hospital, waiting times for medical examinations are still relatively long, averaging around 3 hours and 45 minutes. This indicates a gap between actual service times and expected service times. Long wait times are a significant issue because patients not only lose productive time but can also experience discomfort during their hospital stay. For patients with certain health conditions, long waits can also increase fatigue and discomfort during the service process.

The issue of waiting times needs to be analyzed based on the factors that potentially influence it. One factor that has evolved in the healthcare system is patient registration methods. Digital transformation is encouraging healthcare facilities to develop information technology-based registration systems. Digitization of services is fundamentally aimed at improving access, speeding up administrative processes, reducing redundant work, and providing convenience to the public.

One form of digitalization of services for National Health Insurance (JKN) participants is the use of the Mobile JKN application. Developed by BPJS Kesehatan, the Mobile JKN application provides digital services to participants, including various administrative services and queue management at integrated healthcare facilities. This technology is expected to reduce reliance on in-person registration at the counter and help manage patient arrivals.

According to Laudon and Laudon (2022), a properly designed and used information system can help organizations improve process efficiency, provide information more quickly, and support decision-making. In the context of hospital services, a digital registration system can be an instrument for improving service flow. Patients can gain access to service information earlier, while healthcare facilities can obtain information about the number of patients to be served. This, in theory, can help hospitals control queues and distribute service loads.

However, the use of digital systems does not automatically guarantee shorter wait times. The effectiveness of the technology is still influenced by the quality of implementation, information system readiness, integration between units, service capacity, patient compliance with arrival schedules, and the ability of staff to manage queues. According to DeLone and McLean (2020), the success of an information system is influenced by system quality, information quality, service quality, system usage, user satisfaction, and the resulting benefits. Therefore, the use of Mobile JKN needs to be tested based on actual service conditions, not simply based on the assumption that digitalization always results in faster service.

This provides an important basis for comparing waiting times between patients using manual registration and those using Mobile JKN. This comparison is necessary to determine whether there is a significant difference in waiting times between the two registration methods. The comparison results can provide insight into the effectiveness of the registration method used at the Internal Medicine Clinic at PTPN VIII Subang Regional Hospital. If significant differences are found, the hospital can use these findings as a basis for evaluating its queue management system and optimizing its digital registration channels.

In addition to the registration method, the type of JKN participant is also a factor that needs to be considered. JKN participants consist of Contribution Assistance Recipients (PBI) and Non-PBI groups, each with different participant characteristics. These differences may relate to administrative aspects and participant financing mechanisms. However, differences in participant status should not be a basis for discrimination in the provision of medical services. The principle of health care positions patients as recipients of services who must receive access and treatment in accordance with applicable regulations.

According to Kotler and Keller (2022), service quality can be reflected in an organization's ability to consistently meet customer needs. In the hospital context, meeting

these needs includes aspects of access, speed, accuracy, safety, comfort, communication, and equality of service. Therefore, differences in participant status need to be empirically examined to determine whether these administrative characteristics are related to differences in patient waiting times.

Testing based on membership type is also important from the perspective of public service equity. If there is no significant difference in waiting times between PBI and non-PBI patients, this condition may indicate that the service process has been relatively equal based on membership status. Conversely, if there is a significant difference, the findings require further investigation to determine whether the difference stems from the administrative process, queuing mechanisms, patient distribution, or other operational factors. Thus, analysis of membership type serves not only as a statistical analysis but also as a basis for evaluating the principle of service equity.

This study also considers the possibility of an interaction between registration method and JKN membership type. Interaction analysis is important because the effect of registration method on waiting times may not be the same across all participant groups. Theoretically, the use of Mobile JKN could provide different benefits for PBI and non-PBI patients if there are differences in technology usage patterns, administrative processes, or patient arrival characteristics. According to Sugiyono (2022), interaction analysis is used when researchers want to determine whether the effect of an independent variable on a dependent variable differs based on the category of other variables. Thus, testing for interactions can provide a more comprehensive understanding than simply examining the influence of each factor separately.

In addition to waiting time, this study links waiting time to the responsiveness dimension, a crucial component of service quality. According to Parasuraman, Zeithaml, and Malhotra (2021), responsiveness relates to the willingness and ability of service providers to assist customers and provide prompt service. This dimension is particularly relevant in hospital care, as patients need assurance that their needs are met promptly and are not left waiting without adequate information.

In healthcare, responsiveness is not only related to the speed of medical treatment but also encompasses the promptness of staff in providing information, assisting patients with the service flow, providing clarity regarding queues, and responding appropriately to patient needs. According to Tjiptono and Chandra (2020), responsiveness is a crucial element of service quality because customers assess the extent to which service providers are willing and prepared to provide prompt assistance. If patients have to wait long periods without certainty or adequate information, perceptions of service responsiveness can potentially decline.

The relationship between wait times and responsiveness becomes increasingly important as patients experience the entire service process. Wait times are a directly observable experience, while responsiveness is the patient's perception of the staff's responsiveness. The two can be interrelated because the more effectively the service process is managed, the more likely patients are to receive timely care and perceive a positive response from staff. Conversely, long queues without communication and assurance of service can create the perception that the hospital is less responsive to patient needs.

Thus, research on waiting times at the Internal Medicine Clinic at PTPN VIII Subang Regional Hospital is important not only from an operational perspective but also from a service quality perspective. Waiting time analysis can provide information on the effectiveness of registration methods, the equality of services based on membership type, and the possible interaction between these two factors. Measuring the relationship between waiting times and responsiveness can also demonstrate how the efficiency of the service process relates to patient perceptions of service quality.

Based on the overall description, this study has practical relevance for the management of RSUD PTPN VIII Subang, especially the Internal Medicine Polyclinic, in evaluating the effectiveness of the registration system and patient queue management. This study is expected to provide empirical information regarding the difference in waiting time between manual registration and Mobile JKN, differences based on PBI and Non-PBI membership types, the interaction between registration methods and membership types, and the relationship between waiting time and service responsiveness.

Thus, this study was conducted with the aim of analyzing the waiting time for patient medical examinations at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital based on manual and Mobile JKN registration methods, analyzing the difference in waiting time based on PBI and Non-PBI membership, testing the interaction between registration methods and membership types on waiting time, and analyzing the relationship between waiting time and service quality in the responsiveness aspect. The results of the study are expected to be the basis for evaluation for hospitals in improving the efficiency of service flows, optimizing the use of digital technology, controlling queues, and improving

Formulation of the problem

Based on the identification of problems that have been described previously, the formulation of the problem in this research is as follows:

1. What is the overview of the use of the Mobile JKN application, the type of patient membership, and the waiting time for medical examinations at the Internal Medicine Clinic of PTPN VIII Subang Regional Hospital?
2. Is there a difference in waiting time for medical examinations between patients who use the Mobile JKN application and patients who register manually at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital?
3. Is there a difference in waiting time for medical examinations based on the type of membership for Contribution Assistance Recipients (PBI) and Non-Contribution Assistance Recipients (Non-PBI) at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital?
4. Is there an interaction effect between the registration method using the Mobile JKN application and manual registration with PBI and Non-PBI membership types on the waiting time for medical examinations at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital?
5. Is there a relationship between waiting time for medical examinations and the quality of service in the responsiveness dimension at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital?

Research purposes

General purpose

In general, this study aims to analyze the differences in waiting time for medical examinations based on the registration method using the Mobile JKN application and manual registration, the types of PBI and Non-PBI membership, as well as the interaction effect of these two factors on waiting time for medical examinations and their relationship with the quality of service in the responsiveness dimension at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital.

Special purpose

Specifically, this research aims to:

1. To find out the overview of the use of the Mobile JKN application, types of PBI and Non-PBI membership, and waiting times for medical examinations at the Internal Medicine Polyclinic at PTPN VIII Subang Regional Hospital.

2. To analyze the difference in waiting time for medical examinations between patients who use the Mobile JKN application and patients who register manually at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital.
3. To analyze the differences in waiting times for medical examinations based on the types of PBI and Non-PBI membership at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital.
4. To analyze the interaction effect between the registration method using the Mobile JKN application and manual registration with PBI and Non-PBI membership types on the waiting time for medical examinations at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital.
5. To analyze the relationship between waiting time for medical examinations and service quality in the responsiveness dimension at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital.

II. FRAMEWORK OF THOUGHT AND HYPOTHESIS

Quality healthcare requires process management that provides convenience, speed, accuracy, and certainty to patients. Waiting time is one measure of the efficiency of the service flow. The more effective the registration process and the more organized the service flow, the greater the chance of managing wait times.

The use of Mobile JKN is a form of service digitization that can be used to reduce in-person administrative processes. Digital registration allows some processes to be completed before patients arrive at the healthcare facility. This theoretically reduces queues at the registration counter and speeds up patient transition to the next stage of care. In contrast, manual registration requires in-person interaction at the counter, potentially increasing administrative processing time, especially when there are a relatively large number of patients.

From a queuing theory perspective, patient waiting times are influenced by arrival patterns, service capacity, and the service mechanism used. The use of a digital registration system can help regulate arrival patterns and reduce patient concentration at a single service point. Therefore, the registration method is thought to be related to the length of medical examination wait times.

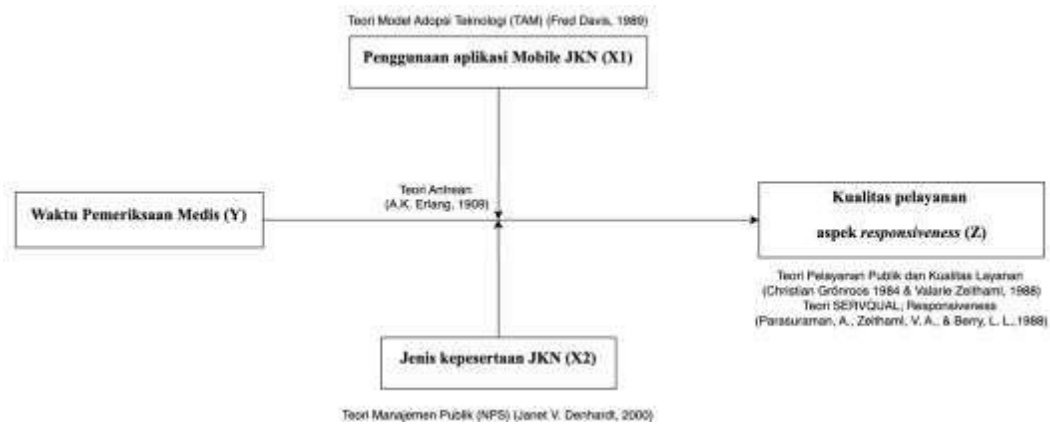
In addition to the registration method, the PBI and non-PBI membership types need to be aligned with the principles of fair and non-discriminatory service. Differences in membership status should not result in patients receiving different service speeds if all patients follow the same service pathway. Therefore, it is necessary to empirically test whether membership types actually result in differences in waiting times.

This study also tested for a possible interaction between registration method and membership type. An interaction occurs if the effect of registration method on waiting times differs across membership groups. Conversely, if there is no interaction, the effect of registration method on waiting times is relatively consistent for both PBI and non-PBI patients.

Furthermore, medical examination wait times are seen as being related to service quality, particularly the responsiveness dimension. Responsiveness relates to the ability of staff to provide prompt service, assist patients, provide information, and respond to patient needs. Longer wait times can create negative perceptions of service responsiveness. Therefore, the longer a patient waits, the lower their perception of service responsiveness.

Based on this description, the research paradigm can be described as indicating that registration method and type of participation are factors related to medical examination wait times. These two factors were also tested together through possible interactions. Furthermore, medical examination wait times were analyzed for their relationship to service quality in terms of responsiveness.

All the relationships between the use of the Mobile JKN application, the type of membership, and its impact on the waiting time for medical examinations at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital and its impact on the quality of service as explained, are summarized in the research paradigm below:



Research Hypothesis

1. There is a difference in waiting time for medical examinations between patients who use Mobile JKN and patients who register manually.
2. There is a difference in waiting time for medical examinations between patients with PBI and non-PBI membership.
3. There is an interaction effect between registration method and type of participation on waiting time for medical examination.
4. There is a significant relationship between waiting time for medical examination and quality of service in the responsiveness aspect.

III RESEARCH METHODOLOGY

This study employed a quantitative approach with descriptive and verification methods. The descriptive approach was used to describe medical examination waiting times and service quality in terms of responsiveness, while the verification approach was used to examine differences and relationships between the variables studied.

The research was conducted at the Internal Medicine Polyclinic of PTPN VIII Subang Regional Hospital in 2026. The research design used a cross-sectional approach, namely data collection was carried out during a certain research period to obtain an overview of the condition of respondents and research variables at the same time.

The study population was JKN patients receiving services at the Internal Medicine Clinic of PTPN VIII Subang Regional Hospital. The study sample consisted of 100 patients. Sampling was conducted using consecutive sampling, meaning patients who met the study criteria and arrived during the data collection period were included as respondents until the specified sample size was reached.

For the purpose of factorial analysis, 100 respondents were divided equally into four groups, namely 25 patients using Mobile JKN with PBI membership, 25 patients using manual registration with PBI membership, 25 patients using Mobile JKN with Non-PBI membership, and 25 patients using manual registration with Non-PBI membership.

The variables analyzed consisted of the registration method as the first differentiating variable, the type of participation as the second differentiating variable, the waiting time for medical examination as the main variable, and the quality of service in the responsiveness aspect as the variable analyzed in relation to waiting time.

Data on medical examination waiting times were obtained from medical records and/or the Hospital Information System (SIMS). Waiting times were calculated based on the

time required for patients to receive a medical examination, according to the operational definition of the study. Data on service quality in the responsiveness aspect were obtained through a questionnaire using a Likert scale of 1–4 distributed to respondents. Validity tests were conducted for each item, with an r value of > 0.197 ($p < 0.05$) and a Cronbach's Alpha reliability of 0.901.

Data analysis was conducted through several stages. The Mann-Whitney test was used to determine differences in waiting times between patient groups based on registration method and membership type. Next, a Two-Way ANOVA was used to test the main effects and possible interactions between registration method and membership type on waiting times. The relationship between waiting times and the responsiveness aspect of service quality was analyzed using Spearman correlation. Furthermore, simple linear regression was used to determine the direction and magnitude of the relationship/influence of waiting times on the responsiveness aspect of service quality.

IV RESULTS AND DISCUSSION

The results of the study were obtained from 100 patients who received services at the Internal Medicine Clinic of PTPN VIII Subang Regional Hospital. The research subjects were divided into four groups based on the combination of registration methods and JKN membership types, namely Group I consisting of patients with manual registration and Non-PBI membership, Group II consisting of patients with manual registration and PBI membership, Group III consisting of patients using Mobile JKN with Non-PBI membership, and Group IV consisting of patients using Mobile JKN with PBI membership. Each group consisted of 25 respondents, so the total number of research subjects was 100 patients.

The analysis was conducted in stages, including the characteristics of the research subjects, examination of waiting time and service quality in the responsiveness aspect, Two-Way ANOVA analysis to determine the effect of registration method, type of membership, and the interaction of both on waiting time, comparative analysis between groups, and correlation analysis between waiting time and service quality in the responsiveness aspect. The presentation of these results is intended to provide an empirical picture of the pattern of service waiting time based on registration method and type of membership and its relationship with patient perceptions of service responsiveness.

1. Characteristics of Research Subjects

Table 1. Characteristics of Research Subjects

Characteristics	Group				p-value
	I (n = 25)	II (n = 25)	III (n = 25)	IV (n = 25)	
Gender :					0.984*
Man	13	12	13	12	
Woman	12	13	12	13	
Age (years)					0.808**
Average (SD)	43.9 (9.7)	45.8 (10.6)	43.6 (9.7)	45.6 (10.0)	
Median	44	45	44	46	
Range	27-62	28-65	27-61	28-64	

Description: Group I = Manual–Non-PBI; Group II = Manual–PBI; Group III = Mobile JKN–Non-PBI; Group IV = Mobile JKN–PBI. *) Chi-square test; **) One Way ANOVA.

Based on Table 1, the gender distribution in the four study groups showed a relatively balanced composition. Group I consisted of 13 male patients and 12 female patients, Group II

consisted of 12 male patients and 13 female patients, Group III consisted of 13 male patients and 12 female patients, while Group IV consisted of 12 male patients and 13 female patients. The Chi-square test results obtained a p-value of 0.984, which is greater than 0.05. This indicates that there is no significant difference in gender distribution between the study groups.

Age characteristics also showed a relatively homogeneous pattern. The average age of patients in Group I was 43.9 years with a standard deviation of 9.7 years, Group II was 45.8 years with a standard deviation of 10.6 years, Group III was 43.6 years with a standard deviation of 9.7 years, and Group IV was 45.6 years with a standard deviation of 10.0 years. The median age ranged from 44 to 46 years, while the range was 27 to 65 years.

The One-Way ANOVA yielded a p-value of 0.808. This value is greater than 0.05, indicating no significant age differences between the four study groups. This indicates that the baseline characteristics of the subjects, based on gender and age, were relatively balanced, allowing for comparisons of waiting times and service quality between groups, given the relatively homogeneous characteristics of the subjects.

2. Results of the Examination of Waiting Time and Quality of Service Responsiveness Aspects

Table 2 Results of the Examination of Waiting Time and Quality of Service Responsiveness Aspects in the Four Research Groups

Variables	Group			
	I (n = 25)	II (n = 25)	III (n = 25)	IV (n = 25)
Waiting time (minutes) :				
Average (SD)	34.24 (4.26)	34.32 (4.30)	154.52 (5.65)	120.40 (2.58)
Median	34	35	155	120
Range	26-43	27-42	145-164	116-125
Normality test (p-value)	0.993	0.607	0.478	0.378
Quality of Service (Responsiveness)				
Average (SD)	40.80 (1.73)	40.96 (1.57)	37.56 (0.51)	37.68 (0.48)
Median	41	41	38	38
Range	38-44	38-43	37-38	37-38
Normality test (p-value)	0.028	0.014	<0.001	<0.001

Note: Normality test based on Shapiro-Wilk. Data is declared normally distributed if $p > 0.05$.

Based on Table 2, there was a quite striking difference in the average waiting time between the study groups. Group I, patients with the manual registration method and non-PBI membership, had an average waiting time of 34.24 minutes. Group II, patients with the manual registration method and PBI membership, had an average waiting time of 34.32 minutes.

In contrast to the two manual groups, Group III, which used Mobile JKN and had non-PBI membership, experienced an average waiting time of 154.52 minutes. Group IV, which used Mobile JKN and had PBI membership, experienced an average waiting time of 120.40 minutes. Thus, descriptively, the waiting time for patients using Mobile JKN was significantly higher than for patients who registered manually.

This difference is also evident in the medians. The median wait time for Group I was 34 minutes and for Group II was 35 minutes, while the median for Group III was 155 minutes

and for Group IV was 120 minutes. These findings suggest that the use of Mobile JKN in this study data cannot be understood as directly reducing waiting times for medical examinations.

The results of the normality test showed that all waiting time data had a p-value > 0.05, namely 0.993 in Group I, 0.607 in Group II, 0.478 in Group III, and 0.378 in Group IV, respectively. Thus, the distribution of waiting time data in the four groups met the assumption of normality.

In contrast to waiting time, the responsiveness aspect of service quality data showed a p-value <0.05 across all groups, namely 0.028 in Group I, 0.014 in Group II, <0.001 in Group III, and <0.001 in Group IV. Thus, the responsiveness data were not normally distributed across the four groups. This condition is the basis for using nonparametric tests to compare the responsiveness aspect of service quality between groups.

Descriptively, the average responsiveness in Group I was 40.80 and Group II was 40.96. Meanwhile, the average responsiveness in Group III was 37.56 and Group IV was 37.68. This pattern indicates that groups with longer waiting times tended to have lower responsiveness scores.

3. Two-Way ANOVA Analysis of Waiting Time

Table 3. Results of Two-Way ANOVA Analysis for Waiting Time

Source	Sum of Squares	df	Mean Square	F-test	p-value
Corrected Model	280705.070	3	93568.357	4978.585	<0.001
Intercept	737365.690	1	737365.690	39233.753	<0.001
Mobile Application (M)	266152.810	1	266152.810	14161.458	<0.001
Participant (P)	7242.010	1	7242.010	385.333	<0.001
Interaction (M*P)	7310.250	1	7310.250	388.964	<0.001
Error	1804.240	96	18,794		
Total	1019875.000	100			
Corrected Total	282509.310	99			

Based on Table 3, the overall model shows significant results with a p-value <0.001. This indicates that the combination of registration method, type of participation, and the interaction of the two are simultaneously related to variations in medical examination waiting times.

The Mobile Application factor yielded an F-value of 14,161.458 with p<0.001. These results indicate a highly significant difference in waiting times based on registration method. This finding demonstrates that the waiting time for patients registering manually differs significantly from that for patients using Mobile JKN.

The Participant factor, or type of participation, also showed an F-value of 385.333 with p<0.001. These results indicate a significant difference in waiting times based on participation type. Thus, unlike the results of the previous analysis, the research table that serves as the basis for this analysis shows that there is a statistically significant difference in waiting times between PBI and Non-PBI participation types.

Furthermore, the interaction between the Mobile Application and Participant yielded an F-value of 388.964 with p<0.001. These results indicate a significant interaction effect between registration method and participation type on waiting time. Thus, the influence of registration method on waiting time cannot be separated from the patient's participation type.

This interaction finding is important because it shows that the difference in waiting times between the manual and Mobile JKN methods does not have an identical pattern in the PBI and non-PBI groups. Therefore, interpretation of the research results requires considering the combination of both factors, rather than solely examining the effect of registration method or membership type separately.

4. Comparison of Waiting Times Based on Registration Method, Participation Type, and Interaction

Table 4. Comparison of Waiting Time between Mobile Application, Participant, and Interaction

Factor	Mean (95% CI)	p-value
Mobile Application		
Manual	34.28 (33.06–35.50)	<0.001
Mobile JKN	137.46 (136.24–138.68)	
Participant		
Non-PBI	94.38 (93.16–95.60)	<0.001
PBI	77.36 (76.14–78.58)	
Interaction		
Manual–Non-PBI	34.24 (32.52–35.96)	0.948
Manual–PBI	34.32 (32.60–36.04)	
Mobile JKN–Non-PBI	154.42 (152.80–156.24)	<0.001
Mobile JKN–PBI	120.40 (118.68–122.12)	

Description: 95% CI: 95% Confidence Interval

Based on the table above, the average waiting time for patients using the manual method was 34.28 minutes, while patients using Mobile JKN had an average waiting time of 137.46 minutes. This is a significant difference, approximately 103.18 minutes. A p-value <0.001 indicates that the difference is statistically significant.

This finding deserves special attention because the direction of the difference contradicts the assumption that digital registration automatically results in shorter wait times. According to research data, patients using Mobile JKN actually experienced significantly longer wait times than those who registered manually.

Regarding the type of participation factor, non-PBI patients had an average waiting time of 94.38 minutes, while PBI patients had an average waiting time of 77.36 minutes. This difference was 17.02 minutes and was statistically significant at $p < 0.001$. Therefore, non-PBI patients had longer waiting times than PBI patients.

Interaction analysis revealed a more specific pattern. Comparison between Group I and Group II, namely, non-PBI manual patients and PBI manual patients, yielded $p = 0.948$. This value indicates that there is no significant difference in waiting time between non-PBI and PBI patients when both use the manual registration method.

In contrast, the comparison between Group III and Group IV, namely Non-PBI Mobile JKN users and PBI Mobile JKN users, yielded $p < 0.001$. Thus, there was a significant difference in waiting time between Non-PBI and PBI participants in the Mobile JKN user group.

Substantively, the pattern shows that differences in waiting times based on membership type are particularly evident among Mobile JKN users. Using the manual method, the wait times for both groups were nearly identical, at 34.24 minutes and 34.32 minutes, respectively. Using the Mobile JKN method, the difference was significantly greater, at 154.42 minutes for Non-PBI and 120.40 minutes for PBI.

Thus, the study results indicate a strong interaction between registration method and membership type. This finding may indicate that the implementation of Mobile JKN in the service flow at the Internal Medicine Clinic has not yet resulted in a uniform service pattern for all patient groups. This situation requires further investigation into the stages following digital registration, such as patient arrival, verification, queue synchronization, administrative processes, initial examinations, and doctor readiness.

Service Quality Responsiveness Aspect

Table 5. Quality Responsiveness aspect of service from the four research groups

Quality of Service aspects Responsiveness	Group				p-value*
	I (n = 25)	II (n = 25)	III (n = 25)	IV (n = 25)	
Median	41	41	38	38	<0.001
Range	38-44	38-43	37-38	37-38	

Information: *) Kruskal-Wallis test

Based on table 5, the median quality of service in the responsiveness aspect in Group I and Group II was both 41. Meanwhile, the median responsiveness in Group III and Group IV was 38 respectively. Descriptively, the group of patients who used Mobile JKN had a lower responsiveness value than the group of patients who registered manually.

The Kruskal-Wallis test yielded $p < 0.001$. This value indicates a significant difference in service quality in terms of responsiveness between the four research groups.

These findings demonstrate a pattern consistent with the wait time analysis. The manual group, with a wait time of approximately 34 minutes, showed a median responsiveness of 41, while the Mobile JKN group, with a much longer wait time, showed a median responsiveness of 38. This pattern suggests that patient experience with wait time is related to their assessment of service responsiveness.

However, the Kruskal-Wallis test results only indicate overall differences between groups and do not indicate which specific pairs of groups differ. If it is necessary to identify distinct pairs of groups, further analysis can be performed using appropriate nonparametric post-hoc tests.

5. Correlation of Waiting Time with Service Quality Responsiveness Aspect

Table 6. Correlation of Waiting Time to Responsiveness Service Quality

Group	Correlation Coefficient (r)	p-value
Group I (Manual–Non-PBI)	-0.782	<0.001
Group II (Manual–PBI)	-0.864	<0.001
Group III (Mobile JKN–Non-PBI)	-0.582	0.002
Group IV (Mobile JKN–PBI)	-0.161	0.441
All Groups	-0.878	<0.001
Manual	-0.830	<0.001
Mobile JKN	-0.294	0.038
Non-PBI	-0.894	<0.001
PBI	-0.887	<0.001

Description: r = Rank Spearman Correlation.

Based on Table 6, the correlation between waiting time and service quality (responsiveness) across all study groups yielded a correlation coefficient of -0.878 with $p < 0.001$. These results indicate a very strong, significant, and negative relationship between waiting time and responsiveness.

The negative correlation indicates that increased waiting time is associated with a decrease in perceived service quality in terms of responsiveness. In other words, the longer a patient waits for a medical examination, the lower their assessment of service responsiveness tends to be.

In the manual group, a correlation coefficient of -0.830 was obtained with $p < 0.001$. These results indicate a very strong and significant negative relationship between waiting time and responsiveness in patients who registered manually.

In the Mobile JKN group, the correlation coefficient was -0.294 with a $p = 0.038$. This relationship was negative and statistically significant, but the strength of the relationship was

lower than in the manual group. This finding suggests that increased wait times are still associated with decreased responsiveness among Mobile JKN users, although the relationship is relatively weaker.

Based on the type of participation, the Non-PBI group produced a correlation coefficient of -0.894 with $p < 0.001$, indicating a very strong and significant negative relationship. Meanwhile, the PBI group produced a correlation coefficient of -0.887 with $p < 0.001$, also indicating a very strong and significant negative relationship.

In the analysis of each group combination, Group I had a correlation of -0.782 with $p < 0.001$, while Group II had a correlation of -0.864 with $p < 0.001$. Both groups showed a strong to very strong and significant negative relationship.

Group III showed a correlation of -0.582 with $p = 0.002$, indicating a negative relationship with moderate strength and significance. Meanwhile, Group IV produced a correlation of -0.161 with $p = 0.441$. A p value > 0.05 indicates that the relationship between waiting time and responsiveness in the Mobile JKN–PBI group was not statistically significant.

Overall, the correlation results indicate that wait time is closely related to patient perceptions of responsiveness. The very strong negative correlation across all groups suggests that wait time management is a critical aspect that requires attention in improving service quality.

CONCLUSION AND RECOMMENDATIONS

Conclusion

1. There was a significant difference in medical examination wait times based on registration method. Patients who registered manually had an average wait time of 34.28 minutes, while patients using Mobile JKN had an average wait time of 137.46 minutes. Therefore, under the service conditions studied, the use of Mobile JKN did not show shorter wait times than manual registration.
2. There was a significant difference in wait times based on membership type. The average wait time for non-PBI patients was 94.38 minutes, while for PBI patients it was 77.36 minutes. This difference indicates that the non-PBI group had longer wait times than the PBI group.
3. There was a significant interaction between registration method and membership type on medical examination waiting times. In the manual group, waiting times for non-PBI and PBI patients were relatively similar, while in the Mobile JKN group, there was a significant difference in waiting times between non-PBI and PBI patients.
4. There were significant differences in service quality in terms of responsiveness between the four study groups. The manual group had a median responsiveness of 41, while the Mobile JKN group had a median of 38.
5. There was a very strong and significant negative relationship between medical examination waiting time and responsiveness aspect of service quality in all study groups, with $r = -0.878$ and $p < 0.001$. The longer the waiting time, the lower the patient's perception of responsiveness of service.

Recommendation

1. The management of PTPN VIII Subang Regional Hospital needs to conduct a comprehensive evaluation of the patient service process for Mobile JKN users, particularly the steps following the digital registration process. The evaluation should cover the arrival process, verification, queue synchronization, initial examination, and doctor's examination.
2. The integration of Mobile JKN with the queuing system and SIMRS needs to be strengthened so that digital registration data can be forwarded effectively to service units without creating repetitive administrative processes.

3. Hospitals need to monitor wait times separately for manual and Mobile JKN users, as well as by membership type. This monitoring is crucial because research shows significant differences, particularly among Mobile JKN users.
4. Hospitals need to conduct a specific evaluation of the high waiting times for Mobile JKN Non-PBI patients, which average 154.42 minutes and Mobile JKN PBI patients, which average 120.40 minutes. Identifying bottlenecks in both groups can provide the basis for developing service process improvements.
5. The principle of equal service for PBI and non-PBI patients must be maintained. Particular attention should be paid to the use of Mobile JKN, as differences in waiting times based on membership are even more pronounced among this group of users.

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