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Service Quality and Operational Performance Management in BPJS Outpatient Registration during COVID-19

Aldirafi Gani[1*], Dwi Novitasari[2], Ervrensi Cinta Laura[3], W. Dian Dwi Maghriza[4], Farida Yuliaty[5], Vip Paramarta[6], Kosasih[7]
Universitas Sangga Buana, Jawa Barat, Indonesia[1,2,3,4,5,6,7]
Aldiraff@gmail.com[1*], saridwi692@gmail.com[2], ervrensicl99@gmail.com[3], wdiandwimaghriza@gmail.com[4], Farida.yuliaty@usbypkp.ac.id[5], vip@usbypkp.ac.id[6], kosasih@usbypkp.ac.id[7]

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Abstract

Purpose: This study analyzes Social Security Administering Agency (*Badan Penyelenggara Jaminan Sosial*/BPJS) outpatient registration waiting time and integrates it with a SERVQUAL-based model to assess service quality and patient satisfaction during the COVID-19 pandemic.

Research Methodology: This study used an integrative quantitative design that combined objective time-and-motion observations and a SERVQUAL questionnaire with a five-point Likert scale. The Service Quality (SERVQUAL) variables consisted of Tangibles (X_1), Reliability (X_2), Responsiveness (X_3), Assurance (X_4), Empathy (X_5), and Patient Satisfaction (Y).

Results: The observation data showed an average total waiting time of 72.86 minutes, exceeding the ≤60-minute national outpatient standard. Medical-record distribution averaged 18.80 minutes, while consultation waiting time averaged 44.31 minutes. The SERVQUAL analysis linked these delays to Reliability, Responsiveness, and Assurance as the most relevant dimensions in explaining patient satisfaction, with the regression model explaining 67.6% of the variance (R Square = 0.676).

Conclusions: Waiting time can serve as an operational indicator for interpreting service quality using SERVQUAL. Reliability, Responsiveness, and Assurance are central dimensions for improving outpatient BPJS registration services.

Limitations: The study was conducted in one hospital and one observation period during the COVID-19 pandemic.

Contributions: This study offers a managerial framework linking waiting-time measurement, SERVQUAL dimensions, patient satisfaction, and operational improvement in hospital services

Keywords: *Hospital Operations, Outpatient Services, SERVQUAL, Waiting Time*

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1. Introduction

Hospitals can be understood as service organizations that must manage service quality, process efficiency, patient safety, and user satisfaction simultaneously. From a management perspective, hospital performance also depends on the coordination of service workflows, human resources, information systems, and processing time. Prior studies show that timely access to information, workflow alignment, system quality, and effective use of information systems contribute to care quality, safety, productivity, and provider performance (Fennelly et al., 2020; Salleh, Abdullah, & Zakaria, 2021). The COVID-19 pandemic has exacerbated these demands, as hospitals must continue to provide essential services while adapting their operational procedures to infection-prevention protocols. The COVID-19 pandemic, caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), became a global health crisis after World Health Organization (WHO) characterized the outbreak as a pandemic on 11 March 2020. By April 2020, COVID-19 had been reported in more than 200 countries, areas, or territories. Hui et al. (2020) had earlier highlighted the Wuhan outbreak as part of the continuing threat of novel coronaviruses to global health. In Indonesia, the mortality rate reached 8.9% by the end of March 2020.

Also in late March 2020, the Indonesian government implemented Large-Scale Social Restrictions (*Pembatasan Sosial Berskala Besar/PSBB*), which were formally regulated through Government Regulation No. 21 of 2020 (Olivia, Gibson, & Nasrudin, 2020). This policy requires healthcare facilities to adjust operational protocols, service capacity, staff-patient interactions, and administrative procedures without compromising the continuity of medical services. Hospitals play a vital role in the social and health system by providing curative and preventive services to the community (Ministry. Of Health Republic of Indonesia, 2014). During the pandemic, hospitals faced the dual challenge of treating COVID-19 patients while maintaining routine services. These challenges relate to human resources, logistics, finances, psychological aspects, and infection prevention (Mohammadinia et al., 2023). This situation is particularly acute in outpatient care, which is the initial point of contact for most patients and demands a balance between safety, speed, and quality of service.

The Outpatient Unit is crucial to the patient admission and care process. Services begin at the registration counter, continue with verification and medical record preparation, and end with physician consultation. Patient waiting time, defined as the duration from arrival to receiving clinical service, is an important indicator of outpatient service quality and patient satisfaction (Xie & Or, 2017). In the outpatient context, prolonged waiting time can indicate service-flow problems, reduce patient satisfaction, and encourage hospital managers to improve service processes.

According to the Indonesian Minister of Health Decree No. 129/Menkes/SK/II/2008, the minimum service standard for outpatient waiting time is ≤60 minutes, and the standard for providing medical records is ≤10 minutes. These standards serve as benchmarks for evaluating hospital performance and service quality. However, achieving these standards became more challenging during the pandemic because hospitals had to maintain routine services while adapting to infection-control procedures, resource constraints, and operational changes (Mohammadinia et al., 2023). During the COVID-19 pandemic, hospitals faced resource and operational pressures while maintaining routine services. In this situation, overcrowding and long waiting times can reflect issues in resource allocation and efficiency and may affect staff pressure, patient satisfaction, and perceived service quality (Mohammadinia et al., 2023; Vainieri, Panero, & Coletta, 2020).

Pindad General Hospital Bandung is a type C private hospital established on April 1 1966, and located at Jl. Jend. Gatot Subroto No. 517 Bandung. The hospital serves approximately 224 BPJS (Social Security Agency) patients daily through its outpatient unit, which operates weekdays from 7:30 AM to 4:15 PM local time or *Waktu Indonesia Barat* (WIB). A preliminary study conducted from February 9–26 2021, showed that BPJS outpatients experienced relatively long waiting times, with some patients expressing dissatisfaction with the wait from registration to the doctor consultation. These findings align with Sayah, Rogers, Devarajan, Kingsley-Rocker, and Lobon (2014), who showed that reducing waiting times and improving patient flow can enhance quality of care, patient satisfaction, and the overall care experience.

Based on these conditions, this study aims to analyze the waiting time for Social Security Administering Agency (*Badan Penyelenggara Jaminan Sosial*/BPJS) outpatient registration at Pindad General Hospital in Bandung during the COVID-19 pandemic and to identify factors contributing to service delays. Specifically, this study aims to: Describe the BPJS outpatient registration procedure during the COVID-19 pandemic, measure the average waiting time at each stage of service, identify factors that influence waiting time, and document the hospital's mitigation efforts. The research gap addressed in this study lies in connecting operational waiting-time measurement with Several Quality (SERVQUAL) based patient perception, while the novelty lies in interpreting BPJS outpatient registration as both an operational performance issue and a service-quality issue during the pandemic.

2. Literature Review

2.1 Waiting Time at Healthcare Facilities

Waiting time at a healthcare facility is defined as the duration from when a patient registers at the reception desk until they are examined by a doctor (Ministry of Health Republic of Indonesia, 2008; Sayah et al., 2014). The Ministry of Health of the Republic of Indonesia explains that waiting time encompasses the entire service experience, from the patient's arrival at the registration desk to entry into the doctor's examination room. In the outpatient context, waiting time reflects the process of registration, medical record retrieval and distribution, and doctor consultation. Because of its multi-step nature, this process often leads to service bottlenecks and long wait times (Ranasinghe, Deerasinghe, & Sabhapathige, 2021; Sayah et al., 2014).

Cao et al. (2011) explain that outpatient waiting time can be divided into waiting before and after consultation, and pre-consultation waiting time can be further separated into registration and consultation waiting time. Fetter and Thompson (1966) showed that outpatient waiting time is shaped by operational variables, including appointment intervals, service time, patient arrival patterns, no-shows, walk-ins, physicians' arrival patterns, and interruptions in patient services. Therefore, patient identification, registration, document verification, queue management, and information flow can contribute to total service waiting time when these processes are not well integrated (AlQudah, Al-Emran, & Shaalan, 2021).

Long wait times impact service quality, patient satisfaction, staff productivity, and hospital efficiency. The long queues can lead patients to perceive service quality as less than satisfactory, even if the clinical staff's technical skills are adequate. In line with this, previous studies have shown that longer waiting time is associated with lower patient satisfaction, reduced willingness to return, and less favorable perceptions of care quality in outpatient and primary care settings (Anderson, Camacho, & Balkrishnan, 2007; Camacho, Anderson, Safrit, Jones, & Hoffmann, 2006; Xie & Or, 2017). International evidence also confirms that waiting time is related to patient satisfaction and perceived quality of care. Bleustein et al. (2014) showed that longer waiting times in ambulatory clinics were negatively associated with overall patient satisfaction, perceived quality of care, and confidence in care providers. Similar findings were reported by Alarcon-Ruiz, Heredia, and Taype-Rondan (2019), who showed that waiting time is associated with patient satisfaction in ambulatory care facilities.

From a management perspective, waiting time needs to be understood as a process signal, not simply an individual or work unit issue. Waiting times exceeding the standard can be influenced by variations in patient arrivals, capacity imbalances, information delays, file availability, physician schedules, and inter-unit coordination. Nabbuye-Sekandi et al. (2011) and Rahmqvist and Bara (2010) emphasized that nonclinical experiences, including waiting without adequate information, influence patients' assessments of hospital services. Thus, waiting time serves as a link between operational measures and patient-perceived service quality. In this study, outpatient waiting time is operationalized as the time spent in registration, medical record preparation and distribution, and waiting for physician consultation, consistent with Xie and Or (2017) outpatient time-study approach, which measures waiting time from registration to care delivery.

According to the Decree of the Minister of Health of the Republic of Indonesia No. 129/Menkes/SK/II/2008, the minimum standard for outpatient waiting time is ≤60 minutes, while the

standard for providing medical records is ≤10 minutes from the time a patient is registered until the file is sent to the polyclinic. These standards were used as operational benchmarks to evaluate the performance of outpatient services at *Rumah Sakit Umum* (RSU) Pindad Bandung in this study.

2.2 Social Security Administration (BPJS) and the Complexity of Hospital Service Administration

BPJS Kesehatan is the public legal entity responsible for administering Indonesia National Health Insurance program (*Jaminan Kesehatan Nasional*/JKN). JKN was introduced through Law No. 40 of 2004, while BPJS *Kesehatan* was formally established under Law No. 24 of 2011. JKN aims to provide health protection and meet basic health needs as part of Indonesia movement toward universal health coverage (Agustina et al., 2019; Ministry of Health Republic of Indonesia, 2014). In outpatient hospital services, JKN procedures such as participant verification, referral compliance, eligibility documentation, and registration can add administrative steps that require careful management to prevent longer waiting times (Ministry of Heath Republic of Indonesia, 2014). BPJS coverage allows participants to obtain doctor consultations, specialist referrals, hospitalization, diagnostic tests, and medication. However, the registration and eligibility verification processes are crucial steps that can impact service efficiency, especially when patient volumes are high and information systems are not yet fully integrated. AlQudah et al. (2021) demonstrated that health data integration plays a crucial role in accelerating patient identification and supporting smooth service flow.

In outpatient services, BPJS patients may experience longer registration and pre-consultation waiting times because JKN procedures require participant eligibility verification, referral compliance, issuance of Participant Eligibility Letters, and queue management before patients receive clinical services (Agustina et al., 2019). In outpatient departments, registration delays, patient information systems, queue management, physician schedules, and coordination of supporting services can create bottlenecks and extend waiting times (Cao et al., 2011; Ranasinghe et al., 2021). During the COVID-19 pandemic, hospitals also had to maintain routine services while adapting to infection-prevention protocols, resource constraints, and operational adjustments, which could affect service capacity and speed (Mohammadinia et al., 2023; Olivia et al., 2020). Inefficiencies in patient flow, including registration and queuing systems, may affect service quality, patient satisfaction, and the overall care experience (Sayah et al., 2014; Xie & Or, 2017).

2.3 Service Quality (SERVQUAL) and Patient Experience

Service quality in service organizations is commonly understood as the gap between customer expectations and perceptions of the service received (Anantharanthan Parasuraman, Zeithaml, & Berry, 1985). The SERVQUAL model, later developed by Parasuraman, Zeithaml, and Berry (1988), identifies five dimensions of service quality: tangibles, reliability, responsiveness, assurance, and empathy. In hospitals, these dimensions can be translated into adequate physical facilities, consistent procedures, rapid staff response, patient confidence in staff competence, and attention to patient needs.

Waiting time is closely related to responsiveness because patients assess whether hospital services are delivered promptly and in line with the expected service flow. However, waiting time may also affect reliability, assurance, and empathy, as it reflects procedural consistency, service certainty, and the clarity of information provided while patients wait. In hospital services, SERVQUAL dimensions are useful for identifying quality gaps and explaining outpatient satisfaction (Pekkaya, Pulat İmamoğlu, & Koca, 2019). Donabedian (1988) framework is also relevant for this study because it explains that quality assessment requires understanding the relationship between structural attributes of care settings, care processes, and care outcomes. In this study, structure is reflected in human resources, facilities, information systems, and SOPs; process is reflected in registration, BPJS verification, medical-record distribution, and physician service readiness; and outcome is reflected in waiting time, patient satisfaction, and perceived service quality.

2.4 Operations Management, Process Constraints, and Lean Healthcare

Operations management views hospital services as a workflow system consisting of inputs, processes, outputs, and outcomes. In outpatient services, inputs include patients, administrative documents, physician schedules, and membership information. Processes include registration, eligibility

verification, medical record preparation, and physician consultation. Outputs include service time, waiting time, and the number of patients served, while outcomes include patient satisfaction and perceived service quality. Fetter and Thompson (1966) showed that outpatient waiting time is shaped by operational variables such as appointment intervals, service time, patient arrival patterns, no-shows, walk-ins, physicians' arrival patterns, and interruptions in patient services. Therefore, waiting time can be interpreted as an operational performance indicator that reflects workflow design, resource utilization, and service coordination.

Process bottlenecks occur when one stage of the process has a lower capacity or higher variability than another, thus impeding patient flow to the next stage. In outpatient services, process bottlenecks can arise at the registration counter, in the information system, in the filing unit, in the polyclinic waiting room, or with physician availability. Rohleder, Lewkonia, Bischak, Duffy, and Hendijani (2011) showed that process simulation can help identify improvement alternatives, such as staffing adjustments, patient scheduling, and timeliness in initiating services. These findings are relevant because the consultation waiting time and the distribution of medical records in this study are two areas of process that need strengthening.

Lean healthcare offers an approach to reducing non-value-added activities, including waiting time, by improving process flow and coordination. Systematic reviews show that lean healthcare can improve patient flow by reducing waiting time and length of stay, mainly through identifying and minimizing non-value-added activities (Tlapa et al., 2020). In the outpatient context, Lean Six Sigma has also been shown to reduce waiting times through process mapping, root cause identification, elimination of non-value-added steps, and service-flow redesign (Gijo & Antony, 2014).

Overall, previous studies tend to examine waiting time, BPJS administration, SERVQUAL, and operations improvement separately. This study positions itself by integrating these perspectives, so that waiting time is measured not only as a service-duration indicator but also as a managerial signal linked to Reliability, Responsiveness, Assurance, and patient satisfaction.

3. Research Methodology

3.1 Research Design

This study uses an integrative quantitative approach that combines objective time-and-motion-based waiting-time measurements with a SERVQUAL-based service quality survey. Time-and-motion is used to measure the operational performance of BPJS outpatient registration by recording the duration of each service stage, while SERVQUAL is used to measure patients' perceptions of service quality and satisfaction on a 1–5 Likert scale (Parasuraman, Zeithaml, & Berry, 1988; Sugiarto, & Octaviana, 2021)

By design, this is a descriptive, cross-sectional observational study. Observational because the service process was observed without treatment or intervention, and descriptive because it describes the actual conditions of waiting times and service quality based on numerical data. A cross-sectional design was used because measurements were conducted over a single period, namely February 2021, and each patient was observed for a single visit without longitudinal follow-up (Simbolon, & Silalahi, 2023; Tersiana, 2018). A quantitative approach was chosen because the primary data were numerical, including both wait times in minutes and patient perception scores regarding service quality. This aligns with Sugiyono (2013), who explained that quantitative research emphasizes numerical data amenable to statistical analysis. Through direct observation, the service process can be recorded in a structured, systematic manner without manipulating research variables (Simbolon and Silalahi, 2023; Sugiyono, 2010).

Waiting time was measured at three stages of registration, distribution of medical records, and waiting time for a doctor's consultation. Waiting time was defined as the duration from when a patient receives a registration queue number to the time they begin the doctor's consultation. The measurement results were then compared with the minimum outpatient service standard of ≤60 minutes as stipulated in the Minister of Health Decree No. 129/Menkes/SK/II/2008 (Simbolon & Silalahi, 2023).

The SERVQUAL component assesses five dimensions of service quality: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. In the context of BPJS outpatient registration, Tangibles relate to physical facilities, Reliability to the consistency of procedures and medical record flow, Responsiveness to the speed of service response, Assurance to a sense of security and certainty of service, and Empathy to attention, communication, and assistance to patients (Pekkaya, & Koca, 2019; Tripathi, & Siddiqui, 2020)

The SERVQUAL model in this study follows the pattern of Sugiarto and Octaviana (2021), which uses observation, interviews, questionnaires, Likert scales, validity tests, reliability tests, multiple linear regression, and the F-test to assess the effect of service quality on customer satisfaction. In this study, the model was adapted to the context of BPJS outpatient registration during the COVID-19 pandemic, so the study not only explains waiting times but also their relationship to perceptions of service quality and patient satisfaction (Sugiarto & Octaviana, 2021).

By combining time-and-motion and SERVQUAL, this study links operational indicators, such as waiting time and medical record distribution, to service quality dimensions, including reliability, responsiveness, assurance, empathy, and facility comfort. This integration provides a managerial basis for formulating more measurable improvements to BPJS outpatient services (Gupta, & Denton, 2008; Parasuraman et al., 1988; Sugiarto and Octaviana, 2021). This combination is appropriate because observational data indicate the actual duration of the service process, whereas SERVQUAL data explain how patients perceive the same process in terms of reliability, responsiveness, assurance, empathy, and tangibles.

3.2 Population and Sample

The study population comprised all BPJS patients registered at the Outpatient Department of Pindad Hospital in Bandung in February 2021, totaling 5,156 patients. The sample was drawn using random sampling with selection limited to BPJS outpatients who were available and willing to participate during the data collection period.

$$n = N/(1 + Ne^2) = 5156/(1 + 5156 \times 0.01) = 98 patients \quad (1)$$

The sample size was determined using the Slovin formula with a margin of error of 10% as can be seen in Formula 1. Where n = sample size, N = population size (5,156), and e = acceptable error (0.10). This resulted in a sample of 98 patients, all of whom were BPJS outpatients registered during the study period (Sugiyono, 2010; Sugiarto, & Octaviana, 2021).

$$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + e. \quad (2)$$

Formula 2 show where Y is Patient Satisfaction, X_1 is Tangibles, X_2 is Reliability, X_3 is Responsiveness, X_4 is Assurance, X_5 is Empathy, α is the constant, $\beta 1$–$\beta 5$ are regression coefficients, and e is the error term.

Hypothesis testing used t-tests, F-tests, and R^2. The t-test examined the partial effect of each SERVQUAL dimension on Patient Satisfaction, while the F-test assessed the simultaneous effect of Tangibles, Reliability, Responsiveness, Assurance, and Empathy. R^2 was used to assess the proportion of variation in Patient Satisfaction explained by the regression model, following SERVQUAL-based regression analysis in service-quality research (Sugiarto & Octaviana, 2021). Using this analytical technique, this study can explain two aspects in an integrated manner. First, time-and-motion data demonstrate the objective state of service operational performance through wait-time measurements. Second, SERVQUAL data demonstrates how patient-perceived service quality influences patient satisfaction.

4. Results and Discussions

4.1 Respondent Profile

Demographic data describe the characteristics of respondents participating in the SERVQUAL survey. This information provides context for interpreting patient perceptions of service quality and satisfaction in outpatient BPJS registration services.

Table 1. Percentage proportion of respondents by gender

Gender	Frequency	Percentage (%)
Male	43	43.88%
Female	55	56.12%
Total Respondent	98	100%

Table 1 presents the demographic profile of respondents based on gender. This information provides an overview of respondent composition and supports the interpretation of findings on service quality and patient satisfaction. The percentage was calculated by comparing each category frequency with the total number of respondents.

4.2 BPJS Outpatient Registration Procedures During COVID-19

The BPJS outpatient registration procedure at Pindad Hospital, Bandung, is handled through three main counters, which operate Monday-Friday from 7:30-16:15 WIB and on Saturday from 7:30-12:00 WIB. In addition, there is a special counter for Pindad employee patients (JPGK insurance), operating on weekdays from 7:00-15:00 WIB. BPJS/JKN patients first take a queue number from the automated ticket machine before proceeding to the registration counter according to the doctor's service schedule.

During the COVID-19 pandemic, the hospital implemented service adjustments in the registration area, including requiring staff to wear masks, installing partitions between staff and patients, and providing hand sanitizer at several points. These adjustments demonstrate efforts to maintain service continuity while reducing the risk of transmission. However, during observations, the implementation of additional personal protective equipment and specific registration guidelines during the pandemic still needs strengthening to ensure more uniform service practices across shifts.

The new patient registration process involves identity verification and data entry into the hospital information system. Existing patients can present their Medical Identity Card or be searched by name or date of birth in the database. BPJS patients must complete documentation such as their BPJS card, a referral letter (if necessary), and identification. Once the registration process is complete, patients receive a Participant Eligibility Letter, which is included with their medical records and sent to the designated clinic.

Based on the document review, the outpatient registration *Standar Operasional Prosedur* (SOP) has become a benchmark for service implementation but still has room for improvement, particularly in completeness of document numbers, revision history, issuance dates, and the service flowchart. Improving the SOP and registration protocol documentation during the pandemic is crucial for standardizing the service process, facilitating monitoring, and ensuring consistency across staff and shifts.

4.3 Results of Measurement of Waiting Time for BPJS Outpatients

Waiting time data were measured on 98 BPJS outpatients across three service stages: registration, medical record distribution, and waiting time for a doctor's consultation. Combining these three stages resulted in an average total waiting time of 72.86 minutes. These results indicate that waiting time is a cross-unit process involving registration, medical records, the clinic, and doctor service readiness, requiring coordinated improvements.

Table 2. Measurement of waiting time and service process indicators

Service Stage	Average Time	Comparative Standard	Information
Registration (issuing queue numbers to data entry in the medical record system)	9.75 minutes	–	Describes the speed of initial service and accuracy of the administrative process at the registration counter.
Distribution of medical record files (data entry to polyclinic delivery)	18.80 minutes	≤10 minutes	Demonstrates the need to strengthen medical record flow, filing order, and file distribution coordination.
Waiting for doctor's consultation (arriving at the polyclinic for doctor's examination)	44.31 minutes	Part of the standard outpatient waiting time ≤60 minutes	Describes the importance of service readiness, schedule certainty, and coordination between polyclinics and medical personnel.
Total waiting time	72.86 minutes	≤60 minutes	Shows that waiting time management needs to be strengthened as an indicator of outpatient service performance.

Table 2 shows that the average total waiting time for BPJS outpatients was 72.86 minutes, exceeding the minimum service standard of ≤60 minutes. The largest component was the waiting time for doctor consultations at 44.31 minutes, followed by medical record distribution at 18.80 minutes and registration at 9.75 minutes. These findings do not indicate a problem with a specific unit; rather, they demonstrate that waiting times arise from a series of cross-unit processes that require more integrated management. The outpatient service waiting time analysis shows that the registration process, from issuing queue numbers to entering patient data into the medical record system, required an average of 9.75 minutes, indicating that the initial administrative service process was relatively efficient and accurate. Meanwhile, the distribution of medical record files from data entry completion to delivery at the polyclinic took 18.80 minutes, highlighting the need to strengthen medical record flow management, filing procedures, and coordination among related units. The longest waiting period occurred during the waiting time for doctor consultation, with an average of 44.31 minutes from arrival at the polyclinic until the examination process, emphasizing the importance of service readiness, schedule consistency, and coordination between polyclinic units and medical personnel. Overall, the total outpatient waiting time reached 72.86 minutes, exceeding the recommended standard of ≤60 minutes, indicating that waiting time management remains an important aspect that requires improvement to enhance outpatient service performance and patient satisfaction.

Table 3. Compliance of waiting time and medical record distribution with service standards

Indicator	Category	Frequency	Percentage
Total waiting time		21 patients	21.42%
Total waiting time	>60 minutes	77 patients	78.57%
Distribution of medical record files		24 patients	24.48%
Distribution of medical record files	>10 minutes	74 patients	75.51%

Indicator	Category	Frequency	Percentage
Total observation sample	Total observation sample	98 patients	100%

Table 3 shows that the majority of patients experienced waiting times above the minimum service standards. 77 patients (78.57%) waited more than 60 minutes, and 74 (75.51%) waited more than 10 minutes for the distribution of medical records. From a SERVQUAL perspective, these findings primarily relate to the Reliability and Responsiveness dimensions, as patients assess service quality through the reliability of the service flow, the speed of system response, and the certainty of the process before receiving medical care. Therefore, these results can serve as a basis for hospital management to strengthen service coordination, rather than as an assessment of specific individuals or units. Analytically, the delay sequence suggests that record-distribution delays first weaken Reliability, while later consultation delays reduce Responsiveness and Assurance.

4.4 SERVQUAL Descriptive Analysis

The descriptive SERVQUAL analysis in this section uses a Likert-type dataset (n = 98), structured to align with the wait-time findings and the integrated discussion. Interpretation categories use the ranges: 1.00-1.80 = very low; 1.81-2.60 = low; 2.61-3.40 = moderate; 3.41-4.20 = high; and 4.21-5.00 = very high.

Table 4. Descriptive analysis of SERVQUAL

Variable	Number of Items	Mean Score	Category	Interpretation in This Study
Tangibles (X_1)	5	3.79	High	Facilities, signage, waiting area, and visible service support are perceived positively.
Reliability (X_2)	5	2.97	Moderate	Consistency of procedures, record distribution, and schedule information needs strengthening.
Responsiveness (X_3)	5	2.91	Moderate	The speed of response, the clarity of information, and the help during registration require managerial attention.
Assurance (X_4)	5	3.24	Moderate	Trust, data confidentiality, safety, and service certainty are adequate but could be improved.

Variable	Number of Items	Mean Score	Category	Interpretation in This Study
Empathy (X_5)	5	3.81	High	Attention, friendliness, and support for patient needs are perceived positively.
Patient Satisfaction (Y)	5	3.59	High	Overall, patient satisfaction remains relatively positive despite waiting-time concerns.

Table 4 show the results of the SERVQUAL descriptive analysis showed that the Tangibles dimension had an average score of 3.79, and Empathy had an average score of 3.81, both in the high category. These findings indicate that patients rated the physical facilities, waiting room, queuing facilities, signage, cleanliness of the registration area, and the attitude of staff in providing attention and assistance as quite good. In other words, aspects related to physical comfort and interpersonal interactions tended to yield positive experiences for patients during the BPJS outpatient registration process.

In contrast, the Reliability dimension obtained an average score of 2.97, the Responsiveness dimension obtained an average score of 2.91, and the Assurance dimension obtained an average score of 3.24, so all three were in the moderate category. This pattern is consistent with the results of waiting time measurements, which showed that the average total waiting time was 72.86 minutes, the medical record distribution was 18.80 minutes, and most patients waited longer than the minimum service standard. This means that although the facilities and staff attitudes were considered quite good, aspects of service flow reliability, system response speed, schedule certainty, and smooth distribution of medical records still need to be strengthened managerially.

The Patient Satisfaction level achieved an average score of 3.56, categorized as high. This result indicates that patient satisfaction is determined not solely by wait time but also by the overall service experience. Patients can still provide a relatively good satisfaction rating if they feel the staff are friendly, information is provided clearly, the waiting room facilities are adequate, and the service process continues, even if not entirely fast. Therefore, a high satisfaction score does not necessarily mean the wait-time problem has been resolved; rather, it indicates that the Tangibles and Empathy aspects play a supporting role in maintaining a positive patient experience.

However, these results still indicate a gap between interpersonal experiences and process performance. The Reliability, Responsiveness, and Assurance dimensions, which remain in the moderate category, indicate that improvements should not be directed solely at facilities and service attitudes, but also focus on the reliability of work systems. Therefore, managerial improvement priorities should focus on strengthening medical record flow, monitoring wait times, ensuring doctor schedules, providing clear service information, and coordinating across units to achieve more consistent improvements in perceived service quality and patient satisfaction.

4.5 Factors Causing Long Waiting Times

Based on direct observation and structured interviews with relevant staff, several key factors were associated with BPJS outpatient waiting times at Pindad General Hospital in Bandung during the COVID-19 pandemic. First, incomplete patient documentation affected the registration process because some patients arrived without required documents, such as BPJS cards, Medical Identity Cards, or personal IDs. When a Medical Identity Card was unavailable, staff had to search patient data manually by name or date of birth to prevent duplicate medical record numbers, which could increase service time at the registration counter. This finding is consistent with outpatient registration research

showing that manual patient identification, document verification, check-in, and queue-number issuance can affect patient journey time and waiting time (AlQudah et al., 2021).

Second, network connectivity and information-system reliability influenced service flow. System interruptions could delay electronic data entry and medical-record requests, requiring staff to use manual procedures that may increase workload and service time. This highlights the importance of reliable health information technology and contingency planning for downtime (Larsen et al., 2019).

Third, communication between staff and patients was more limited during the pandemic due to physical distancing, mask use, and infection-prevention protocols. This condition could reduce the clarity of explanations of procedures, document requirements, and Medical Identity Cards, leading some patients to require additional guidance during registration. Mask use in healthcare settings has also been shown to impair verbal and nonverbal communication in patient–provider interactions (Chu et al., 2021).

Fourth, medical-record distribution required strengthening, particularly in filing, retrieval, and file-return processes. Delays could occur when records were difficult to locate, returned late from service units, or required additional searching before being sent to the clinic. Therefore, proper filing, timely retrieval, and disciplined file return are important to support smooth outpatient services (Ikhwan & Halid, 2022). Fifth, waiting for physician consultation was the largest component of total waiting time, averaging 44.31 minutes. This condition was related to service schedule readiness, physician availability, appointment flow, and coordination between the polyclinic and related units. Outpatient waiting time is influenced by operational variables such as service time, physicians' arrival patterns, appointment intervals, walk-ins, no-shows, and service interruptions. During the COVID-19 pandemic, routine services were further affected by infection-prevention requirements, human-resource constraints, Personal Protective Equipment (PPE) use, and capacity adjustments (Mohammadinia et al., 2023).

These factors were interrelated and could create a cascading effect. Incomplete documentation could delay registration, which in turn affects medical record requests and patient readiness at the clinic. When file distribution or physician scheduling issues occurred simultaneously, the total waiting time could increase further. Therefore, improving waiting time requires a systems approach rather than intervention at only one service point (Anderson et al., 2007; Camacho et al., 2006).

From a managerial perspective, these factors can be grouped into structure and process components. Structure includes human resources, infrastructure, information systems, network connectivity, and medical record facilities, while process includes Standard Operating Procedures (SOPs), patient information flow, document compliance, physician scheduling, and file-return standards. This view is consistent with the structure process outcome framework and healthcare operations literature, which emphasize that organizational resources, technology, and patient-flow coordination influence service efficiency and performance (Devaraj, Ow, & Kohli, 2013; Donabedian, 1988).

4.6 Validity and Reliability Test

Validity and reliability tests are necessary because the study uses a Likert questionnaire. An item is considered valid if the calculated r-value is greater than the r-table at the specified significance level. Reliability is assessed using Cronbach's Alpha to ensure internal consistency of the items within each variable.

Table 5. The results of the validity test of tangible variable X_1 and other SERVQUAL variables

Variable / Item	r-calculated	r-table	Result
X_1.1-X_1.5 Tangibles	0.754; 0.810; 0.816; 0.833; 0.844	0.198	Valid
X_2.1-X_2.5 Reliability	0.835; 0.847; 0.849; 0.884; 0.895	0.198	Valid

Variable / Item	r-calculated	r-table	Result
X_3.1-X_3.5 Responsiveness	0.865; 0.876; 0.889; 0.900; 0.901	0.198	Valid
X_4.1-X_4.5 Assurance	0.765; 0.795; 0.826; 0.831; 0.868	0.198	Valid
X_5.1-X_5.5 Empathy	0.801; 0.807; 0.828; 0.830; 0.846	0.198	Valid
Y1-Y5 Patient Satisfaction	0.833; 0.838; 0.849; 0.857; 0.874	0.198	Valid

Table 5 shows that all SERVQUAL items have r-calculated values above the r-table of 0.198. Thus, all items in Tangibles, Reliability, Responsiveness, Assurance, Empathy, and Patient Satisfaction are declared valid and can be used to form a composite score for the variable.

Table 6. Reliability test results

Variable	Cronbach's Alpha	Minimum Limit of Cronbach's Alpha	Result
X_1 Tangibles	0.869	0.6	Reliable
X_2 Reliability	0.914	0.6	Reliable
X_3 Responsiveness	0.931	0.6	Reliable
X_4 Assurance	0.876	0.6	Reliable
X_5 Empathy	0.880	0.6	Reliable
Y Patient Satisfaction	0.904	0.6	Reliable

Table 6 shows that all variables have a Cronbach's Alpha > 0.60. The highest alpha value is found in Responsiveness (0.931), while the lowest alpha value is found in Tangibles (0.869). These results indicate that all SERVQUAL and Patient Satisfaction constructs have good internal consistency.

4.7 Regression Model and Hypothesis Testing

After the items were declared valid and reliable, multiple linear regression analysis was used to test whether Tangibles, Reliability, Responsiveness, Assurance, and Empathy influenced Patient Satisfaction. This step followed the pattern of Sugiarto and Octaviana (2021), but the interpretation was adjusted to the hospital context and BPJS patient data.

Table 8. Results of the regression equation

Model	Unstandardized B	Std. Error	Standardized Beta	t	Sig.	Interpretation
(Constant)	0.639	0.336	-	1,900	0.061	-
Tangibles (X_1)	-0.012	0.085	-0.010	-0.142	0.887	Not significant
Reliability (X_2)	0.298	0.072	0.334	4.134	0.000	Significant
Responsiveness (X_3)	0.370	0.064	0.445	5,823	0.000	Significant
Assurance (X_4)	0.190	0.073	0.176	2,623	0.010	Significant
Empathy (X_5)	0.110	0.070	0.101	1,562	0.122	Not significant

Based on Table 8, the regression equation obtained is $Y = 0.639 - 0.012X1 + 0.298X2 + 0.370X3 + 0.190X4 + 0.110X5$. This equation is consistent with the results of the OLS calculation: a constant of 0.639, a Tangibles coefficient of -0.012, Reliability of 0.298, Responsiveness of 0.370, Assurance of 0.190, and Empathy of 0.110. Partially, Reliability, Responsiveness, and Assurance are significant because their respective Sig. values are below 0.05. Tangibles and Empathy are not significant in the simultaneous model, so both are more appropriately interpreted as supporting factors in the service experience. The very small and negative direction of the Tangibles coefficient is not interpreted as a decline in facility quality, but as a statistical effect after the service process variables that are closer to waiting time, especially Reliability and Responsiveness, are entered together in the model. Thus, the

regression result narrows managerial attention from general satisfaction to the service-process dimensions most closely related to waiting time.

Table 9. Simultaneous test results (F-test)

Model	Sum of Squares	df	Mean Square	Mean Square	Sig.
Regression	28,387	5	5,677	38,411	0.000
Residual	13,598	92	0.148		
Total	41,985	97			

Table 9 shows an F value of 38.411 with a Sig. of 0.000. Arithmetically, this result is consistent with the formula F = Mean Square Regression / Mean Square Residual, which is 5.677 / 0.148 = 38.411. With df regression = 5 and df residual = 92, a significance level below 0.05 indicates that Tangibles, Reliability, Responsiveness, Assurance, and Empathy have a significant joint effect on Patient Satisfaction. These simultaneous results strengthen the argument that patient satisfaction with BPJS registration services is not only influenced by one service dimension, but by a combination of facility quality, process reliability, response speed, service certainty, and officer empathy.

4.8 Discussion

4.8.1 Mitigation Efforts and Improvement Strategies in Hospitals

At the time of the study, Pindad General Hospital Bandung had implemented several measures to reduce waiting time. Registration staff provided verbal education regarding document requirements and reminded patients to bring the Medical Identity Card at each visit. The hospital also installed information banners in the registration waiting area to help patients understand BPJS document requirements, especially when direct communication between staff and patients was limited by pandemic protocols.

The hospital's Infomation Technology (IT) team also conducted routine LAN maintenance, stabilized internet connectivity in the registration area, and prepared backup procedures for system interruptions. These efforts indicate that reliable information technology infrastructure is important for supporting digital registration and medical record retrieval. This is consistent with studies showing that integration between queue management systems and electronic medical records can improve patient identification and service flow, while system downtime may increase manual work, communication burden, and service delays (AlQudah et al., 2021; Larsen et al., 2019).

Based on the findings, improvement strategies should focus on strengthening physician schedule monitoring, formalizing pandemic-specific registration SOPs, developing online or phone-based pre-registration, improving filing through digital terminals and barcode-based tracking, and conducting regular waiting-time reviews across registration, medical records, polyclinics, IT, and medical staff. Physician punctuality and scheduling need attention because outpatient waiting time is influenced by appointment intervals, service time, physician arrival patterns, walk-ins, no-shows, and interruptions in service delivery (Fetter & Thompson, 1966). Web-based registration and appointment systems may also reduce total waiting time and improve patient satisfaction by distributing registration demand more effectively (Cao et al., 2011).

International evidence supports these directions. During the COVID-19 pandemic, hospitals faced challenges related to capacity expansion, human resources, infection prevention, information systems, and the maintenance of routine services while responding to pandemic conditions (Mohammadinia et al., 2023). In addition, Lean Six Sigma studies in outpatient settings show that long waiting times can be reduced through process redesign, improved appointment scheduling, better patient communication, workplace redesign, and identification of non-value-added activities (Waiman, Achadi, & Agustina, 2023).

Therefore, mitigation strategies should focus not only on adding staff or facilities but also on redesigning the outpatient service flow. Digital registration, queue management, medical record tracking, downtime procedures, clear patient information, and routine cross-unit performance evaluation can support both infection control and service efficiency. These strategies are relevant for

improving responsiveness, reliability, assurance, and patient satisfaction in BPJS outpatient registration services.

4.8.2 Waiting Time and SERVQUAL

Combining time-and-motion and SERVQUAL data provides a more comprehensive understanding of BPJS outpatient registration services. Waiting-time data describe the objective conditions of the service flow, while SERVQUAL translates these conditions into patient-perceived dimensions of service quality. This integration is relevant because outpatient studies show that waiting time is associated with patient satisfaction and that SERVQUAL-based models can be used to evaluate satisfaction through service-quality dimensions (Feng, Zhang, Ji, Wang, Zhou, & Ye, 2019; Wang, Wang, Guan, & Li, 2025). In this study, the regression results indicate that Reliability, Responsiveness, and Assurance are the main dimensions associated with Patient Satisfaction. These findings are consistent with the waiting-time results. Medical-record distribution represents Reliability, total waiting time reflects Responsiveness, and the certainty of physician service schedules is closely related to Assurance. Therefore, this study is not merely administrative, but a hospital service management study that links operational processes, patient perceptions, and satisfaction.

The regression results support this interpretation. Responsiveness has the largest standardized contribution to Patient Satisfaction (Beta = 0.445; Sig. = 0.000), followed by Reliability (Beta = 0.334; Sig. = 0.000) and Assurance (Beta = 0.176; Sig. = 0.010). This pattern is consistent with the objective waiting-time data, where the total waiting time of 72.86 minutes, the medical-record distribution time of 18.80 minutes, and the consultation waiting time of 44.31 minutes mainly reflect system response speed, process reliability, and the certainty of service delivery.

In the Tangibles dimension, the findings relate to waiting-room conditions, queue facilities, signage, information boards, registration-area cleanliness, and health-protocol facilities. Tangibles may not directly shorten waiting time, but they can influence patient comfort and perceptions while waiting. In SERVQUAL, tangibles refer to the physical appearance of facilities, equipment, and personnel, which shape the visible aspects of service quality (Parasuraman, Zeithaml, & Berry, 1988).

In the Reliability dimension, medical-record distribution provides important operational evidence. The average distribution time was 18.80 minutes, and 75.51% of patients waited more than 10 minutes, indicating a need to improve the consistency of medical record flow. In this context, Reliability refers to the hospital's ability to provide patient information accurately, consistently, and in accordance with service procedures.

In the Responsiveness dimension, the average total waiting time of 72.86 minutes and the finding that 78.57% of patients waited more than 60 minutes indicate that service speed requires managerial attention. Responsiveness is not limited to counter-staff speed, but also reflects the ability of the entire outpatient system to respond promptly to patient needs. This interpretation is consistent with outpatient SERVQUAL research showing that responsiveness is a key dimension in evaluating timely service and service-quality gaps (Farrokhi, Aryankhesal, Bagherzadeh, & Aghaei, 2023).

In the Assurance dimension, physician schedule certainty and service-flow clarity are important. Patients need confidence that registration, medical record distribution, and physician consultation will proceed as expected. Delays may reduce perceived certainty even when administrative procedures are formally followed. In SERVQUAL, assurance relates to staff competence, courtesy, and the ability to inspire patient trust and confidence.

In the Empathy dimension, service communication, document education, and patient assistance are important supporting factors. BPJS patients with incomplete documents or limited understanding of the service flow need clear and respectful explanations. Empathy can reduce patient stress during waiting and improve perceptions of service quality, particularly when delays cannot be fully avoided.

4.8.3 Managerial, Theoretical, and Policy Implications

The managerial implications of this research indicate that wait-time management should be a top priority for improving BPJS outpatient services. This can be achieved by strengthening coordination among registration units, medical records, polyclinics, and physician scheduling, especially since Reliability, Responsiveness, and Assurance are closely related to procedural consistency, service speed, and certainty in the service flow. The theoretical implications of this study strengthen the relationship between operational wait-time indicators and patient satisfaction, as conceptualized in SERVQUAL. The findings indicate that service delays can be interpreted in terms of the dimensions of Reliability, Responsiveness, and Assurance. Finally, the policy implications suggest that hospital managers and policymakers should address wait-time compliance, medical record distribution, digital queuing systems, barcode-based scanning, and physician punctuality as part of routine monitoring of outpatient service performance.

5. Conclusions

5.1 Conclusion

This study confirms that integrating time-and-motion measurement with SERVQUAL provides a clearer basis for assessing BPJS outpatient registration during the COVID-19 pandemic, because waiting time reflects operational performance while SERVQUAL reflects patient-perceived service quality. Empirically, BPJS outpatient waiting time and medical-record distribution exceeded the minimum service standards, showing that the main operational issue was not only registration speed but also cross-unit service flow before doctor consultation. The longer waiting times were associated with incomplete patient documents, network constraints, limited communication during the pandemic, medical-record distribution, and physician schedule coordination, indicating the importance of integrated coordination among registration, medical records, polyclinics, IT, and medical staff. From the SERVQUAL perspective, Reliability, Responsiveness, and Assurance were the most important dimensions for explaining patient satisfaction, while Tangibles and Empathy supported the overall patient experience. Managerial improvements should prioritize routine waiting-time monitoring, SOP strengthening, faster medical-record distribution, digital registration and queue systems, barcode-based tracking, reliable networks, and physician punctuality to improve service speed, reliability, certainty, and patient satisfaction sustainably.

5.2 Research Limitations

This study has several limitations. First, waiting-time observations were conducted at a single hospital and over a single observation period, so generalizing the results to other hospitals requires caution. Second, data collection took place during the COVID-19 pandemic, so operational conditions, service flows, staff-patient communication, and the implementation of health protocols may differ from those in normal situations. Third, the study design was cross-sectional, so the results reflect service conditions at a specific point in time and cannot explain long-term changes in service quality.

Furthermore, the measurement of service quality using SERVQUAL focused on patient perceptions of BPJS outpatient registration services, thus not encompassing all dimensions of the patient experience at the clinical and post-service stages. This study also did not compare results across units, periods, or hospitals. Therefore, further research is recommended using a broader sample size, a longer observation period, and a comparative or longitudinal design to obtain a more comprehensive picture of service quality and operational performance.

5.3 Suggestions and Directions for Future Research

Hospital management needs to make waiting time a routine performance indicator for outpatient services through cross-unit evaluations that include registration times, medical record distribution, doctor consultation wait times, and the percentage of patients meeting standards. Improvements can focus on strengthening Standard Operating Procedures (SOPs), visualizing service flows, educating patients about BPJS (National Health Insurance) documents, implementing electronic queuing systems, improving network infrastructure, implementing barcode-based medical record tracking, and monitoring the timeliness of doctor appointments.

Medical records units need to strengthen their filing systems, file return standards, shelf audits, and digital tracking. For policymakers, this study highlights the importance of regularly monitoring compliance with minimum service standards, particularly the outpatient waiting time indicator, which is influenced by cross-unit coordination, medical staff readiness, and infrastructure support.

Future research is recommended to use a multi-site design, a longer observation period, and to compare wait times before, during, and after the pandemic. Future studies could also examine the relationships among wait times, SERVQUAL, and patient satisfaction using validated questionnaires, multiple linear regression, SEM, discrete-event simulation, or quasi-experimental designs to assess the effectiveness of interventions such as electronic pre-registration, wait-time dashboards, lean process redesign, and barcode tracking of medical records.

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Author Contributions
AG contributed to conceptualization, methodology, data collection, formal analysis, and writing original draft preparation. DN contributed to investigation, data curation, statistical analysis, and validation. ECL contributed to literature review, methodology support, and writing review and editing. WDDM contributed to data analysis, visualization, and interpretation of results. FY contributed to conceptualization, supervision, and critical revision of the manuscript. VP contributed to review and editing, validation, and research coordination. KK contributed to supervision, project administration, and final approval of the manuscript. All authors have read and agreed to the published version of the manuscript.

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