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# ANALYZING PATIENT WAITING TIMES IN OUTPATIENT SERVICES: A MIXED-METHODS APPROACH TO OPTIMIZING HEALTHCARE DELIVERY AT KIEN AN HOSPITAL IN HAI PHONG CITY IN 2025

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## ABSTRACT

**Background:** Patient waiting time is a critical indicator of healthcare service quality that significantly influences patient satisfaction and healthcare outcomes. In Vietnam, extended waiting times remain a persistent challenge despite national regulatory frameworks established by the Ministry of Health. This study addresses a critical gap in understanding patient flow dynamics within provincial hospitals, contributing essential evidence to Vietnam's ongoing healthcare reform efforts aimed at service decentralization and quality improvement.

**Objective:** This study aimed to assess patient waiting times at Kien An Hospital, identify factors influencing these durations, and develop evidence-based recommendations for service improvement that align with Vietnam's national healthcare transformation agenda.

**Methods:** A mixed-methods approach combining quantitative and qualitative methodologies was employed. Quantitative data were collected from 250 outpatients through structured observation and questionnaires. Qualitative data was gathered through in-depth interviews with 15 participants. Analysis included descriptive statistics, comparative analysis, and thematic content analysis.

**Results:** Patients experienced a mean waiting time of 172.05 ± 6.90 minutes, with diagnostic testing consuming the largest proportion (80.44 ± 4.25 minutes). Morning consultations required significantly longer waiting times than afternoon appointments (190.10 ± 8.03 versus 101.60 ± 6.47 minutes, $p<0.001$). No significant differences were observed between insured and uninsured patients. Qualitative analysis identified primary contributing factors including specialist workforce shortages, procedural inefficiencies, inadequate separation of outpatient and inpatient diagnostic services, and information technology limitations.

**Conclusion:** The multifaceted nature of waiting time determinants at Kien An Hospital necessitates a comprehensive implementation approach. This research provides actionable insights that hospital administrators and policymakers can use to enhance patient-centered care delivery and optimize resource allocation, directly supporting Vietnam's strategic healthcare priorities of improving accessibility, efficiency, and service quality at the provincial level.

***Keywords:*** Patient waiting time, outpatient services, healthcare quality improvement, mixed-methods research, Vietnam healthcare system.

## 1. INTRODUCTION

Patient waiting time has emerged as a critical healthcare quality indicator, with the World Health Organization (WHO) formally recognizing it as fundamental to evaluating healthcare service delivery effectiveness[1]. This comprehensive metric encompasses the complete patient journey from arrival through service completion, including registration, consultation, diagnostics, and treatment phases (Oche & Adamu, 2011). Extensive research demonstrates strong correlations between waiting times and patient satisfaction, clinical outcomes, and overall healthcare system efficiency[2].

International standards establish that 90% of patients should receive care within 30 minutes of their scheduled appointments[3]. However, significant gaps persist between these evidence-based benchmarks and real-world performance, particularly within developing healthcare systems. Global studies document substantial variations in waiting times: 173 minutes in Benin [4], 168 minutes in Nigeria [5], and 161 minutes in Iran (Mohebbifar et al., 2014), indicating widespread challenges in achieving optimal service delivery timelines.

Prolonged waiting times result from multiple interconnected factors, including excessive patient volumes, inadequate staffing levels, inefficient operational processes, and insufficient technological infrastructure [6]. These delays generate cascading negative effects throughout healthcare systems, creating psychological distress among patients, reducing healthcare provider job satisfaction, and ultimately compromising overall system performance and quality of care [7].

Vietnam's healthcare system exemplifies these challenges within the broader Southeast Asian context.

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Recent empirical evidence from major Vietnamese institutions reveals concerning trends in service delivery efficiency. The 108 Central Military Hospital documented mean waiting times of 215.6 ± 130.9 minutes, with diagnostic procedures representing the primary operational bottleneck at 131.8 ± 100.8 minutes[8]. Provincial healthcare facilities demonstrate similar patterns, with Tien Giang Provincial General Hospital reporting average waiting times of 147.9 ± 72.1 minutes and notable disparities between health insurance beneficiaries (148.7 ± 59.8 minutes) and self-paying patients (117.6 ± 50.4 minutes) [9].

Despite regulatory interventions, including Ministry of Health Decision No. 1313/QD-BYT (2013), which established maximum waiting time thresholds ranging from 2-4 hours depending on service complexity, implementation gaps persist across healthcare facilities nationwide [10]. This disparity between policy intentions and operational realities suggests an urgent need for more sophisticated, context-specific approaches to waiting time management that address the unique challenges facing Vietnamese healthcare institutions.

This study addresses these knowledge gaps through comprehensive mixed-methods investigation of waiting times and determinants at Kien An Hospital, where recent health insurance policy changes increased patient volumes by 20%, resulting in mean examination times of 3.9 hours—exceeding national benchmarks. The research objectives extend beyond quantifying waiting periods to explore causal factors from multiple stakeholder perspectives and propose evidence-based interventions for timely, high-quality healthcare delivery. Findings contribute to waiting time management knowledge while providing practical recommendations for healthcare administrators in comparable resource-constrained contexts.

## 2. METHODS

### 2.1. Study participants

Inclusion criteria for the quantitative study encompassed outpatients aged ≥18 years who completed the entire consultation process and demonstrated cognitive capacity to participate in structured interviews.

Exclusion criteria were applied to patients requiring emergency medical intervention, those referred for hospital transfer, and individuals who discontinued their consultation process prior to completion.

The qualitative research component employed purposive sampling techniques to identify 15 participants stratified into three distinct groups: five patients selected to represent diverse demographic characteristics and clinical conditions; five healthcare personnel from outpatient services, laboratory diagnostics, and medical imaging departments; and five hospital administrative leaders, including the hospital director and departmental heads.

### 2.2. Research methods

#### *2.2.1. Study Design and Setting*

This investigation implemented a mixed-methods research paradigm, integrating a cross-sectional quantitative survey with qualitative in-depth interviews. The study was conducted during the first quarter of 2025 (January through March) within the Outpatient Department of Kien An Hospital, situated in Hai Phong, Vietnam. This methodological triangulation was selected to facilitate comprehensive data collection on both measurable waiting time parameters and contextual factors influencing patient experiences.

#### *2.2.2. Study Population and Sampling*

For the quantitative component, sample size determination was executed utilizing the statistical formula for estimating a population mean:

$$n = Z^2_{1-\alpha/2} \frac{S^2}{(E * \bar{X})^2}$$

where in $Z^2_{1-\alpha/2}$ = 1.96 (corresponding to a 95% confidence interval), E = 0.1 (representing the predetermined absolute error margin), $\bar{X}$ = 30.9 minutes (estimated mean waiting time), and S = 24.1 (standard deviation) derived from previous research by Le et al [11]. The calculation yielded a minimum required sample size of 234 participants, which was subsequently augmented to 250 to accommodate an anticipated non-response rate of approximately 7%. Participant selection was accomplished through systematic sampling methodology with a sampling interval of 21 (k = 145/7), calculated from the documented average daily patient volume of 145 consultations.

#### *2.2.3. Data Collection Procedures*

Quantitative data acquisition was facilitated through a structured questionnaire developed in accordance with the parameters established in Ministry of Health Decision 1313/QD-BYT. The instrument captured comprehensive demographic characteristics, clinical parameters, administrative data, and precise time measurements corresponding to each discrete step within the consultation process. Research assistants who received standardized training implemented consistent timing procedures to record waiting intervals at each service delivery point.

For qualitative assessment, semi-structured interviews were conducted utilizing interview guides specifically tailored to each participant category. Patient interviews were designed to elicit experiential narratives, emotional responses to waiting periods, and recommendations for service enhancement. Healthcare personnel interviews explored operational challenges, communication barriers, and potential improvement strategies. Administrative leadership interviews addressed strategic priorities, resource allocation constraints, and institutional vision for service optimization.

#### *2.2.4. Variables and Measurements*

The primary outcome variables comprised total waiting time and constituent sub-waiting periods at distinct service delivery points. Independent variables encompassed patient-specific characteristics (age, gender, educational attainment), clinical factors (quantity of diagnostic procedures, treatment outcomes), and administrative variables (consultation session timing, calendar date, appointment classification). Qualitative variables incorporated participant experiences, perceived systemic barriers, and proposed intervention strategies.

#### *2.2.5.Data Analysis*

Quantitative data underwent statistical analysis utilizing SPSS software (version 20.0). Descriptive statistical analyses generated means, standard deviations, frequencies, and proportions. Independent-Sample T-tests and Analysis of Variance (ANOVA) were performed to examine associations between waiting times and various predictor variables. Statistical significance was established at $p<0.05$ for all analyses.

Qualitative data was subjected to rigorous thematic

analysis of verbatim interview transcripts, employing systematic coding procedures to identify recurring thematic elements and relational patterns. The analytical process focused on elucidating systemic barriers, participant perspectives, and viable intervention strategies through constant comparative methodology.

#### *2.2.6. Ethical Considerations*

The research protocol received comprehensive ethical review and approval from the institutional ethics committee of Kien An Hospital (Approval number: KA-EC-2024-027). Written informed consent was obtained from all research participants prior to data collection. Confidentiality and anonymity were meticulously maintained throughout the investigative process through data de-identification procedures and secure data storage protocols. This methodologically robust approach facilitated both quantitative assessment of waiting time parameters and qualitative understanding of contextual factors, thereby enabling the development of evidence-based recommendations for service quality enhancement at Kien An Hospital.

## 3. RESULTS

### 3.1. Quantitative Findings

The study analyzed data from 250 participants with demographic characteristics presented in Table 1. The sample was predominantly elderly, with a slight female predominance. Most patients were attending follow-up appointments, and the majority had health insurance coverage.

**Table 1. Demographic Characteristics of Study Participants (n=250)**

| Characteristic | Category | n | % |
|---|---|---|---|
| Age group (years) | 18-39 | 4 | 1.6 |
| | 40-59 | 43 | 17.2 |
| | ≥60 | 203 | 81.2 |
| Gender | Male | 109 | 43.6 |
| | Female | 141 | 56.4 |
| Appointment type | New consultation | 16 | 6.4 |
| | Follow-up | 234 | 93.6 |
| Consultation session | Morning | 199 | 79.6 |
| | Afternoon | 51 | 20.4 |
| Health insurance status | Insured | 220 | 88.0 |
| | Uninsured | 30 | 12.0 |

Remarks; Our analysis of waiting times revealed that patients experienced a mean total waiting time of 172.05 ± 6.90 minutes (approximately 2 hours and 52 minutes). This aggregate measure encompassed multiple segments of the patient journey with considerable variation based on service complexity, as shown in Table 2. The waiting time increased proportionally with the number of diagnostic tests required, with patients undergoing three diagnostic procedures facing the longest average wait at 233.33 ± 17.55 minutes, more than double the time required for clinical examination alone (95.60 ± 11.08 minutes).

**Table 2. Patient Waiting Times by Service Category**

| Service Category | n | Mean Waiting Time (minutes) ± SD |
|---|---|---|
| Physician consultation waiting | 250 | 27.61 ± 1.58 |
| Clinical examination only | 60 | 95.60 ± 11.08 |
| With one diagnostic test | 19 | 170.17 ± 16.98 |
| With two diagnostic tests | 49 | 186.18 ± 11.85 |
| With three diagnostic tests | 49 | 233.33 ± 17.55 |
| Medication dispensing | 250 | 10.65 ± 28.08 |
| Total average waiting time | 172.05 ± 6.90 | |

Remarks; Detailed assessment of diagnostic service waiting times revealed an average waiting period of 80.44 ± 4.25 minutes across all testing modalities (Table 3). However, significant variation was observed between specific procedures, with electrocardiogram demonstrating the longest mean waiting time (103.33 ± 5.62 minutes) and radiography services showing the greatest efficiency (43.48 ± 5.24 minutes), indicating substantial differences in procedural throughput and resource allocation across diagnostic departments.

**Table 3. Waiting Times for Diagnostic Testing Procedures**

| Diagnostic Procedure | n | Mean Waiting Time (minutes) ± SD |
|---|---|---|
| Electrocardiogram (ECG) | 76 | 103.33 ± 5.62 |
| Biochemistry tests | 148 | 96.15 ± 2.41 |
| Urinalysis | 49 | 92.51 ± 3.92 |
| Ultrasonography | 81 | 74.65 ± 4.60 |
| Hematology tests | 49 | 72.54 ± 3.74 |
| Radiography (X-ray) | 19 | 43.48 ± 5.24 |
| Average diagnostic testing waiting time | 194.97 ± 107.59 | |

Remarks; Statistical analysis examined potential associations between patient characteristics and waiting time duration (Table 4). Consultation session timing emerged as the most influential factor, with morning attendees waiting significantly longer (190.10 ± 8.03 minutes) than afternoon patients (101.60 ± 6.47 minutes, $p<0.001$). Health insurance status and appointment type did not demonstrate statistically significant associations with waiting time, though new patients experienced considerably longer waiting periods (221.55 ± 31.98 minutes) than follow-up patients (168.66 ± 7.01 minutes), a difference that did not reach statistical significance threshold ($p>0.05$), possibly due to the small proportion of new consultations in the study sample.

**Table 4. Factors Influencing Patient Waiting Times**

| Factor | Category | Mean Waiting Time (minutes) ± SD | p-value |
|---|---|---|---|
| Health insurance status | Insured | 173.00 ± 7.42 | 0.09 |
| | Uninsured | 165.10 ± 18.92 | |
| Consultation session | Morning | 190.10 ± 8.03 | < 0.001* |
| | Afternoon | 101.60 ± 6.47 | |
| Appointment type | New consultation | 221.55 ± 31.98 | 0.27 |
| | Follow-up | 168.66 ± 7.01 | |

**: Statistically significant at p<0.05*

Remarks; During the consultation sessions, patients who attended morning clinics had a longer mean waiting time (190.10 ± 8.03 minutes) compared with those attending afternoon clinics (101.60 ± 6.47 minutes). A statistically significant difference in waiting time was observed between morning and afternoon consultations ($p < 0.001$).

### 3.2. Qualitative Findings

#### *3.2.1. Patient Experiences and Perceptions*

Thematic analysis revealed patients consistently identified two critical waiting phases: physician consultation access and diagnostic test results. These delays generated substantial psychological distress, particularly among vulnerable populations. A 65-year-old cardiovascular patient explained: "The long wait makes me uncomfortable and tired, as my condition makes it difficult to sit for extended periods." Diagnostic uncertainty amplified anxiety, with a 58-year-old diabetic patient noting: "When I wait for a long time, I feel anxious and impatient to know my test results and understand my condition."

Extended waiting produced physiological impacts among patients with pre-existing conditions. A 71-year-old patient with multiple comorbidities observed: "I have multiple chronic conditions, especially heart disease, so waiting for long periods in crowded spaces with limited ventilation compromises my health." Several elderly patients reported symptom exacerbation during prolonged waiting in congested environments.

Despite timing concerns, patients expressed satisfaction with facility infrastructure, praising cleanliness, seating, and modern equipment. The predominant improvement suggestion involved departmental reorganization. A 63-year-old retired teacher recommended: "The hospital should divide consultation rooms by medical specialty rather than having everyone see general internal medicine physicians first, which creates unnecessary waiting and referrals."

#### *3.2.2. Healthcare Staff Perspectives*

Staff interviews revealed sophisticated understanding of operational challenges creating waiting bottlenecks. Distinct temporal demand patterns emerged across departments: Medical Imaging experienced peak congestion Mondays-Tuesdays (9:00-10:30 AM, 2:00-3:30 PM), Laboratory Services faced maximum submissions (8:30-10:00 AM), and Outpatient Department encountered greatest concentration (9:00-10:30 AM).

Workforce limitations constituted the predominant concern. A senior radiologist articulated resource-capacity mismatches: "We have four ultrasound machines and four examination rooms, but currently only two radiologists available. Patient volume increases significantly at the beginning of the week, coinciding with follow-up diagnostic tests for inpatients scheduled on Mondays, creating substantial congestion." Laboratory supervisors similarly noted: "During peak hours, we receive specimen submissions in overwhelming batches, which exceeds our processing capacity given current staffing levels."

Procedural inefficiencies exacerbated delays, including inappropriate delegation of specimen transport to students and appointment disruptions from late arrivals. A senior physician observed: "Patients arriving after their scheduled appointment time experience longer waits themselves, but also extend waiting times for subsequent patients, as we attempt to accommodate everyone."

Extended waiting created bidirectional stress between patients and providers. A triage nurse described deteriorating interactions: "When patients wait excessively, their dissatisfaction often manifests in inappropriate communications with healthcare staff, creating workplace stress and anxiety." An internal medicine specialist noted workflow disruptions: "Anxious patients who have waited extensively frequently enter examination rooms uninvited to ask questions, disrupting ongoing consultations and further delaying care for all patients."

Staff recommendations included infrastructure modifications (dedicated outpatient imaging areas), human resource expansion (three additional radiologists), and technological enhancements (redundant analytical equipment, electronic signatures, barcode generators). IT limitations were emphasized, particularly network congestion and outdated printing infrastructure requiring immediate attention.

#### *3.2.3. Hospital Leadership Perspectives*

Senior administration demonstrated sophisticated awareness of waiting challenges and institutional improvement commitment. The hospital director emphasized systematic monitoring: "The Quality Management Department provides comprehensive waiting time data during hospital management briefings every morning, enabling us to identify emerging problems and implement rapid interventions."

Leadership identified structural constraints impeding improvement. The deputy director acknowledged recruitment difficulties: "Despite aggressive recruitment efforts, we continue to experience significant difficulties attracting and retaining radiologists and laboratory physicians due to competition from private facilities offering superior compensation packages." Infrastructure limitations were recognized, with the planning head noting: "Current facility design prevents optimal separation of diagnostic services for inpatient and outpatient populations, creating unavoidable service bottlenecks during peak periods."

Strategic interventions included preferential recruitment packages. The human resources director detailed: "We have implemented preferential recruitment packages for diagnostic specialists, including a 50 million VND signing bonus for radiologists and laboratory physicians who commit to a minimum three-year contract." Performance-based compensation prioritized bottleneck services, with diagnostic staff receiving 20% higher monthly incentives than other clinical areas.

Leadership articulated clear performance targets. The quality director reported: "We have established a maximum acceptable patient waiting time of 205

minutes, with ongoing efforts to further reduce this to 170 minutes through targeted process improvements." The strategic plan emphasized technological solutions (digital registration, time-slotted appointments, system integration, electronic prescriptions, automated monitoring) and environmental modifications (massage chairs, electromagnetic therapy machines in waiting areas). These multifaceted strategies demonstrated comprehensive understanding of waiting time determinants and systematic improvement commitment.

## 4. DISCUSSION

This study found that patients at Kien An Hospital experienced a mean total waiting time of 172.05 ± 6.90 minutes, which exceeds the target of 3.5 hours (210 minutes) established by the Ministry of Health Decision 1313/QD-BYT. While this represents significant improvement from the preliminary assessment in early 2024 (3.9 hours), it remains higher than waiting times reported in comparable Vietnamese facilities. For instance, Nguyen et al. documented a mean waiting time of 147.9 ± 72.1 minutes at Tien Giang Provincial Hospital[9]. Our findings align with the operational reality at Kien An Hospital, which processes 140-195 outpatients daily following the 2023 expansion of primary healthcare coverage for local residents.

The most substantial component of total waiting time was associated with diagnostic testing (80.44 ± 4.25 minutes), with considerable variation across different procedures. Electrocardiogram demonstrated the longest mean waiting time (103.33 ± 5.62 minutes), followed by biochemistry laboratory tests (96.15 ± 2.41 minutes). This finding parallels results from Bui et al. (2024), who identified diagnostic testing as the most time-consuming segment of the patient journey (131.8 ± 100.8 minutes) at 108 Military Central Hospital. Qualitative interviews with patients validated these quantitative findings, with participants consistently identifying diagnostic testing delays as a primary source of anxiety: "When I wait for a long time, I feel anxious and impatient to know my test results and understand my condition."

Our statistical analysis revealed that consultation session timing was the most significant determinant of waiting duration, with morning attendees waiting 87% longer than afternoon patients (190.10 ± 8.03 versus 101.60 ± 6.47 minutes, $p<0.001$). This temporal disparity was comprehensively explained through qualitative interviews, which identified the 9:00-10:30 AM timeframe as the peak congestion period across all departments. This finding aligns with international literature documenting morning-predominant appointment scheduling practices in healthcare facilities worldwide [5,12].

Healthcare staff interviews elucidated specific factors contributing to this temporal concentration. Medical imaging staff noted: "Patient volume increases at the beginning of the week, coinciding with follow-up tests for inpatients scheduled on Mondays, creating substantial congestion." Similarly, laboratory personnel identified procedural factors exacerbating morning delays: "During peak hours, we receive specimen submissions in overwhelming batches, which exceeds our processing capacity." These observations reflect resource-demand misalignment that negatively impacts service efficiency.

Notably, our study found no significant difference in waiting times between insured and uninsured patients (173.00 ± 7.42 versus 165.10 ± 18.92 minutes, $p>0.05$). This represents a positive outcome of administrative streamlining efforts, as hospital leadership confirmed: "Administrative procedures for insured and uninsured patients have been substantially improved at Kien An Hospital." This finding contrasts with research by Nguyen et al., which documented longer waiting times for insured patients (148.7 ± 59.8 minutes) compared to self-paying patients (117.6 ± 50.4 minutes) [9].

A clear positive correlation emerged between the number of diagnostic tests required and total waiting time. This relationship has been well-documented in previous research and reflects the cumulative nature of waiting times in sequential healthcare processes [8,11]. Qualitative investigation identified three primary contributing factors: specialist workforce shortages ("We have four ultrasound machines and rooms but only two radiologists available"), procedural inefficiencies ("Students without proper training in specimen handling procedures lead to mishandling"), and technology infrastructure limitations ("The hospital's internal network frequently experiences congestion").

Our qualitative findings revealed that extended waiting times generate both psychological and physiological impacts, particularly for vulnerable patient populations. Elderly patients with chronic conditions reported specific health concerns related to prolonged waiting in crowded environments: "I have multiple chronic conditions, especially heart disease, so waiting for long periods in crowded spaces with limited ventilation compromises my health." This finding extends beyond conventional patient satisfaction metrics to encompass actual health outcomes, highlighting the clinical relevance of waiting time reduction strategies.

Equally important, our study documented the negative impact of extended waiting times on healthcare staff wellbeing and performance. Clinical personnel described a cycle of deteriorating patient-provider interactions: "When patients wait excessively, their dissatisfaction often manifests in inappropriate communications with healthcare staff, creating workplace stress and anxiety." Physicians further noted workflow disruptions caused by anxious patients who interrupt consultations, creating a cascade of additional delays. This bidirectional impact underscores the importance of considering both patient and provider perspectives when developing waiting time interventions.

Our integrated analysis yielded comprehensive waiting time reduction recommendations aligned with Naiker et al.'s three-category framework: resource alignment, operational efficiency, and process improvement [6].

Resource alignment interventions should address service capacity-demand imbalances through targeted workforce expansion in radiology and laboratory services, supported by financial incentives. Hospital leadership has implemented differential compensation structures (50 million VND signing bonuses and 20% higher performance bonuses for diagnostic specialists). Infrastructure reorganization should establish dedicated outpatient diagnostic areas, while enhanced role delegation to qualified non-physician providers would enable appropriate task-shifting.

Operational efficiency improvements include time-slotted appointment systems with online registration to distribute patient volume throughout operational hours. Session balancing with afternoon appointment incentives would mitigate morning congestion. Patient flow optimization through clear visual pathways and first-in-first-out queuing principles would enhance service delivery. Enhancement of waiting

environments with health education activities and comfort amenities (massage chairs, electromagnetic therapy machines) would improve patient perception during unavoidable delays [5].

Process improvement strategies encompass information system integration for seamless interdepartmental data transfer, electronic signature verification for expedited result availability, and standardized specimen handling protocols. Technology upgrades should address identified infrastructure limitations: network congestion prevention, outdated equipment replacement, redundant analytical equipment installation, and individual patient barcode generators. Automated congestion monitoring with real-time alerts would facilitate dynamic resource reallocation during peak periods.

Hospital leadership established specific performance targets of maximum 205-minute waiting times, progressing toward 170-minute goals. Successful implementation requires addressing organizational culture and staff capacity barriers, as sustainable improvements depend on developing change management capabilities alongside technical interventions.

The cross-sectional design capturing January-March 2025 data presents limitations affecting generalizability. Seasonal fluctuations in disease prevalence may alter patient volumes and waiting times throughout the year, while the absence of longitudinal data prevents distinguishing between persistent structural issues and temporary operational challenges [6]. Findings reflect conditions at a specific provincial hospital, limiting transferability to facilities with different resource configurations or patient demographics. Future research should employ: continuous monitoring protocols across 12-18 months at multiple hospitals to capture seasonal variations; intervention effectiveness studies with pre-post measurements at 3, 6, and 12 months; multi-site comparative analysis across healthcare system levels; and mixed-methods longitudinal case studies following departmental process improvements. These approaches would provide robust evidence regarding temporal stability and determinant variations across different Vietnamese healthcare contexts.

This research provides empirical evidence that, while the hospital adheres to the specific clinical examination time limit set by the Ministry of Health (Decision 1313/QĐ-BYT, 2013), significant bottlenecks exist within the diagnostic pathway [10]. The prolonged waiting times for patients needing multiple procedures point to systemic issues, including information technology limitations and specialist workforce shortages. These findings underscore the need for targeted resource allocation and procedural reforms to ensure that broader healthcare quality objectives are met.

## 5. CONCLUSION

This mixed-methods study assessed patient waiting times at Kien An Hospital, revealing mean waiting times of 172.05 ± 6.90 minutes, with diagnostic testing as the primary component (80.44 ± 4.25 minutes). Morning consultations required 87% longer waiting times than afternoon appointments, representing the most influential temporal factor. Qualitative findings demonstrated that extended waiting generates psychological distress among patients and workplace stress for staff. Primary contributors include specialist workforce shortages, procedural inefficiencies, inadequate outpatient-inpatient diagnostic service separation, and information technology limitations. We propose comprehensive intervention strategies encompassing resource alignment, operational efficiency, and process improvement. Synchronized implementation of these complementary approaches, with multilevel stakeholder engagement, could significantly reduce waiting times while enhancing patient satisfaction and staff wellbeing. Future research should evaluate longitudinal intervention effectiveness and cost-effectiveness in resource-constrained environments. Comparative studies across diverse Vietnamese healthcare settings would enhance generalizability and support national quality improvement initiatives.

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