International Journal of Research and Review
[Indexed, Peer-Reviewed Journal]
Volume 12; Issue: 6; June 2025
Website: www.ijrrjournal.com
Research Paper *E-ISSN: 2349-9788; P-ISSN: 2454-2237*

Optimizing Outpatient Pharmacy Waiting Time at Andalas University Hospital: A 5M1E Framework Analysis

Indira Ika Christianti[1], Hardisman[2], Elfira Yusri[3]

[1]Department of Public Health, Faculty of Medicine, Andalas University, Padang, Indonesia
[2]Department of Clinical Pathology, Faculty of Medicine, Andalas University, Padang, Indonesia.

Corresponding Author: Hardisman

DOI: https://doi.org/10.52403/ijrr.20250680

ABSTRACT

Background: Waiting time is one of the key performance indicators in outpatient pharmacy services that directly influences patient satisfaction and service quality. At Andalas University Hospital, outpatient pharmacy services have struggled to meet national standards for waiting time.
Objective: This study aims to analyze the factors contributing to prolonged waiting times in the outpatient pharmacy unit at Andalas University Hospital and propose targeted solutions for service improvement.
Methods: A qualitative descriptive study was conducted using the 5M1E (Man, Method, Machine, Material, Money, and Environment) approach. Data were collected through in-depth interviews, observations, and document review from January to November 2022. Triangulation was performed to validate the findings.
Results: The average waiting time for non-compounded prescriptions was 32 minutes 53 seconds, exceeding the national standard of ≤30 minutes. Key contributing factors included uneven staff scheduling, competency disparities, physician non-compliance with the National Formulary, lack of electronic prescribing systems, SIMRS limitations, inadequate inventory monitoring, limited training hours, and suboptimal physical workflow. Comprehensive problem-solving strategies addressing each factor were proposed, including workforce redistribution, electronic system upgrades, inventory management improvements, and expanded staff training.
Conclusion: Multiple interconnected factors contribute to extended outpatient pharmacy waiting times. An integrated intervention addressing human, technological, operational, and policy-related factors is essential to meet national standards and improve patient satisfaction. The 5M1E framework provides a valuable tool for healthcare quality improvement initiatives.

Keywords: Pharmacy waiting time, Outpatient pharmacy, 5M1E analysis, Hospital service quality, Health service improvement

INTRODUCTION

Hospitals are healthcare institutions that provide comprehensive individual healthcare services, encompassing inpatient care, outpatient services, and emergency care. Their core functions include medical treatment, diagnostic and therapeutic support services, nursing care, rehabilitation, health promotion, and disease prevention. In addition, hospitals serve as centers for education and training of medical and paramedical personnel, as well as for research and the development of

health sciences and technologies. To ensure the safety and well-being of patients and staff, hospitals are also required to implement environmental health management in accordance with established health standards (Ministry of Health, 2010).

In accordance with Law No. 44 of 2009, hospitals are mandated to deliver comprehensive healthcare services that integrate promotive, preventive, curative, and rehabilitative care. Among the essential services that must be provided, pharmaceutical services are explicitly mandated under the Minister of Health Decree No. 129 of 2008 (Ministry of Health, 2008). Pharmaceutical services are defined as patient-centered professional services directly involving the preparation and provision of pharmaceutical products, with the primary objective of achieving optimal therapeutic outcomes that enhance patients' quality of life (Ministry of Health Regulation, 2016).

To ensure the quality of pharmaceutical services within hospitals, continuous quality control processes, including monitoring and periodic evaluation, are essential. One critical quality indicator is prescription service waiting time, which should be regularly evaluated in accordance with established minimum service standards. Based on the Ministry of Health Decree No. 129/Menkes/SK/II/2008, the standard waiting time for pharmacy services is ≤ 30 minutes for non-compounded (ready-to-dispense) prescriptions and ≤ 60 minutes for compounded prescriptions. Previous studies have identified prolonged waiting times as a significant factor contributing to patient dissatisfaction, which may negatively influence patient loyalty and retention (Permana, 2018).

Prolonged prescription waiting times can have a substantial impact on patient satisfaction. Moreover, hospital pharmacy departments often serve as major revenue centers, contributing significantly to overall hospital income. It has been reported that approximately 90% of healthcare services involve pharmaceutical supplies, with pharmacy services accounting for up to 50% of total hospital revenue (Fedrini, 2015). Observations and interviews conducted at the Outpatient Pharmacy Department of Andalas University Hospital revealed a continuous increase in outpatient visits from 2020 to 2022. This increase is directly proportional to the growing number of prescriptions processed by the outpatient pharmacy during the same period. However, the proportion of prescriptions dispensed within the targeted waiting time of ≤ 30 minutes for ready-to-dispense medications remains below the established standard. According to reports from the Public Relations Department of Andalas University Hospital, several patient complaints have been lodged concerning delays in prescription services. Such issues may compromise patient satisfaction and adversely affect the hospital's reputation and public perception.

MATERIALS & METHODS

This research used a qualitative descriptive approach applying the 5M1E analysis framework, which examines factors related to Man, Method, Machine, Material, Money, and Environment.

Data Collection

Data were gathered from:

- In-depth interviews with hospital staff (pharmacists, physicians, administration)
- Direct observations of outpatient pharmacy workflows
- Document reviews, including hospital policies, BPJS Quality Committee reports (2022), prescription records, and training schedules.

Triangulation

Triangulation of data sources was performed to validate findings by cross-referencing interview data, observations, and documents.

This study utilized both logical and political approaches for problem identification. The logical approach involved the collection and

analysis of available data, including interviews with key stakeholders and a review of the 2022 BPJS Quality and Credential Committee Report obtained from Andalas University Hospital. The political approach was conducted through structured discussions with the President Director, Board of Directors, and Heads of relevant departments within the hospital.

Data collection methods included general and focused observations, specifically targeting the Outpatient Pharmacy Department. In-depth interviews were conducted with selected hospital personnel to gather qualitative insights. Document analysis was performed using internal hospital reports and records related to pharmaceutical services. Additionally, brainstorming sessions were held with working groups and hospital supervisors to identify and prioritize the primary issues. Subsequently, problem analysis was conducted, and several alternative solutions were developed for consideration.

RESULT

Pharmacy waiting time refers to the duration from when a prescription is received until the medication is dispensed to the patient. According to the Ministry of Health standard, the acceptable waiting time is ≤ 30 minutes for ready-to-dispense medications and ≤ 60 minutes for compounded medications (Ministry of Health, 2008).

The data analysis revealed that over a 10-month observation period, 60% of pharmacy waiting times failed to meet the established Ministry of Health standard of ≤ 30 minutes. A significant improvement was observed in April 2022, during which waiting times decreased substantially and approached the standard, as reflected by an upward trend in the performance graph. However, this improvement was not consistently sustained, as a decline in pharmacy waiting time performance was observed in September and October, although the waiting times remained within acceptable limits and above the standard threshold.

Pharmacy waiting time is defined as the duration from the moment a prescription is received until the medication is dispensed to the patient. According to the Ministry of Health Decree No. 129/Menkes/SK/II/2008, the standard waiting time is ≤ 30 minutes for ready-to-dispense medications and ≤ 60 minutes for compounded medications.

Analysis of outpatient pharmacy waiting time over a 10-month period revealed that 60% of the monthly data points did not meet the Ministry of Health's standard of ≤ 30 minutes. While some months approached the standard, consistent compliance was not achieved throughout the period. A significant improvement was observed in April 2022, during which the average waiting time decreased substantially. However, this improvement was not sustained, as performance declined in September and October, though waiting times remained above the standard threshold.

Table 1. Average Waiting Time for Ready-to-Dispense Medications at Andalas University Hospital

No	Month	Number of Prescriptions	Average Waiting Time (Minutes)	Compliance with MOH Standard (Decree 129/2008)
1	January	310	34,15	Not Yet Compliant
2	February	276	32,15	Not Yet Compliant
3	March	355	39,02	Not Yet Compliant
4	April	273	56,43	Not Yet Compliant
5	May	304	37,29	Not Yet Compliant
6	June	312	34,03	Not Yet Compliant
7	July	317	29,51	Compliant
8	August	317	19,29	Compliant
9	September	317	21,15	Compliant
10	October	317	22,29	Compliant
TOTAL			325,31	
Average Waiting Time			32,53	Not Compliant

Further examination of the monthly data showed that only 4 out of the 10 months achieved compliance with the ≤ 30-minute standard. The table also illustrates the number of prescriptions processed each month alongside the average monthly waiting time. In April, for example, the pharmacy processed 273 prescriptions with an average waiting time of 56 minutes and 43 seconds. Notably, some months with a higher number of prescriptions demonstrated shorter waiting times, indicating potential improvements in workflow efficiency.

Across the 10-month observation period, the average outpatient pharmacy waiting time was calculated at 32 minutes and 53 seconds. Although this figure reflects an overall positive trend and gradual improvements in service delivery, it still falls short of the national standard for ready-to-dispense medications. This suggests the need for further intervention to enhance service efficiency and ensure consistent adherence to the established benchmarks.

Table 2. Percentage of Compliance with National Formulary Usage at Andalas University Hospital, January–October 2022

No	Month	Total Prescription Items (R/)	Non-Compliant Items (R/) with National Formulary	Ministry of Health Target (Decree 129/2008)	Achievement at Unand Hospital	Remarks
1	January	1.404	113	100%	92%	Not Yet Compliant
2	February	1.310	120	100%	91%	Not Yet Compliant
3	March	1.587	150	100%	91%	Not Yet Compliant
4	April	1.351	104	100%	92%	Not Yet Compliant
5	May	1.350	120	100%	91%	Not Yet Compliant
6	June	1.273	106	100%	92%	Not Yet Compliant
7	July	1.386	87	100%	94%	Not Yet Compliant
8	August	1.244	124	100%	90%	Not Yet Compliant
9	September	1.033	123	100%	88%	Not Yet Compliant
10	October	1.187	136	100%	89%	Not Yet Compliant
11	November	1.333	122	100%	91%	Not Yet Compliant
TOTAL		14.458	1.305			
Average Compliance Percentage				100%	91%	Not Yet Compliant

According to the Indonesian Ministry of Health Decree No. 129 of 2008 on Minimum Service Standards for Hospital Pharmaceutical Services, prescriptions are required to adhere 100% to the National Formulary. At Andalas University Hospital, the compliance rate with the National Formulary was recorded at 91%. As shown in the table above, several prescribed items did not align with the National Formulary (Fornas). Non-compliance by prescribing physicians results in additional workload for the hospital pharmacy staff, as they are required to reconfirm and adjust the prescriptions before dispensing, thereby increasing the overall prescription processing time.

Table 3. Pharmaceutical Staffing at Andalas University Hospital in 2022

No	Regulation PMK 56 of 2014	Andalas University Hospital	Remarks
1	Type C Hospital: 1 Pharmacist as Head of Pharmacy Department 2 Pharmacists for Outpatient Services 4 Pharmacists for Inpatient Services 1 Pharmacist Coordinator for receiving and distribution, who also	1 person 6 persons 8 persons 1 person	Staffing levels meet PMK standards

	provides pharmaceutical services in inpatient or outpatient clinics		
2	Required to attend 10–20 hours of training annually, including internal or external training	No regulation currently in place for minimum training hours. National Formulary and Dispensing training conducted once a year. sekali,	Need to establish a minimum annual training standard at Andalas University Hospital

Pharmaceutical services must be performed by pharmacists and pharmaceutical technical personnel. Pharmaceutical technical personnel involved in pharmaceutical services are required to work under the supervision of a pharmacist. Pharmaceutical personnel are defined as individuals engaged in pharmaceutical work, consisting of pharmacists and pharmaceutical technical staff. In addition, administrative support staff who are familiar with pharmaceutical operations assist in performing non-clinical support tasks.

The calculation of pharmacist staffing needs is based on the workload in outpatient pharmaceutical services, which includes managerial and clinical pharmacy services such as prescription review, drug dispensing, drug utilization recording (PPO), and patient counseling. Ideally, the recommended ratio is 1 pharmacist for every 50 patients. Given that the average number of prescriptions processed daily at Andalas University Hospital Outpatient Pharmacy is 293, approximately 6 pharmacists are required to adequately cover outpatient services.

Hospital pharmaceutical services must be carried out by qualified healthcare personnel who possess both the competence and authority to perform pharmaceutical tasks. These healthcare professionals, including pharmaceutical personnel, are expected to demonstrate responsibility, uphold high ethical and moral standards, maintain professional expertise, and continuously improve their competencies. One essential strategy to support this continuous improvement is through ongoing professional training. There is a need for accessible, up-to-date, and interactive learning platforms that can effectively support continuous learning for all pharmacy staff, allowing active engagement of pharmaceutical personnel in their professional development. The following is the training schedule that has been implemented at Andalas University Hospital:

Table 3. Training Activities at the Pharmacy Department Andalas University Hospital in 2022

No	Training Activity	Training Activity	Duration	Target Participants	Compliance with MOH Decree 129/2008
1	Aseptic Dispensing Training	July 7, 2022	6 hours	Pharmacy Staff	Belum Sesuai
2	In-House Training by the Health Professions Committee	July 23, 2022	10 hours	All Andalas University Hospital Staff	Compliant

According to the Ministry of Health Decree No. 129/Menkes/SK/II/2008 on Hospital Minimum Service Standards, training is intended for all hospital staff and includes all competency development activities conducted either within or outside the hospital, excluding formal education, with a minimum requirement of 10–20 hours per year. Based on data observations and interviews, routine training has been conducted annually. However, training specifically designated for pharmacy staff has been limited to aseptic and dispensing training. As a result, competency development is not distributed evenly across the pharmacy workforce, and training programs specifically targeting pharmaceutical services have only covered a

single topic area. Furthermore, dispensing training was attended by only selected representatives of the pharmacy staff

DISCUSSION

The 5M1E analysis (Man, Material, Method, Machine, Money, and Environment) is a widely used root cause analysis tool for identifying contributing factors behind a problem or suboptimal condition (Zhao, 2020). In the context of this study, the 5M1E framework was applied to analyze factors contributing to prolonged waiting times in the outpatient pharmacy service at Andalas University Hospital.

According to the Ministry of Health Decree No. 129/Menkes/SK/II/2008 on Hospital Minimum Service Standards, the acceptable waiting time for ready-to-dispense prescriptions is ≤ 30 minutes, and for compounded prescriptions, ≤ 60 minutes. Waiting time refers to the duration between the submission of a prescription to the pharmacy staff and the time the patient receives the medication. Extended waiting times can negatively impact service quality and patient satisfaction. Therefore, performance indicators aligned with these time standards are essential to monitor service compliance and improvement efforts.

Based on observations, document review, and interviews, it was found that the outpatient pharmacy's average waiting time for ready-to-dispense medications in 2022 was 32 minutes and 53 seconds—exceeding the national standard. No formal evaluation of waiting times for compounded prescriptions was found. This performance gap indicates that the outpatient pharmacy service at Andalas University Hospital has yet to consistently meet the established minimum service standards. Waiting time is a critical determinant of patient satisfaction, which in turn affects patient loyalty and the hospital's public perception.

Given that the pharmacy department serves as a revenue-generating center, particularly through prescription fulfillment, improving service efficiency is vital to enhancing both patient experience and hospital revenue. The number of prescriptions served directly influences income, and the faster prescriptions are processed, the more patients can be accommodated.

In-depth interviews with key informants emphasized the need for a structured evaluation of both ready-to-dispense and compounded medication waiting times. Feedback from patients included frequent complaints regarding delays in receiving medication, highlighting a pressing need for performance improvement. The absence of waiting time evaluation for compounded medications further reflects a gap in quality monitoring.

Problem identification was conducted through a review of relevant hospital policies and discussions with the Head of the Pharmacy Department. The root causes of long outpatient pharmacy waiting times were categorized using the 5M framework: Man (human resources and staffing), Material (availability and use of pharmaceutical supplies), Method (standard operating procedures and workflow), **Machine** (equipment and technology), and **Money** (budget and financial support). These elements were analyzed to understand their contribution to delays in service delivery and to inform strategic recommendations for service optimization.

Man Factor

Based on observations, interviews, and document analysis, several human resource issues were identified as contributing factors to prolonged waiting times in the outpatient pharmacy at Andalas University Hospital.

Firstly, unequal staff distribution and scheduling were found to be major contributors. According to the Ministry of Health Regulation No. 56/2014, a Type C hospital pharmacy should have adequate staffing levels, which Andalas University Hospital has met numerically. However, scheduling does not always align with peak patient arrival hours. For example, during peak hours (11:00–15:00) at the outpatient

pharmacy, staff may be reassigned to other units, such as the emergency pharmacy, due to absenteeism, leading to prescription backlogs.

Secondly, there is a variation in staff competency levels. Not all personnel are authorized to perform clinical functions such as prescription assessment or identification of prescription irregularities. Pharmacy technicians often require additional supervision and approval from pharmacists for clinical decision-making, which prolongs processing time. Furthermore, staff turnover due to resignation or civil servant recruitment results in variability in experience levels among pharmacy personnel, with newer staff often having less clinical competence.

Thirdly, limited training opportunities contribute to inconsistent competency development. Although aseptic dispensing and effective communication trainings are conducted annually, there is no formal regulation stipulating minimum training hours for pharmacy staff. Training sessions often involve only a portion of the pharmacy staff, and comprehensive performance evaluations are not regularly conducted.

Lastly, non-compliance by prescribers with the National Formulary was identified as another source of delay. When prescriptions are written for medications outside the formulary, pharmacy staff must contact the prescribing physicians for clarification and adjustments before processing the prescriptions, leading to extended waiting times.

Triangulation of data from interviews, observations, and document reviews confirmed that, while staffing numbers meet regulatory standards, discrepancies in staff competency, ineffective scheduling during peak hours, insufficient training, and prescription non-compliance remain significant challenges impacting outpatient pharmacy service efficiency.

Method

Several methodological issues were identified during the analysis of pharmacy services at the Andalas University Hospital outpatient unit, contributing to prolonged waiting times and patient dissatisfaction.

Firstly, the absence of estimated waiting time communication to patients at the prescription counter was a common issue. Pharmacy staff did not inform patients about how long it would take to process ready-to-dispense or compounded medications. This lack of communication often triggered complaints, especially when the waiting time exceeded patient expectations. This issue appears to stem from inconsistent implementation of the Standard Operating Procedure (SOP) for pharmacy dispensing and limited supervision by the head of unit and section coordinators.

Secondly, handwritten prescriptions frequently caused delays. When prescriptions were illegible, pharmacy staff were required to verify the orders by contacting the respective clinic nurses or physicians. This process could take considerable time, especially when the physician was unavailable due to clinical duties. Although illegible prescriptions were not common, they still had a significant impact on the workflow when they occurred.

Thirdly, the absence of an integrated Hospital Management Information System (SIMRS) with e-prescription capabilities posed a structural barrier. Prescriptions were still manually written and physically submitted at the outpatient pharmacy counter, leading to inefficiencies. The current SIMRS software in use at Andalas University Hospital does not support electronic prescribing, which limits the speed and accuracy of prescription processing.

Document analysis, interviews, and direct observations all confirmed that Andalas University Hospital's pharmacy operations continue to rely on handwritten prescriptions and that the current information system lacks integration to

support efficient pharmacy workflows. The lack of digital prescription capabilities not only delays service delivery but also increases the likelihood of human error and communication breakdowns between departments.

In conclusion, limitations in procedural implementation, manual prescription handling, and outdated information systems significantly contribute to longer waiting times and patient complaints. Upgrading to an integrated, e-prescription-capable SIMRS would likely improve efficiency and service quality in the outpatient pharmacy unit.

Machine

Technical infrastructure and equipment limitations were also identified as contributing factors to the delays experienced in outpatient pharmacy services at Andalas University Hospital.

One key issue was unstable internet connectivity. Although the hospital internet network operates at 200 Mbps, the connection is shared with the broader university network, without separation between office and public access. This often led to network instability, causing service interruptions until connectivity was restored. Additionally, system interface updates made to the Hospital Management Information System (SIMRS) in early 2022 required staff to adapt to new workflows, further contributing to inefficiencies during the transition period.

A second problem involved insufficient hardware availability at some outpatient clinics. In several polyclinics, data entry stations were limited, requiring staff to queue for shared computers located at the front desks. This delayed the real-time updating of patient data, which is necessary before pharmacy processing could proceed. Although improvements were made in subsequent months by providing additional computers, these early limitations impacted patient flow and processing speed.

Furthermore, lack of integration within the SIMRS system resulted in fragmented data processing. After consultations, patients were required to report back to outpatient clinic administration staff to complete the data entry in the SIMRS system before their prescriptions could be processed at the pharmacy. This manual handoff often led to patient confusion and delays, as patients sometimes forgot to report back, creating additional back-and-forth communication between departments.

Observations and interviews consistently highlighted that the absence of an integrated electronic medical record and pharmacy system, combined with network and hardware limitations, significantly affected service efficiency. Implementing a fully integrated SIMRS with real-time data sharing between clinics and pharmacy units would substantially improve workflow and reduce patient waiting times.

Material

Material-related issues also contributed to delays in outpatient pharmacy services at Andalas University Hospital. Although essential pharmaceutical supplies were generally available, certain challenges were identified regarding prescription compliance with the National Formulary (Fornas). Non-compliance required pharmacy staff to verify and adjust prescriptions with the prescribing physicians, delaying dispensing processes. In 2022, formulary compliance averaged 91%, still below the 100% target established in Ministry of Health Decree No. 129/2008.

Additionally, standardized documentation and reference materials were not uniformly available for all pharmacy staff, particularly for newly recruited personnel. This limited access to updated guidelines and protocols may have contributed to inconsistencies in prescription evaluation, further prolonging service time.

Several material management issues were identified as contributing factors to delays in pharmacy services at Andalas University Hospital. The core problem was related to inventory management inaccuracies within the Hospital Management Information System (SIMRS). The pharmacy system

lacked a warning stock feature to alert staff when inventory levels were low. As a result, pharmacy personnel had to manually verify and calculate actual stock levels when prescriptions were received, increasing processing time.

The inaccuracy of stock data in the SIMRS was largely due to inconsistent data entry practices among pharmacy staff. Medications were sometimes taken from inventory without immediately updating the electronic records, leading to discrepancies between actual and recorded stock levels. This made it difficult for pharmacy warehouse staff to predict when stock needed to be replenished at the outpatient pharmacy depot.

While standard operating procedures (SOP) for stock taking were in place, requiring stock audits every three to six months, there was a lack of regular evaluation and enforcement by supervisors to ensure strict adherence to these procedures. This operational gap contributed to frequent delays in medication dispensing, particularly when stock shortages were only identified after prescription processing had already begun.

Thus, deficiencies in real-time stock monitoring and discipline in inventory documentation led to service inefficiencies, highlighting the need for strengthened internal controls and upgraded inventory management systems within the pharmacy department.

Money

Financial constraints also played a role in limiting improvements within the outpatient pharmacy services. Budget allocation for continuous staff training remained insufficient, resulting in limited opportunities for professional development. Existing training programs were often held only once a year and did not fully cover all aspects of clinical pharmacy service development.

In addition, funding for IT infrastructure improvements — such as the development of an integrated SIMRS with e-prescription capability — had not yet been prioritized, despite its potential to significantly enhance service efficiency. Investment in software integration, expanded training programs, and updated clinical resources will be essential to ensure that pharmacy services comply with national standards while meeting patient expectations.

Environment

Environmental factors indirectly affected pharmacy service performance. The layout of the outpatient pharmacy was not fully optimized to accommodate fluctuating patient volumes during peak hours. Congestion at the prescription submission counters occasionally occurred due to high patient load combined with limited staffing during these periods.

Furthermore, workflow coordination between outpatient clinics and pharmacy units lacked streamlined communication channels, leading to repeated physical movements of patients between departments. This back-and-forth process created patient dissatisfaction, particularly when delays coincided with peak hours or system slowdowns.

Improving physical workspace layout, optimizing patient flow, and developing clear interdepartmental communication protocols would significantly reduce inefficiencies related to environmental factors.

Problem Solving and Recommendations

To address the issues identified through the 5M1E analysis, a multi-faceted strategy is proposed:

1. Workforce optimization, training, and rotation based on workload and peak hours.
2. Implementation of e-prescribing, enhanced communication, and regular SOP evaluation.
3. Infrastructure upgrades, including dedicated bandwidth and additional clinic workstations.
4. Real-time inventory systems with better stock control and monitoring practices.

5. Regular training mandates and funding allocation to support continuous service improvement.
6. Environmental redesign and queue flow optimization for high-volume service areas.

CONCLUSION

This study identified multiple contributing factors to the suboptimal waiting time performance in the outpatient pharmacy service at Andalas University Hospital. Using the 5M1E framework, the analysis revealed that issues related to human resources, workflow methods, technological limitations, inventory management, training resources, and the physical service environment collectively hindered the hospital's ability to meet the national standard of ≤30 minutes for non-compounded prescriptions.

The average waiting time in 2022 was 32 minutes and 53 seconds, with only 4 out of 10 months achieving compliance with national standards. Furthermore, prescription conformity with the National Formulary remained at 91%, indicating a need for improved physician compliance.

To address these issues, comprehensive solutions are required—ranging from human resource distribution and competency development, implementation of electronic prescription systems, enhancement of SIMRS functionality, improvement in stock monitoring, and expansion of pharmacy-specific training. Strategic investment in infrastructure and digital transformation, supported by hospital leadership, will be critical for sustainable service improvement.

In conclusion, improving pharmaceutical services in hospitals requires an integrated approach that considers operational systems, human behavior, technological capabilities, and policy adherence. The findings from this study can inform other healthcare institutions facing similar challenges and serve as a model for quality improvement initiatives aimed at increasing patient satisfaction and organizational efficiency.

Declaration by Authors

Acknowledgement: We would like to thank the Department of Public Health, Faculty of Medicine, Andalas University for their support and all the contributors who helped in this study.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

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How to cite this article: Indira Ika Christianti, Hardisman, Elfira Yusri. Optimizing outpatient pharmacy waiting time at Andalas University Hospital: a 5M1E framework analysis. *International Journal of Research and Review*. 2025; 12(6): 712-722. DOI: *https://doi.org/10.52403/ijrr.20250680*

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