



## Analysis of Drug Stock Discrepancies between SIMRS Data and Physical Stock in the Pharmacy Warehouse of Andalas University Teaching Hospital

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### Article Info :

Received:  
22-09-2026  
Revised:  
25-09-2026  
Accepted:  
29-09-2026

### ABSTRACT

*Discrepancies between drug stock recorded in the Hospital Management Information System (SIMRS) and physical stock can reduce the efficiency of pharmaceutical services and threaten patient safety. This study aimed to describe drug stock discrepancies at the Pharmacy Warehouse of Andalas University Hospital, together with the condition of four related factors: human resources (HR), standard operating procedures (SOP), SIMRS, and drug management. A descriptive quantitative design was applied from April to May 2026. Stock data for 84 drug items were compared between SIMRS records and physical counts, and 34 pharmacy staff completed a Likert-scale questionnaire. Data were analyzed univariately. Of the 84 items, 65 (77.4%) showed no discrepancy, whereas 19 (22.6%) did. Most respondents rated HR (52.9%), SOP (58.8%), and drug management (52.9%) as poor, while 52.9% rated SIMRS as good. These findings show that stock discrepancies persist alongside weaknesses in staff thoroughness, SOP compliance, and stock recording, even though SIMRS itself was considered adequate. Strengthening staff competence, SOP supervision, real-time data entry, and the recording of every drug transaction is needed to reduce stock discrepancies*

**Keywords :** Drug Management; Human Resources; Stock Discrepancy; SIMRS; SOP



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## INTRODUCTION

Drug inventory management is a critical component of healthcare delivery, because patients depend on the timely availability of safe, high-quality, and affordable medicines, which the World Health Organization regards as an essential part of an effective health system. Sound inventory management enables health facilities to supply the right type, quantity, and timing of medicines to patients [1]. In Indonesian hospitals, this responsibility lies with the pharmacy unit and covers planning, procurement, storage, distribution, and accurate and timely recording and reporting. Together, these activities form part of effective health-logistics governance for supplying medicines to the other service units within the hospital [2].

To support these processes, Indonesian hospitals have adopted the Hospital Management Information System (SIMRS) for recording and reporting drug inventory, so that data are accurate, timely, and usable for managerial decision-making [3]. Nevertheless, drug stock discrepancies, defined as mismatches between the stock recorded in the system and the physical stock in the pharmacy warehouse, are still frequently found. Rohimah and Siyamto reported that, even where hospitals applied drug-management methods such as ABC-VEN, stock recording was often still done manually, resulting in inaccurate inventory data and drug stock-outs [4]. Chowdhury et al. likewise found that only 30.4% of stock cards were recorded accurately, a condition that can trigger drug shortages and wastage and, in turn, widen the gap between system data and physical stock [5].

A similar problem occurs at Andalas University Hospital, a State University Hospital (RSPTN) classified as a Type B hospital. A preliminary survey, consisting of interviews with the Head of the Pharmacy Installation and direct observation of the pharmacy warehouse on 13 January 2026, identified a discrepancy between SIMRS data and physical stock estimated at around 12% of drug items. In addition, a random check of 10 drug items found discrepancies in 6 of them. Four factors were identified as contributing to this problem. First, human resources (HR): staff lacked thoroughness, for example by

picking medicines or entering data that did not match the items taken. Second, standard operating procedures (SOP): although SOPs were available, their implementation was inconsistent; for instance, depot staff requested medicines from the warehouse without a prescription, so the transaction was not recorded. Third, SIMRS: data were often entered late, after medicines had been taken by the service unit but not yet recorded in the system. Fourth, drug management: errors frequently occurred in the recorded quantity and type of medicine.

These discrepancies matter for both service delivery and quality assurance. When physical stock is lower than the quantity recorded in SIMRS, staff may assume that a medicine is available when it is not, which delays patient service and prompts emergency procurement or the borrowing of medicines. Both measures reduce service efficiency and increase the risk of errors in drug management. Inaccurate inventory data also weaken requirement planning and may lower the hospital's assessment on the Pharmaceutical Service and Medication Use (PKPO) standards [6]. However, information on the magnitude of the discrepancy and on the condition of the factors involved at this hospital is still limited to the preliminary survey. Therefore, this study aims to describe drug stock discrepancies between SIMRS data and physical stock in the Pharmacy Warehouse of Andalas University Hospital, together with the condition of human resources (HR), standard operating procedures (SOP), SIMRS, and drug management.

## RESEARCH METHODS

This study used a descriptive quantitative method aimed at objectively and systematically describing a phenomenon based on numerical data obtained from questionnaires. The study was conducted from April to May 2026 at the Pharmacy Installation of Andalas University Hospital. The population consisted of all 34 staff involved in drug management, all of whom were used as the sample, and all 500 drug items recorded in SIMRS, from which a sample of 84 drug items was used.

Data were collected using both primary and secondary data. Primary data were obtained by distributing questionnaires to pharmacy staff, developed based on indicators for each variable HR, SOP, SIMRS, and drug management using a Likert scale. Secondary data were obtained through observation, namely by comparing drug stock data recorded in SIMRS with the physical stock available in the pharmacy warehouse. The data-analysis technique used was univariate analysis, aimed at describing the frequency distribution and percentage of the study variables, both independent and dependent, so as to determine the category of each variable (e.g., good or poor).

## RESULTS AND DISCUSSION

### a. Respondent Characteristics

**Table 1. Respondent Characteristics**

| Characteristic    | Category                                     | n  | %    |
|-------------------|----------------------------------------------|----|------|
| Gender            | Male                                         | 12 | 35.3 |
|                   | Female                                       | 22 | 64.7 |
| Age (years)       | 17–25                                        | 9  | 26.5 |
|                   | 26–35                                        | 20 | 58.8 |
|                   | 36–45                                        | 5  | 14.7 |
| Education         | Senior High School                           | 1  | 2.9  |
|                   | Diploma III (Pharmacy)                       | 21 | 61.8 |
|                   | Bachelor of Pharmacy (S1)                    | 2  | 5.9  |
|                   | Pharmacist Professional Program              | 10 | 29.4 |
| Position          | Pharmacist                                   | 11 | 32.4 |
|                   | Pharmacy Assistant                           | 22 | 64.7 |
|                   | Warehouse Attendant                          | 1  | 2.9  |
| Employment Status | Civil Servant (PNS)                          | 3  | 8.8  |
|                   | Government Employee w/ Work Agreement (PPPK) | 8  | 23.5 |
|                   | Daily Contract Worker (PHL)                  | 21 | 61.8 |
| Work Unit         | Temporary Employee (PTT)                     | 2  | 5.9  |
|                   | Warehouse                                    | 5  | 14.7 |
|                   | Outpatient                                   | 8  | 23.5 |
|                   | Inpatient                                    | 10 | 29.4 |
|                   | OR–Intensive Care                            | 5  | 14.7 |

|                      |   |      |
|----------------------|---|------|
| Emergency Department | 4 | 11.8 |
| Chemo-TPN            | 2 | 5.9  |

Based on Table 1, it can be concluded that among the 34 staff members of the Pharmacy Installation at Andalas University Hospital, the gender distribution was dominated by 22 women (64.7%). By age, the 26–35-year group was the largest, with 20 people (58.8%). By education, the majority of respondents, 21 people (61.8%), held a Diploma III in Pharmacy. By position, 22 people (64.7%) were pharmacy assistants, and by employment status, 21 people (61.8%) were Daily Contract Workers (PHL). By work-unit placement, 10 people (29.4%) were assigned to the inpatient depot.

#### **b. Overview of Drug Stock Discrepancies between SIMRS Data and Physical Stock**

The following presents the frequency distribution of drug stock discrepancies between SIMRS data and physical stock in the Pharmacy Warehouse of Andalas University Hospital.

**Table 2. Drug Stock Discrepancy between SIMRS Data and Physical Stock in the Pharmacy Warehouse of Andalas University Hospital**

| <b>Stock Discrepancy</b> | <b>n</b> | <b>%</b> |
|--------------------------|----------|----------|
| No discrepancy           | 65       | 77.4     |
| Discrepancy              | 19       | 22.6     |
| Total                    | 84       | 100      |

Based on Table 2, of the 84 drug items observed, 65 items (77.4%) showed no discrepancy between SIMRS data and physical stock, while 19 items (22.6%) showed a discrepancy in the Pharmacy Warehouse of Andalas University Hospital. The drug items most frequently showing a discrepancy included bisoprolol 2.5 mg, clonidine 0.15 mg, hydrochlorothiazide tablets, bisoprolol 5 mg, and dutasteride.

The observation results show that discrepancies still exist between the quantity of drug stock recorded in SIMRS and the physical stock available in the warehouse, in the form of either lower or higher physical quantities compared with the system data. This condition indicates that inaccuracies remain in the recording, data-entry, and stock-control processes. The discrepancy between SIMRS pharmaceutical-logistics data and physical stock in the Pharmacy Warehouse of Andalas University Hospital is caused by delays in entering data into SIMRS as well as a lack of staff thoroughness in recording drug stock. Another contributing factor is the high volume of workload, which means recording is not always carried out directly at the time the drug transaction occurs.

Drug stock discrepancies can affect the quality of pharmaceutical services because they lead to inaccurate inventory data, resulting in less accurate drug-requirement planning, an increased risk of drug shortages, and losses due to poorly monitored inventory. Inventory inaccuracy is a finding that can lower the assessment of Pharmaceutical Service and Medication Use (PKPO) standards and affect the hospital's accreditation status [6].

#### **c. Overview of Human Resources (HR)**

The following presents the frequency distribution of Human Resources (HR) in the Pharmacy Warehouse of Andalas University Hospital.

**Table 3. Human Resources in the Pharmacy Warehouse of Andalas University Hospital**

| <b>Human Resources</b> | <b>n</b> | <b>%</b> |
|------------------------|----------|----------|
| Poor                   | 18       | 52.9     |
| Good                   | 16       | 47.1     |
| Total                  | 34       | 100      |

Based on Table 3, among the 34 pharmacy staff, 18 respondents (52.9%) rated the HR factor as poor, while 16 respondents (47.1%) rated it as good. Category determination was based on a mean value of 34.35, with scores < 34.35 categorized as poor and scores ≥ 34.35 categorized as good. The highest score was found in staff understanding of the drug-management workflow and adherence to working procedures, while the lowest score was found in staff thoroughness during the process of picking medicines from the warehouse.

Human resources are one of the important elements in a health-service management system. This factor relates to Human Factor Theory, which states that human error is one of the main causes of failure in a work system [7]. A lack of knowledge and skill among pharmacy staff can lead to errors in data entry, drug picking, and stock recording, which ultimately contribute to stock discrepancies [1].

This finding is consistent with the study by Rohimah and Siyamto, which stated that although hospitals have implemented drug-management methods, stock recording still often experiences inaccuracies due to weaknesses in human resources [4]. This is in line with the findings of Chowdhury et al., who found that only 30.4% of stock cards were recorded accurately, indicating weaknesses in staff competence in recording and controlling drug inventory [5].

The high score in the aspects of workflow understanding and procedural compliance is because most staff are Diploma III and Professional Pharmacy graduates who received basic training in drug-management procedures during their education or job orientation. However, this good level of understanding is not yet fully matched by thoroughness while working, since the high workload and large number of drug items that must be handled within a limited time make staff tend to work quickly, making them prone to errors when picking medicines from the warehouse. The fact that the majority of staff, 21 people (61.8%), are Daily Contract Workers (PHL) implies limited access to formal competency-development programs, which are usually reserved for permanent employees.

Suboptimal human resources in drug management can increase the risk of human error, such as errors in picking medicines, recording drug quantities, or delays in entering data into SIMRS, which ultimately increases the risk of drug stock discrepancies and reduces compliance with the Patient Safety (KPS) and PKPO standards regulated under the 2024 Hospital Accreditation Standards [6].

#### **d. Overview of Standard Operating Procedures (SOP)**

The following presents the frequency distribution of Standard Operating Procedures (SOP) in the Pharmacy Warehouse of Andalas University Hospital.

**Table 4. Standard Operating Procedures in the Pharmacy Warehouse of Andalas University Hospital**

| <b>Standard Operating Procedures</b> | <b>n</b> | <b>%</b> |
|--------------------------------------|----------|----------|
| Poor                                 | 20       | 58.8     |
| Good                                 | 14       | 41.2     |
| Total                                | 34       | 100      |

Based on Table 4, among the 34 pharmacy staff, 20 respondents (58.8%) rated SOP implementation as poor, while 14 respondents (41.2%) rated it as good. Category determination was based on a mean value of 32.06, with scores < 32.06 categorized as poor and scores ≥ 32.06 categorized as good. The highest score was found in the availability of SOPs as a working guideline, while the lowest score was found in staff compliance in carrying out work according to the established SOPs.

A standard operating procedure is a written guideline used to standardize work processes so that services run effectively, safely, consistently, and in accordance with healthcare quality standards [2]. The success of a system depends heavily on the level of individual compliance with established rules [8]. If SOPs are not applied consistently, discrepancies can occur in drug-management processes, such as recording errors, uncontrolled distribution, or improper storage, which ultimately contribute to drug stock discrepancies [1].

This finding is consistent with the study by Subagaya et al., which found inconsistencies in the application of the FEFO (First Expired First Out) principle and in the use of stock cards, which only reached 44%, indicating that the implementation of standard procedures in drug storage and control still needs improvement [9]. A study by Yurdiansyah and Andriani also found that drug distribution had not yet fully met the standards set out in the 2016 Pharmaceutical Service Standards regulation, indicating weak implementation of SOPs in the pharmacy warehouse [9].

The high score for SOP availability is because the drug-management SOP documents have been prepared and placed in the pharmacy warehouse as part of fulfilling hospital accreditation requirements. However, the low compliance score indicates that the availability of SOP documents has not been fully matched by implementation in the field. This occurs because the high workload means that some SOP

steps are sometimes skipped in order to save time, and there is not yet consistent supervision of SOP implementation by the head of the pharmacy installation.

#### e. Overview of the Hospital Management Information System (SIMRS)

The following presents the frequency distribution of the Hospital Management Information System (SIMRS) in the Pharmacy Warehouse of Andalas University Hospital.

**Table 5. Hospital Management Information System (SIMRS) in the Pharmacy Warehouse of Andalas University Hospital**

| SIMRS | n  | %    |
|-------|----|------|
| Good  | 18 | 52.9 |
| Poor  | 16 | 47.1 |
| Total | 34 | 100  |

Based on Table 5, among the 34 pharmacy staff, 18 respondents (52.9%) rated SIMRS as good, while 16 respondents (47.1%) rated it as poor. Category determination was based on a mean value of 31.76, with scores  $\geq 31.76$  categorized as good and scores  $< 31.76$  categorized as poor. The highest score was found in SIMRS's ability to assist the drug data-recording and management process, while the lowest score was found in technical constraints or system disruptions during SIMRS use.

A hospital management information system is an information-technology system used to support health-service processes through fast, accurate, and timely data processing. In pharmaceutical services, SIMRS is used to help record drug stock, distribution, inventory control, and drug-usage reporting. Good use of SIMRS can help improve the accuracy of drug stock data and minimize recording errors [3].

This finding is consistent with the study by Shulihah and Abdul Razak (2020), who found that 76.7% of respondents stated that SIMRS helped in monitoring and controlling drug stock, although 33.3% of drug items still experienced stock-outs [10]. International research shows strong relevance: Shen et al. reported that before the implementation of an artificial-intelligence-based drug-management information system, the average annual inventory error rate reached 0.425%, and after the implementation of an integrated digital system, this figure dropped to 0.025%, with drug supply-chain efficiency increasing by 42.4% [11].

Although SIMRS was generally rated as good by most respondents, nearly half of the staff still rated it as poor. The high score for SIMRS's ability to assist recording indicates that the system at Andalas University Hospital is, in principle, already adequate to support stock recording. However, the low score for technical constraints indicates that, in practice, SIMRS still frequently experiences disruptions, such as slow connectivity, particularly during peak service hours, as well as delays by staff in entering data for example, when medicines have already been taken by the service unit but not yet entered into the system.

#### f. Overview of Drug Management

The following presents the frequency distribution of drug management in the Pharmacy Warehouse of Andalas University Hospital.

**Table 6. Drug Management in the Pharmacy Warehouse of Andalas University Hospital**

| Drug Management | n  | %    |
|-----------------|----|------|
| Poor            | 18 | 52.9 |
| Good            | 16 | 47.1 |
| Total           | 34 | 100  |

Based on Table 6, among the 34 pharmacy staff, 18 respondents (52.9%) rated drug management as poor, while 16 respondents (47.1%) rated it as good. Category determination was based on a mean value of 33.74, with scores  $< 33.74$  categorized as poor and scores  $\geq 33.74$  categorized as good. The highest score was found in the alignment of drug-storage practices with applicable standards, while the lowest score was found in the accuracy and thoroughness of drug recording.

Pharmacy personnel must have adequate competence to carry out the entire process of pharmaceutical-supply management, from planning, procurement, and receiving to storage, distribution, control, and recording, in order to ensure the availability of medicines in the right quantity, at the right time, and of the right quality [2]. Indonesian health law also requires health-service facilities to guarantee the availability of pharmaceutical supplies that are safe, high-quality, and affordable [13].

This finding is consistent with the study by Hapsari et al. (2023), which showed that although several stages of drug management already met standards, stock-management efficiency was still not optimal [14]. This also aligns with the international study by Gutesa et al., who found that only 33.3% of health facilities had an electronic logistics information system, while most still relied on manual recording that is prone to error, with an average inventory-accuracy rate of only 74.5% [15]. This study concluded that strengthening a comprehensive drug-management system, from planning to stock control, is key to ensuring drug availability and minimizing stock discrepancies in health-service facilities.

The high score for storage is because the Pharmacy Warehouse of Andalas University Hospital already has adequate storage facilities, such as drug shelves arranged by dosage form and appropriate storage temperature, so that the physical arrangement of medicines is already relatively well organized. The low score for recording indicates that the administrative process has not kept pace with the physical storage conditions, because stock-card recording and data entry into SIMRS are sometimes carried out after the drug-picking activity is completed, rather than directly at the time of the transaction, making the process prone to missed entries and incorrect quantities.

## CONCLUSION

The results of this study, conducted in the Pharmacy Warehouse of Andalas University Hospital, indicate that drug stock discrepancies between SIMRS data and physical stock still occur, caused by a lack of staff thoroughness in entering data, errors in picking medicines or entering data that does not match the medicine taken, and delays by SIMRS staff in entering data in real time when drug-request transactions occur.

### Suggestions

The hospital is advised to improve the competence and thoroughness of human resources in the pharmacy installation through regular training on drug management, particularly regarding procedures for recording and entering stock data into SIMRS. The hospital is also advised to evaluate and strengthen the implementation of Standard Operating Procedures every three months, accompanied by consistent supervision from the head of the pharmacy installation, and to optimize the use of SIMRS by improving staff discipline in entering data in real time. The hospital is further advised to improve the drug-management system in the pharmacy warehouse, such as recording every drug movement receipt, dispensing, and return in an orderly manner and in accordance with the time of occurrence, so that physical stock data and SIMRS data remain synchronized. For future researchers, it is recommended that this study be developed further using a qualitative or mixed-methods approach to explore more deeply the root causes of drug stock discrepancies, as well as to expand the sample scope to pharmacy installations in other hospitals in order to obtain a more comprehensive picture of this issue.

## ACKNOWLEDGMENTS

The authors would like to thank the management and staff of the Pharmacy Installation of Andalas University Hospital for the permission and cooperation provided during the data-collection process, all respondents who were willing to participate as research subjects, and the supervising and examining lecturers who provided guidance and input throughout this thesis process.

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