

## **THE EFFECT OF MEDICAL AND NON-MEDICAL STOCK CONTROL ON LOGISTIC PROCESSES AT ADINDA MEDICAL CENTRE HOSPITAL, SIDENRENG RAPPANG REGENCY**

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### **ABSTRACT**

*Stock control is essential for maintaining reliable hospital logistics processes. Preliminary observations at Adinda Medical Centre Hospital identified inaccurate stock records, limited logistics personnel, procurement delays, and inefficient distribution. This study analyzed the associations of medical and non-medical stock control with hospital logistics processes at Adinda Medical Centre Hospital, Sidenreng Rappang Regency. A quantitative descriptive-analytic study with a cross-sectional design was conducted among 106 respondents selected by simple random sampling from a population of 145 employees involved in requesting, using, or managing medical and non-medical goods. Data were collected using a structured questionnaire and analyzed using descriptive statistics, the Chi-square test, and risk estimates at a significance level of 0.05. Good medical stock control was reported by 63 respondents (59.4%), good non-medical stock control by 60 respondents (56.6%), and good hospital logistics processes by 66 respondents (62.3%). Medical stock control was significantly associated with hospital logistics processes ( $p = 0.001$ ;  $OR = 9.792$ ; 95%  $CI: 3.938-24.352$ ), whereas non-medical stock control was not statistically significant ( $p = 0.061$ ). These findings indicate that strengthening medical stock planning, recording, monitoring, storage, and distribution should be prioritized while non-medical stock management continues to be improved for operational support.*

**Keywords:** *Hospital logistics process, inventory management, medical goods, non-medical goods, stock control.*

### **INTRODUCTION**

Hospital logistics management plays an important role in supporting the continuity, safety, and quality of healthcare services. Recent studies show that hospital supply chains are vulnerable to distribution delays, inaccurate inventory data, and weak coordination among service units, especially when recording and monitoring systems are not well integrated (Hezam et al., 2024; Rehman et al., 2023). These conditions indicate that ineffective stock control may disrupt hospital logistic processes and reduce service efficiency.

In Indonesia, hospital logistics management includes the planning, procurement, storage, distribution, and monitoring of medical and non-medical goods. Studies in Indonesian hospital settings show that medical procurement and logistics information systems are closely related to the accuracy of stock data, timeliness of distribution, and quality of healthcare services (Fadillah et al., 2025; Janitra & Djamhuri, 2024; Wahyuddin et al., 2024). In hospital services, stock control is essential to ensure the

availability of medicines, medical devices, office supplies, and other operational equipment needed to support healthcare services.

Medical stock control is one of the important components in maintaining the continuity of hospital logistics. Medical goods include medicines, medical devices, and consumable medical supplies that are directly used in patient care. Previous studies showed that ineffective inventory control may increase the risk of stock-out, expired products, and overstock, whereas ABC, VEN, EOQ, and minimum-maximum stock level approaches can support more efficient planning and control of medicines and medical consumables (Arifianto, 2023; Darmawan et al., 2021; Lisni et al., 2021; Mahmudi et al., 2022; Yudianti et al., 2021).

Non-medical stock control also plays a significant role in supporting hospital operational activities. Non-medical goods such as office stationery, cleaning supplies, linens, and household equipment are needed to maintain administrative and service-support efficiency. Previous studies reported that ineffective non-medical logistics management may cause stock shortages, distribution delays, and inaccurate records, while better inventory information systems can improve documentation, coordination, and service support (Fathiha et al., 2025; Izza & Muzid, 2025; Tampubolon et al., 2025; Tawarma & Marlina, 2023).

The novelty of this study lies in its simultaneous examination of medical and non-medical stock control within a private hospital in Sidenreng Rappang Regency. Unlike previous studies that assessed pharmaceutical inventory, medical-equipment logistics, or non-medical logistics separately, this study compares the statistical associations of both stock-control variables with hospital logistics processes using the Chi-square test and risk estimates (Tampubolon et al., 2025; Wahyuddin et al., 2024; Yudianti et al., 2021).

Based on preliminary observations conducted at Adinda Medical Centre Hospital, several problems related to stock control and logistic processes were identified. The hospital still uses a manual recording system, resulting in discrepancies between physical stock and stock records, particularly for non-medical goods. Approximately 60% of non-medical items were not monitored daily, and stock discrepancies reached 5–15% each month. In addition, the limited number of logistics personnel caused stock checking to be conducted only one to two times per month. Medical logistics also experienced procurement delays, where several medical devices required up to three months for procurement, and some medicines experienced stock shortages two to three times per quarter. Distribution systems were also considered inefficient because service units had to collect goods directly from the logistics warehouse, causing queues and delays during busy hours.

These conditions indicate that medical and non-medical stock control at Adinda Medical Centre Hospital has not been implemented optimally and may be associated with the effectiveness of hospital logistics processes. Therefore, this study aimed to examine the associations of medical stock control (X1) and non-medical stock control (X2) with hospital logistics processes (Y) using the Chi-square test and risk estimates at Adinda Medical Centre Hospital, Sidenreng Rappang Regency.

## RESEARCH METHOD

Cross-sectional research is appropriate for analyzing exposure and outcome variables at a single point in time and for identifying statistical relationships among variables in a defined population (Wang & Cheng, 2020). This study employed a quantitative method with a descriptive-analytic, cross-sectional design. Data were collected once from each respondent to examine the associations of medical and non-medical stock control with hospital logistics processes under actual field conditions. The study was conducted at Adinda Medical Centre Hospital, Sidenreng Rappang Regency, from February to April 2026 after obtaining approval from the research supervisor and official permission from the hospital.

The population in this study consisted of all employees involved in the process of requesting, using, and managing medical and non-medical goods at Adinda Medical Centre Hospital, totaling 145 employees. The sample was defined as a portion of the population considered representative of the entire study population. The sample size was calculated using the Slovin formula with a 5% margin of error, resulting in a minimum sample of 106 respondents. A simple random sampling technique was applied to provide equal opportunity for each member of the population to be selected as a respondent. The inclusion criteria consisted of employees involved in the process of requesting, using, or receiving medical and non-medical goods, employees who had worked for at least six months, employees who had collected goods from the logistics warehouse within the last three months, and employees willing to participate in the study. The exclusion criteria included employees who were on leave or inactive during data collection, employees not involved in stock management activities, and respondents who completed the questionnaire incompletely.

Data collection in this study involved primary and secondary data sources. Primary data were obtained directly from respondents using structured questionnaires distributed after obtaining official permission from the hospital. The questionnaire contained items related to medical stock control, non-medical stock control, and hospital logistic processes. Secondary data were obtained from hospital documents, stock reports, goods request records, logistics distribution reports, books, scientific journals, previous studies, and other references relevant to the study variables. The use of multiple data sources aimed to provide a comprehensive understanding of the research problem and strengthen the validity of the findings.

The research instrument used in this study was a structured questionnaire developed based on the research variables. The medical stock control variable assessed inventory planning, inventory supervision, and storage systems for medical goods. The non-medical stock control variable measured inventory planning, supervision, and storage systems for non-medical goods such as office supplies, cleaning equipment, and operational materials. Meanwhile, the dependent variable assessed hospital logistic processes, including procurement, warehousing, distribution, and inventory control systems.

The collected data were processed using SPSS and Microsoft Excel. Data cleaning, coding, and tabulation were conducted to ensure completeness, consistency, and

accuracy. Univariate analysis summarized respondent characteristics and variable distributions using frequencies and percentages. Bivariate analysis used the Chi-square test to examine the association of medical and non-medical stock control with hospital logistics processes. Risk estimates were reported as odds ratios (ORs) with 95% confidence intervals (CIs) when available. Statistical significance was determined at  $p < 0.05$ .

To ensure the quality of the research instrument, validity and reliability testing were conducted before the questionnaire was distributed to respondents. Validity testing was performed using Pearson product-moment correlation at a significance level of 0.05; questionnaire items were considered valid when the calculated  $r$ -value was greater than the  $r$ -table value and the significance value was less than 0.05. Reliability testing was conducted using Cronbach's alpha, with variables considered reliable when the alpha coefficient was greater than 0.70. The instrument testing showed that all indicators for medical stock control, non-medical stock control, and hospital logistic processes met the validity criteria, and the Cronbach's alpha values for each variable exceeded the minimum reliability threshold. Therefore, the questionnaire was considered valid, reliable, and appropriate for use in this study.

The conceptual framework was developed from the premise that effective inventory control supports the continuity of procurement, storage, distribution, and stock monitoring in healthcare institutions (Hezam et al., 2024; Rehman et al., 2023). As shown in Figure 1, medical stock control (X1) and non-medical stock control (X2) are positioned as independent variables associated with hospital logistics processes (Y).

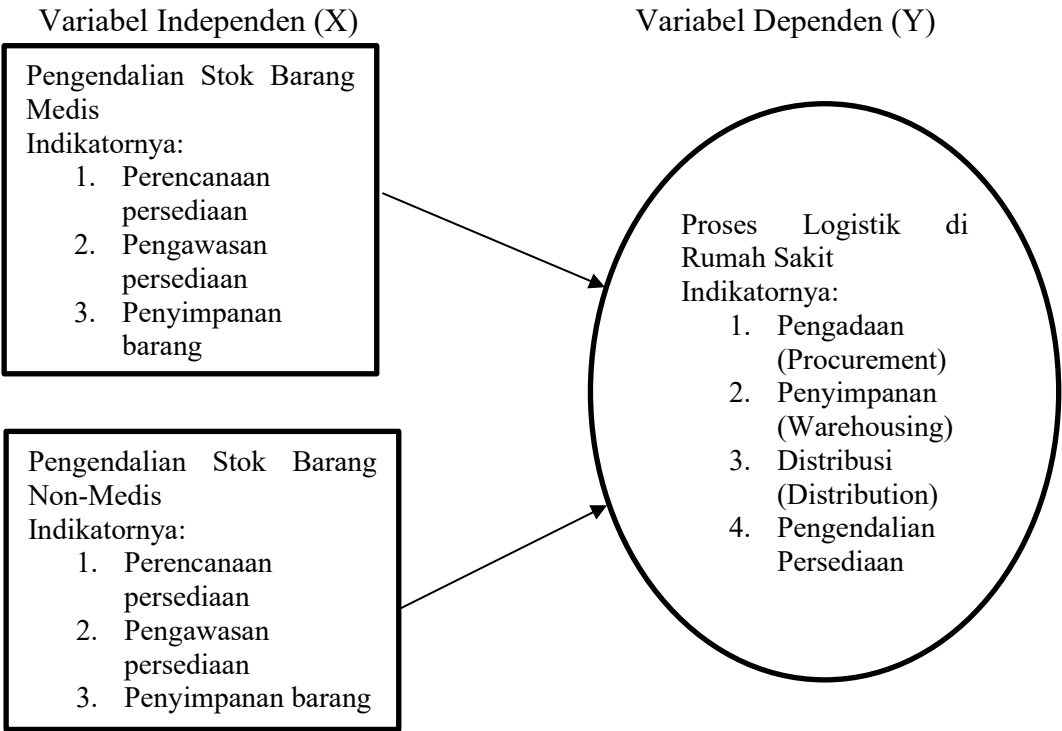


Figure 1. Conceptual Framework

Figure 1 shows that medical and non-medical stock control are assessed through inventory planning, supervision, and storage, whereas hospital logistics processes are reflected in procurement, warehousing, distribution, and inventory control. This framework guided the measurement and analysis of the study variables at Adinda Medical Centre Hospital.

## **RESULTS AND DISCUSSION**

### **Results**

#### **Respondent Characteristics**

Previous hospital logistics studies emphasize that empirical stock data, inventory records, and service-unit responses are important for evaluating whether logistics systems support healthcare service continuity (Darmawan et al., 2021; Wahyuddin et al., 2024; Yudianti et al., 2021). In this study, data were collected from February to April 2026 at Adinda Medical Centre Hospital, Sidenreng Rappang Regency, to examine the associations of medical and non-medical stock control with hospital logistics processes. Results are presented as frequencies, percentages, Chi-square tests, and risk estimates using  $p < 0.05$  as the significance threshold.

The demographic characteristics of respondents provide an overview of employees involved in this study. Based on the inclusion and exclusion criteria, respondent characteristics included gender, age, and work unit at Adinda Medical Centre Hospital. The study involved 106 respondents who were directly involved in the process of requesting, using, and managing medical and non-medical goods within hospital service activities. These respondent characteristics were considered important because they may influence employee understanding and involvement in stock control and logistic processes within the hospital.

Based on gender characteristics, the majority of respondents were female employees, totaling 70 respondents (66.0%), while male respondents accounted for 36 respondents (34.0%). These findings indicate that the study was dominated by female employees. This condition may occur because healthcare service activities at Adinda Medical Centre Hospital involve a larger proportion of female employees, particularly nurses and administrative staff who are actively involved in the use and management of medical and non-medical supplies.

Age distribution showed that most respondents were in the age group of 30–39 years, totaling 57 respondents (53.8%). Meanwhile, respondents aged 20–29 years accounted for 46 respondents (43.4%), and respondents aged over 40 years accounted for 3 respondents (2.8%). These findings indicate that the majority of respondents were within the productive age category and actively involved in hospital operational and logistic activities.

Based on work unit characteristics, the majority of respondents were from the inpatient unit, totaling 37 respondents (34.9%). Furthermore, respondents from the administration unit accounted for 17 respondents (16.0%), followed by the outpatient unit with 15 respondents (14.2%), and the emergency unit with 11 respondents (10.4%). In

addition, respondents from the pharmacy unit totaled 7 respondents (6.6%), security unit accounted for 6 respondents (5.7%), cleaning service unit accounted for 4 respondents (3.8%), while IT, laboratory, and radiology units each accounted for 3 respondents (2.8%). These findings indicate that respondents were distributed across various hospital units directly involved in stock management and logistic activities at Adinda Medical Centre Hospital. The diversity of work units involved in this study provides broader representation regarding the implementation of medical and non-medical stock control in supporting hospital logistic processes. Table 1 summarizes the respondents by gender, age group, and work unit.

Table 1. Respondent Characteristics

| Category               | n  | %    |
|------------------------|----|------|
| Gender                 |    |      |
| Male                   | 36 | 34.0 |
| Female                 | 70 | 66.0 |
| Age (years)            |    |      |
| 20–29                  | 46 | 43.4 |
| 30–39                  | 57 | 53.8 |
| >40                    | 3  | 2.8  |
| Work unit              |    |      |
| Inpatient              | 37 | 34.9 |
| Outpatient             | 15 | 14.2 |
| Emergency department   | 11 | 10.4 |
| Administration         | 17 | 16.0 |
| Pharmacy               | 7  | 6.6  |
| Information technology | 3  | 2.8  |
| Laboratory             | 3  | 2.8  |
| Radiology              | 3  | 2.8  |
| Security               | 6  | 5.7  |
| Cleaning service       | 4  | 3.8  |

*Source: Primary Data Processed, 2026*

Collectively, these demographic characteristics show that the respondents represented service and support units that routinely interact with hospital logistics. This profile is relevant because stock control effectiveness depends not only on warehouse procedures but also on the involvement of users, administrators, and service units in requesting, using, and reporting medical and non-medical goods (Fadillah et al., 2025; Janitra & Djamhuri, 2024).

### Hypothesis Testing

The descriptive analysis showed that 63 respondents (59.4%) reported good medical stock control, 60 respondents (56.6%) reported good non-medical stock control, and 66 respondents (62.3%) reported good hospital logistics processes.

Hypothesis testing used the Chi-square test to examine the association of medical and non-medical stock control with hospital logistics processes. The significance

threshold was  $p < 0.05$ , and the results are presented in Table 2.

Medical stock control was significantly associated with hospital logistics processes ( $p = 0.001$ ). The risk estimate indicated that respondents reporting poor medical stock control had 9.792 times the odds of reporting poor logistics processes compared with those reporting good medical stock control (95% CI: 3.938–24.352). Non-medical stock control was not statistically significant ( $p = 0.061$ ).

Table 2 demonstrates that H1 was supported, whereas H2 was not supported. Medical stock control was the only variable among those tested that showed a statistically significant association with hospital logistics processes.

Table 2. Chi-Square Test and Risk-Estimate Results

| Variable                                               | p-value | OR (95% CI)          | Result          |
|--------------------------------------------------------|---------|----------------------|-----------------|
| Medical stock control → hospital logistics process     | 0.001   | 9.792 (3.938–24.352) | Significant     |
| Non-medical stock control → hospital logistics process | 0.061   | Not reported         | Not significant |

Source: Primary Data Processed, 2026

As shown in Table 2, effective medical stock control is more directly related to the continuity of hospital services because medicines, medical devices, and consumable supplies are required for patient care. Non-medical stock remains operationally important, but its association did not reach statistical significance in this sample.

This finding is consistent with studies emphasizing that accurate recording, routine monitoring, and demand-based procurement reduce stock-outs, overstock, expiration, and distribution delays for medical supplies (Arifianto, 2023; Darmawan et al., 2021; Lisni et al., 2021; Mahmudi et al., 2022; Yudianti et al., 2021).

Accordingly, hospital logistics improvement should prioritize medical stock control while continuing to strengthen non-medical stock planning, documentation, and coordination.

## Discussion

### Hypothesis 1: Medical Stock Control Has a Significant Effect on Hospital Logistic Processes

Medical stock control was significantly associated with hospital logistics processes ( $p = 0.001$ ). This result supports previous evidence that the availability of medicines, medical devices, and consumable medical supplies depends on accurate planning, procurement, recording, storage, monitoring, and distribution (Darmawan et al., 2021; Mahmudi et al., 2022; Yudianti et al., 2021).

Effective medical stock control helps hospitals minimize stock-outs, overstock, expired products, and delays in service delivery. Inventory classification, minimum–maximum stock levels, and demand-based procurement can improve the efficiency and responsiveness of healthcare supply chains (Arifianto, 2023; Lisni et al., 2021; Rehman et al., 2023).

The OR of 9.792 (95% CI: 3.938–24.352) indicates a strong association between poor medical stock control and poor hospital logistics processes. Although the cross-sectional design does not establish causality, the magnitude of the association highlights the operational risks created by weak planning, inaccurate records, and irregular stock monitoring.

The findings are also consistent with Janitra and Djamhuri (2024), who emphasized the role of information systems and internal control in medical procurement, and with Wahyuddin et al. (2024), who identified planning, procurement, storage, distribution, and control as essential components of medical-equipment logistics.

The practical implication is that hospital management should establish routine inventory checks, reconcile physical and recorded stock, define reorder points, and strengthen coordination between logistics personnel and service units. These measures can reduce discrepancies and operational disruption (Fadillah et al., 2025; Winardi & Saifudin, 2021).

## **Hypothesis 2: Non-Medical Stock Control Does Not Have a Significant Effect on Hospital Logistic Processes**

Non-medical stock control was not significantly associated with hospital logistics processes ( $p = 0.061$ ). Although better non-medical stock control tended to accompany smoother logistics activities, the observed relationship did not meet the predefined significance threshold.

Non-medical supplies—including office materials, cleaning equipment, linen, and household items—remain necessary for administrative, environmental, and support functions. Previous studies have linked weaknesses in non-medical logistics to inaccurate records, limited monitoring, delayed distribution, and insufficient information systems (Fathiha et al., 2025; Izza & Muzid, 2025; Tampubolon et al., 2025; Tawarma & Marlina, 2023).

A plausible explanation is that medical goods have a more immediate and direct connection to patient care, whereas some non-medical items have lower urgency, broader substitution options, or more flexible patterns of use. Consequently, disruptions in medical stock may be perceived more quickly by service units.

Nevertheless, non-medical stock should not be neglected. Inventory availability can affect service-user satisfaction, while accurate data and timely distribution support overall supply-chain efficiency (Bimenyimana & Irechukwu, 2023; Hezam et al., 2024).

The study contributes by examining medical and non-medical stock control simultaneously in a private-hospital context. Previous studies generally assessed pharmaceutical inventory, medical-equipment logistics, non-medical logistics, or logistics information systems separately (Izza & Muzid, 2025; Janitra & Djamhuri, 2024; Tampubolon et al., 2025; Wahyuddin et al., 2024; Yudianti et al., 2021).

These findings are useful for hospital management because they support prioritizing medical stock control while maintaining systematic non-medical stock management. Integrated recording, timely procurement, warehouse monitoring, and coordinated



distribution can improve operational efficiency, healthcare service continuity, and patient satisfaction (Bimenyimana & Irechukwu, 2023; Fadillah et al., 2025; Janitra & Djamhuri, 2024).

## CONCLUSION

Medical stock control was significantly associated with hospital logistics processes at Adinda Medical Centre Hospital, whereas non-medical stock control was not statistically significant. Poor medical stock control was associated with substantially higher odds of poor logistics processes. Hospital management should therefore prioritize accurate demand planning, stock recording, routine monitoring, appropriate storage, timely procurement, and coordinated distribution of medical goods. Non-medical stock management should also be strengthened to support administrative efficiency, cleanliness, safety, and service-unit operations. Because the study used a cross-sectional design and self-reported questionnaire data, future research should incorporate longitudinal observations and objective inventory indicators.

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