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Factors Influencing Stockouts of Vital Category Drugs in the Pharmacy Facility, 2024

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Abstract
Introduction: *Stockouts of vital medicines remain a critical issue in hospitals, particularly when drug availability drops to zero in pharmacy facilities. Although supplies may still exist elsewhere, it often takes up to a week for replenishment, potentially jeopardizing patient care. The "vital" category includes life-saving drugs whose unavailability is unacceptable. In Timor-Leste, stockout rates reported by the Ministry of Health were 20% in 2020, 22% in 2021, 19% in 2022, and rose sharply to 43% in 2023.* ***Objective:*** *This study aims to identify the factors contributing to stockouts of vital medicines at the Guido Valadares National Hospital (HNGV) Pharmacy Facility.* ***Method:*** *One of the methods used in this research is a quantitative analytical approach with a cross-sectional study design. The sampling technique employed is probability sampling, which approximates the total sample. Data analysis was conducted using the SPSS program to perform a Spearman Rank Correlation.* ***Result and Discussion:*** *Results revealed that human resources (p = 0.00, r = 0.416), medicine management (p = 0.00, r = 0.472), and patient volume (p = 0.00, r = 0.600) significantly influence stockouts.* ***Conclusion:*** *To eliminate the problem of stockouts in Timor-Leste, health professionals must pay attention to the factors influencing stockouts. Additionally, professional medication control services should plan medication purchases before supplies run out.*
Keywords: Influencing Factors; Stockout; Vital Category Drugs;

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Introduction

According to the WHO, medicine stockouts are a major problem affecting the world. Stockouts reduce the capacity of national health systems to ensure patients' access to pharmacological treatment (Zuma, 2022). Medicine shortages have a significant impact on patients, preventing them from receiving necessary treatments and sometimes leading to death (AlRuthia et al., 2017). The cause of stockouts is when medicines in hospitals are unavailable or at zero stock. However, this does not mean that the medicines are completely gone, but it can take up to a week for the medicine to be restocked from the warehouse. Various factors related to medicine management, including selection, planning, budgeting, procurement, and distribution, contribute to these shortages (Jenzer et al., 2019). Drug stockouts make it difficult to meet the therapeutic needs of patients (Zwaida, Beauregard, & Elarroudi, 2019)

According to data from the Academy of Managed Care Pharmacy (AMCP), the reality of medicine shortages is highlighted by the responses of Heads of Pharmacy Departments. They found that empty medicines could cause 55.5% of problems, negligence 54.8%, medication dose failure 34.8%, and wrong medication failure 70.8%. The results of this study show that the percentage of stockouts is alarmingly high, leading to significant consequences for patient care. Drug stockouts have serious consequences for patients, including changes in treatment plans and medication errors, which can ultimately lead to death. In 2019, 56% of U.S. hospitals reported that changes in patient care or treatment were insufficient due to the lack of drugs, while approximately 37% of hospitals reported similar concerns. A study of 2,136 hospitals in 36 European countries revealed that 95% considered the lack of medicines/stockouts to be a significant patient care problem (Phuong, Penm, Chaar, Oldfield, & Moles, 2019), (Deng et al., 2023)

Research conducted in Makassar Hospital, Indonesia, reported a stockout rate of 19.1% (Anisah, 2017). The study emphasized that to address this issue, improvements are needed in drug logistics management, starting from planning, procurement, budgeting, storage, and distribution, as well as better reporting and monitoring.

In Timor-Leste, stockouts of medicines have been a recurring issue. Data from the Ministry of Health showed that in 2020, stockouts were at 20%, in 2021 at 22%, and in 2022 at 19%. However, in 2023, stockouts significantly increased to 43%, leading to poor treatment outcomes and even deaths among patients (INFPM.TL, 2024). According to the stockout report from January to June 2024 at the National Hospital Guido Valadares, the total stockout rate was 50%. The highest stockout percentage occurred in January, with 25%, while the lowest was 2% in June.

The causes of stockouts are multifaceted. One major factor is the lack of a proper planning system, where the process from the initial planning phase to the procurement of medicines is poorly coordinated (Bilal, Bititci, & Fenta, 2024), (Pristiyantoro, Retno, & Lestari, 2023). Financial insufficiencies, delays in budget approval, and difficulties in manufacturing, such as a lack of raw materials, also contribute to medicine shortages.

Ineffective medicines can worsen health conditions, and the procurement process often lacks attention to proper control and management of drugs in storage (Jenzer et al., 2019), (Hanjaya, Fitriani, & Syamsul, 2021)

Timor-Leste does not have its own pharmaceutical factory and must import medicines from other countries. The long distance and delays in the delivery of medicines exacerbate the stockout issue. To reduce stockouts in Timor-Leste, the Ministry of Health needs to address the root causes of these shortages. The Ministry of Health must adhere to the planned processes, ensure that budget approvals align with the actual requirements, and increase the number of health professionals to monitor and manage medicines in storage. It is essential to process orders for missing medications quickly and establish pharmaceutical factories in Timor-Leste to minimize the reliance on imports. The Ministry of Health must work diligently, collaborating with other stakeholders to address these issues and provide effective care to the population.

Method

This research uses an analytical quantitative method with a cross-sectional study design. The study was conducted at Guido Valadares National Hospital in September 2024, with the population consisting of health professionals working in pharmacy facilities. The sample for this research included 50 health professionals from the pharmacy facilities. Probability sampling was used to approximate the total sample. The independent variables in this research are human resource factors, medicine management, and the increasing number of patients, while the dependent variable is the stockout of medicines, categorized as vital. Data collection instruments included questionnaires and primary data. Bivariate data analysis was conducted using the SPSS program to analyze Spearman's Rank Correlation.

Result and Discussion

Result

1. Respondent Characteristics

Table 1

Frequency distribution of respondent characteristics based on gender, age, education level, and profession

No	Gender	Frequency	Percent (%)
1	Female	22	44
2	Male	28	56
Total		50	100
No	**Age**	**Frequency**	**Percent (%)**
1	26-35	27	54
2	36-45	16	32
3	46-55	6	12
4	>55	1	2
Total		50	100
No	**Education Level**	**Frequency**	**Percent (%)**
1	Pre-Secondary	1	2
2	Bachelor	25	50
3	Degree	24	48
Total		50	100
No	**Occupation**	**Frequency**	**Percent (%)**
1	Warehouse Staff	1	2
2	Nurse	2	4
3	Administration	1	2
4	Pharmacist	46	92
Total		50	100

Based on Table 1 above, the distribution of respondent characteristics shows that there are 50 health professionals in total. The majority are male, with a frequency of 28 (56%). The age group most represented is 26-35, with a frequency of 27 (54%). The majority hold a bachelor's degree, with a frequency of 25 (50%). The most common profession is pharmacist, with a frequency of 46 (92%).

2. Univariable Analysis

Table 2

Frequency distribution based on variable factors influencing the stockout of vital category medicines

No	Human Resources	Frequency	Percent (%)
1	Enough	17	34
2	Enough	21	42
3	Not Enough	12	24
Total		50	100
No	**Medication Management**	**Frequency**	**Percent (%)**
1	Good	17	34
2	Average	19	38
3	Less	14	28
Total		50	100
No	**Number of Patients**	**Frequency**	**Percent (%)**
1	Less	17	34
2	Enough	22	44
3	Increased	11	22
Total		50	100
No	**Stock Out**	**Frequency**	**Percent (%)**
1	Never Happened	16	32
2	Happened enough	22	44
3	Happened rarely	12	24
Total		50	100
No	**Medication ITEMS 50**	**Frequency *Stock Out***	**Percent (%)**
1	January	25	50%
2	February	9	18%
3	March	8	16%
4	April	3	6%
5	May	3	6%
6	June	2	4%
Total		**50**	**100**

Based on Table 2 above, the results show that, out of a total sample of 50, the variables influencing the stockout of vital category medicines show that the majority were in the “Enough” human resources category, with a frequency of 21 (42%). Medication management was mostly categorized as "Average," with a frequency of 19 (38%). Most patients were categorized as "Enough," with a frequency of 22 (44%). Most medicines experienced stockouts in the "Happened Enough" category, with a frequency of 22 (44%). The majority of stockouts for vital category drugs occurred in January, with a frequency of 25 (50%).

3. Bivariate Analysis

Table 3

Analysis of human resource factors and the occurrence of stockouts of vital category medicines in the pharmacy room

Human Resource		Stock Out			Total	*Correlation*	
		Did not happen	Happen average	Happened strongly		p-*value*	*Spearman rank*
Enough	N	11	3	3	17	0.03	0.416**
	%	22%	6%	6%	34%		
Enough average	N	2	17	2	21		
	%	4%	34%	4%	42%		
Not enough	N	3	2	7	12		
	%	6%	4%	14%	24%		
Total	N	16	22	12	50		
	%	32%	44%	24%	100		

Based on the results of the Spearman rank correlation statistical test, the p-value = 0.03 is lower than α = 0.05, indicating that human resource factors significantly influence the occurrence of stockouts of vital category medicines in the HNGV Pharmacy warehouse. The correlation coefficient of 0.416** falls within the 0.40–0.59 range, which indicates a strong correlation.

Table 4

Analysis of medicine management factors and the occurrence of stockouts of vital category medicines

Drug Management		Stock Out			Total	*Correlation*	
		Did not happen	Happen average	Happened Strongly		p-*value*	*Spearman rank*
Good	N	11	4	2	17	0.01	0.472**
	%	22%	8%	4%	34%		
Average	N	2	15	2	19		
	%	4%	30%	4%	38%		
Not good	N	3	3	8	14		
	%	6%	6%	16%	28%		
Total	N	16	22	12	50		
	%	32%	44%	24%	100%		

Based on the results of the Spearman rank correlation statistical test, the p-value = 0.01 is lower than α = 0.05, indicating that medicine management factors significantly influence the occurrence of stockouts of vital category medicines in the HNGV Pharmacy warehouse. The correlation coefficient of 0.472** falls within the 0.40–0.59 range, indicating a strong correlation.

Table 5
Factor analysis of the number of patients and the occurrence of stockouts of vital category medicines in the pharmacy room

Number of patients		Stock Out			Total	*Correlation*	
		Did not happen	Happen average	Happened Strongly		p-*value*	*Spearman rank*
Minus	N	12	3	2	17	0.00	0.600**
	%	24%	6%	4%	34%		
Average	N	3	17	2	22		
	%	6%	34%	4%	44%		
Increase	N	1	2	8	11		
	%	2%	4%	16%	22%		
Total	N	16	22	12	50		
	%	32%	44%	24%	100%		

Based on the results of the Spearman rank correlation statistical test, the analysis showed that the significance level (p-value = 0.00) is lower than α = 0.05, which means that medicine management factors have a significant influence on the occurrence of stockouts of vital category medicines in the Pharmacy Warehouse at HNGV. Additionally, the correlation coefficient value of 0.600** falls within the 0.60-0.79 range, indicating a strong correlation.

Discussion

Respondent Characteristics

As shown in Table 1, the distribution of respondent characteristics reveals that out of 50 health professionals, the majority are male (28 respondents, 56%). The age group most represented is 26-35 years, with 27 respondents (54%). The majority hold a bachelor's degree, with 25 respondents (50%). The most common profession is pharmacist, with 46 respondents (92%).

According to the results of a study by researcher Is Hadidah (2020), of 50 respondents, most health professionals were men (28 respondents, 56%). In terms of age, most respondents were 28-35 years old, with 22 individuals (31.42%). Regarding education level, the majority were pharmacists, with 25 respondents (50%).

The researcher concluded that men are at the highest risk of causing stockouts of vital medicines, due to a lack of attention to controlling medicines. Additionally, a bachelor's degree in education may influence stockouts, as it could indicate insufficient knowledge in medicine management.

Bivariate Analysis

Influence of Human Resource Factors on the Occurrence of Stockouts in Vital Category Medicines.

Based on Table 3 above, the results of the Spearman rank correlation statistical test analysis showed that the p-value (0.03) is lower than α = 0.05, meaning that human resource factors significantly influence the occurrence of stockouts of vital category

medicines in the HNGV Pharmacy warehouse. The coefficient correlation value is 0.416**, which falls within the 0.40–0.59 range, indicating a strong correlation. This result is similar to the research conducted by (Hadidah & Rochmah, 2016), where the Spearman rank analysis showed that the p-value (0.00) is smaller than α = 0.05, indicating a significant relationship between human resources and drug stockouts. Human resources are a key factor influencing stockouts; poorly planned and uncontrolled management of medicines contributes to stockouts (Hayes et al., 2019).

The researcher concludes that adequate human resources are essential for preventing stockouts, as health professionals closely monitor and manage medicine supplies to avoid shortages. However, when human resources are insufficient, the lack of control by health professionals contributes to stockouts. Influence of Drug Management Factors on the Occurrence of Stockouts in Vital Category Medicines.

Based on Table 4 above, the results of the Spearman rank correlation statistical test analysis showed that the p-value (0.01) is lower than α = 0.05, meaning that drug management factors significantly influence the occurrence of stockouts of vital category medicines in the HNGV Pharmacy warehouse. The coefficient correlation value is 0.472**, which falls within the 0.40–0.59 range, indicating a strong correlation. This result is consistent with the research by Diah Nurcahya (2016), where the Spearman rank analysis showed that the p-value (0.00) is smaller than α = 0.05, indicating a significant relationship between medicine management and stockouts.

Medicine management is crucial in controlling stock levels. Pharmaceutical supply management, including planning, procurement, storage, and service, must adhere to relevant statutory provisions. Drugs should be dispensed using the FIFO (first in, first out) system, where the first item to arrive is the first to be used, and the FEFO (first expire, first out) system ensures that products nearing their expiration date are used first.

Therefore, the researcher concludes that good medicine management practices help prevent stockouts, as health professionals pay close attention to managing supplies. In contrast, poor management can lead to stockouts due to inadequate oversight by health professionals. Influence of Patient Numbers on the Occurrence of Stockouts in Vital Category Medicines.

Based on Table 5 above, the results of the Spearman rank correlation statistical test showed that the p-value (0.00) is lower than α (0.05), indicating that medicine management factors have a significant influence on the occurrence of stockouts of vital category medicines in the HNGV Pharmacy warehouse. The correlation coefficient value (0.600) falls within the 0.60-0.79 range, which indicates a strong correlation. This result is like the research conducted by Imas Sayidati Hadidah (2018), where the Spearman rank analysis also showed a significant level p-value of 0.00, lower than α = 0.05, suggesting a significant relationship between the number of patients and drug stockouts.

An increased number of patients correlates with a greater need for medicines, ensuring that patients receive the necessary medications safely and adequately. Therefore, the researcher concluded that the increase in the number of patients influences stockouts due to the insufficient control of medicine management by health professionals. When

the number of patients decreases, health professionals can provide better attention to medicine management, preventing stockouts during the treatment process.

Conclusions

Based on the results of this research, it is concluded that human resource factors, medicine management factors, and the increasing number of patients all have a strong significant influence on the occurrence of stockouts at the National Hospital Guido Valadares**.**

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