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Stock Management in the Drug Warehouse of Maritime Health Office in Indonesia

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Abstract:- Good drug stock management ensures the availability of drug stock in health service units. This study aims to see the correlation between logistics activities and good drug stock management. By using quantitative descriptive method with multiple linear regression. The population of this study were employees of the Maritime Occupational Health Office, with a saturated sampling method of 90 respondents. Primary data were obtained from survey results while secondary data were obtained from the office and literature review. Data analysis includes validity test, reliability test, normality test, linearity, coefficient of determination and t-test. Based on the results of the study, it can be concluded that drug planning to good drug management has a positive and significance correlation. drug procurement to good drug management has a positive and significance correlation. drug receipt & storage to good drug management has a positive and significance correlation. drug distribution to good drug management has a positive and significance correlation. supervision &control togood drug management has a positive and significance correlation. drug planning, drug procurement, drug receipt & storage, drug distribution, and supervision & controlsimultaneously have a positive and significance correlation. So it can be concluded that the logistics activities in the form of planning, procurement, receiving & storage, distribution, supervision & control of drugs have a correlation to the management of drug stock either partially or simultaneously. Therefore, the availability of drug stock can be raised by improving the drug stock management process.

Keyword:- *good drug stock management, drug warehouse, health service unit.*

I. INTRODUCTION

Health problems have become a basic need for society. Alongwith the increase in the standard of living of the community, the demand for the quality of health services has alsobeenincreasing. One of the important things in sustaining the quality of health services is the success in maintaining the availability of drugs, not only in quantity but also in the process of procurement and delivery as well as the treatment of the drugs in order to be safe. For such purposes, it is necessary to handle the process inan appropriate, effective and efficient way in an ongoing basis which includes the stages of planning, procurement, storage, distribution and use of drugs by utilizing available sources. The main objective of drug management is the availability of drugs with good quality, evenly distributed, with the types and quantities in accordance with the needs of basic health services[1]

The Maritime Work Health Center is a technical implementing unit in the health sector under the Directorate General of Sea Transportation of the Ministry of Transportation of the Republic of Indonesia which provides health services. From the Drug Storage Efficiency Data, it was found that the percentage of achievement in drug storage efficiency was still below the standard. This condition is mainly suspected by deficiencies in management practices, for example the problem of drug planning that does not use forecasting methods and does not care about safety stock, causing excess and damage to several types of drugs. Budget allocations for drug procurement that are not in accordance with the needs, is also suspected to be the cause of drug availability problems. In some cases it is still found that the drug receipt process is not carried out on working days, the drug is not received by the responsible Warehouse Officer, the drug management document is incomplete and according to the rules, the drug storage is not neat, the FEFO (First Expired First Out) storage method has not been done optimally, and so on. Distribution of drugs that have not been carried out administratively and not in accordance with the rules of SOP (Standard Operating Procedure) are also a very crucial problem. Other problems are stock taking activities that are not carried out regularly, monitoring and control which havenot been optimal, and the implementation of inventory that has not been optimally integrated between pharmacies and drug warehouses.

This study aims to analyze correlation between planning, procurement, receipt and storage, distribution, supervision and control of drugs partially and simultaneously to management of drug stocks in the drug warehouse of the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia.

II. LITERATURE REVIEW

A. Logistics Management

Several experts and researchers have concluded that logistics management is a management system as the subordinateofthe Supply Chain Management study whose activities include planning, storage, distribution of goods and related services efficiently and effectively to meet customer needs.

B. Warehousing Management

Warehouses can be viewed as temporary storage places to store inventory materials and as a buffer in the supply chain.

According to[2]warehouse is a special facility that is permanent, designed to achieve the target level of service with the lowest total cost. Warehousing management aims to control warehousing activities, so as to reduce warehouse costs, enable the process of taking and entering goods into the warehouse effectively and efficiently, as well as providing convenience and accuracy of inventory information in the warehouse.

C. Drug Management

According to[3] drug management is a series of activities involving aspects of selection, procurement, storage and distribution of drugs that are managed optimally to ensure the accuracy of the number and type of pharmaceutical supplies by utilizing available sources such as personnel, funds, facilities. and software (methods and procedures) in an effort to achieve the goals set at various levels of the work unit.

Drug management is a pharmaceutical activity that starts from planning, requesting, receiving, storing, distributing, recording and reporting as well as monitoring and evaluating[4].

Based on this understanding, the researcher concludes that in the drug management cycle there are basic functions including selection, planning, demand, procurement, receipt and storage, distribution, supervision and control of drugs that are interrelated in realizing good drug stock management supported by the organization, availability of funding, information management and human resource development in it.

D. Medication Planning

Drug planning is an activity to determine the amount and type of drug, time and efficiency in drug supply. Planning is done to avoid drug shortages by using an accountable method.

In drug planning, in addition to forecasting needs, it is necessary to calculate drug safety stock. The purpose of the safety stock calculation is to provide stock security to avoid stagnation or stockout of drugs, because this can cause patients not to get drugs as the end result of health services.

As stated by[5] that drug planning needs to consider safety stock, lead time, remaining stock, disease patterns.The definition of safety stock according to [6] is the company's inventory level during the lead time or delivery of the ordered goods.According to [4]concerning Standards for Pharmaceutical Services in Hospitals, there are planning guidelines that consider the available budget, setting priorities, remaining inventory, past period usage data, waiting time for orders and development plans.

E. Drug Procurement

Procurement is aprocess or activity to meet operational needs that have been defined in the planning function. The process of implementing the procurement plan starts from the planning function and determining needs, as well as financing the plan in the budgeting function.[7].

Determining the real need for goods and services requires the adequacy of the budget and priority needs. The allocation of funds for the procurement of drugs must be adjusted to the needs so that the drugs received are in accordance with what is procured and needed. Therefore, it is necessary to identify the need for goods.

F. Drug Receipt and Storage

The warehouse officer is obliged to check the delivered drug including the number of packages/crate, type and amount of drug, form of drug and expiration date in accordance with the Order Letter document. The frequency of reception must be properly scheduled so that officers can prepare themselves for checking.

The preparation of the drug is carried out after the drug acceptance process is carried out. This is done to facilitate the search and control as well as to maintain the quality of the drug and is carried out in accordance with established procedures, both alphabetically, frequency of use and estimated volume.

G. Drug Distribution

Distribution is the process of expenditure and distribution of from the warehouse to be handed over to those who logistics and equipment are entitled, through an accountable handover process, and by a proof of handover. Both

processes and supporting documents must be met in accordance with Standard Operating Procedures (SOP).

Drug distribution activities include determining the frequency of distribution, determining the number of drugs and types of drugs to be given and carrying out drug delivery[8].

H. Drug Monitoring and Control

Supervision and control is a process of monitoring activities for the movement of incoming and outgoing logistics and equipment from and to the warehouse so that inventory and placement can be known quickly, precisely and accurately and accountably.

Supervision and control activities consist of inventory inspection, recording and reporting activities. Control of lost drugs, damaged drugs and expired drugs is also carried out to maintain the availability of drugs and the safety of drug use by patients.

I. Good Drug Management

Drug management in hospitals includes the stages of planning, procurement, storage, distribution, and use which are interrelated with each other, so they must be well coordinated that each can function optimally. The disconnection between each stage will result in inefficient supply and use of existing drugs[9].

As stated by[10] service quality is an important policy to maintain customer support and build a large base.

The benchmarks for assessing the success of inventory management according to[11], include:

- The TOR ratio; It is the comparison between the value of using or selling inventory to the total value of inventory. Higher TOR means faster inventory turnover, higher investment utilization or more efficient;
- The ratio of inventory levels; It is the ratio between the total value of inventory to the value of inventory usage per month;
- The ratio of revenue to inventory; It is used for benchmarking performance as a competitive advantage and efficiency, because revenue is the company's goals and targets;
- Service level ratio; It is the percentage comparison between the number of requests for goods that can be met with the total number of requests;
- Stock accuracy ratio; It is the percentage of comparison between the accuracy of the amount of inventory recorded in the books and the actual amount in the warehouse;
- The ratio of surplus inventory; It is the ratio between the surplus inventory value and the total inventory value, is expressed as a percentage;
- Dead inventory ratio; It is the ratio between the value of dead inventory items and the total inventory value stated as a percentage.

III. RESEARCH METHODOLOGY

This study uses a quantitative descriptive method with multiple linear regression. The population of this research is 90 employees at The Maritime Work Health Center of technical implementing unit in the health sector. Through the saturated sampling method, the number of samples is set at 90 respondents. Data collection techniques are interview, observation and questionnaire method. Primary data were obtained from the results of the questionnaire, then the Likert Scale developed by Renis Likert was used to measure respondents' perceptions. While secondary data in the form of documents, literature review and the results of observations or interviews. Data were analysedthroughvalidity test, reliability test, normality test, linearity, coefficient of determination and t-test.

IV. RESULTS AND DISCUSSION

The data used as the basis for the description of this study are generated from questionnaire scores on drug planning (X1), drug procurement (X2), drug receipt & storage (X3), drug distribution (X4), supervision & control (X5), and good drug management. (Y).

All data were processed using descriptive statistical techniques consisting of the mean (mean), median value (median), frequently occurring value (mode), standard deviation, frequency distribution (variance), minimum and maximum values. , the range between the minimum and maximum values (range), data diversity (sample variance), total value (sum), completed with a histogram graph of the research variables.

A. Research Instrument Test

Based on the results of the validity test with N = 90-2 (df = 88) then yieldRtable value is 0.2072, it is concluded that all instruments of variables X1, X2, X3, X4, X5 and Y produce Rcount>Rtable, meaning that all items of variables are declared valid.

From the reliability test, it was found that Cronbach's Alpha 0.60 , so that all items are reliable and feasible to be used as a research instrument.

B. Test Requirements Analysis

This requirement must be met before testing the hypothesis for regression analysis, which is known as the classical assumption. Test requirements analysis carried out in this study is the Normality Test. The resulting prediction model will be BLUE (Best Linear Unbiased Estimation).

Requirements testing was carried out with SPSS version 24.0.

Normality test is useful to see whether the data has a normal distributioncriteria or not. Normality test in this study uses graphic analysis. Graph analysis is in the form of histogram graphs and Probability Plot graphs or some call it the P-Plot test. Where the histogram graph is said to be normal if the data distribution is bell shaped, not skewed to the left or not skewed to the right. Normality test with histogram where the histogram graph is said to be normal if the data distribution is bell shaped, not skewed to the left or not skewed to the right, and the probability plot (p-plot test) is said to be normal if it can see the spread of items on the diagonal line on the chart.

C. Hypothesis testing

a) Drug planning has a positive correlation with good drug management.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.596[a]	0,355	0,348	2,560
a. Predictors: (Constant), x1				
b. Dependent Variable: y				

Table 1: Significance Test Of Drug Planning (X1) On Good Drug Management (Y) - Model Summary[B]

Based on the results of the analysis, as exhibited in table 1, the correlation statistics between drug planning and good drug management shows the numberof 0.596, with the R square of 0.355. It means that 35.50% of the changing in drug management performance is contributed by drug planning. The impact is also significant which is proved by the significance number of 0.045, then the proposed hypothesis is proven acceptable.

This shows that a good drug planning process can make drug management run well, resulting in the availability of sufficient drug stock. Planning must use the need forecasting method, not only using the previous year's drug demand data, so thedemand can be informed to the health service unit. The need of drugs in the previous year is animportant informationthat need to be considered in compiling the number and types in the following year. The sorting of types of drugs from the previous year affects the priority of the types of drugs that will be planned for the following year.

b) Drug Procurement has a positive correlation with good drug management.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.630[a]	0,397	0,390	2,474
a. Predictors: (Constant), x2				
b. Dependent Variable: y				

TABLE 2. SIGNIFICANCE TEST OF DRUG PROCUREMENT(X2) ON GOOD DRUG MANAGEMENT (Y) - MODEL SUMMARY[b]

The table 1 shows the results of the analysis of the correlation between drug procurementand good drug management. From the table, it shows the correlation score is 0.630, with the R square of 0.397. It means that 39.70% of the improvement in drug management performance is contributed by drug procurement. The impact is also significant which is proved by the significance number of 0.05, then the proposed hypothesis is proven true.

This shows that the drug procurement process in accordance with the provisions and budget allocation that adjusts to drug needs has proven to be able to improve the performance of good drug management.

c) Drug Receipt and storage has a positive with good drug management.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.585[a]	0,343	0,335	2,584
a. Predictors: (Constant), x3				
b. Dependent Variable: y				

TABLE 3: SIGNIFICANCE TEST OF DRUG RECEIPT AND STORAGE (X3) ON GOOD DRUG MANAGEMENT (Y) - MODEL SUMMARY[B]

The results of the analysis as shown in table 3 explain thatthe correlation statistics between drug planning and good drug management shows the numberof 0.585, with the R square of 0.343. In other words, that 34.30% of the changing in drug management performance is contributed by drug planning. The impact is also significant with significancescore of 0.020, then the proposed hypothesis is proven true.

The better the process of receiving & storing drugs, the better the management of drugs at the Shipping Work Health Center will be. The drug checking process is carried out before the goods (drugs) are received. Checks are carried out regarding the suitability of the quantity and type ordered.

Checks are also carried out regarding the condition of the drug, the expiration period and the completeness of the supporting documents, so as to facilitate the management of the drug stock. Storage must be neatly arranged according to storage procedures.

d) Drug distribution has a positive correlation with good drug management.
Based on the results of the analysis, obtained statistical correlation is o,765 and the R square is 0.586. this means that 58.6% improvement of good drug management is contributed by the improvement of drug distribution system.The significance number was 0.000. Thus, the proposed hypothesis can be accepted.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.765[a]	0,586	0,581	2,051
a. Predictors: (Constant), x4				
b. Dependent Variable: y				

TABLE 4: SIGNIFICANCE TEST OF DRUG DISTRIBUTION (X4) ON GOOD DRUG MANAGEMENT (Y) - MODEL SUMMARY[B]

The results of this analysis indicate that the distribution of drugs has a directcorrelation with good drug management at the Shipping Health Center. The drug distribution processwhich is carried out according to standard operating procedures (SOP) and applicable rules, can make the process easier for officers and leaders as policy makers, so as to ensure an improvement in drug management performance.

e) Drug supervision & control has a positive correlation with good drug management.
The statistical correlations were obtained between drug control & supervision to improving drug management performance. The result of the computation yield correlation statistic of 0.735 and the result of the calculation of R square shows the number of 0.541. Thus, it can be interpreted that the improvement in the performance of good drug management was contributed by the performance of drug supervision and control by 54.1%. The proposed hypothesis is proven true because statistical calculations show a significance value of 0.004.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.735[a]	0,541	0,536	2,159
a. Predictors: (Constant), x5				
b. Dependent Variable: y				

TABLE 5: SIGNIFICANCE TEST OF DRUG SUPERVISION & CONTROL (X5) ON GOOD DRUG MANAGEMENT (Y) - MODEL SUMMARY[B]

The results of statistical analysis show that the better the supervision and control of drugs, the better the performance of drug management at the Shipping Health Center. Supervision and control are important activities in drug management because if done properly, the availability of the amount, type and condition of the drug will be maintained.

f) Planning, procurement, receiving & storage, distribution, supervision & control of drugs simultaneously have a positive correlation with good drug management practices.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.830[a]	0,688	0,670	1,821
a. Predictors: (Constant), x5, x2, x1, x3, x4				
b. Dependent Variable: y				

TABLE 6: CORRELATION OF PLANNING (X1), PROCUREMENT (X2), RECEIPT & STORAGE (X3), DISTRIBUTION (X4), DRUG MONITORING & CONTROL (X5) SIMULTANEOUSLY ON GOOD DRUG MANAGEMENT (Y)

The results of the analysis demonstrate the correlation number, as shown in table 6. The four variables simultaneously have positive correlation with a contribution of 0.670, meaning that 67% of the improvement in drug management performance is contributed by the 4 variables. Meanwhile, a significant test shows thefigure of 0.000, this indicates that the influence given by the 4 variables is significant. This means that the proposed hypothesis is proven true and can be accepted.

The results of variable relationship analysis show that if the performance improvement is carried out jointly between the variables of planning, procurement, receipt & storage, distribution, supervision & control of drugs, the performance of drug management at the Shipping Health Center will be even better, with contribution of 67%. The contribution of other factors not examined in this study was 33%. other factors from variables that were not included in the study that

may have an effect include recording & reporting factors, drug maintenance, drug deletion, and others.

Table 7 below shows the results of statistical analysis related to regression coefficient and the significance of all variables: Planning (X1), Procurement (X2), Receipt & Storage (X3), Distribution (X4), Drug Monitoring & Control (X5) andGood Drug Management (Y)

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	-0,513	2,568		-0,200	0,842
	x1	0,231	0,114	0,201	2,036	0,045
	x2	0,221	0,114	0,183	1,938	0,050
	x3	-0,294	0,124	-0,258	-2,366	0,020
	x4	0,476	0,113	0,477	4,197	0,000
	x5	0,374	0,127	0,324	2,953	0,004
a. Dependent Variable: y						

TABLE 7: REGRESSION RESULTS

V. CONCLUSION

From the results of research and overall analysis, some conclusions can be drawn as follows:

- Drug planning has a positive and significant correlation with good drug stock management, so that the strategy to better the drug management at the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia can be done through bettering the drug planning.
- Drug procurement has a positive and significant correlation to good drug management, meaning that the management of the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia can improve the performance of drug stock management by improving the drug procurement.
- Drug acceptance & storage has a positive and significant correlation to good drug stock management. Based on the results of the analysis, it can be concluded that the performance of drug management at the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia can be extended by developing thesystem and procedure of drug acceptance & storage.
- Drug distribution has a positive and significant correlation with good drug stock management. From the results of the analysis, the drug distribution system will be the critical factor to advance good drug stock management at the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia.
- Drug supervision & control has a positive and significant correlation with good drug stock management. The management of the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia may consider this variable to level up the performance of drug stock management.
- Planning, procurement, receipt & storage, distribution, supervision & control of drugs simultaneously have a positive and significant correlation to good drug stock management at the Maritime Occupational Health Center of the Ministry of Transportation of the Republic of Indonesia. The results of the analysis show that the contribution of all variables to drug stok management is 0.670 or 67% with a significance of 0.000. This means that the better the variables of planning, procurement, receipt & storage, distribution, supervision & control of drugs, the better the management of drug stocks at the Maritime Health Center of the Ministry of Transportation of the Republic of Indonesia. While there are 0.330 or 33% are other factors from variables that are not included in the study also affect good drug stock management, such as recording & reporting, drug maintenance, drug deletion, and others.

VI. RECOMMENDATION

- All variables analysed in this research have positive correlation and significant impact on the good drug management both partially and simultaneously. The managment could use the single variable to boost the drug stock management practices or put all variables all together. Parties related to the drug management process must have the correct understanding of the standard operating procedures (SOPs),so that there are no handicaps in its implementation.
- It is necessary to carry out good supervision because with good supervision, the availability of the quantity, type and condition of the drug is well maintained. It can be done routinely checking the remaining stock by taking into account the safety stock that should exist. Strategies and programs as well as regular evaluations in the drug control process will prevent unwanted things in the management of drug stocks such as stock shortages, damaged drugs, expired drugs or even dead stock/dead stock.
- There needs to be special attention for those who are directly in charge of managing drug stocks to pay more attention to the factors that lead to good stock management so that stock availability is maintained.
- Logistics activities encompass many other factors that have not been investigated yetin this study and may have more potential impact on the drug stock management, so it is recommended to examine other potential variables that have not been explored in this study.

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