Correlation Between Drug Inventory Planning Through ABC Theory Approach and Pareto Method With Disease Prevalence in Clinic of First Class Prison Lowokwaru Malang

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ABSTRACT

Clinics of Class I Correctional Institutions (Lapas) in Lowokwaru, Malang City, are currently prisons with the most populous residents in East Java. In the prison, the capacity has exceeded 200 percent. Improvement of assisted residents in First Class Prison Lowokwaru Malang, must be balanced with the availability of existing facilities, especially in health facilities in prisons. In addition, there is also an increase in the number of patient visits at the Clinic of First Class Prison Lowokwaru Malang. This type of research is correlative research with a quantitative analysis approach. The data analysis technique in this study uses the product moment statistical test or Pearson (ρ). The instrument used in this study is secondary data with a report format that has been developed by researchers. This study showed that drugs with classification A were all drugs classified into the classification of 20-80, with an investment value of 79.05% and volume of 21.35%, while drugs with classification C were all drugs classified as 80-20, which is the investment value of 5.47% and volume of 55.06%. In addition, the results of the correlation show that there is only a significant relationship with the planning of Gentamicin 5 gram (X4) drug supply through the ABC Theory and Pareto Method approaches with the prevalence of Atopic Dermatitis (Y), and planning the supply of Ciprofloxacin HCl (X3) through the ABC Theory approach and the Pareto Method with the prevalence of Dental Caries (Y). Conclusion: Drug inventory planning carried out at Lowokwaru Malang Class I Clinic is still inefficient and needs further research related to drugs that show significant results but according to the literature it is considered inefficient in the treatment of disease therapy.

***Keywords**: Drug inventory planning, ABC theory, Pareto Method method, Prevalence of disease.*

1. INTRODUCTION

Health care institutions cannot be separated from logistical management to fulfill all needs in providing health services. Functions in the implementation of drug logistics management in health care institutions include planning, procurement, storage, distribution, deletion, evaluation and monitoring that are interrelated with each other, so that there is a need for good coordination so that each function can function optimally. The unrelatedness of each logistic management function will result in inefficient existing logistics supply systems so that it can negatively impact hospitals both medically and economically [1].

The First Class Prison in Lowokwaru, Malang City, is currently a prison with the most populous residents in East Java. In the prison, the capacity has exceeded 200 percent [2]. Improvement of assisted residents in Malang Class I Lowokwaru Lapas, must be balanced with the availability of existing facilities, especially in health facilities in prisons. The main objective is to meet the health needs of patients in prison. Based on data on the number of patient visits, many prison residents have made use of available health service facilities. An overview of prison patient visits can be seen in the following figure.

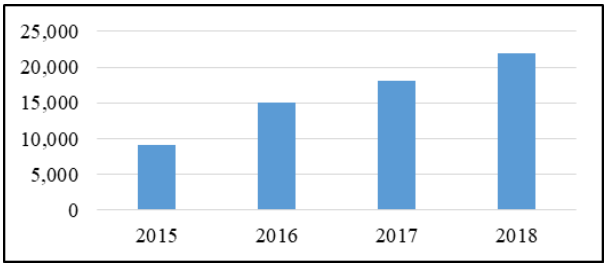

Figure 1. Patients Visits at the First Class Prison in Lowokwaru, Malang City Clinic in 2015-2018

Source: Report of Patient Visits at the First Class Prison in Lowokwaru, Malang City Clinic in 2015-2018

The First Class Prison in Lowokwaru, Malang City Clinic receives visits of assisted patients with the highest frequency of disease in skin diseases of around 33.73% of total patient visits, the next highest visit is those assisted with cases of ARI disease, about 25.30% of total patient visits. Then in the third place the biggest disease cases were dental and mouth diseases reaching 10.14%. This can also affect the stock of drugs needed and must be available. Planning for drug supply that has not been optimal at The First Class Prison in Lowokwaru, Malang City Clinic has caused various problems, one of which is the occurrence of out of stock drugs in clinical pharmacy installations. The following are the trends in the use of drugs that experience out of stock in the First Class Prison in Lowokwaru, Malang City Clinic during the months of January- October 2018.

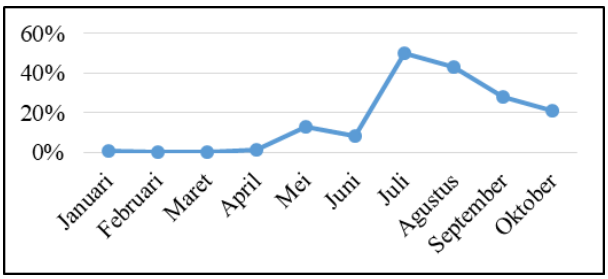

Figure 2. Trend of the Use of Out-of-Stock Medicines for the January- October 2018 Period at the First Class Prison in Lowokwaru, Malang City Clinic

Source: Data on Drug Use for the First Class Prison in Lowokwaru, Malang City Clinic (2018)

In Figure 2, it can be seen the description of drug usage trends that experience an out of stock in the supply of medicines found at the First Class Prison in Lowokwaru, Malang City Clinic. The highest drug out of stock in the clinic occurred in July, the use of drugs experiencing out of stock reached around 49.82%. This study aims to determine the relationship between drug inventory planning through the ABC Theory and Pareto Method approaches with the prevalence of disease in the First Class Prison in Lowokwaru, Malang City Clinic.

2. METHOD

This type of research is correlational research with a quantitative analysis approach [3]. The dependent variable in this study is planning drug supplies through the ABC Theory and Pareto Method approaches. The independent variable in this study is the prevalence of disease. The research subjects used in this study were the First Class Prison in Lowokwaru, Malang City Clinic, which is one of the small-scale health facilities intended for the target community in the First Class Prison in Lowokwaru, Malang City Clinic. The instrument used in this study is in the form of "Documents" with a report format that has been developed by researchers. Data analysis techniques in this study using product moment statistical tests or Pearson (ρ).

3. RESULTS AND DISCUSSION

3.1 Drug Inventory Planning through the ABC Theory Approach and the Pareto Method

The analysis uses the total usage of each drug for six months starting from July to December 2018, then the data on the total usage of each drug is multiplied by the price of the drug unit so that the drug cost value is obtained. The next step is to determine the cumulative amount by sorting the cost of the drug from the largest to the smallest. After the cumulative amount is known, the cumulative percent of each drug can be determined. The cumulative percent can be analyzed and classified as drugs with the classifications A, B and C. Furthermore, the cumulative percent can be analyzed and classified drugs with classifications A, B and C which are classified as 20-80 or 80-20 based on the Pareto Method, the results are as follows.

Table 1. Classification of drug items through the abc theory approach and the pareto method at the first class prison in lowokwaru, malang city clinic in year 2018

No	Class (ABC Theory)	Class (*Pareto Method*)	Type of Drug		Usage	
			n	%	n	%
1.	A	20-80	19	21,35	59.783.150	79,05
2.	A	80-20	0	0	0	0
3.	B	20-80	0	0	0	0
4.	B	80-20	21	23,60	11.706.320	15,48
5.	C	20-80	0	0	0	0
6.	C	80-20	49	55,06	4.138.627	5,47
Total			89	100	75.628.097	100

Source: Primary Data, 2019

The drug inventory planning analysis in this study shows that drugs with classification A are all drugs classified into the 20-80 classification, namely with an investment value of 79.05% and volume of 21.35%, which is a group of objects that are considered vital which dominate the total Its contribution is from the value of drug budgeting costs at the First Class Prison in Lowokwaru, Malang City Clinic. Classification B is

all drugs classified into 80-20 classification, namely investment value of 15.48% and volume of 23.60%, indicating that the type of drug is considered a trival object or object that does not have a large influence, Drug with C classification is entirely the drugs included in the 80-20 classification, namely with an investment value of 5.47% and a volume of 55.06%, are considered trival objects or objects that do not have a major influence.

3.2 Correlation between Drug Inventory Planning through ABC Theory and Pareto Method with Prevalence of Disease

3.2.1 Atopic Dermatitis (AD)

Based on data analysis using Pearson correlation test obtained the value of the correlation coefficient as follows.

Table 2. Correlation between drug inventory planning through abc theory approach and pareto method with atopic dermatitis prevalence (AD)

X		Y Atopic Dermatitis
Amoxycillin 500mg (X1)	Correlation Coefficient (ρ)	-0.307
	Significance	0.554
	Hypotheses	H_0
Inerson ointmen (X2)	Correlation Coefficient (ρ)	0.711
	Significance	0.113
	Hypotheses	H_0
Desolex 0,05% 10gram (X3)	Correlation Coefficient (ρ)	-0.258
	Significance	0.621
	Hypotheses	H_0
Gentamicin 5gram (X4)	Correlation Coefficient (ρ)	0.886
	Significance	0.019
	Hypotheses	H_a
Methylprednisolon 4mg (X5)	Correlation Coefficient (ρ)	0.635
	Significance	0.176
	Hypotheses	H_0
CTM (X6)	Correlation Coefficient (ρ)	0.002
	Significance	0.997
	Hypotheses	H_0
Interhistin (X7)	Correlation Coefficient (ρ)	0.620
	Significance	0.189
	Hypotheses	H_0
Cetirizine (X8)	Correlation Coefficient (ρ)	0.477
	Significance	0.339
	Hypotheses	H_0
Erytromycin 500mg (X9)	Correlation Coefficient (ρ)	-
	Significance	-
	Hypotheses	-

Source: Primary Data, 2019

Significance value shows the value of Significance for the correlation of planning the supply of Gentamicin 5gram drug (X4) through the ABC Theory and Pareto Method approach with the prevalence of Atopic Dermatitis (Y) is $0.019 < \alpha = 0.05$ so it means that there is a significant relationship within the 95% confidence level between planning the supply of Gentamicin 5 grams of drugs through the ABC Theory and Pareto Method approach within the prevalence of Atopic Dermatitis (AD) in patients.

Gentamicin 5 grams is a drug that is significant at 95% confidence level associated with the prevalence of Atopic Dermatitis (DA), where Atopic Dermatitis (DA) is classified as a skin disease which is the highest first disease case at the First Class Prison in Lowokwaru, Malang City Clinic. In the results of the drug inventory planning analysis based on the ABC theory, *Gentamicin* 5 grams is a type of drug belonging to the classification of drug A, which means that the drug is a drug with a high usage value. According to Reddy (2008), drugs belonging to the classification of drug A are drugs that require very strict control because in ordering with a frequency greater than the drug in class B and C [4]. In addition, in the classification based on the Pareto Method, *Gentamicin* 5 grams is a type drugs classified as drug classifications of 20-80 mean that the type of drug is a group of objects that are considered vital where it dominates the total contribution of the cost of budgeting medicine at the First Class Prison in Lowokwaru, Malang City Clinic.

In line with the research of Tay *et al*. (2016: 442), *Gentamicin* is recommended for DA but its use is in addition to the drug Betamethasone dipropionate or can be added to the use of the drug *Clotrimazole* so as to increase the effectiveness of using the drug in the treatment of DA disease [5]. Then there needs to be further research related to the results of the analysis which shows that there is a significant relationship between planning the supply of *Gentamicin* 5 grams drugs through the ABC Theory and Pareto Method approaches with the prevalence of Atopic Dermatitis (AD) [6],[7].

3.2.2 Scabies

Based on data analysis using Pearson correlation test obtained sig > α = 0.05 value in the relationship of 5% *Scabimite Cream* (X1), *Amoxycillin* 500mg (X2), *Mefenamic Acid* 500mg (X3), CTM (X4), *Declofenac Sodium* 5mg (X5) with the prevalence of Scabies (Y), meaning that there is no significant relationship between drug inventory planning through the ABC Theory and Pareto Method approaches with the prevalence of scabies [8].

3.2.3 ARI

Based on data analysis using Pearson correlation test obtained sig > α = 0,05 on the relationship of *Amoxycillin* 500mg (X1), *Lapifed / Trifed* (X2), *Flutamol-p* (X3), *Demacolin* (X4), *Neuroxon* (X5), *Mucohexin* (X6), *Paracetamol* 500mg (X7), CTM (X8), *Glyceryl Guiacolot* (GG) 100mg (X9), Vitamin B Complex (X10) with the prevalence of ARI disease (Y), meaning that there is no significant relationship between planning drug supplies through an approach ABC Theory and the Pareto Method with the prevalence of ARI [9].

3.2.4 Dental Caries

Based on data analysis using Pearson correlation test, the value of correlation coefficient is obtained as follows.

Table 3. Correlation between drug inventory planning through abc theory approach and pareto method with prevalence of dental caries

X		Y Scabies
Amoxycillin 500mg (X1)	Correlation Coefficient (ρ)	-0.035
	Significance	0.947
	Hypotheses	H_0
Asam Mefenamat 500mg (X2)	Correlation Coefficient (ρ)	0.736
	Significance	0.095
	Hypotheses	H_0
Ciprofloxacin HCl (X3)	Correlation Coefficient (ρ)	0.827
	Significance	0.042
	Hypotheses	H_a
Paracetamol 500mg (X4)	Correlation Coefficient (ρ)	0.450
	Significance	0.370
	Hypotheses	H_0
Natrium Declofenac 5mg (X5)	Correlation Coefficient (ρ)	0.240
	Significance	0.646
	Hypotheses	H_0
Metronidazole (X6)	Correlation Coefficient (ρ)	0.074
	Significance	0.889
	Hypotheses	H_0

Source: Primary Data, 2019

Significance value shows the value of Significance for the relationship of planning inventory of *Ciprofloxacin* HCl (X3) through the ABC Theory and Pareto Method approaches with the prevalence of Dental Caries (Y) is 0.042 < α = 0.05 so that means there is a significant relationship at the 95% confidence level between planning the supply of *Ciprofloxacin* HCl drugs through the ABC Theory and Pareto Method approach with the prevalence of dental caries.

Ciprofloxacin HCl is a drug that is significant at the 95% level of confidence associated with the prevalence of dental caries, where dental caries is classified as a type of dental and oral disease which is the third highest case of disease in the Malang Class I Lowokwaru Lapas Clinic. In the results of the drug inventory planning analysis based on the ABC theory, *Ciprofloxacin* HCl is a type of drug belonging to the classification of drug A, which means that the drug is a drug with a relatively high usage value [10],[11]. According to Reddy (2008), drugs belonging to the classification of drug A are drugs that require very strict control because in ordering with a frequency greater than the drug in class B and C. In addition, in the classification based on the Pareto Method, *Ciprofloxacin* HCl is a type drugs classified as drug classifications of 20-80 mean that the type of drug is a group of objects that are considered vital where it dominates the total contribution of the cost of budgeting medicine at the First Class Prison in Lowokwaru, Malang City Clinic.

Based on the research of Haque, Sartelli, & Haque (2019:9), it is mentioned that the oral cavity is a natural region for various microbes while antibiotics are often prescribed and used unnecessarily and excessively [12]. Various studies report that at least 30-50% of antimicrobials are prescribed without scientific reasons. Improper use of antibiotics contributes to the development of antimicrobial resistance. Then there needs to be further research related to the results of the analysis which shows that there is a significant relationship between the planning of *Ciprofloxacin* HCl drug supplies through the ABC Theory and Pareto Method approaches with the prevalence of dental caries at the First Class Prison in Lowokwaru, Malang City Clinic.

3.2.4 Pulp and Periapical Tissue Disease

Based on data analysis using Pearson correlation test obtained sig > α = 0.05 value on the relationship of

Amoxycillin 500mg (X1), *Mefenamic Acid* 500mg (X2), *Ciprofloxacin* HCl (X3), *Paracetamol* 500mg (X4), *Declofenac Sodium* 5mg (X5), *Metronidazole* (X6) with the prevalence of pulp and periapical tissue (Y), meaning that there is no significant relationship between drug inventory planning through the ABC Theory and the Pareto Method approach with the prevalence of pulp and periapical tissue [13].

4. CONCLUSION

Conclusions obtained from research that has gone through the process of analysis and discussion are as follows:

- Inventory planning carried out at the First Class Prison in Lowokwaru, Malang City Clinic through the ABC theory approach is still not efficient because there are still more drugs classified as C than Class A drugs which should be a priority in planning.
- Inventory planning carried out at the First Class Prison in Lowokwaru, Malang City Clinic through the Pareto Method is still not efficient because there are still more 80-20 classification drugs or considered trival drugs rather than 20-80 classification drugs which are considered vital drugs which should be a priority in planning the inventory.
- Analysis and discussion of the correlation test of drug inventory planning through the ABC Theory and Pareto Method approaches shows the results:
  - *Gentamicin* 5 grams (X4) is a drug in classification A and 20-80 showing significant results that there is a relationship based on analysis and discussion of significance values at 95% confidence level specifically in planning the supply of *Gentamicin* 5 grams (X4) through the ABC Theory and Pareto Method approaches with prevalence of atopic dermatitis (Y). But there was no significant relationship between planning *Amoxycillin*
  - 500 mg (X1) drug supplies, *Inerson ointment* (X2), *Desolex* 0.05% 10 grams (X3), *Methylprednisolon* 4mg (X5), CTM (X6), *Interhistin* (X7), *Cetirizine* (X8), *Erytromycin* (X9) through the ABC Theory and Pareto Method approaches with the prevalence of Atopic Dermatitis (Y).
  - *Ciprofloxacin* HCl (X3) is a drug in classification A and 20-80 showing significant results that there is a relationship based on analysis and discussion of significance values at the 95% level of confidence specifically in planning the supply of *Ciprofloxacin* HCl (X3) through the ABC Theory and Pareto Method approaches with disease prevalence Dental caries (Y). However, there was no significant relationship between planning the supply of *Amoxycillin* 500 mg (X1), *Mefenamic Acid* 500mg (X2), *Paracetamol* 50mg (X4), *Declofenac* 5mg (X5), *Metronidazole* (X6) with the prevalence of Dental Caries (Y).
  - There is no significant relationship between drug inventory planning through approaching the ABC Theory and the Pareto Method with the prevalence of scabies, ARI, and pulp disease and periapical tissue.

Based on the results of the analysis and discussion of the research, some suggestions that can be proposed for further research is the need for further research related to the gap analysis and discussion of drug inventory planning through ABC Theory and Pareto Method with the prevalence of disease with correlation tests which show significant results but in the literature shows that the drug is not the recommended drug.

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