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Analysis of Efficient Drug Supply Control at Muhammadiyah Siti Aminah Bumiayu Hospital Using the MMSL Method (Minimum-Maximum Stock Level) Period March – May 2023

Anna Sofia[1*], Jason Merari Peranginangin[2], Wiwin Herdwiani[3]
[1]Magister Manajemen Farmasi, Fakultas Farmasi, Universitas Setiabudi Surakarta
[2,3] Fakultas Farmasi, Universitas Setiabudi Surakarta
Corresponding Author: Anna Sofia, annasofiaamien@gmail.com

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A B S T R A C T

Medicine supplies that are too large or small will make hospitals sick loss. These losses can be in the form of drug supply costs enlarges and becomes disturbed smooth running of health services in hospitals. Objective study This For know influence method MMSL to supply drug in a way efficient in Installation Pharmacy RSU Muhammadiyah Siti Aminah Bumiayu. This research design uses quasi-experimental without control, by applying the method studied, namely minimum-maximum stock levels. Sampling using technique which can be obtained from Retrospective data for October 2022 – December 2022 and method application prospectively, namely March 2023 - May 2023 and carry out strategies repair use method Hanlon. All data drug results analysis A B C became the sample for this research. Analysis of inventory value data was carried out, stock value out, dea d stock and ITOR before and after application of the method using test statistics Wilcoxon Signed Rank Test. The inventory value before applying the MMSL method was IDR 289,756,421, and after applying control using the MMSL method it was IDR 184,725,126 , with a value of p=0.002<0.05. The implementation of drug control using the MMSL method shows that there is an influence on the value of drug supplies in the pharmaceutical installation of RSU Muhammadiyah Siti Aminah Bumiayu.

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INTRODUCTION

Hospital pharmacists have a very important role in aspects of management (drug management) and pharmaceutical services and are interrelated throughout the hospital service system (Kemenkes. 2016). Efficient drug management is one of the most important factors in overall management success, and aims to ensure the availability of good quality drugs, in the right type, right quantity, on time and used rationally so that the available funds can be used as well as possible. and sustainable in order to meet the interests of the community who seek treatment at the health service unit (Kumalasari & Rochmah, 2016).

Pharmaceutical installations have authority in the process of procuring drugs or pharmaceutical preparations, by purchasing directly or carrying out their own production on a small scale according to needs (Siregar, 2004). Hospital management must be able to control inventory in order to ensure effective and efficient use of capital. An effective drug supply is if it can meet the needs of the health service units that cover it (Ida et al, 2021).

Drug supply control aims to create a balance between supply and demand. The control function is very important to ensure the effectiveness and efficiency of drug supply management itself. Technological developments in the health sector have implications for the development of types of diseases and the number of types and types of drugs. The availability of accurate, correct and up to date drug information is a necessity for health service providers as well as patients and the public. In general, hospitals have the largest routine costs for procurement of pharmaceutical preparations. According to the national drug policy, drug costs constitute a fairly large part of all health costs. From various surveys it can be concluded that the costs for purchasing medicines in hospitals can absorb around 40-50% of the total operational health services (Fadhila, 2013).

Various methods of drug inventory control can be applied in hospital pharmacy installations, one of which is the MMSL (Minimum-Maximum Stock Level) method. This MMSL method is a method of determining minimum stock and maximum stock when ordering pharmaceutical preparations. Other inventory control methods such as EOQ (Economic Order Quantity) are by determining the number of orders and the amount that must be ordered by minimizing total costs, namely ordering costs and storage costs. Apart from that, there is also an inventory control method, the ROP (Reorder Point) method. ROP is a limit on the number of orders or repurchases taking into account the grace period or waiting time (Listyorini, 2016).

Final report results for 2021 at the Muhammadiyah General Hospital Siti Aminah Bumiayu has several problems related to control supplies in hospitals include high stock out values , the presence of several dead stock drugs and excess drug stock (over stock) in several types of drugs and the absence of certain inventory control methods in installation pharmacy, so matter This push did it study For find out the effect of applying the Minimum-Maximum stock level or stock method minimum (Smin) And stock maximum (Smak) on efficiency control drug supplies at the Muhammadiyah Siti General Hospital Pharmacy Installation Aminah Bumiayu.

Based on Indarti research 2019 Results of applying the minimum-Maximum stock level has a positive impact on drug inventory efficiency namely a decrease in inventory value and ITOR (Inventory Turn Over) value Ratio) in accordance with Which expected, as well as implementation method minimum-maximum stock level influences the effectiveness of drug supplies, namely the existence of decreasing the number of stockout incidents so that this result has a big influence on efficiency and effectiveness of investments made by Home Pharmacy Installations Sick Central General Dr. Sardjito Yogyakarta.

The aim of this research is to analyze control and increase the efficiency of the drug management cycle in the pharmacy installation of RSU Muhammadiyah Siti Aminah Bumiayu. Based on observations in the field, it was found in the results of the 2021 final report at the Muhammadiyah Siti Aminah Bumiayu General Hospital that there were several problems related to inventory control at the hospital, including the presence of high stock out values, the presence of several dead stock drugs and excess drug stock (over stock). for several types of drugs and there is no specific inventory control method in pharmaceutical installations, this requires analysis to improve optimal inventory management

THEORETICAL REVIEW

Hospital Pharmacy Installation

A Hospital Pharmacy Installation is a section/department/or facility within a hospital where all pharmaceutical activities are carried out for the needs of the hospital itself. The main activities of IFRS start with planning, procurement, storage, preparation, delivery, direct patient care, and all health supplies used in hospitals, both inpatient and outpatient, and all wards. This is management that ends with management. circulated and used, including in hospital polyclinics (Siregar, 2004).

Hospital pharmaceutical services are an inseparable part of the Hospital health service system. The implementation of pharmaceutical services consists of 4 services, namely (Purwanti et al, 2004):

1. Over-the-counter medication is a service for patients who want to self-medicate, which is called self-medication. All medicines include medicines that can be taken without a prescription, such as Essential Medicines (OWA), Limited Over-the-Counter Medicines (OBT), and Over-the-Counter Medicines (OB).
2. The communication service is Intelligence and Reconnaissance (IEC). Advertising pharmacists can facilitate communication with other health professionals, including physicians, and provide information about new and discontinued drugs. Pharmacists must be proactive in handling patient complaints about the drugs they use.
3. Prescription drug services are prescription services which are fully the responsibility of the pharmacist administering the pharmacy. Pharmacists cannot substitute other drugs for prescription drugs.
4. Medication administration is an important competency that pharmacists must have in the field of medication administration. H. Able to design, create and implement effective and efficient drug management.

Medication Management

Drug management is closely related to hospital budgets and expenditures. Inpatient drug costs can reach 40% of total medical costs. According to the Indonesian Ministry of Health, drug costs account for 40-50% of the country's total medical expenditure. Considering the importance of financing and the importance of medicines for hospitals, medicines must be managed effectively and efficiently in order to provide maximum benefits for patients and hospitals. Management includes selection and planning, procurement, distribution, distribution and utilization.

Medication management in hospitals is an important part of the overall hospital management function because inefficiency has a negative impact on hospitals both medically and economically. The aim of drug management in hospitals is to provide the necessary drugs when needed, in sufficient quantities, with guaranteed quality and affordability to support quality services. In a drug management system, each main function builds on the previous function to determine the next function (Liliek, 1998).

According to (Quick, et al, 2012), the drug management cycle includes four stages, namely: 1) selection, 2) procurement, 3) distribution, and 4) use. Each stage in the drug management cycle is interrelated, so it must be managed well so that each can be managed optimally. These interrelated stages in the drug management cycle require an organized supply system so that activities run well and support each other, so that the availability of drugs can be guaranteed to support health services and become a potential source of hospital income. The drug management cycle is supported by management support factors which include organization, administration and finance, Management Information Systems (MIS) and Human Resources (HR). Each stage of the drug management cycle must always be supported by the four management supports so that drug management can take place effectively and efficiently.

Minimum-Maximum Stock Level (MMSL) Method

The MMSL (Minimum-Maximum Stock Level) method is the simplest method for controlling drug inventory that can be applied in hospital pharmacy installations (Satibi et al., 2019). Minimum and maximum stock formulas are often used in scheduling purchases by determining order time intervals. By using this approach, theoretically the maximum stock for each item can be defined, meaning providing sufficient but not excessive stock, the last stock of an order until the next order, as well as minimum stock, where a point for reordering or reorder point (ROP) (Quick) is made. et al, 2007).

ROP Formula (Heizer and Render, 2014)

$$ROP = (d \times L) + SS$$

Information :
ROP: Reorder Point
D : Daily demand
L: Waiting time (lead time)
SS: Safety stock

METHODOLOGY

Study This is quasi- experimental research with nonequivalent without control group design. The sample was determined purposively, taken from retrospective data from October - December 2022 and method application data taken prospectively, namely March - May 2023. The number of research samples was all drugs in the pharmacy installation and then grouped using ABC analysis to obtain category A drugs, B and C. The variables studied were inventory value, stock out value and events, as well as ITOR (Inventory Turn Over Ratio) for all medicines in the Siti Aminah Bumiayu General Hospital Pharmacy Installation. Data analysis used the Wilcoxon Signed Ranks Test statistical test because the data was not normally distributed and homogeneous, by analyzing the results before and after applying minimum-maximum stock levels to sample drugs.

RESULTS

Analysis of ABC and Drug Supply from Suppliers for the Period October – December 2022 to Determine the Research Sample

Before implementing the Minimum-Maximum Stock Level (MMSL), drug use data during October – December 2022 was carried out by ABC analysis to obtain category A, category B and category C drugs. The ABC analysis method is a method used to find out which drugs receive the highest budget. many in the pharmacy installation at RSU Siti Aminah Bumiayu.

Category A is inventory with an investment value of around 75% of the total inventory value. Category B is inventory with around 30% of drug items but has an investment value of around 15% of the total inventory value. Meanwhile, category C is inventory with around 50% of drug items but has an investment value of around 5% of the total inventory value (Ultsch, 2002). This percentage is a range that can vary and differ from one hospital to another. The price in the ABC analysis at the Pharmacy Installation at RSU Muhammadiyah Siti Aminah is the basic price or basic price of drugs for October-December 2022. Grouping of drugs using ABC analysis is carried out to obtain category A, category B and category C drugs based on the number of drug uses at the Muhammadiyah General Hospital Siti Aminah Bumiayu as the application of the Minimum-Maximum Stock Level (MMSL) method. The following are the percentage results of ABC analysis at the Pharmacy Installation at RSU Muhammadiyah Siti Aminah Bumiayu in October-December 2022.

Table 1. Percentage Results of ABC Analysis from October-December 2022

Drug Group	Amount	Percentage (%)	Mark	Usage (%)
A	84	16.83	Rp. 520,073,993	74
B	173	34.66	Rp. 146,913,960	21
C	242	48.49	Rp. 31,666,334	5
Amount	499	100	Rp. 698,654,287	100

Source: Pharmacy Installation at RSU Muhammadiyah Siti Aminah Bumiayu

Table 1 shows the results of the ABC analysis percentage from October – December 2022. The total number of drugs used was 499 items. Drug group A with a total of 84 (16.83%) has a value of Rp. 530,073,993, drug group B with a total of 173 (34.66%) has a value of Rp. 146,913,960 and group C with a total of

242 (48.49%) has a value of Rp. 31,666,334. With the highest number of uses, group A is 74% and the smallest is group C, namely 5%.

Calculation of Safety Stock, Minimum Stock, Maximum Stock of Medicines and EOQ

Following is the data obtained during research and then has researcher analysis start from Calculation of Safety Stock, Minimum Stock and Maximum Stock . Before research was carried out using the MMSL method, there was no standard for when repeat orders had to be made or a maximum limit for drug procurement. For example, the procurement of the drug seretide discus inh 250 before the MMSL intervention carried out repeat orders when there was only 1 stock in the warehouse or even no stock of the drug at all.

Table 2. Calculation of Safety Stock, Minimum Stock, Maximum Stock of Medicines and EOQ

DRUG NAME	*Lead Time* (Days)	Use/Day (Unit)	*Safety Stock* (Units)	Smin (Unit)	PP (day)	Smax (Units)	EOQ
	x	y	xy	2xy	xi	2xy+(xi*y)	
Seretide Discus Inh250	3	8	24	47	30	284	45
Ibuprofen Tab 400mg	3	2,535	7,605	15,210	30	91,260	14,606
Lansoprazole Inj	3	9	28	56	30	337	58
Ns infusion 1000ml	3	37	111	221	30	1,327	253
Candesartan Tab 16	3	559	1,677	3,354	30	20,125	4,355
Nitrocaf Retard Cap	3	321	962	1,924	30	11,546	2,501
Novorapid Flexpen	3	5	15	30	30	178	42
Gabapentin Capsules 100	3	428	1,285	2,570	30	15,419	3,720
Ns infusion 500ml	3	62	187	374	30	2,245	542
Prazotec Inj	3	3	10	20	30	119	30
Antiten-A	3	2	5	9	30	54	14
Cefotaxime Inj	3	50	150	300	30	1,799	467
Seretide Discus Inh500	3	2	7	15	30	88	24
Lansoprazole Tab	3	614	1,842	3,684	30	22,101	6.118
Futrolite infusion	3	8	23	45	30	271	78
Ryzodeg Flex Touch	3	3	8	16	30	94	27
Infusion Rl 500ml	3	38	113	226	30	1,357	398
Levofloxacininf750mg	3	3	9	19	30	111	34
Methylprednisolone125	3	12	36	73	30	436	134
Ns infusion 100ml	3	20	61	121	30	728	228
Peinlos 400 Box/5vials	3	4	13	27	30	159	51
Bunascan Spinal 0.5	3	3	10	20	30	122	40
Paracetamol Inf	3	19	57	113	30	679	224
Omeprazole Cap 20mg	3	748	2,243	4,486	30	26,918	8,959
Hyoscine Butylbromide	3	28	83	165	30	991	333
Inpepsa Syr 100 Ml	3	3	10	19	30	115	39
Cendo Lfx Minidose	3	3	9	18	30	107	38
Ceftriaxon Inj 1gr	3	48	143	286	30	1,714	612
Acarbose Tab 100mg	3	183	550	1,100	30	6,597	2,361
Phenytoin Cap	3	468	1,405	2,811	30	16,864	6,173
Methylprednisolone 4	3	1,006	3,018	6,037	30	36,221	13,372

DRUG NAME	*Lead Time* (Days)	Use/Day (Unit)	*Safety Stock* (Units)	Smin (Unit)	PP (day)	Smax (Units)	EOQ
	x	y	xy	2xy	xi	2xy+(xi*y)	
Tensilo Injection	3	1	3	6	30	39	14
Spironolactone tab 25	3	566	1,697	3,394	30	20,363	7,619
Mecobalamin Tab 500	3	293	880	1,760	30	10,560	3,960
Moxifloxacin inf	3	1	3	5	30	31	12
Infusion water 2000ml	3	8	24	48	30	288	110
Mecobalamin Inj 500	3	27	80	160	30	960	372
Trilac 10mg/Ml Inj	3	2	7	13	30	80	31
Omeprazole Inj 40 Mg	3	31	94	189	30	1,131	444
D5 infusion - 1/2 Ns	3	7	22	44	30	262	105
Novomix 30 (Flexpen)	3	1	4	8	30	48	20
Miniaspi 80mg	3	571	1,714	3,428	30	20,568	8,534
Citicoline Inj 500 mg	3	14	42	84	30	502	209
Berotec 0.1 Mg Inh	3	2	5	10	30	57	24
Rifampicin 600	3	59	177	353	30	2,120	925
Ring As Infusion 500ml	3	14	43	86	30	518	229
Flixotide Nebu	3	8	25	49	30	297	134
Diazepam Tab 5mg	3	439	1,317	2,635	30	15,808	7,147
Cendo P - Pred Minidose	3	3	10	19	30	117	53
Potentik Caplets	3	79	237	475	30	2,848	1,315
Diclofenac Sodium Tab	3	761	2,284	4,568	30	27,408	12,680
Metformin 850 Mg	3	279	836	1,671	30	10,028	4,676
Ondansetron Inj 4mg	3	98	294	588	30	3,529	1,670
Epexol Tab	3	7	22	45	30	269	128
Microgest 200mg	3	5	16	32	30	193	94
Cefixime Tab 100mg	3	70	211	422	30	2,531	1,254
Fartison Inj	3	1	3	7	30	40	20
Mannitol Infusion - 250ml	3	4	12	24	30	143	72
Inpepsa Syr 200 Ml	3	1	3	6	30	36	18
Sansulin Log-G pen	3	1	3	6	30	37	19
Hexymer Tab 2mg	3	225	676	1,352	30	8.115	4,234
Metformin 500mg	3	889	2,666	5,333	30	31,996	16,694
Ezelin Insulin	3	1	3	6	30	36	19
Divalproex Sodium 250	3	29	86	173	30	1,038	546
Ciprofloxacin Infusion	3	7	21	43	30	255	136
Cendo Eyefresh Plus	3	3	8	15	30	90	49
Rifamtibi 600 Tab	3	17	52	104	30	627	338
Clixid Tab	3	87	262	523	30	3,139	1,713
Furosemide Inj	3	29	86	171	30	1,028	568
Codeine Tab 20mg	3	50	149	297	30	1,785	988
Prazotec Tab	3	6	18	36	30	213	118
Otsu Wi 25ml Otsuka	3	30	91	181	30	1,089	607
Ketorolac Inj 30mg/Ml	3	64	193	386	30	2,314	1,294
Curcuma Force	3	113	338	677	30	4,059	2,311
Diclofenac Potassium	3	150	450	901	30	5,405	3,113
Farmavon Inj 4 Mg / 2ml	3	2	5	11	30	65	38

DRUG NAME	*Lead Time* (Days)	Use/Day (Unit)	*Safety Stock* (Units)	Smin (Unit)	PP (day)	Smax (Units)	EOQ
	x	y	xy	2xy	xi	2xy+(xi*y)	
Levopar Tab	3	82	245	489	30	2,935	1,699
Ranitidine 150 Tab	3	331	994	1,988	30	11,927	6,941
Herberser Cd100	3	15	46	91	30	548	320
Lexatrans 500 Tab	3	41	123	245	30	1,470	862
Cendo Genta 0.3% Sm	3	2	6	11	30	68	40
Tranexamic Acid Tab	3	43	130	260	30	1,558	918
Bisoprolol 2.5mg	3	368	1,104	2,207	30	13,244	7,842
Gabapentin Capsules 300	3	109	328	656	30	3,933	2,337

Based on Table 2. Order by category ABC and can its known that all drugs have the same *lead time, but the value safety stock* Which different. Difference mark *safety stock* influenced by the average value of monthly drug use for each type drug. After known *safety stock* from each drug, step furthermore is count mark stock minimum where a repeat order must be made *to* avoid drug shortages and stock maximum to find out the maximum number of h so that there is no excess stock of medicines *(over stock*) . For example, for the drug Seretide discus Inh 250, *repeat orders are placed* when the remaining stock of the drug in the warehouse is at least 47 and the maximum procurement limit (*order)* for 1 month's needs is 284.

Influence Implementation M inimum- M aximum Stock Level

Implementation Calculation minimum-maximum stock levels on booking drug in warehouse Pharmacy RSU Muhammadiyah Siti Aminah Bumiayu, and obtained the following results:

Table 3 . Differences in Inventory Value, ITOR, Stock Out Value , Dead Stock Before and After Intervention

	Research result	Statistical Test Results			TEST Method Description
		Mean	elementary school	ɔ value	
Value Inventory Before intervention	Rp 289,756,421	Rp. 562,407.69	Rp. 1 . 024.753		
Inventory Value After Intervention	IDR 184,725,126	Rp. 434,566	Rp. 701,620	0.00 2	
ITOR Before intervention	8.74 times	3 times	1.00 times		
ITOR after intervention	1 3.21 times	4.6 times	1.1 5 times	0.01	
Stock out Before intervention	Rp. 141,841.0 56	Rp. 1,530,561	Rp. 2,219,565		*Wilcoxon signed rank test*
Stock out after intervention	IDR 122,248,245	Rp. 2,004,069	Rp. 3.853. 184	0.0 27	

	Research result	Statistical Test Results			TEST Method Description
		Mean	elementary school	ɔ value	
Dead stock Before intervention	11.84%	Rp. 176,994	Rp. 331,892		
Dead stock After intervention	8.48%	Rp. 120,858	Rp. 185,233	0.002	

Based on Table 3, it can be said that there is a difference between before and after the intervention, this is indicated by a P value <0.05. Total score results supply before intervention is Rp. 289.76.421 but after intervention mark supplies experience decline as big as Rp. 184.725.126. Results test statistics p value = 0.002, p = < 0.05 p This show exists influence implementation method MMSL research on values supply.

DISCUSSION

Improvements to drug supplies in the pharmaceutical installation at RSU Siti Aminah Bumiayu before implementing the Minimum-Maximum Sock Level are carried out first by ABC analysis or Pareto analysis. Using data on all drug supplies in pharmaceutical installations in the period October – December 2022. Grouping drug with analysis A B C done For get category A, category B and category C drugs based on the number of uses drug in House Sick General Muhammadiyah Siti Aminah Bumiayu as implementation method Minimum-Maximum Stock Levels (MMSL).

Based on data in Table 1. Category A eats most budget a lot and need supervision strict that is of 566 types medication in the installation pharmacy at RSU Siti Aminah, and amount medication used amounting to 499 in month October until December 2022 with percentage amount medication used amounted to 85.46% before use method MMSL inventory. ABC analysis (Pareto analysis) is a management method that is useful for increasing the effectiveness and efficiency of supplies used by hospitals (Rofiq et al., 2020). According to Satibi, (2014) who has classified inventory items into 3 (three) categories according to their use value. The three categories are categories A (representing 10-20% of the number of items using 75-80% of funds), B (representing 10-20% of the number of items using 15-20% of funds) and C (representing 60-80% of the number of items using 5 -10% funds). From grouping using ABC analysis, drug management will be much easier so that predictions, stock control and supplier constraints can be better. So the grouping of drugs based on drug use values in ABC analysis can be seen from table 2.

There are 84 types of category A medicines at the Siti Aminah RSU pharmacy installation with a total cost of IDR. 520,073,993 with a usage percentage of 74%. Category A drugs represent the fastest moving class of drugs and contribute the most. Even though category A drugs are in short supply in hospitals, category A is in very high demand and the price is expensive. This category A medicine requires a very high investment, so in managing inventory,

especially in an effort to avoid stock hoarding, medicines with a high investment value require high costs and storage.

Category B drugs in the Siti Aminah RSU pharmacy installation contain 173 items of medication with a total cost of IDR. 146,913,960 with a usage percentage of 21%. Category B drugs are a group of drugs that have a greater number of drug items than category A but the percentage of use is smaller, but care must be taken even though they can be replaced with other drugs with the same composition so that the drugs can still be served and do not reduce the quality of hospital services. Category C drugs at the Siti Aminah RSU pharmacy installation contain 242 items of medication with a total cost of IDR. 31,666,334 with a usage percentage of 5%.

Category C drugs are slow moving drugs or a group of drugs whose circulation is very slow and the amount used is small. According to Heizer Jay (2015), group C is inventory items with a small annual cash volume which may only represent 5% of the annual cash volume, but represents around 55% of the total inventory or inventory items. Based on this situation, it is necessary to make efforts to collect costs based on unit costing using the ABC (Activity Based Costing) method (Damayanti, 2017), category C drugs are usually slow moving drugs, so this must really be taken into consideration in the procurement process.

Drugs that are included in the slow-acting drug group are more likely to expire. Planning and managing drug inventory for slow selling product groups must be carried out in a way that reduces drug inventory stored in warehouses and shortens the shelf life of drugs before being sold. Effective treatment requires continuous administration of this class of drugs. Medicines that are expensive and whose sales are slow can increase the risk of hospital loss in the sense that the hospital experiences losses (Rofiq et al., 2020).

Based on the results of an interview with the head of the Pharmacy Installation at RSUM Siti Aminah, there is no specific schedule for ordering medicines and suppliers send drugs to the pharmacy warehouse on average 3 days, which is less than 1 week after the Order Letter (SP) is sent from the Pharmacy Installation. This shows that there is a fast response from suppliers for sending goods to hospitals so that stock outs can be minimized. If the supplier does not respond quickly to fulfilling requests, it will cause problems, including stock outs due to long lead times. Based on data on the type of drug along with Lead Time, safety stock, minimum stock and maximum stock are calculated by looking at the average daily use obtained from drug use data.

Based on supply stability data from suppliers, calculate the waiting time (Supplier lead time) at the time of purchase which is calculated from the date of order until the date of receipt. Transit time also has an indirect effect on customer ordering decisions and customer satisfaction (Faizol et al., 2021). Based on research conducted by Dewi and Wirasuta, (2021) they also found that there are three aspects that need to be considered in planning pharmaceutical matters and disposable medical devices based on Minister of Health Decree No. 73 of 2016, namely quantity, type and time. Respondents said procurement was a key factor in increasing cash flow and improving customer service. Planning and procuring drugs is an important first step in the success of the next steps. The plan helps

align procurement needs with the budget available to provide medical services to the hospital. Poor planning and procurement systems result in excess drugs or shortages of health supplies (Puspikaryani et al., 2022).

Based on data on the type of drug along with lead time, then security stock or what is usually called safety stock, minimum stock or minimum stock and maximum stock is carried out by looking at the average daily usage obtained from usage data for October-December 2022.

Calculation of Safety Stock, Minimum Stock, Maximum Stock of Medicines and EOQ In table 2. The EOQ value is the amount booking the most economical way every time you place an order by minimizing ordering costs and storage costs. As an example of calculation procurement of Seretide Discus Inh 250 one year requirement of 2,844 units with EOQ 45 units. Good procurement (order) frequency is one requirement year shared with EOQ, so in One year Can done 63 order times, you can order 5 times in a month, with an order interval of every 6 days so that orders for seretide discus inh 250 in a month is 225. Apart from that, EOQ can help overcome problem Which relate with uncertainty through safe inventory. Using the EOQ method can reduce storage costs and the risk of damage or expiration of medicines, even though ordering costs can increase, there can be considerable cost efficiency. Order quantity Which obtained Can minimize total cost supply, or can obtain amount purchase optimally Possible. With EOQ level economical achieved if costs ordering and cost storage is at in balanced value. If the inventory value is large, then the ordering costs will increase down and costs product storage will increase. Then vice versa, if mark supply small, so cost booking will go on and cost its storage will go down.

The drug management process in the Pharmacy requires a lot of drugs managed and method its use Which very many kinds of. Determine maximum stock and minimum in strategy pharmaceutical supplies always become issue important (Al-Fandi et al., 2019; Maestre et al., 2018) even sometimes, manager pharmacy or the procurement department determines level stock maximum and safe based on average daily pharmaceutical drug consumption and waiting time for drug supplies (Chen et al., 2022). Following is a number of benefit according to Nasution et al., (2022) calculates the safety stock for each type of drug so that it can be adjusted to the drug fast, medium and slow moving .

Implementation Calculation Minimum-Maximum stock levels on booking drug in the Pharmacy Installation RSU Muhammadiyah Siti Aminah Bumiayu, and obtained results that show an influence on decreasing inventory value. Factor affecting exists decline mark supply This is stock preparation pharmacy in the unit Siti RSU pharmacy Aminah controlled with calculation MMSL method where previously Not yet There is method particular application in management preparation pharmacy in the unit Siti RSU pharmacy Aminah. During study done No found emptiness preparation pharmacy on the samples taken. Stock preparation pharmacy No exceed from stock maximum so that achieved effectiveness in management preparation pharmacy in the unit Siti RSU pharmacy Aminah Bumiayu.

Results Inventory Turn Over Ratio (ITOR) experienced increase that is from 8.74 before intervention to 13.21 after exists intervention and testing statistics use the method Wilcoxon signed rank test with p value = 0.01, p < 0.05, p This show exists influence implementation method MMSL research on ITOR values. Results mark stockout experience decline that is from Rp. 141,841,065 before intervention after exists intervention to Rp. 122,248,245. By test statistics p value = 0.027, p < 0.05 p This show exists influence implementation MMSL method on value stock out. Results dead stock experience percentage reduction ie from 11.84% before intervention become 8.48% after exists intervention and testing statistics use method Wilcoxon signed rank test with p-value = 0.002 p < 0.05, p This show exists influence implementation method MMSL research on dead stock percentage. Based on Table on can be said that there is influence significant where value test statistics p value = 0.002, p < 0.05 p This shows exists influence implementation MMSL method on the value dead stock.

Results test statistics show implementation control supply impact positive in management preparation pharmacy, especially in units pharmacy at RSU Siti Aminah. Matter This is in line with research conducted by Indarti [1] the results there is an influence implementation MMSL (Minimum-Maximum Stock Level) method on value supply before intervention Rp. 5,009,221,204 and after intervention Rp. 2,871,879,269 with p value = 0.007 < 0.05. Implementation MMSL method in research the show efficiency and effectiveness control drug with down mark inventory and stock out events.

Implementation method minimum-maximum stock level can used as a method to control reservations throughout type medication in the installation pharmacy at RSU Siti Aminah Bumiayu. Minimum- maximum stock level method This can entered in System Information Management House Sick (billing system), so can make it easier for officer warehouse pharmacy in implementation method the. Study This is only as the study begins For implementation One method controls booking medication in the installation pharmacy, so the required study advanced related methods control other inventory, methods improvements and obstacles implementation method at the end year can minimized so that control inventory in the warehouse pharmacy become more optimal.

CONCLUSION

Implementation control supply preparation pharmacy in the installation Siti RSU pharmacy Aminah Bumiayu by using MMSL method (Minimum-Maximum Stock Level) show exists influence to mark supply preparation pharmaceutical and proven with exists decline mark supply after done intervention.

RECOMMENDATION

Stockout events can also be avoided by implementing inventory control using the MMSL method. The MMSL method has advantages and disadvantages. The disadvantage is that you don't get efficient drug purchasing prices, while the advantage is that the possibility of a stockout occurring is small. Referring to this, it is hoped that future researchers can carry out research again on inventory

planning and control using other methods, as additional information for related agencies.

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