

Analysis of Antiretroviral Drugs (ARV) Logistic Management in the Province of Sumatera Utara (Case Study: Regional Public Hospital Dr. Pirngadi Medan And Public Hospital HKBP Balige)

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Abstract. Management of good drug covers planning, procurement, storage, distribution, destruction, recording and reporting. Those are considered as one of the tasks of the North Sumatra Provincial Health Office and HIV Services in the Regency/City. Poor drug management will also have a negative impact on the quality of health services, due to sufficient and quality drugs greatly affect health services. The aim of this study was to analyze the drug management of the Gudang Antiretroviral (ARV) program in 2019 and 2020 at the Pharmacy Warehouse of the Health Office of North Sumatra Province, the Pharmacy Installation of Regional Public Hospital Dr. Pirngadi Medan, and Pharmacy Installation at Public Hospital HKBP Bali. The study was undertaken in January-April 2021. This study was descriptive with quantitative data that obtained retrospectively and simultaneously, qualitative data obtained through observation and interviews with informants. The data obtained were analyzed using indicators and compared with the standard research results. The findings indicated that in the Pharmacy Warehouse of the Health Office of North Sumatra Province, 5 indicators did not meet the standards and 9 indicators met the standards, 4 indicators at Regional Public Hospital Pirngadi Medan did not meet the standards and 8 indicators met the standards, but had not yet carried out the drug requirements planning process, and indicators of Public Hospital HKBP Balige did not meet the standards and did not plan drug needs. The conclusion of this study was that drug planning at the North Sumatra Provincial Health Office used the consumption method of the previous period. Regional Public Hospital Pirngadi Medan and Public Hospital HKBP Balige did not plan the need for drugs. Drug storage used the FEFO/FIFO system. Drug distribution at the Provincial Health Office and Public Hospital Dr. Pirngadi used a decentralized system, while the distribution system at Public Hospital HKBP Balige was centralized.

Keywords: Analysis, Management, Drug Program, Indicator, Pharmacy Installation

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1. Introduction

Human Immunodeficiency Virus (HIV) is a type of virus that attacks/infects the human immune system, destroys and impairs its function. HIV infection causes progressive damage to the immune system, so then it causes Acquired Immune Deficiency Syndrome (AIDS) [1].

In the worldwide, HIV sufferers always increase, there were 36.4 million people in 2016, there were 37.2 million people in 2017 and there were 37.9 million people at the end of December 2018 while in Indonesia in January 2019 it was reported as many as 640,000 people lived with HIV consisting of 35.48% women and 64.52% men [2].

North Sumatra in 2018 ranked 7th in the number of new positive HIV cases, there were 1,999 people and ranked 14th in the number of new positive AIDS cases with 149 people [3]. In 2019, HIV cases increased to 2,463 people. The cumulative number of HIV + AIDS patients in 2019 who received services according to standards was 76,984 people [3]. Based on the pattern of increasing prevalence of HIV-AIDS, people with HIV need treatment to reduce the amount of virus in the body so that it does not develop into the AIDS stadium.

Kompas National Media in 2008 reported that there was a shortage of ARV drug stock in Jogjakarta due to delays in the delivery of drug supplies from Jakarta. Efforts to overcome this issue began in 2009 in which the government conducted changes to the management system for managing ARV drugs from centralized to decentralized [4].

Regional Health Hospital Dr. Pirngadi Medan is a hospital owned by the Medan City Government which is given the authority to treat HIV-AIDS patients through the Decree of the Minister of Health number 832/Minister of Health/SK/X/2006 concerning the Establishment of Referral Hospitals for ODHA and the Service Standards of Referral Hospitals for ODHA and their Satellites [5]. Meanwhile, the Public Hospital HKBP Balige, Toba Samosir Regency, is the only

public hospital, both private and government, which was first designated as a referral hospital for HIV-AIDS patients for the Tapanuli area which was established through the Decree of the Minister of Health Number 760/Menkes/SK/VI/2007. Regarding the continued appointment of a referral hospital for ODHA [6].

Dealing with the problem of lack of stock of ARV drugs above, the aim of this study was analyzing the logistics management system for ARV drugs at the North Sumatra Provincial Health Office, Pharmacy Installation (IF) Regional Public Health. Dr. Pirngadi Medan and IF Public Health HKBP Balige.

2. Methods

2.1. Research Design

This study was a descriptive study with concurrent and retrospective data collection. Primary data were obtained from concurrent data collection which was carried out during this research by conducting observations and interviews with informants who were directly related to the management of ARV drugs, namely the Head of the Pharmacy Warehouse of the Provincial Health Office, the HIV-AIDS Management Section of the Provincial Health Office, and the ARV Drug Management Staff in the Warehouse. Provincial Health Office Pharmacy, VCT Pharmacist at Regional Public Hospital Dr. Pirngadi Medan, ARV Drug Management Staff/Applications at Regional Public Hospital Dr. Pirngadi Medan, VCT Pharmacist at Public Hospital HKBP Balige and drug management staff/ARV Applications at Public Hospital HKBP Balige. Then observations were undertaken by looking at the management of drugs that occurred, such as: drug planning, procurement, receipt, storage, distribution, destruction/withdrawal, recording/reporting of ARV program drugs from previous years in 2019 and 2020.

The data obtained were grouped into quantitative data and qualitative data. The instruments used were interview guides, data collection sheets in the form of ARV drug planning books, ARV drug stock cards, LPLPO, handover reports (BAST), ARV distribution books, and ARV drug receipt books, recording devices, stationery

2.2. Analysis of Parameter/Indicator

The steps in this study were undertaken by observing the drug management and then comparing it with the standard indicators in table 1.

Table 1. Indicators of drug management

Stage	Indicator	Standard Value
Planning	Planning accuracy	100-150% (Health Ministry RI, 2010)
	Percentage of planning deviation	20-30% (Pudjiansih, 2006)
Procurement	Pengadaan obat essential	100% (Health Ministry, 2010)
	Drug availability	100% (Health Ministry RI, 2019a)
	Drug suitability with DOEN	95% (Health Ministry, 2010)
Storage and Distribution	Drug availability level	12-18 bulan (Pudjiansih, 2006)
	Percentage of number and drug value that is already expired/damaged	$\leq 0,1\%$ in one year (Health Ministry, 2019b)
	Percentage of time average of medicine void	10 days (Pudjiansih, 2006)
	Percentage of dead drug stock	0%
	ITOR (Inventory Turn Over Ratio)	8-12x/year
	System of Drug Administration	FEFO/FIFO (Health Ministry, 2010)
	Suitability percentage of number of concret goods with the stock card	100%
	Management support towards planning and distribution	
Organization Management	Tiered; Central, Province, Regency/City	
Fund availability of drug procurement and other operationals	Pharmacist (Health Ministry, 2010)	
Person in Charge	Pharmacist/Pharmacy Labor (Health Ministry, 2010)	
Number of Human Resources	≤ 4 People (Health Ministry, 2015)	
Information System	Available (Health Ministry, 2010)	

3. Finding and Discussion

3.1. Planning Accuracy

The percentage results of the accuracy of ARV drug planning in 2019 and 2020 can be seen in table 2.

Table 2 . Percentage of Accuracy of ARV Drug Planning in 2019 and 2020

No	Description	2019		2020	
		Number of Drug	Percentage (%)	Number of Drug	Percentage (%)
1	Less <100%	5	38.46	5	38.46
2	Precise 100-150%	3	23.08	0	0
3	Too much >150%	5	38.46	8	61.54
	Total	13	100	13	100

3.2. Planning Deviations

The results of the percentage of planning deviations can be seen in Table 3.

Table 3. Percentage of Drug Planning Deviations in 2019 and 2020

No	Description	2019		2020	
		Number of Drug	Percentage (%)	Number of Drug	Percentage (%)
1	Less < 20%	4	30.76	1	7.70
2	Precise 20-30%	0	0	0	0
3	Too much >30)	8	61.54	11	84.60
4	Not Detected	1	7.70	1	7.70
	Total	13	100	13	100

3.3. The Selection and Procurement of ARV Drugs

Based on the results of interviews with informants 1 and 2 of the Pharmacy Warehouse of the Provincial Health Office, the selection and procurement of drugs for the ARV program at the Provincial Health Office was held by the Ministry of Health (Directorate General of Disease Prevention and Control and Director General of Pharmacy and Medical Devices) in collaboration with PT. Pharmaceutical Chemistry.

3.4. The Reception, Storage and Distribution of Drugs

The indicators used in the reception, storage and distribution stages were the level of availability, the percentage of expired drugs, the average drug vacancy time, the percentage of dead drug stock, the ITOR value, the drug storage system and the percentage match between the number of real goods and the stock card.

3.5. The Percentage of Drug Availability

The level of drug availability aimed to discover the range of adequacy of drug availability for one year with a standard used of 12-18 months. The percentage level of drug availability can be seen in table 4.

Table 4. Percentage of ARV Drug Availability Level in 2019 and 2020

Drug Availability Level										
Institution	Year	∑Drug	Less (<12 Months)	(%)	Precise (12-18 Months)	(%)	Too much (>18 Months)	(%)	Not Detected	(%)
Province Health Department Pirngadi Public Hospital Medan HKBP Public Hospital Balige	2019	13	0	0	9	69.23	4	30.77	0	0
		11	0	0	7	63.63	4	36.37	0	0
		10	2	20	2	20	6	60	0	
Province Health Department Pirngadi Public Hospital Medan HKBP Public Hospital Balige	2020	13	0	0	7	53.85	6	46.15	0	0
		11	0	0	9	81.82	0	0	2	18.18
		11	1	9,1	3	27.27	4	36.36	3	27.27

3.6. Percentage of Expired/Damaged Drug Value

The percentage of expired drugs can reflect inaccuracies and poor drug management. The way to prevent expired drugs must be careful at the time of reception and applying the First Expired First Out (FEFO) rule at the storage stage.

Table 5. Percentage of expired/damaged ARV drugs in 2019 and 2020

No	Year	Facility Name	Value of Drug Stock (IDR)	Total Value of Damaged Drug (IDR)	Result (%)	Standard Value
1	2019	Province Health Department	36.628.257.697	0	0	≤ 0,1%
		Pirngadi Public Hospital Medan	3.296.948.518	34.173.000	1.04	
		HKBP Public Hospital Balige	1954762989	0	∞	
2	2020	Province Health Department	52.373.548.708	2.778.163	0.005	≤ 0,1%
		Pirngadi Public Hospital Medan	2.476.458.431	748.265	0.03	
		HKBP Public Hospital Balige	1.695.236.592	22.208.038	1.3	

3.7. Results of The Average Drug Vacancy Time

The average percentage of drug vacancy time was calculated to discover the availability of drugs in pharmacy warehouses. The average drug void time was calculated based on the comparison between the total number of days off the drug and the total drug items used during the year.

Table 6. Percentage of Drug Vacancy Time in 2019 and 2020

No	Year	Facility Name	Average Days of Drug Void	Percentage (%)
1	2019	Province Health Department	1.5	0.42
		Dr. Pirngadi Public Hospital Medan	1.3	0.37
		HKBP Public Hospital Balige	7.5	2.05
2	2020	Province Health Department	36.5	10
		Dr. Pirngadi Public Hospital Medan	1.3	0.37
		HKBP Public Hospital Balige	0	0

3.8. Percentage of Dead Drug Stock

The percentage of dead drug stock was obtained from the number of drug items that have never been used for a minimum of three months divided by the number of drug items inventory for one year.

Table 7. Percentage of Dead Drug Stock in 2019 and 2020

No	Year	Facility Name	Item Number of Dead Drug Stock	Number of Drug Item	Result (%)
1	2019	Province Health Department	0	13	0
		Dr. Pirngadi Public Hospital Medan	2	11	18.2
		HKBP Public Hospital Balige	1	10	10
2	2020	Province Health Department	0	13	0
		Dr. Pirngadi Public Hospital Medan	3	11	27.3
		HKBP Public Hospital Balige	3	11	27.3

3.9. Results of Inventory Turn Over Ratio (ITOR)

Inventory efficiency was measured by the Turn Over Ratio (TOR) value, which was the amount of fund turnover for each type of drug in one period.

Table 8. ITOR of ARV Drugs in 2019 dan 2020

No	Year	Facility Name	Itor Result (Times)
1	2019	Province Health Department	6.03
		Dr. Pirngadi Public Hospital Medan	8
		HKBP Public Hospital Balige	2.6
2	2020	Province Health Department	2.7
		Dr. Pirngadi Public Hospital Medan	5.9
		HKBP Public Hospital Balige	2.05

4. Results and Discussion

Planning of ARV Drug

The indicators used in the planning phase of the program's drug requirements are the accuracy of planning, the percentage of planning deviations and the suitability of the available drug items with DOEN.

Planning Accuracy

The results obtained from the accuracy of planning for drug needs for the ARV program at the North Sumatra Provincial Health Office in 2019 which met the 23.08% indicator, while none of the planning accuracy met the indicator (0%) in 202, When compared with the standard value, the results obtained in 2019 was still very low and there was no ARV drug planning according to standards in 2020. The standard value used is 100-150% [8], [10]. This result was still not better than the research conducted by Sabri in 2020 regarding the evaluation of drug management for the pulmonary TB program, which was 88% [11], and the research conducted by Candra Dewi in 2020 Evaluation of Drug Procurement and Planning at Regional Public Health the Pandan Arang Boyolali was 101.6% [12].

Planning Deviations

In 2019 and 2020, the accuracy of the deviation percentage was 0%. The standard value of the percentage deviation of planning is 20-30%, [6] This data were due to the high inaccuracy of drug planning in 2019 and 2020. This inaccuracy of drug planning was due to changes in the pattern of using ARV drugs in HIV services. This change in the pattern of drug use was due to the changing pattern of doctor's prescriptions and the indiscipline of HIV patients in treatment. The amount of planned drugs was not the same as the drugs which also affected the results of deviations in drug requirements planning. The results of this study were not better when compared to the research of Yuliana, et al (2019) regarding the evaluation of planning and distribution of

drug programs in Southeast Sulawesi obtained the percentage of drug deviations for HIV-AIDS programs that met the standard value of 6.7% and for leprosy program drugs that met the standard value of 16% [13].

4.3. Reception, Storage and Distribution

The Availability Level of Drug

The level of availability of ARV drugs in the sufficient category (12-18 months) at the Provincial Health Office in 2019 was 69.23% and in 2020 as much as 53.85% For Regional Public Hospital Pirngadi Medan Hospital in 2019 was 63.63% and 81, 81% occurred in 2020, for Public Hospital HKBP Balige in 2019 was 20% and it was 27.27% in 2020. In both hospitals, drug categories were not detected, namely the category of drugs that not used for a year but supplies are in the hospital. The thing that caused the lack of availability of drugs at Public Hospital HKBP Balige was the lack of pharmaceutical workers so that no one who controlled the use/pattern of ARV drug use in the hospital. As for the excess category for the Provincial Health Office, this was due to improper planning, and the excess category was due to the fact that the entry of drugs was not the same as demand in Regional Public Hospital Pirngadi Medan.

Percentage of Expired/Damaged Drug Value

In 2019 at the Provincial Health Office no damaged drugs were found, while at Regional Public Hospital Pirngadi was found as much as 1.036% and at Public Hospital HKBP Balige could not be detected due to incomplete drug stock cards and in 2020 at the Provincial Health Office found around 0.005%, 0.03% was found at Regional Public Hospital Pirngadi Medan and at Public Hospital HKBP Balige found 1.3%. This indicated that the percentage of expired/damaged drugs for the pharmacy warehouses of the Provincial Health Office in 2019, 2020 and the Pirngadi Medan Hospital in 2020 have met the indicators, while the Pirngadi Medan Hospital in 2019 and the HKBP Balige Hospital in 2020 did not meet the r indicator set by the Ministry of Health, namely $< 0.1\%$ [10] This was due to changing patterns of drug use, patients did not take treatment regularly, drugs that were received but there was no demand, the lack of human resources in the management of ARV drugs such as at the HKBP Balige Hospital so that the supervision of the use of ARV drugs was very lacking. this result was not better than the results of Sabri's research, (2020) which was 0% [11].

The Average Drug Vacancy Time

The average drug vacancy time in general has met the indicator standard set by Pudjiansih in 2006 which is 10 days, but the Provincial Health Office pharmacy warehouse exceeded the standard limit of 36.5 days in 2020 [8]. This was due to delays in incoming drugs from the Ministry of Health. The lack of stock of ARV drugs caused the HKBP Balige General Hospital to borrow drugs from other HIV service units. The higher the percentage of drug vacancies, HIV-

AIDS services to ODHA will be disrupted. This result was not better than the research conducted by (Ihsan, S., et al., 2014) in the Evaluation of Drug Management at the Pharmacy Installation of Regional Public Hospital Muna Regency in 2014 which was 8 days [14].

Percentage of Dead Drug Stock

The stock of dead drugs was found at Regional Public Hospital Medan 18.2% in 2019 and 27.3% was found at Public Hospital HKBP Balige in 2020, 10% was in 2019 and 27.3% was in 2020 when compared to the standard value of 0% (Pudjaningsih, 2006). The two hospitals did not meet the indicator. The stock of dead drugs was due to the non-prescribing of drugs by doctors, and also these unused drugs could not be returned to the Health Office. This result was not better than the research conducted by (Munawaroh, M 2019) namely Evaluation of Drug Storage Management at Koesnadi Bondowoso Hospital which was 1.6% [15].

Results of Inventory Turn Over Ratio (ITOR)

The ITOR of Regional Public Hospital Pirngadi Medan obtained 8 times in 2019, while the others did not meet the indicators, it can be concluded that the ITOR that met the indicators (8-12 times / year) was only at the Regional Public Hospital Pirngadi Medan in 2019. The low ITOR value could occur due to the dropping of drugs as well as because there were drugs that distributed but there was no demand. The changing pattern of ARV drug use also affected the ITOR value. The results of this study were not better than the results of research conducted by (Indarti, R., et al, 2019) regarding Drug Inventory Control at Yogyakarta Hospital, namely 8.49 times / year and the results of research conducted by (Kencana, G., 2016) Analysis of Planning and Control of Antibiotic Drug Inventory in Regional Public Hospital Cicalengka that was 8.1 times/year [16],[17].

Drug storage system

Dealing with observations at the Provincial Health Office and Regional Public Hospital Pirngadi Medan, the FEFO and FIFO systems have been implemented, however at the Public Hospital HKBP Balige, the FEFO/FIFO system has not been implemented.

The percentage result of suitability the number of real goods with stock card

Based on the results of direct observations at the Provincial Health Office and Regional Public Hospital Pirngadi Medan, the standard was 100% [8]. while at the Public Hospital HKBP Balige did not meet the standard because stock card was not found in the ARV drug storage cabinets. The results of this study were not better than research of (Yuliana, B. et al., 2019) obtained 100% [13].

Distribution

Drug distribution at the North Sumatra Provincial Health Office in 2019 used a centralized system, whereas it became a decentralized system in 2020. For the distribution of ARV drugs at the Regional Public Hospital Pirngadi Medan, the distribution system used a decentralized system, then the drugs were given to patients with an individual prescription system at the Outpatient Pharmacy. Meanwhile, at Public Hospital HKBP Balige, the distribution system used a centralized system, then drugs were given to patients with an individual prescription system through the Central Pharmacy Installation.

Destruction

Destruction of damaged ARV drugs in 2019 and 2020 has not been carried out in all research locations, drugs that have been damaged/expired at the Provincial Health Office and Regional Public Hospital Pirngadi Medan have been separated from other drugs, while at Public Hospital HKBP Balige still found expired drugs in storage cabinets of ARV drugs.

Reporting

For HIV services, Regional Public Hospital Pirngadi Medan and Public Hospital HKBP Balige report drug management directly to the Sub-Division in charge of managing HIV-AIDS drugs at the Provincial Health Office for 2019 while in 2020 reporting on ARV drugs to the District/City Health Office was done through the SIHA application. For inventory control at the Provincial Health Office used complete drug stock card, SIHA application and Excel Arvast Forecasting software application, Regional Public Hospital Pirngadi Medan used stock cards, ARV drug report files and also used the SIMRS application, whereas at Public Hospital HKBP Balige in 2019 used a card stock and SIHA application and it did not use drug stock card in 2020.

Support Management on Drug Management

The indicators used to support planning and distribution management were organizational management, person in charge, number of human resources (HR), availability of funds and information systems. Ministry of Health of the Republic of Indonesia to improve the quality of public drug management in districts/cities such as e-Fornas for drug planning, e-Monev Catalog for monitoring and evaluation of drug planning and procurement, e-Purchasing/e-Catalog in drug procurement, e-Logistics in distribution. Information and communication technology-based innovations have also been carried out by Hospital by developing SIMRS

Based on the results of interviews and observations, it indicated that the North Sumatra pharmacy warehouse has obtained standard values for supporting management manajemen pharmacy warehouse (Ministry of Health, 2015), Regional Public Hospital Pirngadi Medan has properly equipped the pharmacy warehouse and has a SIMRS that connected to the Pharmacy Installation, while at the Public Hospital HKBP Balige has been equipped with good facilities and

infrastructure but it does not yet have a SIMRS and still lacks of pharmaceutical human resources. [17]

Table 9. Support management in the management of ARV drugs

No	Supporting Management	Facility Name		
		Health Department	Dr. Pirngadi Public Hospital Medan	HKBP Public Hospital Balige
1	Organization Management (Tiered from Central, Province, Regency/City)	✓	✓	✓
2	Fund Provided	✓	✓	✓
3	Person in Charge (Pharmacist)	✓	✓	✓
5	Number of Human Resources Managing ARV Drug ≥ 4 people	✓	✓	×
6	Provided SOP of Drug Management	✓	✓	✓
7	Provided application: SIHA Application (Special for ARV)	✓	✓	✓

5. Conclusion

Responding to the discussion and research results, the following conclusions can be obtained: The drug logistics management system for the ARV program at the Sumatra Provincial Health Office that did not meet the standards was the percentage of planning accuracy, the percentage of planning deviations, the level of drug availability, the average number of drug vacancies in 2020, ITOR results. The drug logistics management system for the ARV program at Regional Public Hospital Dr. Pirngadi Medan that have not met the standards were the level of drug availability, the percentage of expired/damaged drugs in 2020, the number of dead drug stocks resulting from ITOR 2019. Planning for drug needs has not been carried out. The drug logistics management system for the ARV program at Public Hospital HKBP Balige did not meets drug management indicator standards, did not plan for drug needs, the application used was merely the SIHA application, the lack of human resource for ARV drug management.

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