

## ***PROBLEM INDICATORS OF DRUG MANAGEMENT AT DISTRIBUTION STAGE IN INDONESIAN HOSPITALS: A LITERATUR REVIEW***

Permasalahan Indikator Pengelolaan Obat Pada Tahap Distribusi di Indonesia: Literature Review

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### **ABSTRAK**

Tahap distribusi merupakan bagian penting dari manajemen obat di rumah sakit. Namun, terdapat permasalahan pada indikator tahap distribusi obat di rumah sakit. Oleh karena itu, tujuan dari penelitian ini adalah untuk mengetahui permasalahan pada indikator distribusi di instalasi farmasi rumah sakit berdasarkan indikator Depkes RI (2008), Pudjaningsih (1996) dan WHO (1993). Pencarian literatur dilakukan pada bulan Oktober 2023 menggunakan *Google Scholar*, *researchgate* dan Garuda Kemendikbud. Kualitas metodologis dinilai dengan menggunakan alat dari *Joanna Briggs Institute* (JBI). Kami mendapatkan 3.237 artikel dan memasukkan delapan penelitian. Mengenai desain, penelitian ini merupakan penelitian observasi dokumen retrospektif (n=8). Ditemukan bahwa terdapat masalah pada indikator tahap distribusi, seperti *turn over ratio*, obat kadaluarsa atau rusak, stok obat mati dan ketersediaan obat yang tidak optimal di rumah sakit. Sebagian besar artikel melaporkan ketidaksesuaian indikator distribusi obat berdasarkan WHO (1993), Depkes (2008) dan Pudjaningsih (1996). Hal ini menunjukkan bahwa manajemen obat di rumah sakit belum optimal. Temuan penelitian ini dapat menjadi perhatian bagi para apoteker, dokter dan tenaga kesehatan lainnya untuk memperhatikan kelancaran pengelolaan obat di rumah sakit.

**Kata kunci:** Tantangan Distribusi, Logistik Farmasi, Indikator Pengelolaan Obat

### **ABSTRACT**

The distribution stage is an important part of drug management in hospitals. However, there are problems with the indicators of the drug distribution stage in hospitals. Thus, the purpose of this study is to determine the problems in distribution indicators in hospital pharmaceutical installations based on indicators the Ministry of Health the Republic of Indonesia (2008), Pudjaningsih (1996) and WHO (1993). A literatur search performed in October 2023 using *Google Scholar*, *researchgate* and Garuda Kemendikbud. Methodological quality was assessed using tools from the *Joanna Briggs Institute* (JBI). We retrieved 3.237 articles and included eight studies. Regarding the design, they were observation documen retrospective (n=8). It was found that there were problems in the distribution stage indicators, such as *turn over ratio*, expired or damaged drugs, dead drug stocks and drug availability that could have been more in hospitals. Most articles report discrepancies in drug distribution indicators based on WHO (1993), Ministry of Health

(2008) and Pudjaningsih (1996). This shows that drug management in hospitals is not optimal. The findings of this study may be of interest to pharmacists, doctors and other health workers to pay attention to the smooth cooperation of drug management in hospitals.

**Keywords:** Distribution Challenges, Pharmaceutical Logistics, Drug Management Indicators

## INTRODUCTION

One part of logistics management is drug distribution. Distribution is part of drug management where a series of activities in order to distribute pharmaceutical preparations, medical devices, and consumables from storage to service units (Hoffmann, 2009). Effective drug distribution has a good system and management by maintaining a stable drug supply, maintaining good drug quality and minimizing unused drugs due to expiration or damage (Farquharson *et al.*, 2011). Indicators used in drug distribution include the suitability of drugs with stock cards, Turn Over Ratio, expired and damaged drugs, dead drug stocks and the level of drug availability set by the Ministry of Health of the Republic of Indonesia (2008), Pudjaningsih (1996) and WHO (1993).

However, several studies show that there are still various problems found in drug distribution indicators in Indonesian hospitals. A study at Poso Hospital, Central Sulawesi Province, found a mismatch between physical drugs and stock cards by 95.89%, expired and damaged drugs by 11.42%, and dead stock by 4.24% (Herman *et al.*, 2019). Another study reported a discrepancy in the Turn Over Ratio in Indonesian hospitals. In other studies such as in the study at Muntilan Hospital, there was a discrepancy in the TOR (Turn Over Ratio) indicator, this shows that the value of inventory at Muntilan Hospital has not been

economically efficient (Ghozali *et al.*, 2021). Distribution that does not work well results in drug vacancies and will affect pharmaceutical services, for example in TOR (Turn Over Ratio), if a low TOR illustrates that there is still unsold stock (Primadimanti *et al.*, 2022). Death stock or drugs that do not experience transactions within at least 3 months caused by several factors such as lack of planning and commitment of doctors in the allocation of good drugs so that the available drugs are not the drugs needed (Andriani *et al.*, 2023).

The purpose of this literature review aims to identify and thoroughly analyze problem drug distribution indicators and influencing factors in Indonesian hospitals. This study uses a literature review method. The results of this literature review are expected to provide a comprehensive picture of the current condition surrounding drug distribution in Indonesian hospitals. To that it can be used as a reference for policy makers and other researchers for research or further improvement efforts related to drug distribution in hospitals.

## METHOD

### Search Strategi

A literature review search of the literature was performed in April 2021 using the following databases: *Garuda Kemdikbud*, *Google Scholar*, dan *Researchgate*. The search strategy used standard (MeSH terms) and non-standard terms related to “analysis

manajemen obat OR manajemen logistik AND indikator tahap distribusi AND Apoteker Rumah sakit OR farmasi logistik rumah sakit". Each term was grouped through Boolean operators (AND and OR) to their synonyms and subcategories and adapted to each database. Additionally, we manually searched the reference lists of all eligible studies. The databases were searched for publications 2019 until 2024.

## **TOOLS AND MATERIALS**

### **Eligibility Criteria**

Studies were eligible for inclusion if they met the following criteria; (i) Published in English or Indonesian; (ii) The year the article was published between 2019 to 2024; (iii) Discuss the management of distribution-stage drugs in hospitals; (iv) Contain complete and relevant information related to indicators in the hospital distribution stage; (v) Articles containing ISSN Numbers. The following literature and studies were excluded; (i) Articles published before 2019 (ii) literature review; (iii) literatur reviews or meta-analyses; (iv) studies not available in full; (v) The article is irrelevant and incomplete according to the required database; (vi) Thesis and Handbook.

### **Quality Assessment**

JBI's critical appraisal tools (eight items) (Institute, 2020) were utilized to evaluate the methodological quality of the included studies.. Each item was marked "yes," if the article met the criteria of the item; "no," if it did not meet the criteria; "unclear" if sufficient information to make a judgment was lacking; and "Not Applicable,"

if the item did not apply to the article, as shown table 2.

## **RESULT**

### **Search and Study selection**

A total of 3.237 articles were identified from the initial search. After excluding duplicated or irrelevant articles based on titles and abstracts, 104 potentially relevant articles were retrieved for full-text evaluation. Out of these, seven met the inclusion criteria and were included in this literatur review. Figure 1 illustrates the study selection process.

### **Study Characteristics**

The characteristics of the included studies (Table 1) all eight articles were published in English or indonesian from 2019 to 2024. This research was conducted in several hospitals in Indonesia. This research was conducted in Java and outside Java. The study was conducted in several cities in the provinces of East Java (n = 2), Central Java (n = 4), Bali (n = 1) and province of Sumatera (n = 2). The study used deskriptive methods with retrospective observation documen or concurrent, as shown in table 1. Several studies assessed indicators of stock card suitability (n = 0), Turn Over Ratio (n = 7), expired and damaged drugs (n = 6), dead stock of drugs (n = 6), and drug availability (n = 6), as shown table 3.

### **Quality Assessment**

According to the finding of the JBI Critical Appraisal used to evaluate the article's quality, all articles obtained a score of at least six, indicating that the methodological quality of the article was

extremely high. The result of the quality evaluation re shown in table 2.

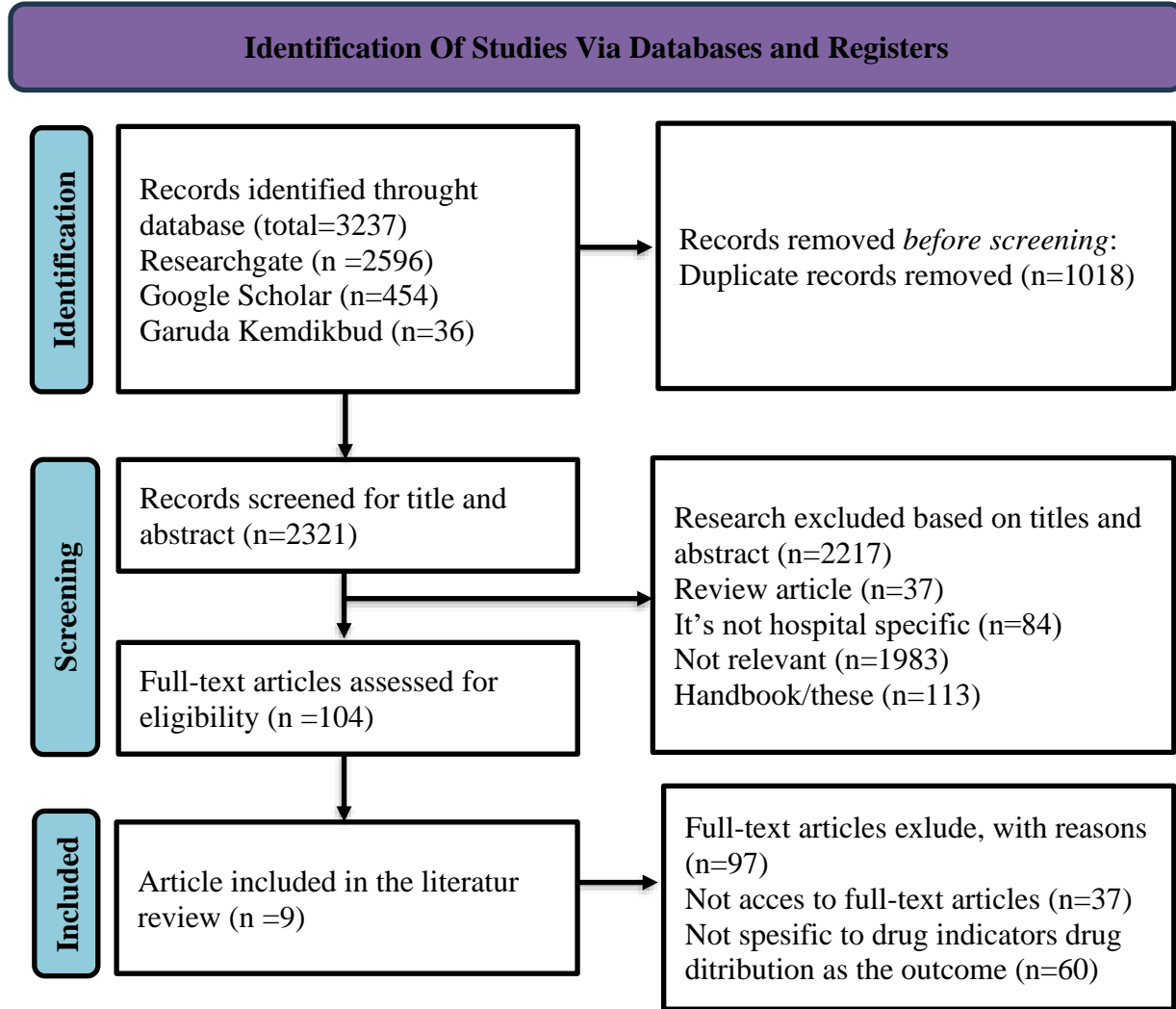


Figure. 1 PRISMA diagram of the extracted studYy

Table 1. Study Characteristics

<b>Author/Year</b>	<b>Setting</b>	<b>Thype of Hospital</b>	<b>Hospital Type</b>	<b>Data Collection Methode</b>
Maulina <i>et al</i> , 2020	Langsa Hospital in Aceh	B	General Hospital	Observasion Document, Retrospektive and prospektive
Satibi <i>et al</i> . 2020	Hospital In Banyuwangi	C	General Hospital	Observasion Document, retrospective and concurrent
Ghozali <i>et al</i> , 2021	Psychiatric Hospital Prof. Dr. Soerojo	A	Mental Health Hospital	Observasion Document, retrospective
Wibowo <i>et al</i> , 2021	Tugu Rejo Hospital In Semarang	B	General Hospital	Observasion Document Deskriptif
Ghozali <i>et al</i> , 2021	Muntilan Hospital, Central Java	C	General Hospital	Observasion Document, retrospective
Nugroho <i>et al</i> , 2022	Air Force Hospital dr. Efram Harsana, Madiun	C	Air Force Hospital	Observasion Document, retrospective and concurrent
Maimum, 2023	Kolonel Abunjani Bangko Hospital in Jambi	C	General Hospital	Observasion Document, retrospective dan Prospektive
Nugrahaini <i>et al.</i> , 2023	Dadi Keluarga Hospital In Purwokerto	C	General Hospital	Observasion Document, retrospective and concurrent
Ningrat Giwangkara <i>et al.</i> , 2023	Hospital Badung Regency	B and C	General Hospital	Observasion Document

Table 2. Quality Assessment

Author/Year	Score
Nugroho <i>et al</i> , 2022	6
Ghozali <i>et al</i> , 2021	7
Wibowo <i>et al</i> , 2021	6
Ghozali <i>et al</i> , 2021	8
Satibi <i>et al</i> . 2020	7
Mauliana <i>et al</i> , 2020	7
Maimum, 2023	6
Nugrahaini, 2023	7
Ningrat Giwangkara <i>et al</i> , 2023	7

Table 3. Checklist of Conformity or Non-conformity of Distribution Stage Drug Management Indicators

Researcher & Year	Compatibility between the physical with the card	the drug stock	TOR	Expired and Damaged Drugs	Dead Stock	Availability Drug
(Nugroho <i>et al.</i> , 2022)	X**		√*	NA***	NA***	√*
Ghozali <i>et al.</i> , 2021)	√*		√*	X**	√*	NA***
(Wibowo <i>et al.</i> , 2021)	X**		X**	X**	X**	√*
(Ghozali <i>et al.</i> , 2021)						
	√*		NA***	NA***	X**	X**
(Satibi <i>et al.</i> , 2020)	√*		√*	NA***	NA***	√*
(Maulina <i>et al.</i> 2020)						
	√*		X**	X**	X**	√*
(Maimum, 2023)	X**		√*	√*	NA***	NA***
(Nurgahaini <i>et al.</i> , 2023)	√*		√*	√*	X**	√*
(Ningrat Giwangkara <i>et al.</i> , 2023)	√*		NA***	X**	X**	NA***

Note \* Appropriate are indicators; \*\* Appropriate are not indicators; \*\*\* not researched

Tabel 4. Data Extraction

<b>Problems with drug distribution indicators in hospitals</b>					
<b>Research &amp; Year</b>	<b>Compatibility between the physical drug with the stock card</b>	<b>TOR</b>	<b>Expired and Damaged Drugs</b>	<b>Dead Stiock</b>	<b>Avaibility Drug</b>
(Maimun, 2023)	warehouse staff who are not careful	Already efficient	Already efficient	NA*	NA*
(Ningrat Giwangkar <i>a et al.</i> , 2023)	Already efficient	NA*	The drugs spent in that period no longer match the needs of practicing doctors today.	Lack of communication between warehouse and pharmacy depot staff and a sudden drop in drug demand.	NA*
(Nurgahain <i>i et al.</i> , 2023)	Already efficient	Already efficient	Already efficient	If there is a special request from a particular doctor, and the doctor is no longer practicing in the hospital and the drug is rare cases of the disease	Already efficient
(Nugroho <i>et al.</i> , 2022)	Warehouse officers do not only do work in the warehouse, so in serving drug requests from outpatient pharmacies, inpatients and treatment rooms, it is very likely not to immediately record every drug dispensing	Already efficient	NA*	NA*	Already efficient

<b>Problems with drug distribution indicators in hospitals</b>					
<b>Research &amp; Year</b>	<b>Compatibility between the physical drug with the stock card</b>	<b>TOR</b>	<b>Expired and Damaged Drugs</b>	<b>Dead Stock</b>	<b>Availability Drug</b>
(Ghozali <i>et al.</i> , 2021)	Already efficient	The accumulation of drugs in warehouses and large purchases that inhibit the circulation of drugs and cause the stacked drugs to be damaged or expired	Already efficient	There is a buildup of drugs in warehouses, causing financial losses	NA*
(Wibowo <i>et al.</i> , 2021)	The information system in logistics is not optimal so that pharmacy warehouse officers need a long time to match between stock and physical drugs through the system and sometimes officers choose to use manual methods	The low TOR due to the abundance of drug stocks and the high value of expired drugs could potentially result in losses for the Hospital.	The drugs spent in that period no longer match the needs of practicing doctors today.	The drugs spent in that period no longer match the needs of practicing doctors today.	Already efficient
(Ghozali <i>et al.</i> , 2021)	Already efficient	NA*	Already efficient	Drug buildup in pharmaceutical warehouses	NA*
(Satibi <i>et al.</i> , 2020)	Already efficient	RSUD Kab Ngawi is appropriate, while RSUD Kab Banyuwangi	NA*	NA*	Already efficient



<b>Problems with drug distribution indicators in hospitals</b>					
<b>Research &amp; Year</b>	<b>Compatibility between the physical drug with the stock card</b>	<b>TOR</b>	<b>Expired and Damaged Drugs</b>	<b>Dead Stock</b>	<b>Availability Drug</b>
		is not yet suitable due to the accumulation of drugs (over stock) in the drug warehouse. Purchasing drugs in large quantities is one of the triggers for drug buildup			
(Maulina <i>et al.</i> , 2020)	Already efficient	NA*	The lack of optimal control on drugs that are approaching expiration, many drugs from previous year's purchase	Doctors do not prescribe certain drugs, mistakes occur by officers because of lack of control over drug stocks that are close to expiration / damaged so that there is a buildup of drugs	Already efficient

Note \* not researched

## DISCUSSION

The results of 9 articles of drug management analysis at the distribution stage in hospitals still have problems with mismatch of drug management indicators at the drug distribution stage in hospitals, including the following.

### **Compatibility between the physical drug with the stock card**

The results showed that the percentage of conformity of the drug with the stock card was 100%. This means that all drugs recorded on the stock card correspond to the drugs that are actually in the pharmacy warehouse. This shows that the system of recording and monitoring drug stocks in pharmacy warehouses is running well and accurately. The high suitability of the drug to the stock card has several positive implications. First, it ensures the availability of appropriate and sufficient medication in the hospital, so that patients can get the appropriate treatment. Second, this fit helps prevent shortages or overstocks of drugs that can cause logistical and financial problems for hospitals. Third, with high suitability, decision making related to drug procurement and distribution can be carried out more efficiently and accurately (Ghozali *et al.*, 2021; Satibi *et al.*, 2020; Mulina *et al.*, 2020; Nurgahaini *et al.*, 2023; Ningrat Giwangkara *et al.*, 2023).

However, there are hospitals that are not optimal, this is because warehouse officers do not only do work in warehouses, so that in serving drug requests from pharmacies, hospitalizations, and treatment rooms do not directly record every drug expenditure. In addition, other problems that

are problematic in this indicator are The information system in logistics is not optimal so that pharmacy warehouse officers need a long time to match between stock and physical drugs through the system and sometimes officers choose to use manual methods (Nugroho *et al.*, 2018; Wibowo *et al.*, 2021; Maimum, 2023).

Some factors that can affect the mismatch between physical drugs and stock cards in hospitals are that the surveillance and monitoring system is not optimal. Supervision and monitoring of the process of selection, procurement, distribution and use of drugs need to be carried out more intensively and structured. It is important to ensure that the entire process runs according to applicable standard operating procedures. In addition, the lack of training socialization on proper recording procedures according to SOPs affects data discrepancies. Pharmacy workers, pharmacists and other health workers involved in the process do not fully understand the applicable regulations. In fact, accurate recording and reporting are important to ensure compatibility between physical conditions and administrative data. Less than optimal communication such as pharmaceuticals, warehouses, not good, this can cause errors in recording during the process of distributing drugs from warehouses to service units so that data accuracy is disrupted (Nugroho *et al.*, 2022; Ghozali *et al.*, 2021).

### **Turn Over Ratio (TOR)**

Most TOR scores in hospitals are still low or not up to standard (Wibowo *et al.*, 2021; Maulina *et al.*, 2020) . The large number of medium and high frequency drug

items shows the hospital pharmacy installations to adapt to variations in drug demand by adjusting quantity requirements. Repeated drug purchases also show that the demand for drugs in hospital pharmacies is very high Based on the table above. The low purchasing frequency, which can cause slow turnover of medicines and the possibility of dead stock or even expired medicines if there is no supervision (Maulina *et al*, 2020).

Possible losses include the need for larger drug storage space and the risk of drugs being buried and damaged. The influencing factor in this indicator is the buildup of drugs in hospital pharmacy warehouses which causes a lack of efficiency in drug distribution in hospitals. Large purchases of drugs that are carried out routinely result in drug stocks experiencing a buildup in warehouses. Though the storage space in the warehouse has limited capacity. Due to the accumulated stock of drugs, the process of distributing drugs from warehouses to service units has been hampered. This will affect the delay in drug turnover in each unit. On the other hand, drug buildup in warehouses also increases the risk of drug damage due to moisture and limited storage space (Ghozali *et al.*, 2021).

Generally, the factors causing the ineffectiveness of TOR are due to disease patterns, decreased levels of patient visits to the hospital, and lack of communication between staff in pharmacy warehouses and other health workers which can result in drug buildup.<sup>4</sup> Efforts are made to control drugs whose turnover is slow and must be closely monitored to avoid expired drugs and dead drug stocks (Wibowo *et al*, 2021).

### **Expired and Damage Drugs**

There are still many hospitals that have not achieved a score of 0% on the indicator of expired or damaged drugs. (Ghozali *et al.*, 2021; Maulina *et al*, 2020; Ningrat *et al*, 2021). Stagnant drugs without quality control and control will be able to cause damaged and expired drugs. The occurrence of damaged, expired and stagnant drugs is caused by management and supporting systems. Damaged and expired drugs reflect the poor distribution system, or lack of quality observation in drug storage due to carelessness of officers, for example drugs or drug stocks purchased last year that have been damaged or returned from patients who are already in incomplete form so that they cannot be returned to the distributor, drugs that are not prescribed by doctors, and negligence of officers in controlling drugs that are close to expiration resulting in excess stock causing expired drugs due to unused drugs or changes in disease patterns (Ningrat *et al.*, 2021; Ghozali *et al*, 2021).

In addition, the pattern of prescribing and the varying demand of doctors, can cause changes in using pharmaceutical preparations and BMHPs so that there are supplies that are not moving and slow moving. Immovable inventory causes stock to die, and expire. Efforts made to overcome so that damaged and expired stocks do not occur need to evaluate stock planning, storage of goods and also the ability and cooperation of pharmaceutical personnel, nursing and hospital doctors in monitoring slow-moving inventory (Maulina *et al*, 2020).

In some Indonesian hospitals there is a problem of expired and damaged drugs that are quite high. A search shows there are some systemic constraints that affect this. First,

supervision and monitoring of drugs that will expire drugs, so that drugs that are almost expired are not detected and not immediately distributed to doctors for use. Second, drug supply systems that do not apply the FEFO principle. If drugs enter and are stored in the warehouse not in the order of expiration period, it has the potential to cause the longest stored drugs to expire first (Ghozali *et al.*, 2021).

### **Dead Stock**

Table 4 shows that most hospitals have not met the standard on the dead stock indicator, which is 0% (Wibowo *et al.*, 2021; Ghozali *et al.*, 2021; Maulina *et al.*, 2020; Nurgahaini *et al.*, 2023; Ningrat *et al.*, 2023). Supplies of pharmaceutical preparations and BMHPs that died in hospitals were related to the planning process. This condition is because the doctor did not prescribe the drug and chose another brand according to the patient's clinical condition at that time (Ghozali *et al.*, 2021; Wibowo *et al.*, 2021; Nugrahaini *et al.*, 2023).

This indicator discrepancy is caused by doctors not prescribing the drug and human error in procurement resulting in a buildup of drug stocks. According to the analysis conducted, the increase in cases of expired and damaged drugs in several Indonesian hospitals is increasing. This is due to the lack of accuracy of Hospital Pharmacy installation employees in recording expired drugs and drug stocks. This causes the nearest expiration drug not to be tracked. then, In drug procurement does not pay attention to the number of expired drugs in the previous year as a reference, so that many drugs purchased exceed the actual need (Wibowo *et al.*, 2021).

Factors that cause dead stock in pharmaceutical warehouses include brand changes, doctors no longer prescribe certain drugs, fluctuating disease trends, and drugs that should be available in pharmaceutical warehouses but are not used in pharmaceutical services (Ghozali *et al.*, 2021). An effort to control in the regulation of pharmaceutical preparations and BMHP is to evaluate supplies that are not used by doctors for more than three consecutive months. Hospital losses due to dead stock are a restrained financial turnover, and have the potential to expire drugs and even damage to supplies due to too long storage. One of the pharmaceutical installation programs in reducing losses is to exchange inventory or return the inventory to distributors. Hospital pharmacists are advised to be more active in communicating and coordinating dead stock information through the Pharmacy and Therapy Team to functional medical staff doctors and monitored every month, this aims to reduce the occurrence of dead stock (Nurgahaini *et al.*, 2023).

### **Availability of the Drug**

Drug planning and pharmaceutical preparations are part of the inventory management process after the selection of drug types and other pharmaceutical preparations. The amount of medicine is adjusted to the needs and budget of the hospital, with the aim of avoiding the availability of drugs. This is adjusted using consumption patterns, epidemiology, and a combination of both so that it is adjusted to the budget available at the hospital (Ghozali *et al.*, 2021).

Based on the research of Elimati Latifah *et al*, it was explained that the availability of drugs in hospitals was not fully following the stipulated provisions. Several problems in drug procurement become obstacles in increasing drug availability such as drug procurement policies that are not optimal due to ineffective drug procurement management that can cause delays in drug delivery to hospitals or inadequate drug needs. There is a difference in availability between public hospitals and private hospitals. This may be due to differences in drug procurement policies, available resources or other factors affecting drug management. The availability of these medications can affect health services and cause patient difficulty getting the necessary treatment. The level of availability of existing drugs is considered sufficient. However, the management and distribution of existing drugs have not been evenly distributed and good (Nugroho *et al*, 2022; Wibowo *et al*, 2021; Satibi *et al*, 2020; Maulina *et al*, 2020; Nurgahaini *et al*, 2023).

This is because these drugs are not managed with good procedures, causing a buildup of drug stocks at one of the hospital's pharmacy depots. Even though these drugs to support the treatment process and patient needs. With this buildup, it ultimately causes inefficiencies in the drug management system even though the availability of drugs is actually adequate. Therefore, it is necessary to improve the management and distribution of drugs that are more structured to support health services that run well (Maulina *et al*, 2020).

Efforts made to overcome this problem made improvements in drug

procurement and drug inventory management in hospitals. These recommendations can be a guide for hospitals and related parties in increasing drug availability and ensuring optimal health services (Ghozali *et al.*, 2021).

## CONCLUSION

This literature review explains that there are problems in the indicators of the drug distribution stage in hospitals that need attention. There is a discrepancy between the physical drug and the stock card, indicating a problem in drug inventory management. The drug turnover ratio in hospitals is also not optimal, indicating inefficient drug use. Another issue is the presence of many expired and damaged drugs in hospitals, as well as dead drug stocks, resulting in waste of resources. The overall availability of drugs in hospitals is also not optimal, influenced by suboptimal procurement policies and inefficient inventory management. Targeted and continuous improvement efforts are needed in drug distribution in hospitals. This includes improved accuracy of drug inventory recording, optimization of drug procurement policies, better monitoring of expiration dates, improved inventory management, and better collaboration between related parties. Thus, it is hoped that the availability of drugs in hospitals can be increased, so that patients can receive optimal health services.

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