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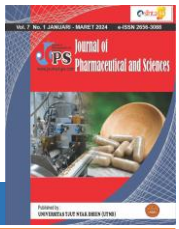

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Evaluation of the suitability of drug storage in the Ngesrep health center pharmacy warehouse based on pharmaceutical standards and Islamic Sharia

Evaluasi kesesuaian penyimpanan obat di gudang farmasi puskesmas Ngesrep berdasarkan standar kefarmasian dan Syariat Islam

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Abstract

Pharmaceutical services are direct services and communication to patients related to pharmaceutical preparations to achieve definite results and improve patients' quality of life. Drug storage is the activity of storing and maintaining by placing received drugs in a place that is considered safe from theft and physical disturbances that can damage the quality of the drug. If there is an error in storing the drug, it will decrease the drug content and result in losses to the Health Center. This study was conducted to distribute the storage of pharmaceutical preparations in the Ngesrep Health Center pharmacy installation warehouse. This study is a type of non-experimental research, namely descriptive research conducted through observation and interviews related to storing pharmaceutical preparations through evaluation based on Permenkes Number 74 of 2016 and the Directorate General of Pharmacy and Medical Devices and analysis of drug storage indicators. Based on the results of the study, it was obtained that the suitability of the spatial storage requirements at the Ngesrep Health Center in 2024 was 90.74%, with excellent information.

***Keywords*: Drug storage, Pharmacy Warehouse, Islamic Sharia**

Abstrak

Pelayanan Kefarmasian adalah suatu pelayanan langsung dan bertanggungjawab kepada pasien yang berkaitan dengan sediaan farmasi dengan maksud mencapai hasil yang pasti untuk meningkatkan mutu kehidupan pasien. Penyimpanan obat merupakan kegiatan menyimpan dan memelihara dengan cara menempatkan obat-obatan yang diterima pada tempat yang dinilai aman dari pencurian dan gangguan fisik yang dapat merusak mutu obat. Jika terdapat kesalahan dalam penyimpanan obat maka akan membuat menurunnya kadar obat dan mengakibatkan kerugian pada Puskesmas. Penelitian ini dilakukan untuk mengevaluasi penyimpanan sediaan farmasi di Gudang instalasi farmasi Puskesmas Ngesrep. Penelitian ini termasuk jenis penelitian non-eksperimental yaitu penelitian berupa deskriptif yang dilakukan secara observasi dan wawancara terkait proses penyimpanan sediaan farmasi melalui evaluasi berdasarkan Permenkes Nomor 74 Tahun 2016 dan Direktoral Jenderal Kefarmasian dan Alat Kesehatan serta analisis indikator penyimpanan obat. Berdasarkan hasil penelitian didapatkan bahwa kesesuaian persyaratan penyimpanan tata ruang di puskesmas Ngesrep tahun 2024 sebesar 90,74% dengan keterangan sangat baik.

Kata Kunci: Penyimpanan obat, Gudang Farmasi, Syariah Islam

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Introduction

Errors in drug storage at the Health Center will result in drug damage, reducing the potency of the drug and making it ineffective for patients. Drug damage has a negative impact not only on patients but also on healthcare facilities. Drug storage management at the Health Center needs to be improved to reduce the risk of expired drugs and maximise drug turnover [1].

Drug storage is one of the security activities for received drugs. Drug storage in the pharmacy installation is part of the integrity or suitability of the drug before being handed over to the patient because errors in drug storage can reduce the level or potency of the drug and cause losses to the Health Center [2].

According to Permenkes No. 74 of 2016 concerning pharmaceutical service standards at the Health Center, this is by the word of Allah SWT in QS. Al-A'la verse 3 says something must be according to the size or level He has determined. Which reads:

وَٱلَّذِى قَدَّرَ فَهَدَىٰ ۝٣

The verse above means "And who determines the level (of each) and gives guidance" and means that Allah determines the type, form, actions, words, and death of everything, then gives guidance to all according to its necessity. This verse teaches the importance of respecting the provisions (levels) set in drug storage and taking guidance from existing guidelines to ensure that drugs remain effective and safe [3]. According to Islamic teachings, drug storage activities should not be carried out carelessly because there are drug ingredients/medicines that are classified as non-halal and have not received halal certification. To minimise the mixing of these things, drug storage is carried out which is adequately regulated and labeled [4]. Based on the background above, research is needed to determine the storage system in the Ngesrep Health Center Pharmacy Warehouse based on pharmaceutical standards and Islamic law.

Experimental Section

This study was conducted descriptively and observationally using checklist sheets and interviews. Evaluation was conducted by comparing drug storage indicators with actual conditions. The results of the obtained scores were calculated based on the Guttman scale:

Yes: Score 1 No: Score 0

Percentage of acquisition (%): $\frac{score\ acquisition}{maximum\ score} x100\%$

The data will be analyzed descriptively to classify the drug storage system's percentage results. The classification is based on the following criteria: a storage system is considered very good if it falls within the range of 81–100%, good if it ranges from 61–80%, quite good if it is between 41–60%, not good if it falls within 21–40%, and very bad if it is between 0–20%.

Based on pharmaceutical standards and Islamic law, the evaluation process for storing drugs in the Ngesrep Health Center pharmacy warehouse is carried out by filling in (✓) on the checklist sheet.

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Table 1. Compliance with Storage Spatial Requirements in Pharmaceutical Logistics at Ngesrep Health Center in 2024 Based on Storage Standards at the Health Center.

Evaluation variables	Hadith
The drug storage area in the pharmacy warehouse may not be entered by anyone other than authorised pharmacy staff.	The one who determines levels (of each) and gives guidance (QS. Al-A'la: 3), which means that Allah determines the type, form, deeds, words and death of everything, then give instructions to everyone according to their needs
The presence of CCTV in the pharmaceutical warehouse	
Cabinet shelves are available to store pharmaceutical supplies, medical devices, and disposable medical supplies (BMHP).	
The distance between the item in the highest position and the ceiling is at least 50 cm.	
The ceiling is non-porous and does not leak.	
Sufficient pallets are available to protect pharmaceutical supplies from floor moisture.	
Transport equipment available (forklift, trolley)	
The warehouse is free from insects and pests.	
Cooling is available to maintain room temperature < 25º C	
Warehouse walls are made of waterproof, non-porous and impact-resistant materials.	
The floor is made of non-hollow vinyl floor hardener (chemical resistant)	
Sufficient space to allow for free transport activities	
There must be at least two doors available for evacuation routes.	
Flood-free location	
A refrigerator is available for storing medicine. certain	
Calibrated room temperature monitoring device available	
LASA drugs are stored separately from each other and are given unique labels.	
For hazardous and toxic materials, the following (B3) must be available: a. Eye washer and shower b. Spillkit (spill handling equipment) c. Material Safety Data Sheet (MSDS)	
The presence of a thermometer to measure the refrigerator temperature (external and internal thermometer)	

Table 2. Compliance with Storage Requirements System in Pharmaceutical Logistics at Ngesrep Health Center in 2024 Based on Drug Storage Standards at Health Centers.

Evaluation variables	Hadith
Medicines and chemicals are clearly and legibly labeled.	• From Abu Hurairah ra, the Prophet SAW, said: "Whoever relieves a believer of one trouble, Allah will surely relieve him of one problem on the Day of Resurrection.
Drugs dispensed from the original container or injection preparations packaged in a syringe are labeled.	
First Expired First Out (FEFO), First In First Out (FIFO) systems and storage based on alphabet or therapeutic class.	
The storage warehouse must be neat and clean.	
Quarantine space is available for expired drugs awaiting destruction.	
The medicine storage area is not for storing other items.	
Medicines approaching their expiry date (3 to 6 months before) are stored separately and given a special mark.	
Checklists are available for the periodic inspection/monitoring of drug	

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storage.	Whoever makes other people's affairs easy, surely Allah will make it easier in this world and the hereafter. • It must not cause harm or endanger other people (H.R. Ibnu Majah. Buku Al-Ahkam p.2340). • No one hoards anything except that he is a sinner" (HR. Muslim).
High alert drugs a. High alert labeling on high-concentrate electrolyte solutions b. Cytostatic drug marking can be given signs/labels according to international standards . In writing LASA/NORUM drugs, Tall Man Lettering is used.	
Narcotics and psychotropic drugs a. Stored in a cupboard with one door and two different types of locks b. A person in charge of the narcotics and psychotropics cupboard must be appointed . The key to the special cupboard is controlled by the pharmacist in charge/other authorised employee . The cupboard key must not be left hanging on the cupboard . Every shift change must be accompanied by a stock check and a documented handover.	
Hazardous and toxic materials (B3) are stored in extraordinary cabinets labeled according to their nature.	

Table 3. Compliance with the Storage Requirements System in Pharmaceutical Logistics at Ngesrep Health Center in 2024 in Pharmaceutical Logistics Based on Islamic Law

Evaluation variables	Hadith
Halal and non-halal drugs are given unique labels	It must not cause harm and must not endanger other people (H.R. Ibnu Majah. Buku Al-Ahkam p.2340)
Halal-certified drugs are stored on the same shelf.	
Storage of drugs whose halal status is not yet clear/not yet certified on the same shelf	
Storage of drugs containing non-halal/haram ingredients is placed separately from halal medications and has not been halal certified.	
Having a list of names of drugs that have been halal certified as a reference in logistic pharmacy	

Table 4. Compliance with Storage Spatial Requirements in Pharmaceutical Logistics Based on Islamic Law.

Evaluation variables	Hadith
Medicines are stored in clean and secure conditions.	H.R. Abu Malik at-Ash'ari, Rasulullah SAW stated: "Cleanliness is part of faith."
Ventilation is well-regulated, ensuring smooth air circulation. This improves the air quality and humidity of the drug storage room.	
Walls are built with smooth materials, and floors have no pores on their surfaces. Doors are opened towards higher room pressure to prevent contamination. If water is discharged, it must be closed and through pipes with cleaning validation.	

Results and Discussion

The warehouse's drug storage process commences with the receipt of incoming drugs and accompanying documentation. Subsequently, the drugs are inspected for their type, quantity, and expiration date and stored in their designated locations. Drug orders that have been verified or verified are archived in a file as evidence of inbound drug administration. Additionally, it is documented in the pharmacy warehouse's drug entry and

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departure book because it is required for the monthly report of drugs from the pharmaceutical warehouse to the chief of the pharmaceutical installation at a later date [5].

The statement in Table 1 regarding the suitability of the storage layout requirements in the Ngesrep Health Center pharmacy warehouse 2024 based on storage standards in health centers is made based on the Technical Instructions for Pharmaceutical Service Standards in Health Centers in 2019 [6]—points 1 and 2 aim to prevent theft and ensure the safety and quality of the stored drugs. In addition, CCTV also facilitates operational supervision and provides essential information in emergencies. Points 3-19 discuss the process of maintaining drug stability and preventing drug damage during storage. One step to reduce the risk of harm is to use pallets placed 50 cm from the roof of the warehouse so that the drugs are not damp and damaged. It is also essential to ensure that the warehouse remains clean and free from insects and rodents that can damage medicines and avoid the risk of flooding. The drug storage warehouse also has a thermometer to monitor room temperature. The layout in the Ngesrep Health Center pharmacy warehouse also includes pallets, trolleys, thermometers, air conditioners to regulate room temperature, and a spill kit to anticipate B3 spills. There are two refrigerators with 2^0C-8^0C and 80C-150C [7].

The results obtained in **Table 1** were 94.73%, which is included in the very good criteria. This can be interpreted as meaning that the storage layout requirements in the Pharmacy Warehouse at the Ngesrep Health Center in 2024 are in accordance with the storage standards at the health center [1].

The score in **table 2** regarding the Compliance of the Storage Requirements System in the Pharmacy Warehouse at the Ngesrep Health Center in 2024 based on Drug Storage Standards at the Health Center is 88.23%. Pharmaceutical dosage forms (liquids, tablets, capsules, infusions, medical devices, etc.) are sorted using the FEFO and FIFO methods after the medications are stored alphabetically [8]. The drawback is that there is no marking of cytostatic drugs that can be given a sign/label according to international standards. Each shift change does not carry out stock checks and documented handovers. There are no cytostatic drugs at the Ngesrep Health Center or other health centers. This drug is usually stored and managed in the hospital pharmacy installation or special area because it requires safe handling and storage and strict procedures to prevent and ensure patient safety. The health centre's pharmaceutical supplies are available: general medicines, high alert medicines, BMHP, narcotic medicines, psychotropic medicines and precursor medicines [6]. The drug stock card is filled at each shift change to ensure the accuracy and completeness of the drug inventory data. This process is essential so that every officer on duty can know the amount of medicine available and record every receipt and expenditure in real time, thereby minimising the risk of errors in stock management and ensuring the availability of the correct medicine for health services [9].

The statement in **table 2** regarding the storage system in the Ngesrep Health Center Pharmacy Warehouse includes several aspects, including medicines and chemicals stored in special boxes that are labeled to reduce the risk of drug exchange. Medicines are stored in medicine containers and sorted alphabetically and with the FEFO system to reduce the risk of expired drugs during storage. The expired drug storage system in the Ngesrep Health Center pharmacy warehouse is placed in a cabinet specially labeled for drugs that expire in 3-6 months until a third party completes the destruction process. High-alert drugs are stored in a separate cabinet with a high-alert label on the cabinet door. Meanwhile, narcotics and psychotropics are stored in a cabinet that cannot be moved with double doors and double locks held by the pharmacist in charge and someone who is mandated to reduce the risk of loss[6].

The results obtained in **Table 2** are 88.23%, which is included in the very good criteria. This can be interpreted as meaning that the storage requirements system in the Pharmacy Warehouse at the Ngesrep Health Center in 2024 meets the standards for drug storage in health centers [1].

Table 3, regarding the Compliance of the Storage Requirements System in the Pharmacy Warehouse at the Ngesrep Health Center in 2024, is based on Islamic Law. This table discusses drug storage based on Islamic law H.R. Ibn Majah. Al-Ahkam Book p.2340. Storage of halal-certified drugs, drugs that are not yet halal-certified, and haram drugs requires special attention to prevent the possibility of mixing or contamination. For example, drugs must be stored separately based on their certification status and labeled according to the halal, uncertified, or haram categories. No haram drugs/ingredients exist in the Ngesrep Health Center pharmacy warehouse[10]. The score obtained in Table 3 is 80%, which is included in the suitable criteria, so it can be concluded that the storage requirements system in the pharmacy warehouse at the Ngesrep Health Center in 2024 is by Islamic law [1]. Table 4 discusses the Requirements for Storage Space in the Warehouse.

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Pharmacy Based on Islamic Law H.R. Abu Malik at-Ash'ari, in which the Prophet Muhammad SAW stated: "Cleanliness is part of faith." The layout of drug storage in the Ngesrep Health Center pharmacy warehouse is kept clean and well-maintained, and ventilation is well-regulated. Hence, air circulation is smooth, walls are built with soft materials, and floors have no pores on their surfaces. Doors are opened in a direction with higher room pressure to prevent contamination. If there is water drainage, it must be closed and through a pipe with cleaning validation[11].

Table 5. Average Percentage of Drug Storage at Ngesrep Health Center

No.	Evaluation variables	Result		Explanation
		Yes(1)	No (0)	
1.	Compliance with Storage Spatial Requirements in Pharmaceutical Logistics at Ngesrep Health Center in 2024 Based on Storage Standards at the Health Center	94,73%	5,27%	Very Good
2.	Compliance with Storage Requirements System in Pharmaceutical Logistics at Ngesrep Health Center in 2024 Based on Drug Storage Standards at Health Centers	88,23%	11,77%	Very Good
3.	Kesesuaian Sistem Persyaratan Penyimpanan di Logistik Farmasi di Puskesmas Ngesrep Tahun 2024 di Logistik Farmasi Berdasarkan Syariat Islam	80%	20%	Good
4	Compliance with Storage Spatial Requirements in Pharmaceutical Logistics Based on Islamic Law	100%	0%	Very Good
Percentage (%) overall		362,96%	37,04%	400%
Average percentage		90,74%	9,26%	100%

The score obtained in **table 4** is 100%, which is included in the perfect criteria, so it can be concluded that the spatial requirements system in the pharmacy warehouse at the Ngesrep Health Center in 2024 is by Islamic Law[1]. **Table 5** shows the average percentage of drug storage in the Ngesrep Health Center Pharmacy Warehouse, which is 90.74%, which is included in the perfect criteria so that it can be concluded that the drug storage process in the Ngesrep Health Center Pharmacy Warehouse is by pharmaceutical standards in health centers and accordance with Islamic law[1]. Storage equipment must be equipped to meet the requirements before the distribution process. Management of narcotic drugs and psychotropic drugs at the storage stage must have a special storage place such as a unique cabinet[12].

The goal of pharmaceutical products that are stored and distributed in an environmentally sensitive manner is to manage the cold chain for temperature-sensitive pharmaceuticals so that the product's efficacy and quality are maintained [13]. The ultimate quality can be significantly impacted by temperature, humidity, air quality, time, and production process factors [14]. Several health centre pharmacy warehouses' drug storage efficiency still falls short of the set indicator levels. The following factors make medication storage efficiency crucial: preserving patient safety, maximising cost control, facilitating drug accessibility, and enhancing service quality, all of which will benefit the organisation [15]. To prevent the expiration of drugs and guarantee the preservation of drug supplies, it is imperative to conduct routine evaluations of drug storage management in the Pharmacy Warehouse [16].

An assessment of the Ngesrep Health Centre Pharmacy Warehouse's drug storage suitability: They base their halal implementation in warehouse management on Islamic Sharia and Pharmaceutical Standards and believe that warehouse practices are crucial for halal pharmaceutical items. This could provide important information for producers, patients, users, researchers, or academicians [17].

Conclusions

Based on the results of the study on the evaluation of the suitability of drug storage in the Ngesrep Health Center pharmacy warehouse based on pharmaceutical standards and Islamic law by evaluating the

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suitability of spatial requirements based on storage standards at the health center, namely with a percentage result of 94.73% (perfect) and the storage requirements system based on storage standards at the health center, namely with a percentage result of 88.23% (ideal), the Storage Requirements System based on Islamic law, namely with a percentage result of 80% (good), and Spatial Planning Requirements with a percentage result of 100% (perfect) so that the average percentage result is 90.74% which is included in the outstanding category.

Conflict of Interest

The authors declare that there is no conflict of interest.

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