

Ergonomics Evaluation of Pharmaceutical Services Facilities (Case Study of Pharmacies in Ambon City)

Rapiah Sarfa Marasabessy
Universitas Darussalam
Maluku, 97128, Indonesia
sarfa@unidar.ac.id

Risman Tunny
STIKes Maluku Husada
Maluku, Indonesia
tunnyapt@yahoo.ac.id

M Chairul Basrun Umanailo
Department of Agricultural and Forestry
University of Iqra Buru
Namlea, 97571, Indonesia
chairulbasrun@gmail.com

Abstract

Pharmacy as a form of pharmaceutical service needs to improve the quality of service continuously following established standards. Service quality is not only influenced by the system but workers as the dominant factor implementing the service must be considered comfort at work. Pharmacies in the city of Ambon today continue to improve service in a system but is not supported by the availability of supporting facilities and an ergonomic environment. The purpose of this study was to evaluate ergonomic problems in pharmacies in Ambon city using Ergonomic Checkpoint. The study was conducted in three pharmacy units. The results showed that there were many complaints of workers including pain in the shoulders, neck, lower back and legs. The work environment in the three pharmacies is average > 300 C. Priority aspects that need to be improved in the three pharmacies are in the Material Storage and Handling aspects, sub aspects 1,2 and 7, aspects of workstation sub aspects 52,53, and 57, and aspects Premises, sub aspects 73, 77, 78 and 79.

Keywords: Pharmacy, Services, Ergonomics, Ergonomic Checkpoint, Evaluation

1. Introduction

Pharmaceutical Services is a direct and responsible service to patients relating to pharmaceutical preparations to achieve definite results to improve the quality of life of patients (Majdah Zawawil and Noriah Ramli 2016). The purpose of conducting pharmaceutical services including to carry out optimal pharmaceutical services both in ordinary circumstances and in emergencies according to the patient and the available facilities. One of the pharmaceutical services that play an important role in increasing the degree of public health is the pharmacy service at the pharmacy. The number of dispensaries in every province in Indonesia has increased every year (Menteri Kesehatan RI 2016). Maluku Province is one of the provinces where pharmacies have increased every year, especially in the city of Ambon. The number of pharmacies in the city of Ambon in 2018 was 50 units while in 2019 an increase of 70 units (Dinas Kesehatan Kota Ambon. Jumlah Apotek di Kota Ambon, 2019). Each pharmacy tries

to improve the quality of service following the specified service standards, but unfortunately, almost every pharmacy in the city of Ambon does not pay attention to supporting facilities and the work environment, causing many worker complaints. The facilities available are usually makeshift tables with chairs made of plastic or wood that are not following the anthropometry of workers so that workers sometimes bend or erect for long periods. Repeated or prolonged sitting or upright work positions can cause low back pain or pain in the lower back (Sari, Mogi, and Angliadi 2015). Pharmacy workers in the etiquette writing section usually experience pain in the shoulder because the writing activities carried out continuously, especially when the number of patients served is very large. Static conditions in the hands that are maintained without relaxation will cause pain in the shoulder (Ramadhiani 2017). Besides supporting facilities, some dispensaries in Ambon city are also not equipped with air conditioning and inadequate air circulation so that workers feel hot, dizzy and get tired quickly. Hot-working environment temperature is one of the dominant factors that cause heat stress on workers (Matin et al. 2020). Previous studies have shown that hot ambient temperatures can increase workers' heart rates (Purwaningsih and Aisyah 2016). so that it leads to fatigue. Another factor that can cause worker fatigue is the lifting process. Not all pharmacies in Ambon City have adequate drug storage. The process of transporting goods from the drug warehouse to the pharmacy is still done manually by carrying or lifting with both hands. Manually lifting heavy loads with unnatural posture is not recommended physiologically because it can trigger heart rate and increase energy consumption (Marasabessy 2012). Besides that, the neat arrangement of workplaces and drug storage makes workers need more time to search for goods required. Work posture factors, heat temperature, work organization, work facilities are factors that trigger low back pain (Li et al. 2012), fatigue and injury. These factors can affect the decline in work productivity which has a direct effect on pharmacy income and overall service quality. For this reason, it is necessary to do an ergonomic evaluation using Ergonomic Checkpoint to find out ergonomic problems that occur in pharmacies in Ambon City in detail to obtain recommendations following the problems found.

2. Research Methods

This research is a quantitative descriptive study conducted at several pharmacies in Ambon city using the Ergonomic Checkpoint issued by the International Labor Organization

Research procedure

The study was conducted through several stages, i. e:

1. Initial Survey
A preliminary survey was conducted to find out workers' complaints related to the facilities and work environment
2. Problem Formulation
Formulate the problem based on the survey results and literature studies studied
3. Identification of Complaints
The identification of worker complaints is done using the Nordic Body Map questionnaire. This stage aims to find out which parts of the body are often felt sick by workers
4. Identification of the Work Environment
Identify work environment factors by using a thermometer to determine the temperature of the work environment, and document work postures
5. Perform an ergonomic evaluation
Perform an ergonomic evaluation by using an ergonomic checkpoint consisting of 9 aspects. But in this study only used 3 priority aspects
6. Recommendations
At this stage, recommendations or improvements are made according to the results of the evaluation of ergonomics

3. Results and Discussion

The results of worker complaints based on the Nordic Body Map questionnaire in the three pharmacies are shown in table 1.

Table I
Complaints of the most priority Workers based on the Nordic Body Mapp

Complaint	pharmacy I	pharmacy II	pharmacy III
Shoulder Pain	80%	85%	70%
Neck Pain	75%	82%	65%

Low Back Pain	85%	80%	80%
Foot Pain	35%	45%	40%

Based on the results of the Nordic body map in table I, the average complaint with the highest percentage is workers at the pharmacy 2. This is caused because of workers

3.1. Working Temperature

The results of working temperature measurements using a thermometer at a pharmacy in Ambon city can be seen in Table 2.

Table 2

Average Temperature in the Work Room		
Average Temperature in the Work Room (°C)		
pharmacy I	pharmacy II	pharmacy III
34°	36°	34°

Based on table 2, the average temperature of the working environment is above 300C, this condition can result in decreased mental activity, reduced responsiveness tends to make mistakes at work and can cause physical fatigue. A good temperature to increase work productivity ranges from 240 C-270 C (Setiawati et al. 2019). The high temperature in the drugstore workspace is caused by the arrangement of goods that are not neat so that a lot of items accumulate and insufficient air circulation. This condition is exacerbated by the absence of air conditioning and limited circulation space. The ventilation used is not following the specified standards ie more than 5% of the floor area of the room that requires ventilation (Rauf and Tahir 2012)

3.2. Ergonomics Evaluation

The observations based on ergonomic checkpoints on each aspect are as follows:

1. Material Storage and Handling Aspects

Material storage and handling at the average pharmacy is following pharmaceutical service standards such as distinguishing between narcotic and psychotropic drugs but ergonomically not handled properly. The conditions of storage and handling of drugs in one pharmacy can be seen in Figure 1.



Figure 1. Conditions of drug storage in warehouses

Priority sub aspects in the Material Storage and Handling aspects for the three pharmacies are shown in table 3.

Table 3.

Evaluation and Recommendation sub aspects on aspects of Material Storage and Handling			
pharmacy	Sub Aspect	Present Condition	Recommendation
pharmacy I	1. clean and mark transportation routes	Mobility of goods to and from the	Rearranging the items needed as needed, and clearing the

pharmacy	Sub Aspect	Present Condition	Recommendation
		warehouse is disrupted due to the laying down of goods blocking the road	way in and out for workers' accessibility
pharmacy II	7.Using portable storage for objects that are not needed	Objects that are not needed are left messy	Disposing of/providing storage shelves that are not needed for items that are not needed
pharmacy III	1. clean and mark transportation routes	Mobility of goods to and from the warehouse is disrupted due to the laying down of goods blocking the road	Rearranging the items needed as needed, and clearing the way in and out for workers' accessibility
	2. Place shelves on drugs close to the work area to reduce work time	The medicine storage rack is located far from the workers	Designing or placing items needed near workers

2. Workstation Design Aspect

The priority sub-aspects of the Workstation Design aspects of the three pharmacies are shown in Table 4.

Table 4.

Sub-evaluation and Recommendations on Workstation Design aspects			
pharmacy	Sub Aspect	Present Condition	Recommendation
pharmacy I	52 and 53 Design workplaces to accommodate all small and large sizes	The chairs and tables that are used do not match the body size of the workers so workers who have tall and large body sizes tend to bend and complain of back pain	Makes flexible and ergonomic desk and chair facilities that are comfortable to wear for all sizes
pharmacy II	52 and 53 Design workplaces to accommodate all small and large sizes	The chairs and tables that are used do not match the body size of the workers so workers who have tall and large body sizes tend to bend and complain of back pain	Makes flexible and ergonomic desk and chair facilities that are comfortable to wear for all sizes
pharmacy III	52 and 53 Design workplaces to accommodate all small and large sizes	The chairs and tables that are used do not match the body size of the workers so workers who have tall and large body sizes tend to bend and complain of back pain	Makes flexible and ergonomic desk and chair facilities that are comfortable to wear for all sizes
	57. Workers are directed to sit and stand alternately	Workers sit for too long or stand for too long	1. Give direction to workers to stand and sit alternately to reduce pain 2. Provides flexible and comfortable chairs

3. Premises Aspect

The priority sub-aspects of the Premises aspect of the three pharmacies are shown in Table 5.

Table 5.
Sub-evaluation and Recommendations on Aspects of Premises

pharmacy	Sub Aspect	Present Condition	Recommendation
pharmacy I	73, 77.78 and 79, protect workers from hot temperatures	Workplace temperatures exceed 30. This can cause heat stress and fatigue	<ol style="list-style-type: none"> 1. Designing natural ventilation according to standards 2. Using air conditioning 3. Do not place the item in front of the vent so that it can obstruct air circulation
pharmacy II	73, 77.78 and 79, protect workers from hot temperatures	Workplace temperatures exceed 30. This can cause heat stress and fatigue	<ol style="list-style-type: none"> 1. Designing natural ventilation according to standards 2. Using air conditioning 3. Do not place the item in front of the vent so that it can obstruct air circulation
pharmacy III	73, 77.78 and 79, protect workers from hot temperatures	Workplace temperatures exceed 30. This can cause heat stress and fatigue	<ol style="list-style-type: none"> 1. Designing natural ventilation according to standards 2. Using air conditioning 3. Do not place the item in front of the vent so that it can obstruct air circulation

4. Conclusion.

Based on the results of the ergonomic evaluation, the three pharmacies need to be improved, prioritizing the work environment, material handling and storage, workplace, supporting facilities and work posture.

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Biography

Rapiah Sarfa Marasabessy is a lecturer in the Industrial Engineering study program at the Darussalam University of Ambon. Completed an undergraduate program in the Mechanical Engineering study program at the Darussalam University of Ambon in 2003 and completed a master's program at the Gadjah Mada University in Yogyakarta with specifications in the field of Ergonomics and Work System Design in 2007

Risman Tunny is a lecturer in the pharmacy study program at Institute of Health Science Maluku Husada. Completed a bachelor's program in the pharmaceutical study program in 2007 at the Indonesian Muslim University in Makassar and then completed a professional program in 2012 and in 2014 master's program at the same university that is Setiabudi University Surakarta with specifications in the fields of science and natural materials

M Chairul Basrun Umanailo is a lecturer at the Faculty of Agriculture at Iqra Buru University with specifications of rural sociology and research methodology. It has an M.Si degree in sociology Obtained from March University. In 2016 Began doctoral education at the University of Brawijaya. Currently still completing a dissertation on the issue of urbanization because of village development that is focused on the Central Java region