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The Effect of Linen Management on the Safety and Health of Laundry Workers at the "X" Hospital in Bandung

Ceria Febiana[1,*], Nurul Khotimah[2]

[1,2]*Departemen of Hospital Administration, Politeknik Al-Islam Bandung, Indonesia*
**Corresponding author email: ceriafebiana@gmail.com*

Abstract

This study aimed to acknowledge the effect of linen management on the health and safety of laundry workers at 'X' Hospital in Bandung. The method of this research was a quantitative research method with a descriptive approach. Data collection was carried out by means of field observations, questionnaires, literature studies and internet browsing. The results showed that the effect of linen management on the safety and health of laundry workers was 37.5%, while 62.5% of the effect was influenced by other independent variables which were not included in this study. In the hypothesis test conducted by the author, the results of the t test were 3.549, which means t count > t table (3.549 > 2.776) so that there is a positive and significant influence between linen management and the health and safety of laundry workers at Muhammadiyah Bandung Hospital. The research found the following problems: 1) poor coordination with the nursing department so that errors still often occur in sorting linen, 2) lack of adherence to procedures, especially personal protective equipment so that it can cause washing workers to be exposed to chemical fluids, and 3) the process of recording all incidents or potential accidents do not go well in the laundry unit. The suggestions given to fix the problem are: 1) to improve communication with other units, 2) to carry out a level of supervision regarding compliance with standard operating procedures and personal protective equipment (PPE), and 3) to record all things that may become potential accidents in the report.

Keywords**:** Linen Management, Occupational Safety and Health, laundry officers

1. Introduction

A hospital is a plenary health service provider institution that is very complex where all aspects must have standardization and be ensured in accordance with predetermined standards. In addition to outpatient, inpatient, pharmacy, laboratory, emergency services, and so on, there are also many other units that are no less important in their roles and positions in carrying out the functions of hospitals as health service providers including nutrition department, laundry, providers of hospital facilities and infrastructure, and many more whose service cannot be ignored.

With the principle of complete service, efforts are needed to help the hospital as a health service provider to continuously take preventive measures in maintaining the quality provided in hospital services. A very important aspect is the role of hospitals as health service providers and as service providers and care givers to cure the patients as the users of the health services (Febiana, 2016).

With the interaction between healthy people and sick people in the same place, there must be efforts to prevent the spread of existing diseases and can continue to spread due to the absence of good prevention efforts by any party. Of course education for visitors, employees, and patients themselves needs to be considered to increase efforts to prevent the spread of the disease.

From the aspect of the hospital that plays a very important role in preventing infection or the spread of disease in the hospital is by providing good linen management in laundry unit that is obliged to clean all public tools that have been exposed or that may be exposed to patients who can spread disease. In the management of laundry services, sometimes many parties consider it trivial because this service is not directly related to patients, but in fact laundry services are very important because how good health services in a hospital will be useless if the laundry services are not optimal. The purpose of the hospital to provide healing efforts to patients will be difficult to achieve because there is a threat of other diseases that may be obtained when the patient is being treated and this will be a new problem for all parties (Checkoway, et al. 2022).

Hospitals need to create not only good management but also good implementation on the officers on duty in an effort to improve the prevention. The prevention of hospital infections cannot develop rapidly if the laundry staff do

not take for granted the impact of compliance with existing procedures. Some of the possibilities to occur are viruses, bacteria, or any organism that lives in the equipments presented to the patient and alternately that can arise from urine, blood, or other body fluids.

Therefore, it is very important to have a standardization of sterilization in laundry management. In addition, there are still many laundry officers who do not understand the basic principles of sterilization, which often endanger not only the patient but also the laundry officer itself and even all employees who are directly related to the patient's linen.

The application and use of personal protective equipment (PPE) cannot necessarily avoid the danger of exposure to disease transmission, because there are already standards and procedures set by the government and related departments that are competent in the implementation of hospital laundry management. The control function of internal and external supervision is needed to ensure that all things that have been determined by existing standards have been carried out properly. On the other hand, employee qualifications cannot be done haphazardly. It must be ensured that the education provided by the hospital can be absorbed and properly implemented by every hospital employee.

We consider that laundry staff in hospital services is one of the most important aspects in efforts to reduce the spread of hospital infections. Thus, the author has the opportunity to conduct research at Muhammadiyah Hospital Bandung as a private hospital that always prioritizes service quality in all services as a health provider. However, we found that there was still an improper linen management process starting from how the separation of infectious and non-infectious linen is still not taken into account, how the distribution of dirty and clean linen is not in accordance with the provisions in which it might lead to new problems in linen management, the irregular use of personal protective equipment (PPE) in every time on duty, from an internal point of view, there may be those who do not know exactly about linen management or can be called the knowledge of employees or laundry officers. And maybe other phenomena can arise in the management of this linen, therefore the author is interested in being able to conduct research in the field of laundry and household parts as an organizer of linen management and implementer of linen management in hospitals (Centers for Disease Control and Prevention, 2022).

Linen is a material made of fabric, while other definitions of linen are terms to refer to all textiles in hospitals which include linen in the treatment room and surgical gowns in the operating room, while nurse's clothes, doctor's suits and work clothes are usually not grouped in the linen category but are categorized as uniform (the Ministry of Health of the Republic of Indonesia, 2004). Some of the specific objectives in linen management are according to hospital linen management guidelines are:

a. As a guideline in providing linen services in hospitals.
b. As a working guideline to get linen that is clean, dry, neat, whole and ready to use.
c. As a guide in minimizing the possibility of cross-infection.
d. To ensure health workers, visitors, contractors, and the environment from being exposed to potential hazards.
e. To ensure the availability of linen in each unit in the hospital.

There are several processes in the management of linen in laundry installations including receiving, sorting, washing, squeezing, drying, ironing, folding, storing, and distributing.

Personal protective equipment (PPE) is a variety of equipment worn by a person that aims to protect himself from exposure that can endanger himself and others. Personal protective equipment (PPE) used by laundry operators when starting cleaning activities until completion are:

a. Headgear
b. Masks
c. Protective eyeglasses
d. Rubber stair cover
e. Apron and
f. Boots.

Health is a dynamic balanced state, influenced by genetic factors, the environment and daily life patterns such as eating, drinking, sex, work, rest, to managing emotional life. Occupational safety is the protection of job security experienced by workers both physically and mentally in the work environment.

The objectives of occupational health and safety (K3) are (Fahad and Febiana, 2021):

a. As a tool to achieve the highest degree of labor health, whether farmers, laborers, fishermen, civil servants, or free laborers.
b. As an effort to prevent and eradicate occupational diseases and accidents, maintain and improve the health and nutrition of the workforce, maintained and improve the efficiency and productivity of labor, eradicate work fatigue and multiply passion and enjoyment of work.
c. Provide protection for the community around the company, in order to avoid fouling the materials of the industrialization process concerned, and protect the wider community from the dangers that industrial production may cause.

The targets to be achieved by occupational health and safety (K3) are:

a. Growing motivation to work safely.
b. Creating orderly, safe and encouraging working conditions.
c. Reducing the rate of work accidents in the workplace.
d. Growing awareness of the importance of the meaning of work safety in the office environment.

e. Increasing work productivity.

Law Number 1 of 1970 concerning occupational health and safety contains the following requirements:

a. Preventing and reducing accidents
b. Preventing, reducing, and extinguishing fires.
c. Preventing and reducing the danger of blasting.
d. Giving a safety during a fire or other dangerous events.
e. Providing relief and accidents
f. Providing personal protective equipment (PPE) to workers.
g. Preventing and controlling the onset or widespread of moisture, smoke dirt dust, steam, wind gust, rays of the sea or radiation, sound and vibration.
h. Preventing and controlling the onset of occupational diseases both physical and psychic, poisoning, infection and transmission.
i. Obtaining sufficient and appropriate lighting.
j. Maintaining good air temperature.
k. Organizing sufficient fresh air.
l. Maintaining cleanliness, health, order.
m. Gaining harmony between work processes
n. Securing and facilitating the removal of people, plant animals or goods.
o. Securing the maintenance of any kind of building
p. Securing and streamlining work with loading, storage treatment of goods
q. Preventing exposure to electricity.
r. Adjusting and summarizing observations on workers whose accidents are getting higher.

Increasing awareness of occupational health and safety (K3) among employees can be pursued, among others, by:

a. Giving employees an understanding on how they should work correctly (precise, fast, and safe)
b. Setting an example by holding experiments that must be carried out, so as to understand and carry out something in a predetermined way.
c. Reassuring employees that occupational health and safety have a basis that is as important as quality and targets.
d. Providing understanding to employees about how to implement work security without being accompanied by a regulation.
e. Striving for the entire content of the occupational health and safety program to be the responsibility of employees for the common good.

2. Literature Review

Linen is a material/fabric used in hospitals for the need for wrapping mattresses, pillows, bolsters, blankets, officers' clothes, patient clothes and other sterile instruments. Many types of fabrics used such as Japanese cotton, drill, flannel, waterproof and anti-water materials bacteria.

According to the Ministry of Health of the Republic of Indonesia (2004), a type of linen that needed in hospitals some of them are: mattress mat fixtures, bed linen, rolling sheaths, blankets, etc. Patient clothing equipment as well as all surgical gowns, various doek, and baby clothing equipment.

Although linen is not used directly in the process treatment however can be seen its effect if the linen treatment not managed properly will result in transmission disease is a nosocomial infection or which is now more frequent called Health-care Associated Infections (HAIs). HAIs constitute infections acquired by the patient during the course of the treatment procedure and medical treatment in health care after 48 hours and 30 days after leaving a health care facility.

Functionally linen is used for a variety of necessities such as clothes, bases, wrappers, rags, and so on, so that the development of its management become not simple anymore, since each section in the hospital has job specifications, the number of great need, high frequency of washing, Limited inventory. For which standards are required linen, among others:

a. Product standards
   Importance for mass or large production as well as achieving mandatory hospital economies of scale have the same product standards.
b. Design standards
   Better hospital gown design that simple, ergonomic, and unisex options which is ideal, especially surgical gowns and patient gowns.
c. Material Standards
   Material selection must be adjusted to function, mode of care, and appearance Expected. Some fabrics used at home pain include Cotton 1005, CVC 50%-50%, TC 65%-35%, Polyester 100% with woven plate or twill/drill, with a more specific final process, such as: water repellent, soil release, PU coated, and so on that has the nature and use of certain uses. With a variety of options

it makes it possible for us to get best results for each product. Color selection on the fabric / clothes also gives its own feel, so that it psychologically affects milieu. In addition to color, it can be shades or motifs, for a more relaxed and modern feel.

d. Standard size
   Consideration of linen size in terms of cost procurement and operations, the wider and heavier, the more expensive it is. By the presence of size a standard bed, for example, 90 x 200 cm.
e. Standard amount
   The stock of linen in the treatment room is ideally 5 stocks in the room, with 1 worn by the patient; 1 Washed; 1 reserve; & 2 stored in logistics (1 with the shape of bed linen or sewn & 1 in the form of sheets fabric).
f. Standard use of linen

For standard use of linen must be wash resistant up to 350 times with normal procedures. Every home each pain is better to have a standard linen airworthiness, can be based on linen age, physical condition linen or with the frequency of washing linen. To that end should be given an identity such as the hospital logo, linen circulation date, linen size, identity number linen, where linen is distributed (Australian Healthcare Laundry & Linen Services Association, 2012).

Based on the Ministry of Health of the Republic of Indonesia (2004), the organization of linen is divided based on the transmission rate of microorganisms and location Dirty linen that can be washed in the laundry is categorized:

1) Infectious dirty linen : linen contaminated with blood, body fluids and feces especially those derived from pulmonary TB infection, HIV, etc.
2) Non-infectious dirty linen: uncontaminated linen the patient's bodily fluids, such as the patient's blood, urine, or feces.

The transfer and transportation of linen is a stage management of linen that has the potential to spread organisms, so that there are certain conditions for linen transportation, that is:

a. Using closed and separate trolleys between dirty linen trolleys with clean linen
b. The trolley is made of stainless steel
c. The container can hold linen load
d. The container can be easily removed and always cleaned. After use, the trolley is always tried to be washed and when used in a clean state.
e. Loading / loading dirty linen / clean is not excessive.
f. The container has a lid.
   Officers are required to use PPE & hand hygiene before and after washing hands.

The definition of occupational safety and health or K3 is any activity to guarantee and protect the safety and health of workers through efforts to prevent occupational accidents and occupational diseases.

According to Febiana and Novita (2018) in general, there are two causes of accidents, namely unsafe action (human factor) and unsafe condition (environmental factor). According to research that 80-85% of accidents are caused by unsafe action. Accidents will inevitably cause losses both in terms of cost and time seized. Occupational accidents are one of the many problems in the field of occupational health. By implementing occupational safety and health (K3) efforts, work accidents should be avoided. However, there are often still frequent accidents, either from workers, equipment, machinery or around work. The impact of work accidents is felt directly by workers, where workers can suffer injuries from mild to severe and can even cause death. Indirect impacts are felt by the community, such as loss of work time, decreased productivity, and others.

3. Materials and Methods

3.1. Materials

This research was conducted at Muhammadiyah Hospital Bandung in March-October 2020.

3.2. Methods

3.2.1. Population

The population is all subjects (humans, animals, experiments, laboratory data, etc.) that will be studied and meet the specified characteristics. Based on the above understanding, the population of this study is that all officers in the Laundry Unit are 6 people.

3.2.2. Sample

The definition of a sample is a portion of the population that is expected to be representative or representative of the population. The desired sample is part of the target population to be directly studied. The sampling technique used by the authors in this study is a saturated sampling technique. Based on the theory described above, the author determines the entire population to be used as a sample to be studied, namely 6 officers in the Laundry Unit.

According to Singh (2006) research methods are a scientific way of obtaining valid data with the aim of being able to be found, proven, and developed a knowledge so that in turn it can be used to understand, solve, and anticipate problems. Based on this understanding, it can be said that research methods are a method used to collect data needed in research. The data collection techniques used to obtain data are as follows:

a. Observation is a planned procedure that includes viewing and recording certain amounts and activities that have to do with the problem we are studying.
b. Questionnaire is a data collection technique that is carried out by giving a set of questions or written statements to respondents to answer. Questionnaires are also an efficient data collection technique.
c. Literature study is a technique used by collecting or taking theories from scientific books and literature reviews.
d. Internet browsing is a way of obtaining data by visiting internet sites related to the problem being studied.

3.2.3. Data Analysis Techniques

Before discussing data analysis techniques, the authors used a measurement scale, namely the Guttman Scale.The Guttman scale is used to obtain questionnaire answers per respondent expressly and clearly. Where the "Yes" question is scored 1 and the "No" question is scored 0.can be calculated with the following calculation index:

Information:

n = Obtained value
N = Number of scores or grades
% = Success rate achieved

The data analysis techniques used by the author are as follows:

1. Test Data Normality
   The normality test in this study was used to determine whether the samples taken were from a normal distributed population or not. Good or decent data is data that has a normal distribution. The normality test was carried out using the Kolmogorov-Smirnov test treated using the SPSS program.
2. Pearson Product Moment Correlation Analysis
   This Correlation Analysis is used to find the relationship between dependent variables and independent variables. Because the scale used in this analysis is nominal, the pearson product moment formula is used.
3. Simple Linear Regression Analysis
   Linear regression analysis is basically an analysis used to predict how far the value of a dependent variable is, when the value of an independent variable is manipulated / changed – changed or lowered. Regression analysis studies the relationships obtained and expressed in mathematical equations that express functional relationships between variables.
4. Analysis of the Coefficient of Dertetermination
   The coefficient of determination (r^2) measures how far the model's ability to explain the variation of independent variables. The higher the value of the coefficient of determination, the better the ability of the independent variable to explain the dependent variable. This coefficient of determination is used to determine the magnitude of the influence of the independent variable on the dependent variable.
5. Test the hypothesis
   Hypothesis testing or t test is intended as a way to determine whether a hypothesis should be accepted or rejected by the researcher and to test for correlation it actually occurs then a test is held. Statistically hypothesis is defined as a statement about the state of the population (parameters) that will be tested for correctness based on data obtained from research samples (statistics).

4. Results and Discussion

Linen management at Muhammadiyah Hospital Bandung are:

a. Collection
   1. Linen collection using trolly. 100% of respondents stated that linen collection used trolly.
   2. Use of Personal Protective Equipment (PPE). 83.3% of respondents stated that laundry workers used PPE during gross linen collection and 16.7% of respondents stated that they did not use PPE when collecting dirty linen.
b. Checking
   1. Noted dirty linen. 83.3% of respondents said officers recorded dirty linen and 16.7% of respondents said officers did not record dirty linen.
   2. Weighing dirty linen. 83.3% of respondents said they were weighing dirty linen and 16.7% of respondents said they were not weighing dirty linen.
c. Washing
1. The procedure for the use of a washing machine. 100% of the 6 respondents stated that there was a procedure for using a washing machine.

2. The procedure for the use of chemical. 100% of the 6 respondents stated that there was a chemical use procedure.

d. Drying
   1. The procedure for the use of the drying machine. 100% of the 6 respondents stated that there was a procedure for using a drying machine.
   2. Temperature indicators in the process of drying. As a result, 66.7% of respondents stated that the temperature indicators in the drying process were appropriate and 33.3% of the respondents stated that the temperature indicators in the drying process were not appropriate.

e. Storage
   1. The storage is already in accordance with the code. 83.37% of respondents stated that storage was in accordance with the code and 16.7% of respondents stated that storage did not match the code.
   2. Storage cabinets in accordance with the provisions. As a result, 66.7% of respondents stated that the storage cabinets were in accordance with the provisions and 33.3% of the respondents stated that the storage cabinets were not in accordance with the provisions.

Implementation of occupational safety and health (K3) laundry workers at Muhammadiyah Hospital Bandung

a. Fixed Procedures for Occupational Safety and Health. 83.3% of respondents stated that there were fixed procedures and 16.7% of respondents stated that there were no fixed procedures for occupational safety and health.
b. Provision of Personal Protective Equipment. 100% of the 6 respondents stated that the hospital provided personal protective equipment.
c. Standard Area of the room. As a result, 66.7% of respondents stated that the area of the laundry room met the standards and 33.3% of the respondents stated that the area of the laundry room was not standardized.
d. Officers' concern for hygiene. As a result, 83.3% of respondents stated that they cared about cleanliness in the work environment and 16.7% of respondents said they did not care about the cleanliness of the work environment.
e. Evaluation of Occupational Safety and Health. 66.7% of respondents stated that an evaluation of the implementation of occupational safety and health was carried out and 33.3% of respondents stated that no evaluation of occupational safety and health was carried out.
f. Provision of P3K Tools. As a result, 66.7% of respondents stated that P3K tools were available in the laundry room and 33.3% of respondents stated that P3K tools were not available in the laundry room.
g. Provision of Special Fire Extinguishers. 100% of the 6 respondents stated that the hospital provided fire extinguishers in the laundry room.
h. Work accidents due to negligence. 83.3% of respondents stated that work negligence was the cause of work accidents and 16.7% of respondents stated that work negligence was not the cause of work accidents.
i. Room Density Level. 83.3% stated the laundry room was too dense to be an effective room and 16.7% stated the laundry room was not too dense to be an effective room.
j. Good and Safe Conditioned Work Facilities. As a result, 66.7% of respondents stated that the facilities in the work room were well conditioned and safe while 33.3% stated that the facilities in the work room were not well conditioned and safe.

The effect of linen management on occupational health and safety (K3) of laundry staff at Limijati Children's Mother Hospital Bandung

To find out the position of the percentage of answers "Yes" obtained from the questionnaire, it is calculated in advance and placed on the range of the percentage scale as follows:

Answer "Yes": $1 \times 100\% = 100\%$

Answer "No": $0 \times 100\% = 0\%$ (so it doesn't need to be counted)

Then the calculation on the answer "Yes" from the questionnaire filling is:

Average "Yes" answer:

$$\frac{5}{6} \times 100\% = 83.3\%$$

In nominal form: 0.83

So that when depicted in scale:

0%.-100%

From the results of calculations using the guttman scale above, it can be concluded that the results obtained are 0.83 which is then adjusted to the interpretation table located in the range of 0.51-0.99 so that it can be said that linen management of occupational safety and health of laundry workers at Limijati Children's Mother Hospital Bandung is "Close to Appropriate".

If the percentage is generated, 83.3% who answered "Yes" as seen in the assessment criteria table, it can be said that linen management of occupational safety and health of laundry workers at Limijati Children's Mother Hospital Bandung entered the level of "Excellent" criteria.

a. Test the Normality of Data

Table 1. Data Normality Test

	Kolmograf- Smirnorv			Shapiro-Wilk		
	Statistic	df	sig	statistik	df	Sig
K3	0.333	6	0.859	0.827	6	0.101
Management	0.407	6	0.524	0.640	6	0.001

The signification results of the two variables, namely, linen management of 0.859 and occupational safety and health of 0.524 based on test criteria, both variables have results of more than 0.05 (0.859>0.05 and 0.524>0.05) so that it can be concluded that both variables are accepted and distributed normally.

b. Simple Linear Regression Test

Table 2. Simple Linear Regression Test

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std.error	Beta		
(Constant)	1.500	4.202		0.357	0.739
Linen Management	0.750	0.484	0.612	3.549	0.196

From the results of a simple linear regression test in the table, it is known that the coefficient value for the linen management variable T is 0.75 this coefficient value shows the magnitude of the influence. Whether the magnitude of the regression coefficient of 0.75 is significant or not, the researcher conducted a T test, from the table it is known that the calculation is 3.549 while the ttabel with free degrees (df = n–k-1) or df = 6-1-1 = 4 and the significant level = 0.025 (double-sided test) obtained a ttabel number of 2.776, then the calculation of the ttabel > which is 3.549 > 2.776 means that H1 is accepted and H0 is rejected, And it can be concluded that for the variable linen management has a positive and significant effect on the occupational safety and health of laundry workers.

c. Spearmen Rank Correlation Test

Table 3. Spearmen Rank Correlation Test

		K3	Linen Management
K3	Pearson Correlation	1	0.612
	Sig.(2-Tailed)		0.196
	N	6	6
Linen Management	Pearson Correlation	0.612	1
	Sig.(2-tailed)	0.196	
	N	6	6

Based on the results of the correlation test in the table, an R value of 0.612 was obtained. This shows that there is a strong correlation between linen management variables and the occupational safety and health of laundry workers.

d. Correlation test (R test)

Table 4. Correlation Test (R Test)

Model	R	R.Square	Adjusted R.Square	Std.Error of the Estimate
1	0.612[a]	0.375	0.219	0.559

a. Predictors (constan) Linen Management
b. Dependent variable :K3

Based on the results of the correlation test in the table, an R value of 0.612 was obtained. This shows that there is a strong correlation between linen management and the occupational safety and health of laundry workers.

e. Determination Test (R square)

Based on the table 4, the R Square value of 0.375 or 37.5% was obtained. This shows that the influence of linen management variables on the occupational health and safety of laundry workers is 37.5% while 62.5% is influenced by other independent variables that were not included in this study.

5. Conclusion

From the results of fieldwork and field observations, it can be concluded:

1. From filling out the questionnaire and calculations produced and concentrated by 83.3% which can be interpreted to mean that linen management at Muhammadiyah Hospital Bandung is "Close to Appropriate" or categorized as "Excellent" criteria in supporting the occupational safety and health of laundry workers.
2. In general, laundry officers at Muhammadiyah Hospital Bandung have carried out linen management well. Because it can be seen from several research indicators that it is concentrated by 100%, namely the collection of linen using trolly, procedures for using washing machines, chemicals and dryers as well as the provision of personal protective equipment and special fire extinguishers. This can be seen from the results of calculating the percentage of questionnaire questions that have been calculated in the previous chapter.
3. Based on the results of the study, it is known that linen management affects the occupational safety and health of laundry workers. This is shown from the calculation results using the SPSS program which begins with the results of testing the normality of data of 0.859 for linen management and 0.524 for occupational safety and health of laundry workers. What can be concluded is that the two data are normally distributed because the p-value is above 0.05. And it produces a correlation of 0.612 and has a coefficient of determination (r^2) of 0.375 or 37.5%. This shows that linen management affects the occupational safety and health of laundry workers by 37.5% while 62.5% is influenced by other independent variables that were not included in this study. In the hypothesis test conducted by the author, the results of the t test were 3,549 which means t count > t table (3,549 > 2,776) so that there is a positive and significant influence between linen management and occupational safety and health of laundry workers at Muhammadiyah Hospital Bandung.

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