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






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Surabaya, 10 April 2023  
  
Dr. Santa Martini, dr., M.Kes  
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## Analysis of Determinant Factors for Hospital Staff Adherence to the Use of PPE the Care of COVID-19 Patients

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### INDEXING

#### Keywords:

Determinant  
Factors;  
Staff Adherence;  
Personal Protective  
Equipment;  
COVID-19;

### ABSTRACT

Hospital staff safety was the priority for hospitals in a pandemic situation. The adoption of standard protocols and the use of PPE is the last line of defense of protection to prevent transmission. Based on the data released by the National Disaster Management Agency in July 2020, there were twenty-six COVID-19 hospital clusters. This study aimed to analyze determinant factors for hospital staff adherence to the use of personal protective equipment in treating COVID-19 patients. This study was observational research with a cross-sectional design. The sample was selected using simple random sampling technique with a total samples of 53 respondents. Data were collected using questionnaire and analyzed using linear regression statistical analysis. The respondents have characteristics as follows: good knowledge (52.83%), good risk perception (50.94%), low barriers to implementation (71.70%), good safety climate (90.57%), and good information (94.34%). There was correlation between knowledge ( $p$ -value = 0.000,  $\beta$  = 0.880), risk perception ( $p$ -value = 0.000,  $\beta$  = 0.846), barriers to implementation ( $p$ -value = 0.000,  $\beta$  = 0.579), safety climate ( $p$ -value = 0.005,  $\beta$  = 0.646), information ( $p$ -value = 0.034,  $\beta$  = 0.620) with hospital staff using PPE. Knowledge and risk perception have a very strong correlation with the hospital staff adherence.

#### Kata kunci:

Faktor Penentu;  
Kepatuhan Staf;  
Alat Pelindung Diri;  
COVID-19;

*Keselamatan petugas rumah sakit menjadi prioritas rumah sakit pada era pandemi. Penerapan protokol kesehatan dan penggunaan Alat pelindung diri menjadi pertahanan terakhir untuk melindungi diri dari penularan. Berdasarkan data yang dikeluarkan oleh Badan Nasional Penanggulangan Bencana bulan Juli 2020, terdapat 26 kluster COVID-19 dari rumah sakit. Tujuan dari penelitian ini adalah untuk menganalisis faktor penentu kepatuhan petugas rumah sakit dalam menggunakan alat pelindung diri saat merawat pasien COVID-19. Penelitian ini merupakan penelitian observasional dengan desain cross-sectional. Sampel dipilih menggunakan teknik simple random sampling dengan total sampel 53 responden. Data dikumpulkan menggunakan kuesioner dan dianalisis menggunakan statistika linear regresi. Responden memiliki karakteristik: pengetahuan baik (52.83%), persepsi risiko baik (50.94%), hambatan implementasi rendah (71.70%), iklim keselamatan baik (90.57%), dan informasi serta pelatihan baik (94.34%). Terdapat korelasi antara pengetahuan ( $p$ -value = 0.000;  $\beta$  = 0.880), persepsi risiko ( $p$ -value = 0.000;  $\beta$  = 0.846), hambatan implementasi ( $p$ -value = 0.000;  $\beta$  = 0.579), iklim keselamatan ( $p$ -value = 0.005;  $\beta$  = 0.646), informasi dan pelatihan ( $p$ -value = 0.034;  $\beta$  = 0.620) dengan kepatuhan staf rumah sakit menggunakan alat pelindung diri saat melakukan perawatan pasien COVID-19. Pengetahuan dan persepsi risiko memiliki korelasi yang kuat terhadap kepatuhan staf rumah sakit.*

## INTRODUCTION

COVID-19 (corona virus disease 19) is a viral infection that has become a global concern since its first appearance in December 2019 in Wuhan China (Nishiura *et al.*, 2020). Based on the data from the World Health Organization until July 2020, more than fifteen million

cases of COVID-19 have occurred worldwide with a death rate of more than six hundred thousand (Nguyen *et al.*, 2020). COVID-19 transmission occurs through droplets and direct contact with the virus, then the virus can enter the open mucosa. Air bone transmission may occur in the presence of action to generate respiratory aerosol (Riadi, 2019).

Hospital staff who provide services to COVID-19 patients have a high risk of infection because this work requires direct contact with the patients. In several countries, it is reported that there is hospital staff infected with the COVID-19 virus, there have already been seven healthcare staff death in the UK (Cook, 2020). In Italy, the epicenter of the European outbreak, there were 10,627 reported positive COVID-19 hospital staffs with 34 deaths (Herron *et al.*, 2020). In Indonesia, based on the data released by the Ministry of Health, it was stated that as of July 2020, 878 health workers were suffered from positive COVID-19 with 89 deaths. In line with the data released by the National Disaster Management Agency in July 2020, there were twenty-six COVID-19 hospital clusters in East Java.

Currently, health workers have a high risk. As the vanguard of COVID-19 patient service providers, health workers and their families are at risk of contracting the infection. To reduce both the infection and safety risks, health workers must work according to strict safety and health procedures. The use of personal protective equipment such as google, N95 masks, hazmat, and gloves is very important as a preventive measure for the transmission of the infection. All health workers are expected to be able to carry out screening independently to protect themselves from the danger of transmitting COVID-19 (Irene Putri and Anulus, 2020).

Adherence to the use of PPE is one of the challenges for health workers, both physically and psychologically when dealing with COVID-19 patients. For example, in terms of physical, the costs associated with wearing and removing level 3 personal protective equipment, and its use for hours uncomfortable. Psychological burdens including difficulty in communicating with patients or the work team can hinder the services provided to patients (Savoia *et al.*, 2020).

Protection against the risk of COVID-19 infection must include universal precaution and transmission-based standards. The use of personal protective equipment is an important effort to protect the staffs and patients from COVID-19 infection (Kemenkes RI, 2020). Based on research involving 12,710 participants from 55 countries during SARS outbreak. The use of PPE is beneficial against infection respiratory tract (relative risk (RR) = 0.89. 95% CI: 0.84-0.94,  $p < 0.01$ ) (Irene Putri and Anulus, 2020) . Adherence to the use of personal protective equipment significantly reduces the risk of transmitting the virus to the hospital staff (Rhee, 2020). The purpose of this study was to analyze the determinants of hospital staff adherence in using personal protective equipment when treating COVID-19 patients.

## RESEARCH METHOD

This study is observational research with a cross-sectional design. There were five variables observed including knowledge, risk perception, barriers to implementation, safety climate, information and training. The population in this study were sixty nurses who served COVID-19 patients in Lavalette Hospital Malang, East Java. The determination of the number of samples was carried out with the help of Krejcie and Morgan table and the sample was selected using simple random sampling technique with a total samples of 53 respondents. Data collection was carried out using an online questionnaire via google form which was



distributed to respondents to be filled out. The questionnaire was assessed using a likert scale. Informed consent was given to respondents before filling out the existing questionnaire. Data were analyzed using linear regression statistical analysis to reveal the relationship between the independents variable (knowledge, risk perception, barriers to implementation, safety climate, information and training) and the dependent variable (hospital staff adherence) and to know which variable affects the adherence of the health worker in using personal protective equipment and how much the effect of these variables to the health worker adherence.

## RESULT AND DISCUSSION

The majority of the respondents (58.49%) in this study indicated that they were compliant with the use of personal protective equipment (Table.1). Most of the respondents had the following characteristics: aged 31-40 years old, are female, had a good knowledge, had a good risk perception, had a low barriers to the implementation, had a good safety climate, and had good information and training.

**Table.1 The Distribution of Respondents'Characteristic**

Variable	Frequency (n)	Percentage (%)
Hospital Staff Adherence		
1. Obey	31	58.49
2. Not obey	22	41.50
Age (years)		
1. 20-30	8	15.09
2. 31-40	20	37.74
3. 41-50	9	16.98
4. >50	16	30.19
Sex		
1. Male	23	43.40
2. Female	30	56.60
Knowledge		
1. Good	28	52.83
2. Bad	25	47.17
Risk Perception		
1. Good	27	50.94
2. Bad	26	49.06
Barriers to Implementation		
1. High	15	28.30
2. Low	38	71.70
Safety Climate		
1. Good	48	90.57
2. Bad	5	9.43
Information and Training		
1. Good	50	94.34
2. Bad	3	5.66

Respondents who had good knowledge and obeyed to the use of personal protective equipment were 61.29%, while bad knowledge and obedient categories were 38.71% (table 2). Respondents who had a good risk perception were more obey than respondents who had bad risk perception. Good knowledge and good risk perception had significant, positive, and

substantial to very strong correlation with the hospital staffs' adherence to the use of protective personal equipment. There was low to moderate correlation among barriers to implementation, safety climate and information and training with hospital staffs' adherence to the use of personal protective equipment (Table.2).

The standard measure coefficient ( $\beta$ ) directly demonstrates the importance of this variable related to each other (table 2). Knowledge ( $\beta = 0.880$ ) is the most important variable, followed by the risk perception variable ( $\beta = 0.846$ ), safety climate variable ( $\beta = 0.646$ ), information and training variable ( $\beta = 0.620$ ), and barriers to implementation variable ( $\beta = 0.579$ )

**Table.2 The correlation coefficient between independent variables and hospital staff adherence**

Variable	Hospital Staff Adherence				p-value	r-value	$\beta$
	Obey		Not Obey				
	N	%	N	%			
Knowledge							
1. Good	19	61.29	9	40.91	0.000	0.795	0.880
2. Bad	12	38.71	13	59.09			
Risk Perception							
1. Good	17	54.84	10	45.45	0.000	0.737	0.846
2. Bad	14	45.16	12	54.55			
Barriers to Implementation							
1. High	5	16.13	10	45.45	0.000	0.280	0.579
2. Low	26	83.87	12	54.55			
Safety Climate							
1. Good	30	96.77	18	81.82	0.005	0.147	0.646
2. Bad	1	3.23	4	18.18			
Information and Training							
1. Good	31	100	19	86.36	0.034	0.085	0.620
2. Bad	0	0	3	13.64			

### Knowledge

Knowledge is one of the factors in the person component in the safety triad theory that will affect adherence (Haghighi *et al.*, 2017). This triad safety theory means that knowledge should have a significant relationship with the hospital staffs' adherence in using personal protective equipment. Based on the study results in table 2, it shows that there was a significant, positive, and very strong correlation between knowledge and hospital staffs' adherence in the use of personal protective equipment in treating COVID-19 patients (r-value = 0.737; p-value = 0.000,  $\beta = 0.80$ ).

Hospital staffs' who had good knowledge of COVID-19 had a higher level of adherence to the use of PPE than hospital staffs who had less knowledge (61.29%). This result is different from the previous study (Yulis Setiya dewi, 2017) which stated that there was no significant relationship between knowledge and hospital staffs' adherence to the use of PPE. The results of the above study are in line with (Eljedi and Dalo, 2014) which stated that knowledge is dominant and very important to shape one's action or behavior.

People with good knowledge tend to think logically about their health condition and have better adherence proven by all actions according to the established protocols about personal

protective equipment. Knowledge plays an important role in determining complete behavior because knowledge will form trust so that it will affect a person in hospital staffs' adherence to the use of PPE (Wulandari *et al.*, 2020).

### **Risk Perception**

Based on the study results in table 2, it shows that there was a significant, positive, and substantial to very strongly correlation between risk perception and hospital staffs' adherence to the use of personal protective equipment when treating COVID-19 patients (r-value = 0.737; p-value = 0.000,  $\beta$  = 0.846). Table 1 shows that most of the respondents had a good perception risk (50.94%). Most of the respondents had good indicators of the likelihood of being exposed to COVID-19 infection in the workplace.

The result of this study is in line with the conceptual theory of the health belief model (HBM). According to HBM, the individual's likelihood of taking action depends directly on the perceived threat and consideration of advantages and disadvantages (Jose *et al.*, 2020). The first assessment was the perceived threat to the emerging risk. This refers to the extent to which a person thinks whether COVID-19 is a threat to him or not.

The result of this study indicates that most of the respondents had a good perception of having a higher level of adherence to the use of PPE (54.84%). Risk perception is also influenced by the respondents' level of knowledge of COVID-19 and the personal protective equipment used for the patient are, If the respondents' level of knowledge is good, the perception of good risk will be formed and will shape one adherence behavior.

### **Barriers to Implementation**

Based on the study results in table 2, it was found that there was no significant relationship between barriers to implementation and hospital staffs' adherence in using personal protective equipment. Table 1 shows that most of the respondents had low barriers to implementation, most respondents had low application barriers to the lack of time indicator and almost all respondents had low barriers to implementation on the indicator of discomfort using personal protective equipment

This result is different from the research conducted by (Efstathiou *et al.*, 2011) which stated that there was a significant relationship between barriers implementation and hospital staffs' adherence in using PPE, although most of the respondents studied had low barriers to implementation. Based on the study, not all respondents with low barriers to implementation, adhere to the use of personal protective equipment. This can occur because of a conflict of interest that occurs within the respondents between the need to serve patients and the need to protect themselves through the use of PPE. As a result, in certain situations, respondents often ignore the use of PPE

### **Safety Climate**

Based on the study results in table 2, it was found that there was no significant relationship between safety climates and hospital staffs' adherence in using personal protective equipment. Table 1 shows that most of the respondents had a good safety climate. Almost all respondents have a good safety climate in indicators of commitment to protection, support from supervisors, and supervision in the workplace. This is in line with the results of

the study conducted by (Yulis Setiya dewi, 2017) which stated there was no significant relationship between safety climate and hospital staffs' adherence to the use of PPE.

The latter section focused on patient safety that should be extended to examine the hospital staffs' safety climate. (Diseases, 2013) The Guideline for Isolation Precaution explains that safety climate is how workers and management perceive safety expectations in the hospital environment. The result showed that based on the safety climate indicator studied, all indicators were in a good category where most of the respondents answered agreed on the components of the statement submitted with the highest percentage on the indicator of supervisor support.

One of the factors that affects the safety climate and also affects the use of PPE is safety policies and procedures. Existing regulations may affect hospital staff in using PPE. The result of observation at the research site indicated that regulation is available in the COVID-19 patient care room (Singer *et al.*, 2009).

### **Information and Training**

Based on the study results in table 2, it was found that there was no significant relationship between information and training and hospital staffs' adherence in using personal protective equipment. Table 1 shows that most of the respondents had good information and training. Respondents who receive good information and training regarding the use of PPE had good adherence in their implementation. This is still not in line with the analysis result of this study because there were still hospital staffs who had good information and training but were not adhere the implementation (Larson, Liverman and Respiratory, 2011). The limitation in the research conducted by Larson was the lack of data related to other factors such as organizational behavior factors including leadership and leadership barriers that limit the use of PPE by health service.

### **CONCLUSION**

Based on the results of the research and discussion, it can be concluded that good knowledge and risk perceptions greatly affect the adherence of health workers in using personal protective equipment. Increased understanding of the risks and knowledge of officers about the use of personal protective equipment and COVID-19 need to be improved and refreshed as long as they treat COVID-19 patients to reduce the transmission of infection to hospital staff.

This study still has several limitations that can be corrected by future researchers to obtain more representative results. Besides, the distribution of the number of respondent between units can also be distributed more so that the results of the study can represent determinant factors for hospital staffs' adherence to the use of personal protective equipment in treating COVID-19 patients

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