

STANDARDS OF PERSONAL PROTECTIVE EQUIPMENT IN HANDLING COVID-19 IN NURSES

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ABSTRACT

Personal Protective Equipment (PPE) is a tool that has the ability to protect a person part or all of the body from potential dangers in the work environment. Personal protective equipment is very important for nurses, every action taken by medical personnel always has a high risk of being exposed to infections, for example when treating a catheter, treating wounds, cleaning body fluids, taking blood, and so on jumlah who has a covid-19 incidence rate, especially nurses in the province of South Sulawesi / Makassar as many as 350 who are exposed. This study aims to determine the standards of Personal Protective Equipment (PPE) for nurses in handling Covid-19 at the Makassar City Hospital. The type of research used in this study was descriptive research, with the sample in this study being nurses at Makassar City Hospital with 54 respondents, the sampling technique used was *Accidental Sampling*. The results showed that of the 54 respondents, the first step before using PPE respondents who answered checked as many as 18 respondents (33.3%), washing hands 36 respondents (66.7%), steps to use complete PPE and could protect those that could protect as many as 54 respondents (100%), using complete PPE as many as 42 respondents (77.8%) and taking steps to release PPE completely as many as 46 respondents (85%). Respondents who carry out treatment activities and meet directly with patients who have confirmed COVID-19 in the *Infection Center* room who use complete Personal Protective Equipment (PPE) and in accordance with the direction of health protocols.

Keywords: COVID-19; nurses; PPE standards

INTRODUCTION

K3 or Occupational Safety and Health is a facility used in carrying out prevention that can be detrimental such as death, disability, injury or injury, loss of property, the environment as a whole, damage to machinery or equipment. Therefore, PPE or Self-Protection Equipment used needs to be improved and carried out prevention in carrying out protection efforts (Andri Dwi Puji, Bina Kurniawan, 2017). Personal Protective Equipment (PPE) is special clothing or equipment used for personal protection from infectious materials. Personal protective equipment is very important for nurses. Every action performed by medical personnel always has a high risk of being exposed to infections, for example when treating a catheter, treating wounds, cleaning body fluids, taking blood, and so on. If at the time of carrying out the procedure does not wear PPE that is in accordance with the place of duty and complete that has been determined, it will have a high risk of exposure to the virus or infection of both the medical personnel themselves and the patient (Pramesti et al., 2017).

Hospitals are an infection for health workers, patients and visitors. The risk of infection in hospitals known as nosocomial infections is a global health problem. *Healthcare Associated Infection* (HAIs) is one of the global problems, including in Indonesia. HAIs are a significant cause of illness and death that have emotional, financial and medical consequences. (Nurmalia et al., 2019). COVID-19 is a type of infectious disease caused by SARS-Cov2. The transmission of this disease from humans to humans and when infected by this virus experiences respiratory problems from

mild to moderate and heals without requiring special treatment. Patients who are elderly with chronic congenital diseases, cancer, cardiovascular disease can aggravate the patient's condition (Ministry of Health of the Republic of Indonesia, 2020).

Generally, the Corona virus or COVID-19, which is a pandemic at this time, has signs and symptoms that resemble the flu then becomes acute breathing, for example coughing accompanied by an increase in body temperature, and experiencing shortness of breath. The length of time interval after the patient is exposed to the Corona virus is 1 week and even the longest interval is 2 weeks. The results of the examination carried out by several patients showed inflammation in the two lungs that were getting wider (Brunner and suddarth, 2020). On December 31, 2019, the WHO China *Country Office* reported an unknown case of pneumonia of unknown etiology in the city of Wuhan, Hubai province, China. On January 7, 2020, China identified pneumonia of unknown etiology as a new type of coronavirus (Coronavirus Disease, COVID-19). On January 30, 2020, WHO designated it as a *Public Health Emergency of International Concern* (KKMD/PHEI) and on March 11, 2020, WHO has designated COVID-19 as a pandemic. The increase in the number of cases took place quite quickly, and spread to various countries in a short time (Terawan Agus Putranto, 2020).

As of August 11, 2020, data reported 19,936,210 with 723,499 deaths worldwide (*Case Fatality Rate/ CFR* 3.7%). Indonesia also reported that on March 2, 2020, until August 11, 2020, the Ministry of Health reported 128,776 confirmed COVID-19, with 5,824 deaths (*Case Fatality Rate / CFR* 4.5%). For South Sulawesi, 10,585 confirmed COVID-19, with 337 deaths (*Case Fatality Rate / CFR* 3.2%) (Ministry of Health of the Republic of Indonesia, 2020). Meanwhile, Harif Fadhillah as the chairman of DPD PPNI on September 22, 2020 said that the increase in cases of COVID-19 exposure continues to experience a significant increase, especially nurses. Where the number of deaths in nurses was 85 people, the next increase occurred in the provinces, namely Jakarta as many as 1,629 exposures, East Java as many as 844 exposed, Bali 156 exposed and South Sulawesi 350 exposed. Therefore, this case is a warning to the relevant parties and all parties if medical personnel become the last defense in dealing with this problem (Prabowo Dani, 2020).

In epidemics of highly contagious diseases, such as Ebola Virus Disease (EVD) or Severe Acute Respirator Syndrome (SARS) or Coronavirus (Covid-19), healthcare workers have a much greater risk of infection than in the general population, due to their contact with contaminated patient body fluids. Contact precautions through Personal Protective Equipment (PPE) can reduce risk (Verbeek et al., 2020). Before conducting an examination, there is a need for standard vigilance where vigilance is created to be applied regularly in carrying out patient care at home and in health service facilities (Ministry of Health RI, 2017). Health workers need vigilance according to other additional transmissions to protect themselves and prevent transmission in health care settings. The workforce caring for COVID-19 patients should always implement contact and droplet vigilance. Airborne precautions should be applied to aerosol-generating procedures and dukugan treatments (WHO, 2020).

As new respiratory infections become widespread, such as during the Covid-19 pandemic, health care workers' adherence to Infection Prevention and Control (IPC) becomes more important. Strategies in these guidelines include the wearing of PPE i.e. face shields, masks, handsoons, and gowns: separation of patients with respiratory infections from others, and stricter cleaning routines.

These strategies can be difficult and time-consuming to follow the exercises. Hence health care authorities and facilities need to consider how best to support health care workers to implement it (Houghton et al., 2020). This study aims to determine the description of nurses against the standards of Personal Protective Equipment (PPE) in handling Covid-19. To find out the nurse's description of the standards of Personal Protective Equipment (PPE) in handling Covid-19

METHOD

The research used in this research is descriptive research, with the sample in this study were 54 nurses at Makassar City Hospital respondents, the sampling technique used was Accidental Sampling.

RESULTS AND DISCUSSION

This research was conducted at the Makassar City Hospital from October 26 to November 26, 2020. This type of research is a descriptive study with the aim of describing compliance with Personal Protective Equipment (PPE) standards in nurses at Makassar City Hospital. Data obtained from the distribution of online questionnaires to nurses on duty in the *Infection Center* room and undergoing a quarantine period at one of the Makassar hotels or at the Makassar City Hospital, where nurses who have treated patients who have confirmed COVID-19, which contains questions about nurses and standards for the use of Personal Protective Equipment (PPE). This study had 54 respondents where nurses who treated patients who had confirmed COVID-19 in the *Infection Center* room using *the Accidental Sampling technique*. The data that has been obtained is then displayed in the form of a table then presented in the form of an explanation of the frequency distribution of the average. The results of the research that has been carried out can be seen from the following description.

Table 1.

Characteristics of Respondents Based on Age, Gender, Last Education, Type of Place of Duty and Period of Work COVID-19

Characteristics of Respondents	f	%
Age (Years)		
21-30	17	31,5
31-40	34	63
41-50	3	5,6
Gender		
Man	18	33,3
Woman	36	66,7
Education Last		
DIII	6	11,1
Ners-S2	48	88,9
Type of Place of Duty		
IC	44	81,5
IGD	10	18,5
Service Life		
> 5 Years	41	75,9
< 5 Years	13	24,1

Based on table 1 data from 54 respondents (100%) who carried out direct care activities and met

patients who had been confirmed with COVID-19, the highest age group characteristics were 31-40 years old as many as 34 respondents (63%), and for the lowest age group characteristics were 41-50 years as many as 3 respondents (5.6%). For the characteristics of the highest sex group were women as many as 36 respondents (66.7%) and for the characteristics of the sex group the lowest was men as many as 18 respondents (33.3%). For the characteristics of the last education group, the highest was Ners-S2 as many as 48 respondents (88.9%) and for the characteristics of the lowest education group was DIII as many as 6 respondents (11.1%). For the characteristics of the type group the highest duty place was IC as many as 44 respondents (81.5%), for the characteristics of the type group the place of duty the lowest was the IGD as many as 10 respondents (18.5%). For the characteristics of the highest working period group was the 5-year > as many as 41 respondents (75.9%) and for the characteristics of the lowest working period group was <5 years as many as 13 respondents (24.1%).

Table 2
 Characteristics of Respondents Based on the Number of People Who Stay Home, Still Doing Outside Activities Home, Once Lived In the Environment with Patients COVID-19, and the elderly Staying

Characteristics of Respondents	n	%
Number of People Living in the House		
> 5 people	31	57,4
< 5 people	23	42,6
Still Doing Activities Outside the Home		
> 5 people	7	13
< 5 people	47	87
Have You Lived in a Neighborhood With COVID-19 Patients		
Yes	1	1,9
Not	53	98,1
Elderly Living in the House		
Yes	17	31,5
Not	37	68,5

Based on table 2 data from 54 respondents (100%) who carried out direct care activities and met patients who had been confirmed with COVID-19, for the group characteristics of the highest number of people living in the same house was >5 people as many as 31 respondents (57.4%), for the group characteristics the lowest number of people living in the same house was <5 people as many as 23 respondents (42.6%). For the characteristics of still doing activities outside the home, the highest was <5 people as many as 47 respondents (87%), for group characteristics still doing activities outside the home the lowest was 7 respondents (13%). For the characteristics of the group that had lived in an environment with COVID-19 patients, the highest were those who answered no as many as 53 respondents (98.1%), for the characteristics of the group who had lived in an environment with COVID-19 patients, the lowest was the one with no 53 respondents (98.1%). For the characteristics of the elderly group who live in the same house, the highest was to answer no as many as 37 respondents (31.5%), and for the characteristics of the elderly who lived in the same house, the lowest was to answer yes to 17 respondents (17.5%).

Based on data was obtained from 54 respondents who carried out direct nursing activities and met with patients who had been confirmed with COVID-19, showing that from the initial steps taken before using PPE, 18 respondents (33.3%) answered checking PPE, and 36 respondents (66.7%) answered washing stairs. There were 54 respondents who answered using complete PPE at the time of treatment. There were 54 respondents (100%) who used alcohol / hand sanitizer in doing hand hygiene during treatment. There were 42 respondents (77.8%) who answered the steps for using complete PPE during treatment, and there were 12 respondents (22.2%) who answered the steps to use incomplete PPE during treatment. There were 54 respondents (100%) who answered yes immediately replace if the PPE used was damaged. There were 54 respondents (100%) who answered yes immediately replace if the PPE used was wet/exposed to splashes of body fluids of patients who were confirmed with COVID-19. There were 54 respondents (100%) who answered yes to always check PPE during treatment. There were 46 respondents (85.2%) who answered the complete PPE release steps , and there were 8 respondents (14.8%) who answered the incomplete PPE release steps. There were 54 respondents (100%) who answered yes to reusable PPE, and there were 54 respondents (100%) who answered using complete PPE when performing treatment activities that can protect from airborne particles (droplets, liquids, viruses/bacteria).

Characteristics of Respondents

The results of this study showed that of the 54 respondents studied, respondents who carried out treatment activities and met directly with patients who had been confirmed with COVID-19, for the highest age group were 31-40 years as many as 34 respondents (63%), and for the lowest age group was 41-50 years as many as 3 respondents (5.6%). The results of this study are in line with previous research that discussed factors related to the use of personal protective equipment in nurses at the inpatient installation of the Mamuju Regency Hospital in West Sulawesi, showing that from the age characteristics, respondents were on average 20-30 years old as many as 42 people and those aged 31-45 as many as 41 people. From the results of this study, it was found that this age stage is the productive age stage as stated by Tyson and Jackson (2001), that the productive age is one of the supporting factors in producing quality services in nursing (Ningsih, 2018).

For the sex group, the highest was female as many as 36 respondents (66.7%) and for the lowest sex group were men as many as 18 respondents (33.3%). The results of this study are in line with the latest research that discusses the relationship between age, gender, length of work, knowledge, attitudes, and availability of personal protective equipment with the behavior of using PPE in health workers, showing that respondents who are female are more (76.1%) who behave well in the use of PPE, compared to behaving less (23.9%). Similarly, more male respondents (78.8%) behaved well in PPE use, compared to behave less (21.2%). So it can be known that there is no significant relationship between gender and the behavior of using PPE in health workers at Banjar Baru Regional Hospital (Apriluanana et al., 2016).

For the last education group, the highest was Ners- S2 with 48 respondents (88.9%) and for the lowest education group it was DIII with 6 respondents (11.1%). The results of this study were directed by previous research that discussed factors related to nurse compliance in the use of PPE in the inpatient room of Bhayangkara Hospital Makassar where there were 60 respondents, showing that the highest education was S1 professional Ners 29 respondents (48.3%), for 15 respondents (25%) who had DIII education, 13 respondents (21.7%) who had S1 Nursing education, and 3 respondents (5%) on S2 Nursing education. So with education with a profession

does not have a significant influence but contributes 95% trust which is more convincing 27%.

For the highest duty type group was IC with 44 respondents (81.5%), for the lowest duty type group, the IGD was 10 respondents (18.5%). The results of this study are in line with previous research that discussed the evaluation of nurses' knowledge and compliance with the use of personal protective equipment in the *Intensive Care Unit* (ICU) of The Senopati Bantul Hospital Yogyakarta showed that out of 20 people there were 12 nurses (60%) had high knowledge and 8 nurses (40%) had low knowledge, and as many as 16 nurses (80%) were obedient to the use of tools personal protection and 4 nurses (20%) did not comply with the use of personal protective equipment, so in this study the nurses at the *Intensive Care Unit* (ICU) of Senopati Bantul Worship Hospital had a high level of knowledge about personal protective equipment and were obedient to the use of personal protective equipment (Pramesti et al., 2017).

For the highest working period group was >5 years as many as 41 respondents (75.9%) and for the lowest working period group was <5 years as many as 13 respondents (24.1%). The results of this study are in line with previous research that discussed factors related to the use of personal protective equipment in nurses at the inpatient installation of the Mamuju Regency Hospital in West Sulawesi, showing that of the 83 respondents in the category of service period between 5 years and below with a total of 18 respondents (21.7%), while the number of respondents who had a service period of 5 years and above was 65 respondents (78.3%), so more and more experience in doing work provides good dampak in providing nurse assistance in maintaining prudence in carrying out actions and also the use of personal protective equipment in accordance with the needs of ada (Ningsih, 2018).

For the group of people living in the same house, the highest was >5 people with 31 respondents (57.4%), for the group of people living in the same house, the lowest was <5 people with 23 respondents (42.6%). For the group still doing activities outside the home, the highest was <5 people as many as 47 respondents (87%), for the group still doing activities outside the home the lowest was 7 respondents (13%). For the group that had lived in an environment with COVID-19 patients, the highest was the one who answered no as many as 53 respondents (98.1%), for the group that had lived in an environment with COVID-19 patients, the lowest was the one who answered no as many as 53 respondents (98.1%). For the elderly group who live in the same house, the highest was answering no as many as 37 respondents (31.5%), and for the elderly group living in the same house, the lowest was answering yes as many as 17 respondents (17.5%).

Use of Personal Protective Equipment

The results showed that the data obtained from 54 respondents who carried out direct care activities and met with patients who had been confirmed with COVID-19, there were 54 respondents who answered using complete PPE when carrying out treatment. There were 42 respondents (77.8%) who answered the steps for using complete PPE during treatment, and there were 12 respondents (22.2%) who answered the steps for using incomplete PPE during treatment. There were 54 respondents (100%) who answered yes immediately replace if the PPE used was damaged. There were 54 respondents (100%) who answered yes immediately replace if the PPE used was wet/exposed to splashes of body fluids of patients who were confirmed with COVID-19. There were 54 respondents (100%) who answered yes to always check PPE during treatment. There were 46 respondents (85.2%) who answered the complete PPE release steps , and there were 8

respondents (14.8%) who answered the incomplete PPE release steps. There were 54 respondents (100%) who answered yes to reusable PPE, and there were 54 respondents (100%) who answered using complete PPE when performing treatment activities that can protect against airborne particles (droplets, liquids, viruses/bacteria). According to researchers, the better and more the body is coated with PPE, the better the protection obtained, the use of PPE and the release of PPE according to standards can prevent the spread of virus or contracting COVID-19.

The results of this study are in line with previous research (Hegde, 2020) by comparing the types of PPE, evaluating modified PPE, procedures for wearing and releasing PPE and types of training in which 2278 participants were included. This type of PPE powered air respirator with Coverall can protect against the risk of contamination better than N95 masks and gowns (Risk Ratio (RR) 0.27, interval trust (CI) 95% 0.17 to 0.43) but is more difficult to wear. Dresses compared to aprons can protect better against PPE-type contamination breathe more comfortably and can increase user satisfaction, but with little impact of contamination. Proper modification to the PPE design can reduce contamination compared to standard PPE. For example, contamination can be reduced by using a protective gown and a combination of gloves so that it can be removed together and cover the wrist area (RR 0.27 95% CI 0.09 to 0.14), tight gowns around the neck, wrist and hand area. Guidelines for the use of PPE, following guidelines and recommendations from the Centers for Disease Control and Prevention to remove PPE compared to no guidance can reduce contamination on its own (MD -5.44 95% CI -7.43 to -3.45). Single-stroke protective glove and gown removal compared to separate release (RR 0.20 95% CI 0.05 to 0.77), double-glove gloves with single gloves (RR 0.34 95% CI 0.17 to 0.66). Additional verbal instruction can lead to less miscue in releasing PPE (md -0.9 95% CI -1.4 to -0.4). User/face-to-face training can reduce non-compliance with PPE release guidelines (odds ratio 0.45 95% CI 0.21 to 0.98) compared to only providing folders or videos. Computer simulations can lead to fewer miscues in ppe releases and delivery videos of wearing PPE can result in better skill scores.

Hand Hygiene

The results of this study showed that the data obtained from 54 respondents who carried out direct care activities and met with patients who had been confirmed with COVID-19, there were 18 respondents (33.3%) who answered the first step of checking before using PPE, and 36 respondents (66.7%) who answered the first step of washing hands before using PPE. For 54 respondents (100%) who answered yes when using alcohol/hand sanitizer in doing hand hygiene during treatment. According to researchers, taking appropriate actions and washing hands regularly and thoroughly with sabun, flowing flow or doing hand washing using alcohol/hand sanitizers can reduce or overcome the spread of the risk of contracting the COVID-19 virus (WHO, 2020).

The results of this study are in line with the previous study (Neuwirth et al., 2020) which was carried out in 8 rooms (two intensive care units, two intermediate, and four standard care units) dedicated to COVID-19 patients at the University Hospital in Cologne / Germany from February 27 to April 21, 2020, from 127 of them 87 nurses, 22 doctors and 18 other employees showed compliance with 85% of PPE use compared to COVID-19 wards with 76% compliance, in particular increased compliance in the areas of hand hygiene and the use of PPE have a major impact on overall compliance. Where the hand hygiene compliance of health workers in COVID-

19 wards performs clearly above national standards (79% for all indications in intensive care units) that are appropriate to address the challenges of the COVID-19 pandemic.

CONCLUSION

Respondents who carry out treatment activities and meet directly with patients who confirmed COVID-19 in the Infection Center room using protective equipment Personal (PPE) that is complete and in accordance with health protocol directions.

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