

Original Research

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Description of Perceptions of The Donning and Doffing of Personal Protective Equipment in Unpad Nursing Students Class of 2017**Rizkika Nur Amalia¹, Etika Emaliyawati², Ati Surya Mediawati³**¹Undergraduate Students, Faculty of Nursing, Universitas Padjadjaran²Department of Emergency and Critical Care, Faculty of Nursing, Universitas Padjadjaran³Department of Basic Nursing, Faculty of Nursing, Universitas Padjadjaran**ARTICLE INFO****Article history:**

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ABSTRACT

Personal protective equipment (PPE) is one of the standard precautions to reduce the risk of infection spreading. Nursing students are expected to have the proper knowledge and attitude regarding the donning and doffing of PPE as taught during the educational period. This study was intended to understand the knowledge and attitude regarding the donning and doffing of PPE on the students in the Faculty of Nursing Universitas Padjadjaran class of 2017 who will attend nurse profession education.

The method of this study was descriptive quantitative. The population of this study was the students in the Faculty of Nursing Universitas Padjadjaran class of 2017. The sampling method was total sampling with a response rate of 82.7% (n=205). The instrument used was an online questionnaire of knowledge and attitude regarding PPE built by the researcher. The validity assessed were the construct validity and the content validity. The reliability had Cronbach's alpha value of 0.913 (knowledge) and 0.808 (attitude). The data analysis used median and frequency distribution.

The study result showed that 113 respondents (55.1%) had proper knowledge regarding PPE while 92 respondents (44.9%) lacked knowledge regarding PPE. The variable study result showed that 111 respondents (54.1%) had a positive attitude toward PPE and 94 respondents (45.9%) had a negative attitude toward PPE. More than half the students in the Faculty of Nursing Universitas Padjadjaran class of 2017 had proper knowledge and a positive attitude. Knowledge and attitude can be affected by training, experience, and the availability of PPE. Practice and training concerning PPE during the educational period can increase the ability of the students to donning and doffing PPE properly because the students can easily understand the basic principles and standard practices and implement them consistently. Therefore, to increase the knowledge and attitude, the revitalization of education and training is required.

Introduction

Healthcare-associated infections (HAIs) are considered a serious problem worldwide because they can cause mortality and morbidity that threaten the well-being and health of patients and health workers (Haque et al., 2018). Infection is a major problem associated with healthcare and more than 1.4 million people worldwide are exposed to hospital-acquired infections with the risk 2-20 times higher in developing countries (Yazie et al., 2019). A recent study by the Centers for Disease Control and Prevention (CDC) showed that in US hospitals there was a significant increase in HAIs in 2020, largely as a result of the COVID-19 pandemic (University of Minnesota, 2021). In addition, HAIs in Indonesia reached 15.74%, far above developed countries which ranged from 4.8 to 15.5% (Suherlin, 2020). The high incidence of work accidents and infections related to health care is an indicator of the importance of infection control efforts by applying standard precautions, one of which is the use of personal protective equipment (PPE).

The use of PPE is one of the keys to reducing the spread of infection that can help protect health workers because they are the group of workers who are most at risk of contracting the disease (Baloh et al., 2019; Kreimer, 2013). When working with infectious diseases with a high risk of transmissions, such as Ebola and covid-19, the simple act of donning (putting on) and doffing (taking off) PPE becomes a lifesaving procedure not only for healthcare workers but also for the patients who depend on them (Christensen et al., 2020). However, several studies have shown that health workers often use the wrong technique in donning and doffing PPE (Kang et al., 2017; Kwon et al., 2017; Phan et al., 2019; Tomas et al., 2015). Deviations in technique can lead to an increased risk of contamination of skin and clothing with healthcare-associated pathogens (Guo et al., 2014; Tomas et al., 2015). Therefore, the effectiveness of PPE is often undermined by inappropriate methods of removing PPE (Baloh et al., 2019).

Various factors can influence the donning and doffing of PPE, including knowledge and attitude factors (Harrod et al., 2020; Jain et al., 2013). Inadequate knowledge and wrong perceptions and attitudes among health workers can directly affect

practice and lead to delayed diagnosis, poor infection control practices, and spread of disease (Wahed et al., 2020). Nursing undergraduate education is the stage of formation and the right moment to get the knowledge, attitudes, and skills needed. In addition, nursing students who are part of nursing care providers are expected to have an adequate knowledge base and a good attitude regarding the donning and doffing of PPE from the time they are students to train and familiarize themselves in preparing for the next level (profession) to be ready in the field of practice and after that the world of work in health services.

In undergraduate nursing education, patient safety and standard precautions are studied in one of the nursing courses and cannot be separated from every nursing action procedure performed by students when learning in the laboratory. At the Faculty of Nursing Unpad, there are Basic Nursing and Patient Safety (KDKP) courses that are studied in semester 3. One of the things studied in the KDKP course is standard precautions and PPE, and it includes an introduction to the types of PPE, as well as techniques or how to donning and doffing of PPE. The competencies that are expected to exist and be possessed by students consist of three aspects, namely knowledge, attitudes, and nursing skills. Students' understanding of the PPE material in the KDKP course will affect students' perceptions of the importance of the PPE, then student perceptions will shape student attitudes when practicing. Therefore, in this study, researchers wanted to know how the description of knowledge and attitudes about the donning and doffing of PPE from the perceptions of Unpad nursing students class of 2017.

Method

The method of this study was descriptive quantitative with a cross-sectional time approach, used to describe the perception of knowledge and attitudes of students in the Faculty of Nursing Universitas Padjadjaran class of 2017 regarding the donning and doffing of PPE. The population of this study was all students in the Faculty of Nursing Universitas Padjadjaran class of 2017 around 248 students, which consisted of three campuses, namely Jatinangor, Garut, and Pangandaran campuses who had participated in KDKP learning related to PPE. The sampling

method was total sampling with a response rate of 82.7% (n=205). The instrument used was a questionnaire consisting of 18 items of knowledge questions and 18 items of attitude questions that were built by researchers and have been tested for validity and reliability. The validity assessed were the construct validity and content validity. The reliability test used a Cronbach's alpha value of 0.913 (knowledge) and 0.808 (attitude). The research has received approval from the Research Ethics Commission of Padjadjaran University with No. 496/UN6.KEP/EC/2021 and research permit from the Dean of the Faculty of Nursing, Universitas Padjadjaran with license number 2330 /UN6.L1/KM/2021. Research ethics applied the principles of respect for human dignity, beneficence, non-maleficence, justice, respect for privacy, and confidentiality. Data analysis used univariate analysis by finding the median and range values presented in the frequency distribution table and the percentage of each variable. The steps of data analysis include editing, coding, data entry, and tabulation. This research was conducted at the Faculty of Nursing, Padjadjaran University for 12 days, from 23 June 2021-4 July 2021.

Results

Table 1. Description of the Characteristics Students in the Faculty of Nursing Universitas Padjadjaran class of 2017 (n=205)

Characteristics	Frequency	Percentage (%)
Gender		
Male	26	12.7
Female	179	87.3
Campus Area		
Jatinangor	130	63.4
Garut	56	27.3
Pangandaran	19	9.3

In table 1. it is known that most of the respondents are women (87.3%) and most of the respondents are from the Jatinangor campus, namely 130 students (63.4%).

Table 2. Description of Knowledge and Attitude of Donning and Doffing of PPE in

Students of the Faculty of Nursing Universitas Padjadjaran Class of 2017 (n=205)

Categories	Frequency	Percentage (%)
Knowledge		
Good	113	55.1
Less	92	44.9
Attitude		
Positive	111	54.1
Negative	94	45.9

In table 2. it is known that more than half of the respondents had good knowledge of PPE, namely 113 respondents (55.1%). The distribution of respondents with less knowledge was 92 respondents (44.9%). In the distribution of respondents according to the attitude category, more than half of the respondents had a positive attitude towards PPE, namely 111 respondents (54.1%). The distribution of respondents with a negative attitude level was 94 respondents (45.9%).

Table 3. Description of Knowledge and Attitudes for the Donning and Doffing of PPE on Students of the Faculty of Nursing Universitas Padjadjaran Class of 2017 Based on the Respondent's Campus Area (n=205)

Characteristics (Campus Area)	Knowledge		Attitude	
	Good		Positive	
	f	%	f	%
Jatinangor	7	54.	7	60
Garut	1	6	8	2
Pangandaran	3	55.	2	42.
	1	4	4	9
	1	57.	9	47.
	1	9	4	0

In table 3. it is known that more than half of student respondents at the Jatinangor, Garut, and Pangandaran campuses both had good knowledge with the percentages of 54.6%, 55.4%, and 57.9%, respectively. In the attitude category, more than half of the students at the Jatinangor campus had a good attitude (60%), while students at the Garut and Pangandaran campuses had more negative attitudes (57.1% and 52.6%).

Table 4. Questions on Knowledge of the Donning and Doffing of PPE for Students in the Faculty of Nursing Universitas Padjadjaran Class of 2017

Questions	Median	Range
Techniques for doffing clean and sterile gloves	5.00	2
Techniques for donning mask	5.00	2
Techniques for doffing mask	5.00	2
Definition and purpose of PPE	5.00	2
Techniques for donning clean and sterile gloves	5.00	3
Techniques for doffing face shield	4.00	2
Techniques for donning face shield	4.00	3
Techniques for donning gown	4.00	3
Techniques for doffing gown	4.00	3
Parts of PPE	4.00	4
PPE that have been contaminated and parts that are still sterile	4.00	4
Assessment of potential infection exposure	4.00	4
When to replace PPE with new ones	4.00	4
Level of PPE	4.00	4
Fit check of PPE that will be used	4.00	4
Sequence for doffing PPE in each type of room	4.00	4
Sequence for donning PPE in each type of room	4.00	4

Based on table 4., the highest median value is in question items related to techniques for doffing clean and sterile gloves, techniques for donning and doffing masks, definition and purpose of PPE, namely 5.00 (R=2). Furthermore, the lowest median was on question items related to the principle of PPE, parts of PPE that have been contaminated and parts that are still sterile, assessment of potential infection exposure, time to replace PPE, level of PPE, fit check of PPE, sequence for donning and doffing of PPE in each type of room is 4.00 (R = 4). This shows that the statement of the technique for doffing clean and sterile gloves, masks, the definition and purpose of PPE is most widely understood, while there are still many who lack and do not understand the sequence and principles of donning and doffing PPE.

Table 5. Questions on Attitudes for the Donning and Doffing of PPE for Students in the Faculty of Nursing Universitas Padjadjaran Class of 2017

good knowledge (55.1%) and a positive attitude

Questions	Median	Range
In my opinion, the technique of donning PPE is an important thing to pay attention to	5.00	2
In my opinion, the donning and doffing of PPE must be done properly	5.00	2
In my opinion, the donning and doffing of PPE should be done sequentially according to the SOP	5.00	3
I immediately replace the PPE if it looks dirty and damaged	5.00	3
In my opinion, it is necessary to replace gloves when switching to another patient	5.00	4
In my opinion, there is no need to wash your hands if you are wearing gloves	5.00	4
In my opinion, it's okay not to replace a mask that feels damp	5.00	4
As a student, I get used to donning and doffing PPE during practicum	4.00	3
I always prepare PPE before starting the practicum	4.00	4
In my opinion, it doesn't matter if you use a level of PPE that is not by the health order and the potential dangers	4.00	4
In my opinion, when giving action, I lower or remove the mask if it feels stuffy	4.00	4
I feel the need to wear PPE in all procedures for patients	4.00	4
In my opinion, doffing PPE should be rolled inwards (the inside of the PPE is on the outside when thrown away)	4.00	4
In my opinion, the way to doffing gowns, masks, and glasses is by holding the straps	4.00	4
In my opinion, training and education do not have a big role in the practice of donning and doffing PPE	4.00	4
In my opinion, the doffing of PPE is carried out in the patient room	4.00	4
In my opinion, during an emergency, there is no need to use the technique of donning, doffing PPE so quickly to prioritize patient safety and provide immediate help	4.00	4
In my opinion, sequentially donning and doffing PPE takes a lot of time	4.00	4

Based on table 5., the highest median value is in the question items related to the opinion that the technique of donning and doffing PPE is an important thing to note and the opinion that the donning and doffing of PPE must be done correctly, namely 5.00 (R = 2). Furthermore, the lowest median was on the question item related to the opinion that donning and doffing PPE sequentially took a lot of time, namely 4.00 (R = 4).

Discussion

From the results of the study in general it was found that more than half of the students had

(54.1%). This is in line with the results of research conducted by Kim & Kang (2019) which showed that knowledge and attitudes of nursing students related to PPE were high, as well as research by Moch. Udin Kurnia Putra (2015) shows that the level of knowledge of UI nursing profession students is high as much as 85.8% and has a positive PPE attitude as much as 51.3%. This may be because more than half of the respondents in this study had good knowledge of the donning and doffing of PPE, so that knowledge was passed down in forming positive attitudes of respondents. This is in line with the theory by Green and proposed by Kim & Kang (2019) that attitudes related to PPE are

positively correlated with knowledge and perceptions regarding the donning and doffing of PPE.

From the results of the study, more than half of Unpad nursing students at Pangandaran and Garut campuses had negative attitudes about donning and doffing PPE. This may be due to the limited PPE facilities at the Pangandaran and Garut campuses compared to the Jatinangor campus which is the central campus. The limitations of PPE facilities will lead to a lack of stimulants repeatedly and also experienced in the donning and doffing of PPE which will ultimately affect the tendency to behave/attitude related to the donning and doffing of PPE.

In addition to showing an overview of knowledge on the donning and doffing of PPE in general, this study also presents results in the form of an overview of knowledge per question item. Based on the frequency of respondents' answers, most of the respondents answered that they understood and understood very well the definition of PPE, the purpose of PPE, the principles of PPE, techniques for donning and doffing gloves, masks, gowns, and face shields, assessment of potential infection exposure, time to replace of PPE, contaminated and sterile parts of PPE. Meanwhile, the aspects of knowledge that are least understood and need to be re-taught are the level of PPE, sequence for donning and doffing PPE in each type of room, and fit check of PPE. The results of the study based on the median value also showed that the statement of the technique for doffing clean and sterile gloves, masks, and the definition and purpose of PPE was the most widely understood, while there were still many who lacked and did not understand the sequence and principles of donning and doffing PPE.

This may be caused by learning and experience such as techniques for doffing gloves which are more often carried out systematically and repeatedly than the sequence for donning PPE. This is reinforced by Bird (1985) in Yuliana (2018), Budiman and Riyanto (2013), that lack of knowledge is caused by lack of experience, lack

of orientation or training, and lack of understanding of teaching. Other knowledge influencing factors are the availability of facilities, references, ease of access, materials, and educational institutions. Therefore, it is necessary to re-do learning regarding the sequence for donning PPE in each type of room because if this is not anticipated, it can put students at risk of being exposed to the disease. Yeon & Shin (2020) mentioned that increasing knowledge can be done through systematic and repeated education which includes personal training on the use of PPE in isolation rooms as well as clarifying each step of the entire process related to the use of PPE. Knowledge will be difficult to forget if it is obtained directly during practice as an experience and repeated so that it becomes a daily habit.

The results of the attitude research per question item based on the median value showed that the majority of respondents had a positive attitude regarding the importance of donning and doffing PPE correctly. Meanwhile, there are still some respondents who have the opinion that donning and doffing PPE sequentially takes a lot of time and do not need to use the correct technique of donning and doffing PPE in an emergency. This assumption cannot be justified because it is not following the principles of occupational safety and health. Health care providers under any circumstances must prioritize personal safety before assisting. In an emergency, one of the important things that need to be considered is the safety of rescuers and patients, one of which can be done by using PPE. These inappropriate assumptions and opinions, if left unchecked, will put individuals at risk of exposure to disease, lazy to donning and doffing PPE sequentially because they think it takes a lot of time and will have an impact on self-contamination.

Adequate knowledge and a positive attitude regarding PPE are important for nursing students who will be in charge of infection control in the future, therefore it is necessary to increase good knowledge about the use of PPE and develop a positive attitude to develop nursing care

programs that quality. The role of educational institutions is also great in increasing knowledge, attitudes, and also habituation. This is in line with the theory which states that educational institutions are a system that influences the formation of attitudes due to the provision of basic knowledge and moral concepts in individuals (Azwar, 2013).

The results of this study are expected to be input to the Faculty of Nursing at Universitas Padjadjaran to improve learning methods and things that need to be taught again regarding the donning and doffing of PPE. In addition, for students of the Faculty of Nursing Universitas Padjadjaran class 2017 can be a self-evaluation in measuring the feasibility of knowledge and attitudes before going to the practice area or at the professional level. In addition, through this research, it is hoped that the data obtained can be initial data to conduct further research related to the donning and doffing of PPE, especially research that is objective by looking at its practical abilities.

Conclusions

Based on the results of research conducted on 205 students in the Faculty of Nursing Universitas Padjadjaran class 2017, it can be concluded that more than half of the students had good knowledge and positive attitudes. The results of this study are in line with previous research which states that nursing students have good knowledge and attitudes, but to increase the knowledge and attitude regarding the donning and doffing PPE, the revitalization of education and training is required.

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