



The relationship between personal protective equipment (PPE) comfort and nurses' behavior in the inpatient areas of Merauke regional hospital

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Article Info

Article history:

Received Jun 2, 2026

Revised Jun 23, 2026

Accepted Jul 10, 2026

Keywords:

Behavior;

Comfort;

Nursing;

PPE.

ABSTRACT

The use of PPE aims to protect health workers from invasion by pathogenic microbes. The use of Personal Protective Equipment (PPE) by nurses is still considered inadequate in its implementation and application. The application of PPE in nursing care is influenced by various factors. One such factor is nurses' behavior in using PPE. This study aims to determine the effect of comfort in using PPE on nurses' behavior in using PPE at Merauke Regional Hospital. This study used a cross-sectional research technique. The sampling method used was stratified random sampling. Based on this calculation, the required sample size was 103 respondents. The independent variable in this study was comfort in using PPE, and the dependent variable was behavior in using PPE. The Chi-square correlation test was used. The Chi-square test yielded a p-value of 0.04 ($p < 0.05$). These results concluded that there was a significant effect between comfort in using PPE and nurses' behavior at Merauke Regional Hospital. The SPSS output showed a correlation coefficient of moderate or moderately strong.

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1. INTRODUCTION

Health workers have a high risk of exposure to various diseases originating from infected blood and body fluids which can cause infections such as Hepatitis B, Hepatitis C, HIV and needle sticks (Mahayanti, 2023). More than 30 types of pathogens can be transmitted through blood and other bodily fluids (Noviarmi & Prananya, 2023). Global data states that there are more than 35 million health workers facing the risk of injury from contaminated sharp objects and the health workers most exposed to disease are nurses (Banda, 2022). Based on global data released by the International Labour Organization (ILO) as of January 11, 2024, there were 77,708 cases of work accidents per 100,000 workers in the world (Reynaldi et al., 2025). There are almost a thousand times more non-fatal workplace accidents than fatal workplace accidents each year (Edu, 2025). According to census data released by the U.S. Bureau of Labor Statistics, there were 5,486 fatal workplace accidents in America in 2022 (PI et al., 2022). In Malaysia, based on the annual statistical report of the Malaysian

Department of Occupational Safety and Health in 2019, there were 259 cases of fatal accidents (Putri et al., 2024). From this data, it is known that the number of work accidents is quite high every year.

Based on Work Accident Insurance claims data from the Indonesian Social Security Administration for Manpower as of February 26, 2024, throughout 2023, the number of workplace accidents in Indonesia reached 370,747 cases. In 2022, there were 265,334 cases of workplace accidents in Indonesia. In 2021, the number of workplace accidents reached 234,370 cases, and in 2020, it reached 221,740 cases. The last four years, from 2020 to 2023, show a significant increase in workplace accidents (Sofiantika & Susilo, 2020).

The use of Personal Protective Equipment (PPE) by nurses is still considered inadequate in terms of implementation and application. This is evident in research conducted by Azzahri 2020, which found that nurses' attitudes toward the use of personal protective equipment are still lacking, as indicated by a negative attitude of 53.30% (Azzahri & Ikhwan, 2020). Research conducted by Apriyango, 2024 showed that nurses' behavior in using personal protective equipment was not significant, as indicated by the majority of respondents who had less than compliant behavior in using personal protective equipment, amounting to 44 people (52.4%) (Apriyanto et al., 2024). Based on the research results Daeli, 2024 at Community Health Center Afulu, it was found that nurses' compliance in using personal protective equipment was influenced by several factors, namely, knowledge, attitudes, actions and good communication with the Community Health Center and the availability of personal protective equipment by the Hospital Management (Daeli et al., 2024).

The PPE available in healthcare facilities is generally standardized, so it may not be suitable for the physical characteristics and comfort of each individual nurse. PPE is manufactured using only general models, so not every nurse feels comfortable wearing it. This is consistent with research conducted by Helga, 2020 which states that wearing PPE can cause discomfort, especially when worn for long periods because the wearer feels confined and isolated. This causes each individual to respond differently. Therefore, workers tend to remove PPE to reduce discomfort (Helga, 2020).

The discomfort of the PPE used is also a factor influencing healthcare workers' behavior in wearing it. Research also shows that there are reports that personal protective equipment such as gowns, boots, masks, gloves, and goggles are too large or too small, making them uncomfortable for healthcare workers (Noviarmi & Prananya, 2023). This situation results in many healthcare workers working with incomplete PPE.

Interviews and observations conducted by researchers with nurses at Merauke Regional Hospital revealed that 3 out of 5 nurses in the inpatient ward did not wear masks while working, citing inconvenience and discomfort. Based on the aforementioned background and the importance of nurses' comfort in using PPE, which is useful for protecting themselves and reducing the incidence of work-related accidents, the researchers were interested in examining "The Relationship Between Comfort in Using Personal Protective Equipment (PPE) and Nurse Behavior in the Inpatient Ward at Merauke Regional Hospital."

2. RESEARCH METHOD

This research is a quantitative research with correlational analytical design using a cross-sectional approach. Using the Probability Sampling technique, a sample of 103 respondents was obtained. The independent variable is the comfort of using Personal Protective Equipment (PPE) using a questionnaire with indicators of Ergonomics, Mobility & Flexibility, Compatibility between PPE and the dependent variable is nurse behavior with indicators of compliance, measured by the percentage of the number of correct answers in each questionnaire for categorization. The Chi-Square statistical test was used to determine the relationship between the two variables. Analysis using the Chi-Square statistical test obtained the result of $p = 0.000 < 0.05$, so H_0 was rejected and H_1 was accepted, which means there is an influence of the independent variable on the dependent variable.

3. RESULTS AND DISCUSSIONS

Result

Table 1. Distribution of respondent characteristics and variables

Charakteristik	Total	Percentage (%)
Age :		
21-30 year	21	20,4
31-40 year	58	56,3
>40 year	24	23,3
Jender :		
Male	20	19,4
Female	83	80,6
Years of employment:		
1-5 year	18	17,5
6-10 year	51	49,5
>10 year	34	33
Highest education:		
Diploma	67	65
Bachelors	34	33
Masters	1	1
Camfort of Using PPE		
Camfortable	32	31,1
Quite Camfortable	55	53,4
Not Camfortable	16	15,5
Nurse Behavior		
Good	55	53,4
Less	48	46,6
Total	103	100

Based on table 1, it shows that of the 103 respondents of Merauke Regional General Hospital, the highest age frequency distribution was found at 31-40 years old, as many as 58 people (56.3%), 83 people (80.6%) were female, the highest frequency of working time was 6-10 years as many as 51 people (49.5%), the highest frequency of last education was D3 education as many as 68 people (66%), most respondents felt quite comfortable in using PPE, namely as many as 55 nurses (53.4%) and there were 55 people (53.4%) who had good behavior.

Table 2. Cross tabulation between variables

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Comfort of Using PPE	Nurse Behavior				Total		p-value
	good		less				
	f	%	f	%	N	%	
Camfortable	23	41,8	9	18,8	32	31,1	0,03
Quite Camfortable	24	43,6	31	64,6	55	53,4	
Not Camfortable	8	14,5	8	16,7	16	15,5	
Total					103	100	

Based on table 2, it shows that of the 23 people (41.8%) who felt comfortable in using PPE and behaved well, there were 9 people (18.8%) who felt comfortable in using PPE but behaved poorly. There were 24 people (43.6%) nurses who felt quite comfortable in using PPE and behaved well, while there were 31 people (64.6%) nurses who felt quite comfortable in using PPE but behaved poorly. There were 8 people (14.5%) nurses who felt uncomfortable in using PPE and behaved well, while there were 8 people (16.7%) nurses who felt uncomfortable in using PPE and behaved poorly.

Table 3. Statistical test results chi-square tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	6.571 ^a	2	.037
Likelihood Ratio	6.754	2	.034
Linear-by-Linear Association	3.645	1	.056
N of Valid Cases	103		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.46.

Based on Table 3, the results of the Chi-square statistical test obtained a p-value of 0.03 ($p < 0.05$). From these results, it can be concluded that there is a significant relationship between comfort in using Personal Protective Equipment and the behavior of nurses at Merauke Regional Hospital.

Discussions

Convenience of Using Personal Protective Equipment (PPE) at Merauke Regional Hospital

Comfort is a condition where an individual feels comfortable based on each individual's perception (Kenedy, 2021). Factors that influence comfort are physical comfort, psychospiritual comfort, social environmental comfort, and socio-cultural comfort (Arif et al., 2022).

The results of the comfort study were presented in three categories: comfortable, quite comfortable, and uncomfortable. Respondents were categorized as comfortable if their score was 38-50, quite comfortable if their score was 24-37, and uncomfortable if their score was 10-23. Table 1 shows that of the 103 respondents, the majority of respondents felt quite comfortable using PPE, namely 55 nurses (53.4%), and a small number of respondents felt uncomfortable, namely 16 people (15.5%). The table above also shows that there were 32 people (31.1%) who felt comfortable using PPE.

In healthcare practice, nurses are healthcare workers who have frequent contact with patients. Therefore, the use of PPE is crucial to prevent disease transmission and exposure to nosocomial infections. If the PPE they wear feels comfortable, nurses are more likely to accept it and use it consistently in every nursing procedure. Conversely, if PPE is uncomfortable, it can decrease nurses' motivation and compliance in using it. The comfort of wearing PPE is related to several aspects, including the suitability of the PPE size to the user's body, the quality of the materials used, good air circulation, and ease of putting on and taking off the PPE. PPE that is too thick, causes heat, or restricts mobility can cause discomfort for healthcare workers, especially nurses who must work for long periods and perform various nursing procedures. These conditions can affect healthcare workers' consistency in using PPE according to standards set by the hospital (Ergin et al., 2021).

According to Karahan (2022), factors that contribute to a person's comfort include the physical environment, supportive healthcare facilities or specialized resources, accessibility of resources and facilities, and the use of appropriate PPE, which contributes to a feeling of comfort (Karahan et al., 2022). This aligns with research conducted by Faizah and Hendra (2013) entitled "Determinant Factors Associated with PPE Use Behavior among Workers in the Technical Services Department of PT. Indocement Tungal Prakarsa." The results, from a total sample of 54 individuals, showed that 77.8% of respondents felt comfortable using PPE, while 22.2% only felt moderately comfortable (Gualandi et al., 2023). According to the researchers' assumptions, comfort in PPE use can be influenced by several factors, such as appropriate PPE size, PPE material that does not cause irritation or excessive heat, ease of use, and whether it interferes with nurses' work activities. If the PPE is uncomfortable, for example, too hot, difficult to use, or hinders mobility during work, this can reduce nurses' willingness to use it consistently. Conversely, if PPE is designed with user comfort in mind, nurses will more readily accept and become accustomed to using it in every nursing procedure (Lasniroha et al., 2026). Feelings of discomfort when using PPE will make nurses reluctant to use it. This discomfort can also hinder work because nurses feel uncomfortable, hot, and heavy when wearing PPE (Mongilong et al., 2024).

According to researchers' assumptions, comfort in using PPE is also related to support from hospital management in providing adequate facilities for healthcare workers. Hospitals have a responsibility to provide PPE that not only meets safety standards but also considers ergonomics and user comfort. Providing high-quality, properly sized, and easy-to-use PPE can increase healthcare workers' satisfaction and comfort in carrying out their duties (Martzarini et al., 2024).

Nurse Behavior at Merauke Regional Hospital

Personal protective equipment (PPE) is a set of tools capable of protecting workers from potential workplace hazards that could lead to workplace accidents or occupational diseases. The use

of PPE by nurses is crucial for preventing disease transmission (Nurmalia et al., 2025). PPE use among nurses was measured using a questionnaire containing questions that met the standards they use in inpatient wards. The results of the study on nurses showed that 55 (53.4%) demonstrated good PPE use behavior, while 48 (46.6%) demonstrated poor PPE use. Behavior based on knowledge, awareness, and a positive attitude is long-lasting (Fairyo, 2018). Lawrence Green explains that health behavior is influenced by three main factors: predisposing factors, supporting factors, and motivating factors (Mustafa et al., 2025).

These research findings align with B. F. Skinner's behavioral theory of behaviorism. Skinner stated that human behavior is influenced by environmental stimuli and the consequences that follow those behaviors. In the concept of operant conditioning, a behavior tends to be repeated if it receives positive reinforcement, while behavior that is unpleasant or causes discomfort tends to be avoided (Noviyanti et al., 2020). Research on PPE use found that more nurses use PPE, but some still do not. Nurses' non-use of PPE can be due to several factors, including knowledge, attitudes, availability of PPE, and policies. Furthermore, respondent characteristics, such as age, gender, education, and length of service, are also determinants of PPE use (Zahira et al., 2025).

According to the researchers' assumptions, PPE use behavior can also be influenced by hospital policies, supervision from superiors, and the workplace safety culture within the hospital environment. A work environment that supports the implementation of occupational safety and health will provide a positive incentive for nurses to comply with PPE use. Support from hospital management in providing high-quality, comfortable, and easy-to-use PPE can also increase nurse compliance with PPE use. Observations during the researchers' fieldwork revealed that supervisory supervision plays a significant role in PPE use behavior. Interviews indicated that ward heads routinely remind nurses to use PPE. Respondents who received warnings or reminders tended to be more consistent in using PPE. This finding is supported by research conducted by Dewi (Dewi et al., 2020) which found that PPE availability, regulations, and supervision significantly correlated with increased compliance in PPE use at hospital. However, several respondents in this study also reported never receiving warnings despite non-compliance, indicating a weak oversight system. Therefore, hospitals need to optimize field supervision. Active supervision can increase awareness and compliance through social pressure and reinforcement of safe work habits.

The Relationship Between Comfort in Using Personal Protective Equipment (PPE) and Nurse Behavior at Merauke Regional Hospital

The study revealed that of the 23 (41.8%) nurses who felt comfortable using PPE and behaved appropriately, 9 (18.8%) felt comfortable using PPE but exhibited poor behavior. Twenty-four (43.6%) nurses felt quite comfortable using PPE and behaved appropriately, while 31 (64.6%) nurses felt quite comfortable using PPE but exhibited poor behavior. Eight (14.5%) nurses felt uncomfortable using PPE and behaved appropriately, while eight (16.7%) nurses felt uncomfortable using PPE and exhibited poor behavior. The Chi-square correlation test yielded a p-value of 0.04 ($p < 0.05$). These results indicate a significant relationship between comfort in using PPE and nurse behavior at Merauke Regional Hospital.

Feelings of discomfort when using Personal Protective Equipment (PPE) can lead to workers' reluctance to use it, leading to varying responses. Other reasons workers may refuse to use PPE include unawareness/unintelligence, heat, tightness, discomfort, unsightly weight, disruption to work, inappropriateness to the hazards involved, lack of sanctions, and refusal by superiors (Banda, 2022). The study found that nurses at Merauke Regional Hospital who felt comfortable had higher levels of positive behavior compared to those who felt uncomfortable. This finding echoes other studies that found a significant relationship between comfort and PPE use behavior. This theory suggests that feelings of discomfort when using PPE will lead to workers' reluctance to use PPE. This is consistent with the findings of a study that found that the majority of nurses who felt uncomfortable exhibited negative behavior.

This finding is inconsistent with Mahayangti's (2018) study. The study showed no relationship between comfort and compliance with PPE use among nurses at Badung Mangusada

Regency Hospital. Spearman's rho analysis showed a P-value > 0.05. The level of comfort in using PPE influences PPE use. The more uncomfortable the PPE, the more reluctant workers are to use it. Discomfort in PPE hinders work because workers experience discomfort, heat, and heaviness while wearing it. The suitability of personal protective equipment (PPE) to the type of work significantly influences workers' comfort levels when using PPE (Berkanis, 2023). Research by Yuliani and Amalia (2019) also demonstrated that comfort in using PPE influences PPE use behavior. Workers with a high level of comfort in using PPE have better compliance (Astuti et al., 2020).

Research by Nuberti (2016) found that internal factors exert a stronger influence on a person's actions. This is based on the level of awareness of each nurse. Although facilities and opportunities for compliant behavior are abundant, if nurses lack awareness, desire, and self-motivation, compliant behavior will not develop (Nurbeti et al., 2021).

According to the researcher's assumption, based on the results of a study on the effect of comfort in using Personal Protective Equipment (PPE) on nurse behavior at Merauke Regional Hospital, it was found that the level of comfort in using PPE is closely related to nurse behavior in using PPE during nursing care. Nurses who feel comfortable using PPE tend to demonstrate better behavior and are more compliant in using PPE in accordance with hospital standard operating procedures. Conversely, if nurses feel uncomfortable using PPE, this can influence their tendency to not use PPE optimally. Comfort in using PPE is a crucial factor that can influence healthcare workers' behavior in implementing occupational safety. This comfort can be influenced by various aspects such as the fit of the PPE to the user's body, the quality of the PPE material, air circulation within the PPE, and the ease of putting on and removing PPE during medical procedures. (Sudarmo et al., 2020) PPE designed with materials that are too thick, cause heat, or restrict movement during work can cause discomfort for nurses. This can make nurses feel distracted from carrying out their duties, potentially reducing compliance.

4. CONCLUSION

Most respondents felt quite comfortable in using PPE, namely 55 nurses (53.4%), and a small number of respondents felt uncomfortable, namely 16 people (15.5%). The results of the study also showed that there were 32 people (31.1%) who felt comfortable in using PPE. The results showed that out of 103 respondents, there were 55 people (53.4%) who had good behavior and there were 48 nurses (46.6%) who had poor behavior. Based on the results of the Chi-square statistical test, the p-value was obtained = 0.037 ($p < 0.05$). From these results, it was concluded that there was a significant relationship between comfort in using Personal Protective Equipment and Nurse Behavior at Merauke Regional Hospital. It is hoped that the Regional General Hospital will create Operational Standards for Compliance with the Use of PPE.

ACKNOWLEDGEMENTS

Thank you are conveyed to Dr. Dewi Wulansari, M.Sc as Director of Merauke Regional Hospital, all respondents who have participated in this study, Mr. Drs. Romanus Mbaraka, MT as Regent of Merauke, Mr. Salfianus Laiyaan as Head of the Regional Personnel Agency of Merauke Regency, Dr. Neville Muskita as Head of the Merauke Health Office, Mr. Mohamad Saljan., S.Kp., M.Kep as Chairman of the Indonesian National Nurses Association Merauke Regency branch, Dr. Sentot Imam Suprpto, MM as Rector of Strada University and all his staff, as well as to all parties involved and have helped in the preparation of this study.

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