

Skin Reactions Due To The Use Of Personal Protective Equipment On Healthcare Workers In Covid-19 Pandemic

Vera Madonna Lumban Toruan^{1*}, Ratna Noor Mariyati², Yetty Hutahaean³, Fransiska Sihotang⁴ and Agnes Kartini⁵

¹Department of dermatology venereology, Mulawarman University, Samarinda, Indonesia

²Graduated from Medical Faculty of Mulawarman University, Samarinda, Indonesia

³Department of Neurology, Mulawarman University, Samarinda, Indonesia

⁴ Graduated from Medical Faculty of Mulawarman University, Samarinda, Indonesia

⁵ Department of dermatology venereology, Abdul Wahab Syahranie Hospital, Samarinda, Indonesia

*E-mail : ver_dn@yahoo.com

Abstract: Since coronavirus disease (Covid-19) cases discovered and became a global problem around the world, healthcare workers (HCWs) are the most frequently confronted with covid patient. The number of cases in Indonesia is quite high, including in Samarinda. Because this virus is very easily transmitted, the use of appropriate Personal Protective Equipment (PPE) on all healthcare workers when carrying out their duties is a must. This applies not only to healthcare workers on duty at covid treatment centers, but also to all health agencies. Face masks, faceshields, medical gloves, coveralls are the types of PPE which used for a long enough duration, can cause unwanted reactions on the wearer's skin. If this reaction is very disturbing and ongoing, it can affect the compliance or influence their quality of life.

The purpose of this study is to determine the diversity of skin disorders that occur to healthcare workers related to the use of PPE, the types of PPE that can cause skin disorders, the relationship between the duration of PPE used and the incidence of skin disorders. This research is an analytical descriptive study, taking data onto cross section using a questionnaire. The respondents of the study were healthcare workers that served for health institutions in the Samarinda region. The results of this study can later be used as a basis for recommendations of preventive measures for skin reactions.

Keywords: Skin reactions, Personal Protective Equipment, healthcare workers, Covid19

1. Introduction

Since the covid-19 case was discovered and became a global problem around the world, in a short period of time thousands of cases have been diagnosed around the world. The coronavirus, which is thought to be the cause of the case that attacks the airways, has had a major impact on society. Healthcare workers are one of the community groups that most often deal directly with people with this disease. The number of cases itself in Indonesia is quite high. Because this virus is very easily transmitted, the use of appropriate Personal Protective Equipment (PPE) on all healthcare workers when carrying out tasks is a must (Pardiansyah, 2018).

Personal Protective Equipment (PPE) has become a complement to mandatory services for healthcare workers. This equipment is used when served for health agencies with the aim of protecting from exposure to hazardous materials including disease-causing pathogens. The type

of PPE used is adjusted to the zone where healthcare workers are on duty. Face masks, faceshields, medical gloves, coveralls are the types of PPE used by healthcare workers (Wujkiw, 2020).

The use of PPE, especially if used for a long enough duration, can cause a reaction on skin. If this reaction is very disturbing and ongoing, it can affect the compliance of healthcare workers in using the PPE. In the study Purushothaman et al, 2020, regarding the unpleasant effects on the use of N95 masks that reported the occurrence of excessive sweating, itching around the nose, acne exacerbation and reddish patches on the face. This unpleasant effect can also result in the user touching the mask and the nose area which can increase the risk of transmitting the virus (al Badri, 2017).

The incidence of hypersensitivity to latex glove material was reported to increase to 17% in healthcare workers. The presence of a history of atopy, and a history of hand dermatitis are risk factors for hypersensitivity in latex gloves. The incidence of urticaria may also be related to the use of medical gloves made from Nitrile. Flour used in some types of medical gloves is reported to trigger hypersensitivity reactions and cause the skin to become rough due to changes in PH (Tabary et al, 2021).

The use of PPE in healthcare workers making friction occur on the skin which then causes damage to the integrity of the skin surface. Some of the symptoms that can occur include erythema, papules, maceration, and scaly skin are the most commonly reported things. Acne and contact allergies dermatitis can also occur due to the effects of occlusion and friction on the surface of the skin (Gheisari et al, 2020).

2. Materials and Methods

This study is a descriptive observational study with a cross-sectional approach. The study was conducted in the Samarinda city area in October – November 2020. The research data came from primary data on research participants. The number of participants in this study was 121 people. The inclusion criteria in this study are healthcare workers who carry out health services directly to patients in health agencies in Samarinda. Data collection is carried out using questionnaires. Filling out the questionnaire is carried out online using a google form. Analysis of the results will be carried out using the frequency distribution table. This study had received ethical approval from the Medical Research Ethics Committee of the School of Medicine of Mulawarman University.

3. Results and Discussion

Data collection is carried out with a questionnaire filled out on a google form randomly to healthcare workers. Each participant can only fill out the questionnaire 1 time. The inclusion criteria are healthcare workers who are still workactive, served patients directly and are willing to fill out the questionnaire. The total number of participants who participated in this study was 121 participants.

Table 1. Distribution of participants by gender

Gender	Number	Percentage
Male	98	18,9%
Female	23	81,1%
Total	121	100%

According to table 1, it can be seen that among 121 participants, 98 of them (81.1%) are female and 23 (18.9%) are male.

Table 2. Distribution of respondents by occupation

Occupation	Number	Percentage
Doctor	37	30,3%
Nurse	84	69,7%
Total	121	100%

According to table 2, it can be seen that 37 participants (30.0%) work as doctors and 84 participants (69.7%) work as nurses.

Table 3. Distribution of respondents by place of work

Institutions	Number	Percentage
Hospital	94	77,7%
Clinic	15	12,4%
General Health Care	13	10,7%
Health Center	15	12,4%
Others	1	0,8%

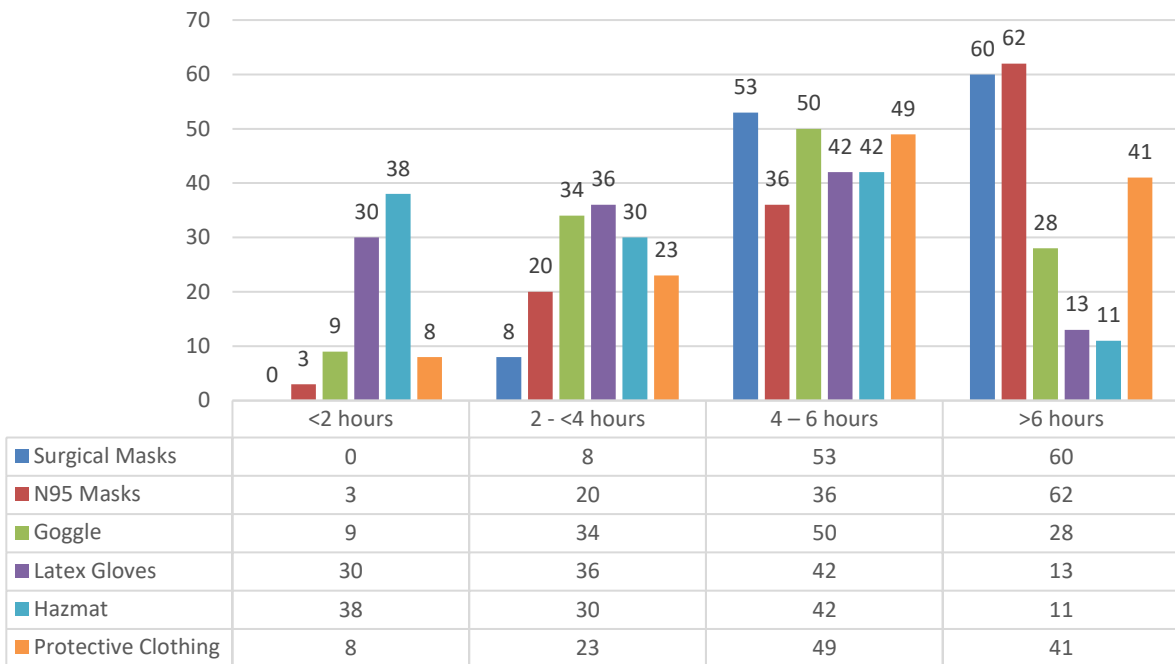
According to table 3, it can be seen that the participants worked the most in the hospital, which was 77.7%. others work in clinics, health centers or private practices.

Table 4. Distribution of the types of PPE used

Personal Protective Equipment (PPE)	Number	Percentage
Surgical Masks	119	98,3%
N95 Masks	70	57,9%
Other Type of Masks	22	18,2%
Goggles	37	30,6%
Latex Gloves	101	83,5%
Non Latex Gloves	23	19%
Face Shields	101	83,5%
Hazmat	29	24%
Protective Clothing	85	70,2%

Table 4 shows the types of PPE used by participants in the last 3 months. The most commonly used personal protective equipment was surgical masks (98.3%), followed by gloves (83.5%) and also face shields (83.5%).

Chart 1. Duration of use of PPE in daily life



In chart 1, it can be seen that duration of participants use each type of PPE during the duty in one day is the most at >6 hours.

Chart 2. Skin Complaints of Face Masks

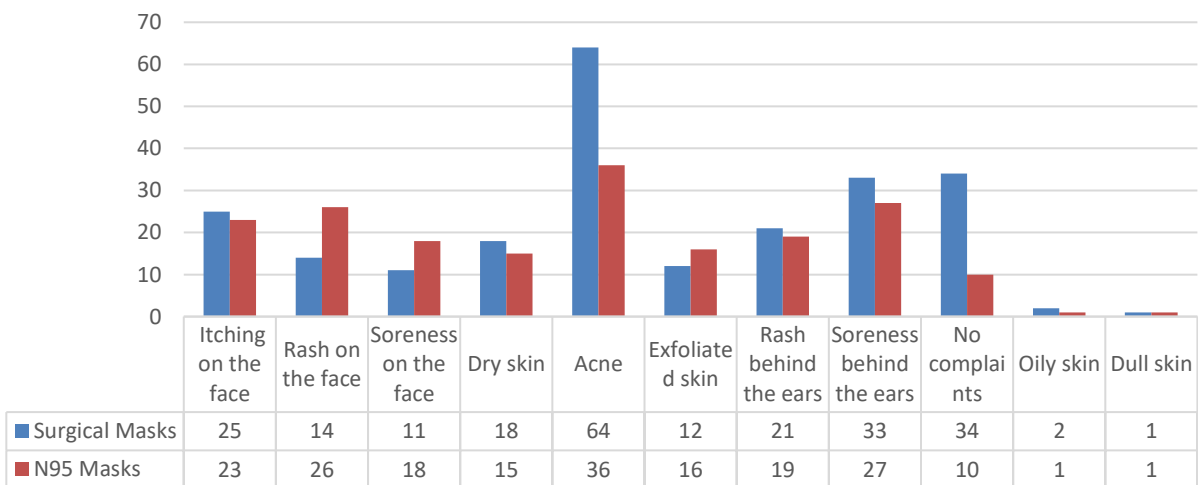


Chart 2, shows distribution of skin reactions experienced by healthcare workers because of face masks. The most complaints were the incidence of acne, 64 participants by using surgical masks, and 36 participants by using N95 masks.

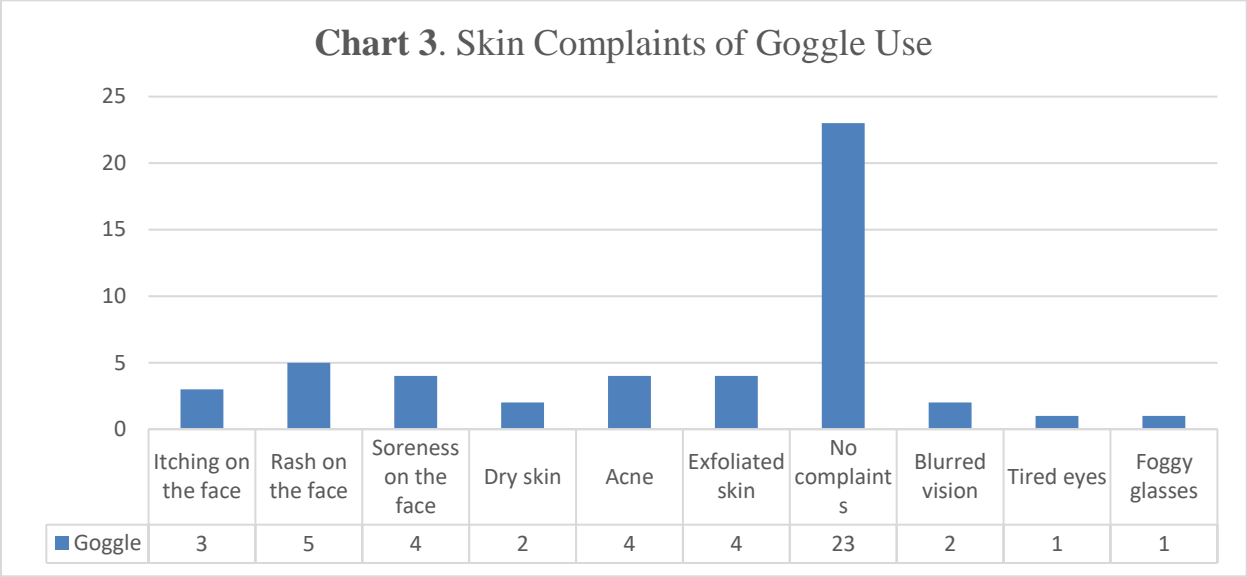
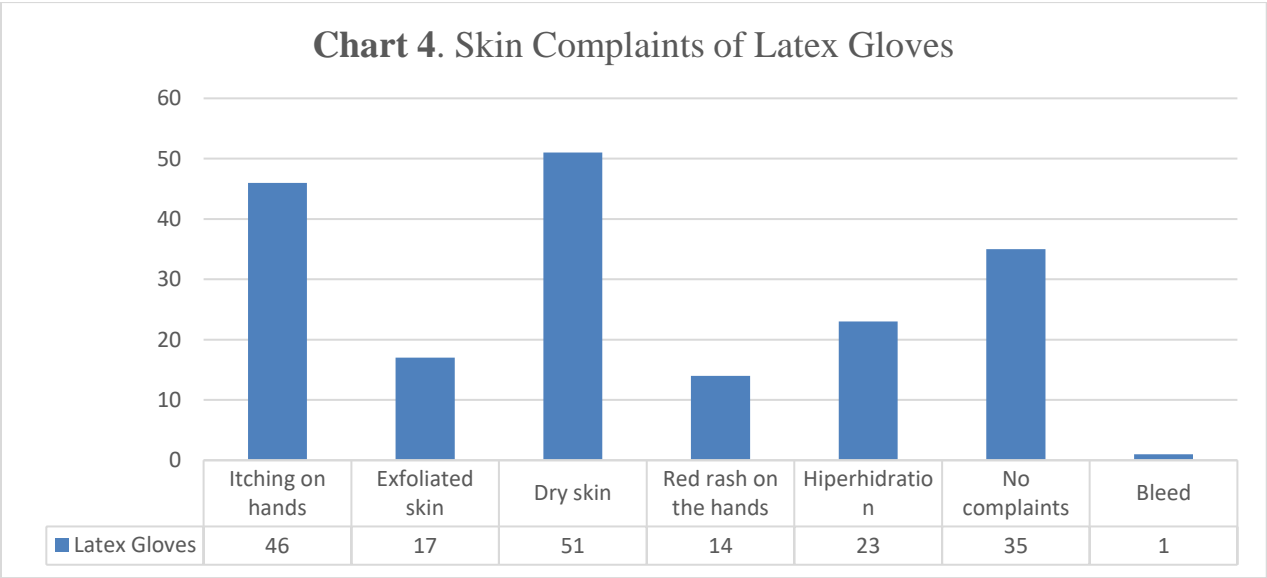


Chart 3 shows that some healthcare workers complaints rash, soreness and exfoliated skin. But mostly, there are no complaints by using protective Goggle.



In chart 4, it can be seen that uses of latex gloves make healthcare workers complaints dry skin, itching on hands and other skin reactions. However, there are also some participants have no complaints of any reaction on their skin.

Chart 5. Skin Complaints of Hazmat and Protective Clothing

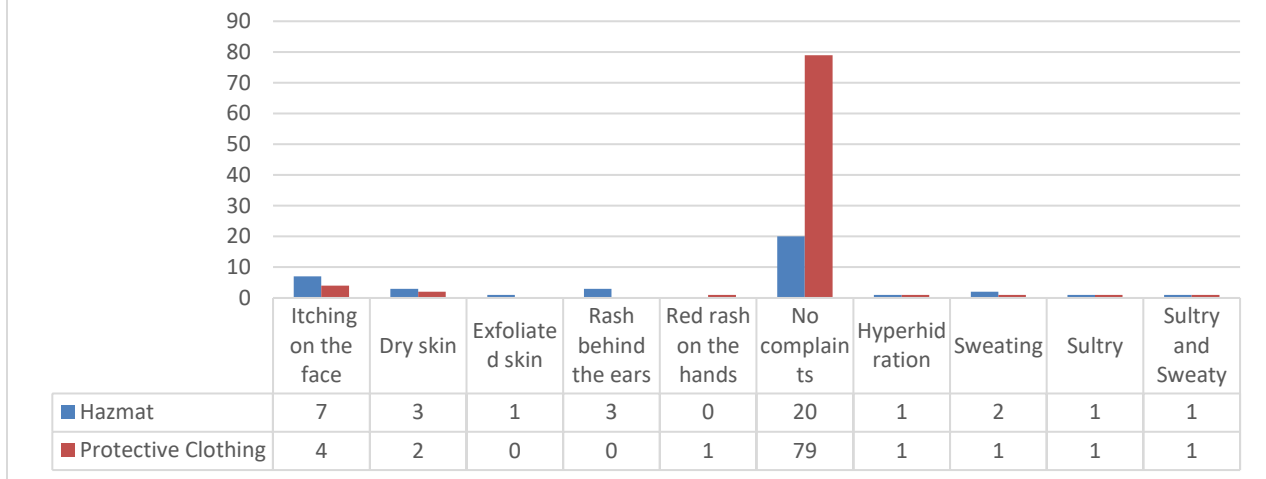


Chart 5 shows that most of participants did not experience any skin complaints regarding the use of hazmat and protective clothing.

The results of this study indicate that skin complaints could appear in the use of PPE for healthcare workers. The incidence of acne is the most common complaint in the wearing of face masks, not only for medical masks but also N95 masks. Acne can occur due to the effects of occlusion and irritation due to friction in wearing a mask, especially at a long enough duration of use (Hu et al, 2020). Increased humidity in the area of the face covered by the mask can also increase the incidence of acne. Most of the healthcare workers complain of skin reactions on their faces after using surgical masks or N95 masks for over 6 hours. This is in accordance with research conducted by Hua et al 2020, that wearing masks for a longer period of time than recommended by WHO can cause acne. Surgical masks and N95 masks should be replaced every 4 hours and 3 days with a rest for 15 minutes after 2 hours of use and cleaning the face with warm water and hypoallergenic soap to minimize skin disorders on the face (Al Badri, 2017).

One of the protective equipment for hands that is often used by healthcare workers is gloves. In this study, the most used gloves were made from latex. Gloves are usually used for the purpose of protecting hands from exposure to chemicals, hot or cold objects, or patient body fluids (Pardiansyah, 2020). Lan et al, 2020 in his study reported that 46% experienced skin complaints in wearing gloves with a duration of less than 6 hours. The percentage increases to 54% with a duration of use of more than 6 hours in a day. In the study, it also reported the occurrence of skin reactions in 88.5% of healthcare workers who used gloves (Hu et al, 2020). The reactions that occur dry skin, itching, the appearance of skin rashes and cracked skin. Complaints of excessive sweating in the hand area and swelling were also reported. (Tabary et al, 2021). In the study, the duration of use of latex gloves averaged 10 hours in a day. Hypersensitivity to latex has been widely reported in healthcare workers. The presence of a

history of atopy, hand dermatitis, history of food allergies, female gender, are risk factors for the occurrence of allergies in contact with latex gloves (Donovan, et al, 2007). The reactions that occur are itching, burning, stabbing pain, contact urticaria or broad urticaria. The gold standard in the diagnosis is skin-prick testing in patients with localized symptoms and latex specific IgE antibody assessment in case of systemic symptoms. First management of latex allergy is personal and environmental avoidance by considering hypoallergenic gloves and use hand cream periodically (De Giorgi et al, 2020).

During the Covid19 pandemic, eye protection equipment was used to prevent the eyes from splashing droplets that were suspected to contain the virus that one of the sources of transmission. Eye protection equipment in the form of goggles is usually coated with rubber on the edges so that close tightly (Pardiansyah, 2020). In this study, the most skin complaints related to the use of goggle glasses was the appearance of red rashes on the skin which indicated of contact dermatitis. Acne, allergic contact dermatitis and irritant contact dermatitis were also reported in the use of goggle by healthcare workers, because of the friction and occlusion mechanism to skin. Those reactions, can also be caused as a result of exposure to non-allergenic material that damages the epidermis without going through a sensitization process (Darlenski and Tsankov, 2020).

The use of protective clothing and hazmat can trigger the incidence of dehydration. Skin reactions due to this PPE rarely reported. The main reason for this situation is probably due to the protective clothing becomes more humid but healthcare workers need to wear it for a long period of time (Gheisari et al, 2020). Prevention for not closed tightly when using PPE to reduce the risk of skin reactions. Treatments of skin reactions effectively reduced by second-generation antihistamin or glucocorticoid as long as mainly reaction is itching and rash. If any serious adverse skin reaction appeared by PPE or medicine administration was ineffective, healthcare workers should consult help from dermatologist (Darlenski and Tsankov, 2020).

Our research has a limitation because data collection uses online questionnaires. This method is used to limit direct contact that risk the transmission of corona virus.

4. Conclusion

Personal protective equipment that is used by healthcare workers during the Covid-19 pandemic are surgical masks, N95 masks, gloves, face shields, goggles, protective clothing. The most complaints occurred in the use of protective equipment is surgical masks, and N95 masks that used for a long time.

Healthcare workers who must use PPE should understand the triggering factors and precipitating factors related to skin complaints that occur by using personal protective equipment.

Healthcare workers who having skin complaints because of PPE should prevent early so compliance with the use of PPE would be minimizing while on duty.

Healthcare workers should consult a dermatologist for skin therapy if adverse skin reaction become very disturbing.

Conflict of Interest

All Authors declare no conflict of interest and agree with the content of the manuscript.

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