# Original Article

# Relationship between Knowledge, Attitude, and Practice of the Use of Face Mask with Acne among Health Workers at General Hospitals in Mataram City, West Nusa Tenggara, Indonesia

**Dinda Rifdayani Inayah,[1] Dedianto Hidajat,[2] Umu Istikharoh[2]**
[1]Faculty of Medicine, Mataram University, Indonesia, [2]Department of Dermatology and Venereology Faculty of Medicine, University of Mataram/West Nusa Tenggara Provincial Hospital, Indonesia

## Abstract

**Background:** The World Health Organization (WHO) has declared the coronavirus a global emergency transmitted by droplets. Personal protective equipment (PPE) such as masks can help lower the viral infection risk. However, prolonged use of PPE can cause skin lesions and aggravate acne. Acne that develops because of the usage of masks is called mask acne (maskne). Knowledge, attitudes, and practices of health workers regarding the use of face masks can help minimize the occurrence of maskne. This study aimed to assess the relationship between knowledge, attitude, and practices of the use of face masks with maskne among health workers in general hospitals in Mataram City, Indonesia.

**Methods:** This study was a cross-sectional analytic observational study involving health workers from type B and C general hospitals in Mataram City, specifically the West Nusa Tenggara Provincial Hospital and the Mataram University Hospital. Primary data were collected using a questionnaire consisting of demographic characteristics, knowledge, attitude, and practice of using masks, then analyzed using the Spearman Correlation test.

**Results:** In total, 104 respondents were included, of whom 39.4% (n=41) had good knowledge, 35.6% (n=37) had a good attitude towards the use of masks, and 25.0% (n=26) had good practice. Interestingly, 42.3% (n=44) had experienced maskne. The Spearman correlation test showed a relationship between knowledge, attitude, and practices towards the use of masks and the incidence of maskne (p=0.014; p=0.000; p=0.006).

**Conclusions:** There is a relationship between knowledge, attitudes, and practice of health workers regarding the use of masks and the prevalence of maskne at the general hospitals type B and C in the Mataram City. This study implies that health workers can prevent the occurrence of maskne which can make the work of health workers more difficult.

**Keywords:** Attitude, health workers, knowledge, maskne, practice

## Introduction

Since the beginning of 2020, the world has experienced major health challenges. At the end of December 2019, several pneumonia patients with an unknown etiology were discovered in Wuhan, Hubei Province, China. Subsequent research showed that the disease was the COVID-19 caused by the SARS-CoV-2 virus.[1] At the end of January 2020, the World Health Organization (WHO) declared COVID-19 a global emergency due to the rapid spread of the virus throughout the world.[2] COVID-19 is transmitted from human to human.[3] For healthcare workers who treat COVID-19 patients, the virus can be transmitted through droplets. Contact with the virus produced in these droplets can cause the virus to enter open mucosa.[2] Coughing and sneezing are two ways that infected people spread the COVID-19 virus to those around them. The 2020 WHO guidelines state that the

use of personal protective equipment (PPE) such as masks can help reduce the risk of viral infection.[4] During the COVID-19 pandemic, health workers must comply with the rules for using PPE when in direct contact with patients in hospitals. Health workers cannot avoid using PPE during a pandemic, particularly when wearing masks.

Masks can prevent healthcare workers from inhaling or expelling droplets that could be a transmission source, however, using masks has negative impacts such as skin lesions, worsening acne, and difficulty breathing when wearing a mask.[4] The most common facial lesions are acne. Acne that occurs due to wearing a mask is referred to as the mask acne (maskne).[5] Maskne is the appearance of acne on areas of the face covered by a mask, specifically the chin, cheeks, and dorsum nasal, due to improper use of a mask. This occurs because when you talk and breathe through a mask, the air inside the mask becomes moist, triggering the growth of acne-causing bacteria.[6]

Masks can be prevented by the knowledge, attitudes, and practices of health workers in their use. Studies examining the effectiveness and potential side effects of using masks on health workers and the public still limited.[7] Research on the knowledge, attitudes, and practices of medical workers regarding the use of surgical masks in the treatment of COVID-19 in Pakistan[8] had a small sample size and was conducted in one government hospital, making the results difficult to generalize. Meanwhile, a study in United Kingdom[9] did not include additional risk factors such as type of mask. This could result in patients receiving misdiagnoses. Therefore, this study aimed to assess the relationship between knowledge, attitude, and practices of using face masks with mask acne among health workers at public hospitals in Mataram City, Indonesia.

## Methods

This research was an observational analytical cross-sectional study conducted between June and August 2021 using a questionnaire consisting of demographic characteristics, knowledge, attitudes, and practice of using masks made using Google forms. The inclusion criteria were health workers from public hospitals type B and C in the Mataram City, specifically the West Nusa Tenggara Provincial Hospital and Mataram University Hospital who agreed to fill out the questionnaire. The exclusion criteria were health workers

who could not speak Indonesian, did not understand how to use technology such as Android, computers, and tablets, could not use Google forms, did not have internet access, and had facial skin disorders other than masks and acne vulgaris.

This study diagnosed mask acne carried out by the dermatologist. Respondents had to answer a total of 26 questions consisting of 7 questions about knowledge, 10 questions about attitudes, and 9 questions about practice. The final score for each section was classified into four categories, namely very poor (0–25%), poor (26–50%), moderate (51–75%), and good (76–100%).

This study used a convenience sampling technique. The collected data was analyzed using univariate analysis and the Spearman correlation test. Ethical clearance was obtained from the Faculty of Medicine, Mataram University with number 106/UN18. F7/ETIK/2021.

## Results

This study surveyed 104 respondents based on age, gender, work place, type of work, last education, and work space. Most of the respondents were aged between 26 and 35 years (97.3%), male (58.7%), worked as nurses (60.6%), last education was as a professional health worker (61.5%), and working in the Emergency Department (27.9%; Table 1).

Of the 104 respondents, 41 (39.4%) respondents had good knowledge, 37 (35.6%) respondents had a sufficient or good attitudes, and 64 (61.5%) respondents had sufficient conduct in the practical variables (Table 2).

The highest score related to knowledge of using masks was 246 (79.0%) for how to care for masks, whereas the lowest score was 579 for factors that irritate or trigger masks (56.0% ). The best score for attitude variable was the aspect of facial hygiene (77%) and the worst was the aspect of using mask (58%). The frequency of mask use (91%) was the best aspect of the practice variable, while the duration of using masks was the worst (16%) (Table 3).

As many as 26 (25.0%) respondents who had previously had acne had been exposed to maskne, while 18 (17.3%) respondents who had never previously experienced acne had been exposed to maskne (Table 4).

Bivariate analysis used the Spearman correlation test to assess the strength of the correlation between knowledge, attitude, and practice of using face masks and the incidence

**Table 1 Distribution of Respondents' Characteristics**

| Characteristics | n | % |
|---|---|---|
| **Age (year)** | | |
| 17–25 | 3 | 2.9 |
| 26–35 | 97 | 93.3 |
| 36–45 | 4 | 3.8 |
| Gender | | |
| Men | 61 | 58.7 |
| Women | 43 | 41.3 |
| Work place | | |
| Provincial General Hospital of West Nusa Tenggara | 52 | 50 |
| Hospital of Mataram University | 52 | 50 |
| Type of work | | |
| General practitioner | 27 | 26 |
| Specialist doctor | 1 | 1 |
| Nurse | 63 | 60.6 |
| Midwife | 8 | 7.7 |
| Nutritionist | 4 | 3.8 |
| Others | 1 | 1 |
| Last education | | |
| Diploma program | 22 | 21.2 |
| Bachelor | 13 | 12.5 |
| Profession | 64 | 61.5 |
| Medical specialists | 1 | 1 |
| Doctorate | 1 | 1 |
| Others | 3 | 2.9 |
| Work space | | |
| Emergency departments | 29 | 27.9 |
| Emergency room of COVID-19 | 10 | 9.6 |
| Outpatient department | 16 | 15.4 |
| Inpatient department | 16 | 15.4 |
| Operating room | 9 | 5.8 |
| Intensive care unit | 10 | 9.6 |
| Others | 14 | 16.3 |

of maskne. According to the Spearman correlation test, the correlation between attitude and the incident of maskne was the strongest (p=0.001), followed by a moderate correlation between knowledge and maskne (p=0.014), and the weakest correlation result was the correlation between practice and maskne (p=0.006; Table 5).

## Discussion

In this study, there was a relationship between knowledge, attitudes, and practices of health workers regarding the use of masks and the incidence of maskne. The aspects investigated were the trigger factors, types of masks, how to use the masks, mask care, mask length,

**Table 2 Distribution of Knowledge, Attitudes, and Practices of Respondents**

| | Poor n (%) | Moderate n (%) | Good n (%) |
|---|---|---|---|
| Knowledge | 26 (25.0) | 37 (35.5) | 41 (39.5) |
| Attitude | 30 (29.0) | 37 (35.5) | 37 (35.5) |
| Practice | 14 (13.5) | 64 (61.5) | 26 (25.0) |

**Table 3 Overview of Respondents' Knowledge, Attitudes, and Practices of Using Mask based on Questionnaire Aspects**

| No | Knowledge, Attitude and Practice Aspect | Correct Answer Score n (%) | Total Score n |
|----|----------------------------------------|----------------------------|---------------|
|    | Knowledge aspect                       |                            |               |
| 1  | Aggravating or precipitating factors   | 579 (56.0)                 | 1040          |
| 2  | How long to use a mask                 | 209 (67.0)                 | 312           |
| 3  | Frequency of use of mask               | 309 (74.0)                 | 416           |
| 4  | How to take care of a mask             | 246 (79.0)                 | 312           |
| 5  | How to use mask                        | 232 (74.0)                 | 312           |
| 6  | Prevention of maskne                   | 261 (63.0)                 | 416           |
| 7  | Treatment of maskne                    | 156 (75.0)                 | 208           |
|    | Attitude aspect                        |                            |               |
| 1  | Using mask                             | 353 (68.0)                 | 520           |
| 2  | How long to use a mask                 | 301 (58.0)                 | 520           |
| 3  | Frequency of use mask                  | 332 (64.0)                 | 520           |
| 4  | Facial hygiene                         | 401 (77.0)                 | 520           |
| 5  | Using makeup                           | 360 (69.0)                 | 520           |
| 6  | Side Effects                           | 373 (72.0)                 | 520           |
| 7  | How to take care of mask               | 389 (75.0)                 | 520           |
| 8  | Using moisturizer                      | 327 (63.0)                 | 520           |
| 9  | Treatment                              | 353 (68.0)                 | 520           |
|    | Practice Aspect                        |                            |               |
| 1  | Type of mask                           | 66 (64.0)                  | 104           |
| 2  | How long to use a mask                 | 17 (16.0)                  | 104           |
| 3  | Frequency of use of a mask             | 283 (91.0)                 | 312           |
| 4  | How to take care of a mask             | 282 (77.5)                 | 364           |
| 5  | Prevention                             | 49 (47.0)                  | 104           |
| 6  | Treatment                              | 20 (19.0)                  | 104           |

mask frequency, negative effects of using the mask, facial hygiene, mask prevention such as applying moisturizer before using the masks and not wearing makeup while using the mask, and mask treatment.

The findings of this study indicate that health workers have good knowledge of how to use masks, which is consistent with the findings of research conducted in Iranian hospitals[10] which reported that health workers had adequate knowledge of how to use masks (respiratory protective equipment) (68.7 %). Research at the Gatot Soebroto Army Hospital, Indonesia[11] also stated that 81.3% had good knowledge of the use of masks. However, a study conducted in Pakistan[7] found that health workers lacked knowledge regarding the proper usage of masks, and most respondents thought that they were familiar with the procedure properly. These

**Table 4 Distribution of Maskne Cases with Exacerbation of Acne**

| Acne History | No Maskne n (%) | Maskne n (%) | Total n (%) |
|--------------|-----------------|--------------|-------------|
| Have a history of acne | 27 (26) | 26 (25.0) | 53 (59.0) |
| No acne history | 33 (31.7) | 18 (17.3) | 51 (41.0) |

**Table 5 Spearman Correlation Test Results between Knowledge, Attitudes, and Practice of Using Masks and the Incidence of Maskne**

| Variable | r | p-value | Description |
|----------|-----|---------|-------------|
| Knowledge | 0.432 | 0.014 | Significant moderate correlation |
| Attitude | 0.682 | 0.001 | Significant strong correlation |
| Practice | 0.227 | 0.006 | Significant weak correlation |

differences in research findings might be due to the academic backgrounds of respondents, research settings, sampling techniques, and sample size used in different studies.[12]

The results of this study show that the best component of respondents' understanding is how to care for masks, while the worst aspect is the trigger factors. The type of mask, duration of use, cleanliness of the mask, how to care for the mask, use of moisturizer before wearing a mask, use of make-up prior to using a mask, facial hygiene, specifically washing the face before and after wearing a mask, stress, hormones, and weather are factors that can trigger or exacerbate the maskne.[4,6,13] In this study, it was found that the research respondents had a positive attitude towards using masks. This result is supported by research conducted in Pakistan[7] on 392 respondents where health workers had a good attitude regarding the use of masks. Furthermore, another study in Iranian hospitals[10] indicate that health workers have a good attitude toward the use of masks. In contrast to research findings in Ethiopia[14] which showed that around 223 (54.7%) health worker respondents had a negative attitude towards using masks, this could be influenced by the respondents' previous level of education and profession.[14]

In the attitude variable, the best outcome is in the aspect of facial hygiene, whereas the worst outcome is in the time of mask use. To avoid maskne, a person should feel comfortable wearing a mask for <4 hours and then rest the face for 15 minutes.[4,6,13]

In the practice variable, respondents showed sufficient behavior in using masks. This result is the same as research conducted in Iranian hospitals[10] which found that health workers showed sufficient practice (48.9%) in using masks. Another study found that as many as 272 (66.7%) respondents demonstrated negative practices regarding the use of masks.[14] This can be changed with education and awareness about the proper use of masks. Healthcare workers with limited knowledge of mask use are more likely to behave incorrectly than those with adequate knowledge.

In the practices variable, it was found that the best aspect of practice in this study was the frequency of masks use, while the worst aspect was the duration of using masks. The correct time to use a mask is <4 hours with a break of 15 minutes.[15]

Based on the findings of the Spearman correlation test analysis, it was determined that there was a statistically significant association between the knowledge, attitudes, and practices of health workers regarding the use of masks and the incidence of mask acne. Based on these results, there will be less possibility of maskne occuring beside that using an unsuitable mask can result in abnormalities in facial skin.[4,13,16] However, in this study, there were three respondents who had adequate knowledge and had a positive attitude but suffered from maskne due to a previous history of acne, which could result in acne exacerbation. This could be caused by poor practice of respondent of using mask, such as wearing a mask for more than four hours without taking a 15 minute break and never changing the mask used during the day, which could be a risk factor for maskne. In addition, two respondents had a positive attitude but suffered from maskne due to the respondent's bad behavior.

The findings of this study regarding the use of masks and the incidence of maskne among health workers revealed that as many as 44 (42.3%) respondents had experienced maskne. Experiments conducted in Spain[17] on health workers revealed the largest cases of occupational skin diseases, including acne (25.7 %). These results are supported by another study which states that continuous use of N95 masks can cause reactions on the skin, where the mostoften reaction is acne (59.6%).[18] In a study conducted in China[19] on 583 health workers, 198 (49%) of health workers had skin disorders. Around 97% of healthcare workers experienced skin problems, the most frequent is on the nose.[20] This is in accordance with data which showing that health workers have reported skin problems such as dry skin, numbness, itching, and burning sensations on the cheeks and nose due to continuous use of masks during the COVID-19 pandemic. As a result of using an unsuitable mask, it could cause erythema, papules, scales, fissures, erosions, ulcers, and vesicles.[16]

The clinical picture of the mask can be seen if the mask is used for a long period of time, namely around >6 weeks after regular use and there is an exacerbation of acne in the area covered by the mask in the O-zone area of the face.[15] According to the description above, if respondents use mask for more than 6 weeks, they will most likely experience facial skin problems. Besides, there were additional symptoms in respondents who had been exposed to maskne, such as face redness, papules, and blackheads.

This study was performed during the

COVID-19 pandemic. Therefore, data collection was carried out online using the Google Form application as a questionnaire tool. This study might be biased because the data is identified only through photos taken by respondents.

In conclusion, there is a significant relationship between the knowledge, attitudes, and practice of health workers regarding the use of masks and the incidence of maskne in type B and C teaching hospitals in Mataram City. The implication of this research is that health workers can prevent the occurrence of mask acne which can make the work of health workers more difficult. This study shows that education for health workers about how to use masks properly is needed.

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