



THE CORRELATION BETWEEN THE USE OF FACE MOISTURIZERS ON THE INCIDENCE OF ACNE VULGARIS DUE TO MASKS

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ABSTRACT

Background: Acne vulgaris or widely known as acne, is a skin disease in the form of inflammation of the pilosebaceous unit characterized by the appearance of comedones, papules, pustules, and nodules. Due to the Coronavirus disease 2019 (COVID-19) pandemic, masks have become personal protective equipment (PPEs), commonly used by health workers and the general public. The combination of friction, repeated pressure, sweat, or stress on the skin from wearing the mask causes acne or an exacerbation of existing acne. Meanwhile, the use of facial moisturizer can maintain skin moisture and help the repair process of the structure of the skin barrier. **Objective:** This study aims to determine the relationship between the use of facial moisturizers and the incidence of acne vulgaris due to masks. **Methods:** This study is an analytical observational study with a cross-sectional design. The subjects in this study amounted to 44 people who were nurses at the Diponegoro National Hospital who had approved the informed consent form, filled out a complete questionnaire, and included the research criteria. The research sample was selected using purposive sampling. The diagnosis of acne vulgaris was made by doctor-in-charge based on the subject's face photo. The statistical test used is Fischer's Exact Test. **Results:** Based on data analysis using Fischer's Exact Test, the results showed no significant relationship between the use of facial moisturizers and the incidence of acne vulgaris due to masks with a p-value = 0.722 ($p > 0.05$). **Conclusion:** There is no relationship between the use of facial moisturizers with the incidence of acne vulgaris due to masks.

Keywords: *Acne vulgaris; moisturizer; MASKNE; COVID-19*

INTRODUCTION

Acne vulgaris, widely known as acne, is a skin disease in the form of inflammation of the pilosebaceous unit characterized by the appearance of comedones, papules, pustules, and nodules. The cause of acne vulgaris is multifactorial, involving several key factors: increased sebum production, hyperkeratinization of the follicular infundibulum, inflammation, and proliferation of *Cutibacterium acnes*. These four factors are interrelated and influenced by heredity, hormones, and immunity.¹⁻³

Based on the guidelines for the management of acne vulgaris by the Southeast Asian Study Alliance shows that skincare products are essential in managing acne. These products can be in the form of facial cleansers, facial moisturizers, and sunscreen. Using skin care products with effective ingredients can improve the skin's protective function, reduce the side effects of acne treatment, and play an essential role in managing and treating acne.⁴

Currently, the world is being hit by a pandemic Coronavirus disease 2019 (COVID-19), a new respiratory disease caused by *Severe acute respiratory syndrome coronavirus 2* (SARS-CoV-2).^{3, 5, 6} This virus can be transmitted through

droplets. The respiratory tract, through coughing or sneezing of an infected person or touching a surface contaminated with these droplets and then touching the mouth, nose, or eyes. The use of masks has the potential to have high value in reducing transmission in the community and the burden of the pandemic and can provide significant benefits if the practice is also supported by other non-pharmaceutical practices such as keeping distance and washing hands and carried out by all people with high compliance.^{3, 7}

Masks are one of the PPEs that are commonly used not only by health workers but also by the general public. These masks can cause several problems on the skin, such as acne, dermatitis, redness, and pigmentation on the face, with acne being the most frequently reported problem. A study reported that of 343 study subjects, 53.1% suffered from acne due to prolonged use of masks. The types of masks used by the subjects in this study consisted of N95 masks (59.2%) and surgical masks (40.8%). The skin problems because masks are due to the use of masks in the long term. The skin often becomes covered, so it experiences obstacles and pressure. The face that is covered by the mask will accumulate



large amounts of moisture from the nose and mouth, which causes the skin to remain moist for a long time which can cause the skin to become weaker and the ability of the stratum corneum to withstand pressure and prevent external pressure from decreasing.^{3,8,9}

Acne due to the use of masks, better known as MASKNE, is thought to be caused by a combination of friction, repeated pressure, sweat, or stress on the skin that causes acne or an exacerbation of existing acne.^{2,3}

One way to prevent facial skin problems can be done by routine facial care. A facial cleanser helps wash away dirt, bacteria, sweat, and oil, reducing irritation and infection. The use of facial moisturizers also helps maintain the water content of the corneum and maintains the structure of the epidermal "wall," and facilitates self-repair.⁸

As mentioned above, using masks in the long term can accumulate large amounts of moisture, making the skin vulnerable. While the use of facial moisturizers or moisturizers can keep the skin moist and help the repair process of the skin "wall". This is what makes the writer interested in examining the relationship between the use of facial moisturizers on the incidence of acne vulgaris due to masks.^{4,8}

METHODS

This study is an analytical study with a cross-sectional approach to determine the correlation between the use of facial moisturizers on the incidence of acne vulgaris due to masks. This research was conducted at the Diponegoro National Hospital. Data collection and analysis were carried out from October to November 2021. Sampling was carried out using the judgment sampling method or purposive sampling on nurses at the Diponegoro National Hospital. In this method, each subject who meets the research criteria is included in the study until the minimum sample size is reached. The minimum sample size was determined using hypothesis testing, with the minimum sample size being 43.

The inclusion criteria used in this study were women aged 20-30 years who used a mask while working, received an informed consent letter, used a mask with a minimum duration of 4 hours/day, and cleaned their face daily. The exclusion criteria were Diponegoro National Hospital nurses who were pregnant, currently receiving treatment for acne vulgaris from a doctor, suffering from miliaria,

rosacea, folliculitis, perioral dermatitis, and/or acneiform eruptions.

The independent variable in this study was the use of facial moisturizers. The dependent variable in this study was the incidence of acne vulgaris. Confounding variables were the type of facial moisturizer, the content of the facial moisturizer, the frequency of use of facial moisturizer, use of cosmetics, type of food, the skin type, and stress level. Data analysis includes hypothesis testing. Fisher's exact test was used for hypothesis testing.

RESULTS

The research was carried out from October to November 2021 by distributing a Google Form questionnaire to nurses at the National Diponegoro Hospital. The researcher contacted 54 nurses at the Diponegoro National Hospital, who then sampled using the purposive sampling method by considering the inclusion and exclusion criteria. After sampling, 44 respondents met the criteria to become research subjects. Respondents who were excluded were ten people, of which three people were excluded because of age, two people were excluded because they were pregnant, and five people were excluded because they were taking acne treatment to the doctor. Respondents who met the criteria as research subjects were then given an informed consent form to fill out and were accompanied to fill out the questionnaire. The photo of the facial skin of the research subject was sent to a doctor who has the competence to determine whether the research subject suffers from acne vulgaris or does not suffer from acne vulgaris.

Table 1. Description of research data

Variables	Frequency (F)	Percentage (%)
Type of mask		
Three plies surgical mask	2	50
KF94 mask	4	9,1
KN95 mask	15	34,1
N95 mask	3	6,8
Cosmetic usage		
Yes	38	86,4
No	6	13,6
Types of cosmetics		
Powder	31	46,3
Sunscreen	12	17,9
Day cream	5	7,5
Foundation	4	6,0
Toner	3	4,5



Serum	5	7,5
BB Cream	2	3,0
Blush	2	3,0
Essence	1	1,5
Face mist	1	1,5
Concelaer	1	1,5
History of parents suffering from acne vulgaris		
Yes	7	15,9
No	37	84,1
Moisturizer usage		
Yes	32	72,7
No	12	27,3
The beginning of using facial moisturizer		
Before 3M regulations regarding COVID-19	29	90,6
After 3M regulations regarding COVID-19	3	9,4
Frequency of using facial moisturizer		
Daily	28	87,5
Non-daily	4	12,5
Intensity of using facial moisturizers during the COVID-19 pandemic		
Increase	5	15,6
Constant	22	68,8
Decrease	5	15,6
Incidence of acne vulgaris		
Yes	29	65,9
No	15	34,1

Based on the masks used as shown in table 1, the types of masks used by nurses at the Diponegoro National Hospital varied, namely 22 (50%) users of 3-layer surgical masks, 4 (9.1%) users of KF94 masks, 15 (50%) 34.1%) users of KN95 masks, and 3 (6.8%) users of N95 masks. Based on the use of cosmetics before the use of masks, 38 (86.4%) nurses at the Diponegoro National Hospital use cosmetics before using masks. Based on the history of parents who suffered from acne vulgaris, 7 (15.9%) Nurses at the Diponegoro National Hospital had parents with a history of acne vulgaris.

There are 32 (72.7%) subjects who use moisturizer. Table 1 also shows the beginning of facial moisturizer usage, where there were 29 (90.6%) subjects using facial moisturizers before the 3M regulations related to COVID-19. Based on the frequency of facial moisturizer use, 28 (87.5%) subjects used facial moisturizers daily. Based on the intensity of using moisturizers during the COVID-19

pandemic, there were 5 (15.6%) subjects who increased, 22 (68.8%) remained the same, and 5 (15.6%) decreased.

Table 2. Bivariate analysis between independent and dependent variables on the correlation between the use of facial moisturizers on the incidence of acne vulgaris due to masks, n=44

Moisturizer usage	Incidence of acne vulgaris		Total	p
	Yes	No		
Yes	22	10	32	0,722
No	7	5	12	
Total	29	15	44	

Notes: *Significant ($p < 0.05$); Fisher's exact test

Table 2 shows a bivariate analysis of the correlation between the use of facial moisturizers and the incidence of acne vulgaris due to masks. Based on the incidence of acne vulgaris by research subjects, as many as 29 (65.9%) nurses at the Diponegoro National Hospital suffered from acne vulgaris. After carrying out statistical tests in the form of Fischer's Exact Test, the p-value is 0.722, it means there is no significant correlation of the use of face moisturizers to prevent acne vulgaris due to mask.

DISCUSSION

From the statistical test that has been carried out in the form of Fischer's Exact Test, the p-value is 0.722 ($p > 0.05$). A p value > 0.05 indicates H_0 is accepted, which means that there is no significant correlation between the use of facial moisturizers and the incidence of acne vulgaris. The results of the study are in line with the research of Kabau S, which states that there is no correlation between the use of types of cosmetics and the incidence of acne vulgaris, with one type of cosmetic being a moisturizer.¹⁰ In contrast, the results are inversely proportional to the research of Perera MP which states a significant relationship between cosmetic exposure and the degree of acne. With the highest cosmetic exposure is moisturizer.¹¹ The difference in the results of these studies can be caused by several things, namely in the Perera MP study using a larger sample size, the research variable is the degree of acne vulgaris, and the measurement of the degree of acne is carried out directly by the researcher.

There is a hypothesis that the use of masks in the long term can cause acne based on the research of Rosner E, of his 343 research subjects, 53.1%



suffered from the use of masks in the long term.⁹ The use of masks in the long period will increase humidity and sweat, which can cause inflammation of the epidermal keratinocytes and pilosebaceous follicles, causing acute obstruction and inflammation.³ Moisturizers themselves have several of them that can increase the moisture of the epidermis, help the skin's protective features, reduce dryness and skin desquamation process, make the skin smoother, and reduce inflammation in the cutaneous layer.^{4,12}

The hypothesis in this study states the relationship between the use of facial moisturizers and the incidence of acne vulgaris due to masks is not proven. These results could be due to the study's limitation, which did not examine factors such as the type of facial moisturizer, the content of facial moisturizer, the frequency of use of facial moisturizer, the skin type, the use of various types of masks, as well as other things that may affect the incidence of acne.

Individual factors can also influence the results of this study. There were 38 subjects out of 44 research subjects who used cosmetics before using masks. The use of cosmetics can cause the accumulation of cosmetic residues, skin cells, dirt, and sebum into one that supports microorganisms.¹ The use of different types of masks can also be one factor that influences this study's results. This is because different types of masks can cover different faces so that the air circulation produced is different.

Due to the study being designed on the pandemic situation, researchers consulted with an expert online to determine whether the subject of this study suffered from acne vulgaris or not, so it becomes the limitation of this study. This can cause errors in the subject of research diagnosis because the quality of the photos is different compared to the direct physical examination. In addition to taking photos, some subjects are still wearing make-up. This can bias the diagnosis of acne vulgaris. It is necessary to do further research using other research designs and a more detailed discussion regarding the effect of the frequency of use of facial moisturizers, the content of facial moisturizers, and the equation of masks used by research subjects so that the results obtained can better describe the relationship between the use of facial moisturizers with the incidence of acne vulgaris due to masks.

CONCLUSION

Based on the results obtained from research that conducted from October to November 2021, it can be concluded that there is no relationship between the use of facial moisturizers with the incidence of acne vulgaris due to masks.

ETHICAL APPROVAL

The research protocol was declared ethical by the Health Research Ethics Committee, Faculty of Medicine, Diponegoro University, Semarang, Indonesia. The ethical clearance letter number is 340/EC/KEPK/FK-UNDIP/VIII/2021.

CONFLICTS OF INTEREST

There is no conflict of interest related to this study's materials, methods, and findings.

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AUTHOR CONTRIBUTIONS

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