

Research Article



**THE RELATIONSHIP BETWEEN DIET AND ACNE VULGARIS IN
STUDENTS OF FACULTY OF MEDICINE 2022-2023
PRIMA INDONESIA UNIVERSITY**

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ABSTRACT

Background: The skin is the outermost part of the body that functions as a barrier between humans and the environment. The structure of the skin is affected by various factors such as climate, age, gender, race, and location in the body. The skin consists of 3 main layers, namely the epidermis, dermis, and subcutaneous. In addition, the skin has sebaceous glands or oil glands located on the skin, hair, and nails. These glands function to maintain skin moisture, especially when they are active and developing during puberty. However, activity can also cause skin problems, such as warts, dermatitis, and acne vulgaris.

Methods: The type of research conducted is observational analytical research on the Kendall's Tau design approach. The sampling technique is stratified random sampling. As many as 98 respondents were obtained who met the inclusion criteria of the research object.

Results: Shows that the most commonly found sex is female. This study shows that there is no relationship between milk consumption and acne vulgaris.

Conclusion: Based on the results of the study, there was no significant relationship between the frequency of milk consumption and acne vulgaris, the amount of milk consumption per day and per week, because milk contains zinc and vitamin A. Zinc functions as an anti-inflammatory agent in acne by inhibiting the growth of *C. acnes* bacteria, and milk contains vitamin D, so it has a pleiotropic effect that can prevent lesions in acne vulgaris.

Keywords: acne vulgaris, milk consumption, student

INTRODUCTION

The skin is the outermost part of the body that functions as a barrier between humans and the environment. The structure of the skin is affected by various factors such as climate, age, gender, race, and location in the body. The skin consists of 3 main layers, namely the epidermis, dermis, and subcutaneous. In addition, the skin has sebaceous glands or oil glands located on the skin, hair, and nails.(1-3) These glands function to maintain skin moisture, especially when they are active and developing during puberty.(3) However, activity can also cause skin problems, such as warts, dermatitis, and acne vulgaris.

Acne vulgaris, also known as acne, generally appears in all age groups. Hormones usually influence in the appearance of acne vulgaris. Almost all adolescents experience acne vulgaris and consider it a problem, according to a study by Shalita and James Rosso, dermatologists from America, adolescents who experience acne vulgaris by 79% to 95%. The incidence of vulgaris in Indonesia is high with an incidence of 85%-100%, while in Southeast Asia the incidence rate is only around 40%-80%. The incidence of acne in 2017 in Europe was 57.8%, in China it was 39.2%, in Africa it was 37% in women, in Caucasians it was 24%, and in India it was 23%.

Milk contains proteins such as whey protein and lactoferrin, which serve to increase iron levels.(4-12) These two proteins have a function to reduce acne vulgaris, due to their antibacterial and anti-inflammatory properties. In addition, protein is also able to reduce the onset of acne,

because collagen functions to increase skin elasticity and moisture.(13) Consumption of whey protein concentrate can cause acne vulgaris. There are several studies that report that skim milk can increase blackheads compared to whole milk.(10-14)

MATERIAL AND METHODS

The type of research used is observational research using a quantitative approach with a cross sectional design.(15) The research was carried out at the Faculty of Medicine, Prima University of Indonesia, carried out in April 2024-June 2024. The research population is students in the 2nd and 4th semesters of the Faculty of Medicine, Prima Indonesia University, the research sample taken is 98 people using the stratified random sampling technique. The analysis used was univariate analysis using a descriptive test, and bivariate analysis using the kendall's-tau_b correlation test.

RESULTS

Characteristics of Research Respondents

All respondents in this study were analyzed using descriptive statistical analysis, with characteristics in the form of gender, age, Frequency of milk consumption, Number of milk consumption per day, Number of milk consumption doses per week, skin type and the degree of weight of acne.

Table 1. Characteristics of Respondents

Characteristics	Number (n)	Percentage (%)
Gender		
Man	20	20,4
Woman	78	79,6
Age		
17	1	1,0
18	14	14,3
19	45	45,9
20	20	20,4
21	13	13,3
22	4	4,1
24	1	1,0

Based on the table above, the results of the study show that the most common gender is female with 79.6%, while male gender is 20.4%. Furthermore, the results of the study show that the most common age is 19 years old as 45.9%, 17 years old as 1.0%, 18 years old as 14.5%, 20 years old as 20.4%, 21 years old as 13.3%, 22 years old as 4.1%, and 24 years old as much as 1.0%.

Table 2. Analysis of Research Variables

Characteristics	Number (n)	Percentage (%)
Skin Type		
Oily	59	60,2
Dry	12	12,2
Usual	27	27,6
Frequency of milk consumption		
1-2/week	38	38,8
3-4/week	34	34,5
1-3/month	17	17,3
Every day	7	7,1
Never	2	2,0
Number of milk consumption per day		
1 dosage	49	50,0
2 Dosage	14	14,3
3 Dosage	2	2,0
Never	33	33,7
Number of milk consumption doses per week		
1 dosage	30	30,6
2 Dosage	31	31,6
3 Dosage	10	10,2
4 Dosage	10	10,2
Never	17	17,3

Severity of acne

Heavy	3	3,1
Light	63	64,3
Keep	32	32,7

Based on the table above, the results of the study show that the skin type is more dominant oily skin as many as 59 people (60.2%), dry skin as many as 12 people (12.2%), and normal skin as many as 27 people (27.6%). From the results of the research in the category of how long to consume milk is more dominant, the category 1-2/week is more dominant as many as 38 people (38.8%), category 3-4/week as many as 34 people (34.7%), category 1-3/month as many as 17 people (17.3%), daily category as many as 7 people (7.1%), and for the never category as many as 2 people (2.0%). From the results of the study in the 1-day category, the most dominant dose in milk consumption was 1 dose as many as 49 people (50.0%), for 2 doses as many as 14 people (14.3%), for 3 doses as many as 2 people (2.0%), and never as many as 33 people (33.7%). From the results of the research in the 1-week category, the most dominant dose in milk consumption is 2 doses as many as 31 people (31.6%), for 1 dose as many as 30 people (30.6%), for 3 doses as many as 10 people (10.2%), for 4 doses as many as 10 people (10.2%), and never as many as 17 people (17.3%). And for the results of the research in the most dominant severity category, 63 people (64.3%) were mild, 3 people (3.1%) were severe, and 32 people (32.7%) were moderate.

Table 3. Relationship between Milk Consumption Frequency and Severity of Acne.

Frequency of Milk Consumption	Severity Of Acne						P-value
	Mild		Moderate		Severe		
	N	%	N	%	N	%	
Every day	4	4,1	3	3,1	0	0,0	
1-2/week	26	26,5	12	12,2	0	0,0	
3-4/week	17	17,3	14	14,3	3	3,1	0,283
1-3/month	14	14,3	3	3,1	0	0,0	
Never	2	2,0	0	0	0	0,0	

Based on the table above, the results of the study were obtained that the frequency of milk consumption with mild severity was 4 people (4.1%), 1-2/week as many as 26 people (26.5%), 3-4/week as many as 17 people (17.3%), 1-3/month as many as 14 people (14.3%), and never as many as 2 people (2.0%). With moderate severity with 3 people (3.1%) every day, 1-2/week as many as 12 people (12.2%), 3-4/week as many as 14 people (14.3%), 1-3/month as many as 3 people (3.1%), and never as much as 0 (0.0%). With severe severity with every day, 1-2/week as much as 0 (0.0%), 3-4/week as many as 3 people (3.1), 1-3/month as much as 0 (0.0%), and never as much as 0 (0.0%),

Based on statistical results using the kendall's tau_b correlation test, with a value of p=0.091. This shows that there is no significant relationship between the severity of acne vulgaris and the frequency of milk consumption.

Table 4. Relationship between the Amount of Milk Consumption per Day and the Severity of Acne

Number of Milk Consumption Doses / Day	Severity Of Acne						P-value
	Mild		Moderate		Severe		
	N	%	N	%	N	%	
Never	24	24,5	9	9,2	1	1,0	
1 dosage	33	33,7	13	13,3	2	2,0	
2 Dosage	5	5,1	9	9,2	0	0,0	0,091
3 Dosage	1	1,0	1	1,0	1	1,0	

Based on the table above, the results of the study were obtained that the number of milk consumption doses per day with mild severity was never as many as 24 people (24.5%), 1 dose as many as 33 people (33.7%), 2 doses as many as 5 people (5.1%), 3 doses as many as 1 person (1.0%). With moderate severity with never as many as 9 people (9.2%), 1 dose as many as 13 people (13.3%), 2 measures as many as 9 people (9.2%), 3 doses as many as 1 person (1.0%). With a severe severity with never as many as 1 person (1.0%), 1 dose as many as 2 people (2.0%), 2 measures none, 3 measures as many as 1 person (1.0%).

Based on the statistical results using the kendall's tau_b correlation test, with a value of p=0.091. This shows that there is no significant relationship between the severity of acne vulgaris and the amount of milk consumed per day

Table 5. Relationship between the Amount of Milk Consumption per Week and the Severity of Acne

Number of Milk Consumption Doses / Week	Severity Of Acne						P- value
	Mild		Moderate		Severe		
	N	%	N	%	N	%	
Never	9	9,2	7	7,1	1	1,0	0,702
1 dosage	22	22,4	8	8,2	0	0,0	
2 Dosage	23	23,5	9	9,2	1	1,0	
3 Dosage	5	5,1	3	3,1	1	1,0	
4 Dosage	4	4,1	5	5,1	0	0,0	

Based on the table above, the results of the study were obtained that the number of milk consumption per week with mild severity was never as many as 9 people (9.2%), 1 dose as many as 22 people (22.4%), 2 doses as many as 23 people (23.5%), 3 doses as many as 5 people (5.1%), and 4 doses as many as 4 people (4.1%). With moderate severity with never as many as 7 people (7.1%), 1 dose as many as 8 people (8.2), 2 doses as many as 9 people (9.2%), 3 doses as many as 3 people (3.1%), and 4 doses as many as 5 people (5.1%). With a severe severity of never 1 person (1.1%), 1 dose of 0 (0.0%), 2 doses of 1 person (1.1%), 3 doses of 1 person (1.1%), and 4 doses of 0 (0.0%).

Based on statistical results using the kendall's tau_b correlation test, with a value of p=0.702. This shows that there is no significant relationship between the severity of acne vulgaris and the amount of milk consumption/week.

DISCUSSION

Based on the results of the research in table 4.1, the most gender characteristics are female as many as 78 people, and the most common age is 19 years old as many as 45 people (45.9%). The results of this study are in line with previous research conducted by Aryawangsa et al. (2023), namely the most gender characteristics are women as many as 108 people (63%). Then followed by 48 people (29%) aged 19 years. The research of Qonnayda and Sutini said that female respondents were more dominant, because, in women, the menstrual cycle is influenced by hormonal factors.(16) Many complain that acne vulgaris sometimes appears before or after menstruation, in women the levels of androgen hormones are known to cause acne vulgaris.(17-18) This androgenic hormone comes from the process of changing fat, especially cholesterol. After menopause, the function of the sebaceous glands in women begins to decline. High androgen hormones in the blood can cause hypertrophy and excessive growth of sebaceous glands which can trigger acne vulgaris.(19-21)

Based on the results of the study in table 4.3, the frequency of milk consumption with the severity of acne has no relationship with the value of p=0.283 This study, which is in line with the research of Anaba and Oaku, LaRosa et al., Nurrochman, Pramesti and Purwanti shows that there is no relationship between the frequency of milk consumption and the severity of acne. This study is not in line with previous research conducted by Alghamdi, Alhemel, and Bukhari, Alkabbaz, Manaf and Azizan showed that there is a relationship between milk frequency and the severity of acne, with milk consumption 1 time per week can cause severe acne.

The meta-analysis conducted by Podgorska et al, the results of the study showed that there was no relationship between the frequency of milk consumption and acne vulgaris, because, milk contains vitamin D which has a pleiotropic effect, which can prevent acne vulgaris lesions by inhibiting cell division, decreasing sebum secretion, preventing pore blockage and inhibiting the growth of Cutibacterium acnes. Vitamin D can lower IL-6 and TNF- α levels.(16)

Research conducted by Maresta, Hikmawati and Nur, with the results of the study showing that there is a relationship between the frequency of milk consumption and the severity of acne. Because milk has two proteins, namely casein and whey protein which play an important role in the development of acne. Casein can increase IGF-1 levels, while whey protein can stimulate insulin beta cells which can lead to hyperinsulinemia. Whey protein contains the amino acids leucine, isoleucine and valine, all three of which are able to stimulate greater insulin secretion than other amino acids. In addition, milk contains the precursor dihydrotestosterone, and various growth factors such as IGF-1. Naturally, milk contains hormones such as testosterone and androstenedione, which are often considered endogenous factors that can increase IGF-1 levels. The precursor of DHT in milk, while IGF-1 can stimulate the production of androgens which can ultimately affect the activity of the sebaceous unit to produce more sebum, and can cause blackheads. The carbohydrates in milk can trigger glycemic and insulinemia responses, which can contribute to the development of acne vulgaris, an effect similar to products or drinks that have a high glycemic index. Hyperinsulinemia that

occurs due to a high glycemic index of milk can increase androgen circulation and inhibit Sex Hormone Binding Protein (SHBP), which can then increase sebum synthesis, which is one of the important factors in the formation and development of acne vulgaris. IGF-1 is also a very important stimulator for target mammalian of rapamycin complex 1 (mTORC1).

Based on the results of the study in tables 4.4 and 4.5, the number of milk consumption doses per day with a value of $p=0.091$ and the number of milk consumption doses per week with a value of $p=0.702$, stated that there was no relationship with the severity of acne. This study is in line with the research of Al Hussein et al., Tadjudin, Pereira Duquai, Juhn et al. showed that there was no relationship between the amount of milk consumption per day and per week and the severity of acne. This study is not in line with the research conducted by Shetty and Swathi, Penso et al., showing that there is a relationship between the number of milk consumption doses per day and per week and the severity of acne.

With milk consumption of 1-2 doses per week. The results of this study are in line with previous research conducted by Kusumaningrum, Riyanto and Widodo, stating that there is no relationship between milk consumption per day and per week. Based on his research, patients who consume milk as much as 3 doses per week can trigger acne.(22-23) Because, dairy products contain zinc, so consuming 1 dose per day can meet about 10% of the dietary reference intake (DRI) intake needs of zinc. Zinc and vitamin A are essential minerals that play an important role in the development of normal epithelium, a decrease in zinc levels in serum can lead to an increase in androgen production. Increased androgen production

can affect the activity of the sebaceous glands as well as can trigger hyperproliferation of the follicle epidermis. Cutibacterium acne (C.acnes), a normal flora bacteria on the skin that is gram-positive anaerobic, and is usually found in polysebacea follicles. This bacterium is thought to have an important role in acne vulgaris. Zinc functions as an anti-inflammatory agent in acne by inhibiting the growth of C. acnes bacteria. Zinc can also heal wounds, and can be beneficial in the recovery of acne vulgaris.

The research conducted by Suppiah et al (2018) from UCSI University, with the results of the study showing there is a relationship between the number of doses of milk consumption per day and per week with the degree of acne vulgaris, with subjects consuming 2 doses of milk for 1 week.(21) Due to the accnegenic nature of milk, it can be caused by the content of hormones that have functions for reproduction, non-reproduction, and growth that can affect the development of acne individually. Insulin-like growth factor (IGF-1), has been shown to play a major role in acne development by causing higher sebum production, and increasing follicular keratinization. Hormones such as testosterone and androstenedione are naturally present in milk, and have been linked to endogenously elevated levels of IGF-1. In addition, the polysebaceous unit can also be affected by the hormone IGF-1, 5 α -reduced steroids and α -lactalbumin contained in milk processing residue, resulting in more sebum production. In addition, IGF-1 levels can increase in the human body after consuming dairy products, because its lactose content can trigger a high insulin response. The carbohydrate content in milk produces a glycemic and insulinemic response, which can lead to the development

of acne, due to the effects of the glycemic index diet. Key proteins in milk such as whey protein and casein can also aggravate acne, casein can also increase IGF-1 concentrations, while whey protein can increase hyperinsulinemia by stimulating beta cell insulin secretion. In addition, milk also contains the precursors progesterone and dihydrotestosterone which can produce blackheads.(24)

For the shortcomings of this study, not only milk consumption can make acne vulgaris, but many factors can trigger acne vulgaris, such as genetics influenced by genetic factors because the sebaceous gland unit is more sensitive to androgen levels, using cosmetics that contain comedogenic ingredients, infection and trauma factors, because there is Cutibacterium acne, smoking contains a lot of arachidonic acid. (Naibaho, 2020).

CONCLUTION

Based on the results of the study, there was no significant relationship between the frequency of milk consumption and acne vulgaris, the amount of milk consumption per day and per week, because milk contains zinc and vitamin A. Zinc functions as an anti-inflammatory agent in acne by inhibiting the growth of C. acnes bacteria, and milk contains vitamin D, so it has a pleiotropic effect that can prevent lesions in acne vulgaris.

1. Further research optimizes knowledge related to risk factors for acne vulgaris, namely food, cosmetics containing comedogenic ingredients and chemicals.
2. For the next researcher to carry out further research using a different diet and using a larger population.
3. For further research, it can analyze the factors that affect the occurrence of acne

vulgaris such as cultural, socioeconomic factors.

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