



## Knowledge Level on Milk Protein Consumption Towards Acne Vulgaris for Gym Users

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### ABSTRACT

**Background:** Acne vulgaris (AV) is a chronic inflammatory disease of the pilosebaceous unit, with a polymorphic clinical picture consisting of various skin disorders. Whey protein is also associated with potential acne triggers and is used as a supplement by young people trying to increase muscle mass. **Objectives:** To find out the description of the knowledge of gym users on the relationship between consuming milk protein and the incidence of acne vulgaris. **Methods:** This research is a descriptive study using a cross-sectional study approach. The sample was selected using a non-probability sampling technique, namely consecutive sampling with a sample size of 67 people using a questionnaire. **Results:** 67 gym users were selected as samples where the knowledge in the good category was as many as 3 people (4,5%), followed by the adequate category with the number of 24 people (35,8%) and the less category of 40 people (59,7%). Most sources of information obtained about the relationship between consuming milk protein to the incidence of acne vulgaris are from social media. **Conclusion:** The level of knowledge of gym users at the Grand Olympus Gym regarding the relationship between consuming milk protein and the incidence of acne vulgaris in general less knowledge.

**Keyword:** Acne Vulgaris, Gym Users, Level of Knowledge, Milk Protein

### ABSTRAK

**Latar Belakang:** Akne vulgaris (AV) adalah penyakit peradangan kronis dari unit pilosebasea, dengan gambaran klinis polimorfik yang terdiri dari berbagai gangguan kulit. Whey protein dikaitkan dengan potensi pemicu jerawat dan digunakan sebagai suplemen oleh usia muda yang mencoba meningkatkan massa otot. **Tujuan:** Untuk mengetahui gambaran pengetahuan para pengguna gym tentang hubungan antara mengonsumsi protein susu dengan kejadian akne vulgaris. **Metode:** Penelitian ini merupakan studi deskriptif dengan menggunakan pendekatan studi potong lintang. Sampel dipilih menggunakan teknik non-probability sampling yaitu consecutive sampling dengan jumlah sampel sebanyak 67 orang dengan menggunakan kuesioner. **Hasil:** Sebanyak 67 pengguna gym dipilih sebagai sampel dimana pengetahuan dengan kategori baik sebanyak 3 orang (4,5%), diikuti kategori cukup dengan jumlah 24 orang (35,8%) dan kategori kurang sebanyak 40 orang (59,7%). Sebagian besar sumber informasi yang didapatkan tentang hubungan antara mengonsumsi protein susu dengan kejadian akne vulgaris berasal dari media sosial. **Kesimpulan:** Tingkat pengetahuan pengguna gym di Grand Olympus Gym mengenai hubungan antara mengonsumsi protein susu dengan kejadian jerawat (acne vulgaris) secara umum berpengetahuan kurang.

**Keyword:** Akne Vulgaris, Pengguna Gym, Protein Susu, Tingkat Pengetahuan



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### 1. Introduction

What is Acne vulgaris (AV)? Acne vulgaris is a chronic inflammatory disease of the pilosebaceous unit, with a polymorphic clinical picture consisting of various skin disorders in the form of comedones, papules, pustules,

nodules, and scarring. Patients usually complain of skin eruptions in predilection sites, namely the face, shoulders, neck, chest, upper back, and upper arms due to sebaceous glands in active areas. The growth of acne vulgaris is caused by various factors such as genetics, endocrine (pituitary sebotropic androgens), dietary factors, the activity of the sebaceous glands, psychological factors, season, stress factors, bacterial infections (*Cutibacterium acnes*), cosmetics, and other chemicals.<sup>[1]</sup>

Acne vulgaris can be caused by increased sebum production. Sebum excretion itself is under the control of androgen hormones. Androgen hormones play a role in changes in sebocyte cells and follicular keratinocyte cells which will cause microcomedones and comedones to become inflammatory lesions. The etiology of acne is still poorly defined and studied intensively. Although most patients report that their acne is precipitated by the intake of some foods, the nutritional aspects of this disorder are controversial in the literature.<sup>[1]</sup> One of them is milk intake which can cause an increase in insulin-like growth factor-1 (IGF-1) levels which affects the development of acne vulgaris.<sup>[2]</sup>

The processed milk that will be discussed is whey which is the liquid part of the milk that remains after separating the curd in the manufacture of cheese. This processed product is a component that is rich in protein, so it is referred to as milk protein (whey protein). Whey protein is also associated with acne-inducing potential because it contains 6 growth factors associated with acne (transforming growth factor, insulin-like growth factor-1 and insulin-like growth factor-2, platelet-derived growth factor, and fibroblast growth factor-1 and fibroblast growth factor-2) and is used as a supplement by young people trying to increase muscle mass.<sup>[2]</sup>

Based on the description above one of the pathogenesis of acne vulgaris is increased sebum production which is associated with the intake of supplements such as milk protein, research is needed to further reveal the level of knowledge about the relationship between consuming protein milk and the incidence of acne vulgaris. A study involving 30 gym-goers and dermatology clinic patients demonstrated a strong positive correlation between the consumption of protein-calorie supplements, particularly whey protein, and a significant increase in the number of acne pustules, papules, and comedones, with the percentage of subjects affected rising from 56.7% at the beginning of the study to 100% after two months. Additionally, several case series reported teenage and adult males experiencing acne eruptions after ingesting whey protein supplements for weight gain and muscle building, with acne improvement primarily observed following the cessation of the supplements.<sup>[9]</sup>

In this regard, the authors are interested in researching the level of knowledge of gym users regarding the relationship between consuming protein milk and the incidence of acne vulgaris because the researcher wants to know the description of the knowledge of gym users regarding the relationship between consuming protein milk and the incidence of acne vulgaris so that gym users can educate people who others and ensure that the information submitted is correct.

## 2. Method

This research was conducted using a descriptive research method that aims to determine the level of knowledge of gym users on the relationship between consuming protein milk and the incidence of acne vulgaris. The cross-sectional study design is the data collection that will be carried out, namely the measurement of the variables is done only once, at one time. The questionnaire used in this study consists of questions regarding knowledge about acne, knowledge about whey protein milk, and knowledge about consuming protein milk in relation to the incidence of acne vulgaris. The research was conducted offline using a Google form that was given to prospective respondents, namely gym users at the Grand Olympus Gym. The time of research was carried out from July 2022 to November 2022.

The target population in this study is gym users at the Grand Olympus Gym. The population in this study is gym users who are still active and regularly exercise at the Grand Olympus Gym in 2022 with a total of 200 people. The sample to be used in this study is gym users at Grand Olympus Gym which meets the sample selection criteria.

The Slovin formula is used to calculate the sample size in this study. The Slovin formula is used to determine the sample size of a known population with certainty. In this study, the sample of gym users was 200 people. Based on the Slovin formula, the sample size in this study is 67.

The research sample was taken using a non-probability sampling technique, namely consecutive sampling where all samples that came sequentially and met the research criteria were included in the study until the required number of samples was fulfilled.

**3. Results**

**Table 1.** Distribution of sample frequencies

Age (years)	N=67	Percentage (%)
16-20	11	16,4
21-25	40	59,7
26-30	13	19,4
31-35	1	1,5
36-40	2	3,0
Gender		
Male	37	55.2
Female	30	44.8
History of Acne Vulgaris		
Yes	46	68,7
No	21	31.3
Source of information		
Doctor	4	6,0
Print media	4	6,0
Family Member	1	1,5

Table 1 shows that the sample distribution is based on age group, with the largest sample being the 21-25 year age group with 40 people (59.7%), followed by 26-30-year-old with 13 people (19.4%), 16-20 years old also as many as 11 people (16.4%). Then, the age group of 36-40 years was 2 people (3.0%) and the least was the age group 31-35 years, only 1 person (1.5%). The sample distribution based on gender in this study was more male than female.

The gender comparison of gym users was 37 male (55.2%) and 30 female (44.8%). most of the sample in this study had a history of acne vulgaris with a total of 46 people (68.7%) compared to the sample who had no history of acne vulgaris, only a few, 21 people (31.3%).

The sample information in the sample knowledge study who knew about the relationship between consuming milk protein and the incidence of acne vulgaris was a total of 43 people (64.2%) and as many as 24 people (35.8%) who did not know. The most dominant sources of information were social media, namely 25 people (37.3%, followed by sources of information from the internet, 7 people (10.4%), doctors and print media, 4 people (6.0%), lecture materials as lecture materials as many as 2 people (3.0%) and family members as many as 1 person (1.5%).

**Table 2.** Statistical values based on the knowledge score of gym users at Grand Olympus gyms

Variable	Mean	Median	Modus	Standard deviation	Maksimum	Minimum	P-value
Total score	10,88	11	10	2,619	18	6	0,095

Table 2 shows that of these 67 samples, the total score of the smallest gym users (Minimum) is 6, and the total score of the largest gym users (Maximum) is 18. The average value of the 67 samples or the Mean is 10.88 with a Standard Deviation of 2.619. Based on the results of Kolmogorov Smirnov, the knowledge score is normally distributed, P-value of 0.095 (P>0.05).

**Table 3.** Distribution of sample frequencies based on knowledge level categories

Knowledge level	N=67	Percentage (%)
Good	3	4,5
Enough	24	35,8
Less	40	59,7

Table 3 shows that the level of knowledge of gym users at the Grand Olympus Gym about the relationship between consuming milk protein and the incidence of acne vulgaris is in the good category of 3 people (4.5%), followed by the sufficient category of 24 people (35.8%) and less category as many as 40 people (59.7%).

Based on the ANOVA, table 4, the output above, it is known that the significant value is 0.554 ( $p > 0.05$ ), so it is concluded that the average level of knowledge based on age is the same and shows that there is no significant relationship.

Based on the ANOVA, table 5, the output above, it is known that the significant value is 0.551 ( $p > 0.05$ ), so it is concluded that the average level of knowledge based on gender is the same and shows no significant relationship.

Based on the ANOVA, table 6, output above, it is known that the significant value is 0.283 ( $p > 0.05$ ), so it is concluded that the average level of knowledge based on the history of acne vulgaris is the same and shows no significant relationship.

Based on the ANOVA, table 7, the output above, it is known that the significant value is 0.003 ( $p < 0.05$ ), so it is concluded that the average level of knowledge based on the source of information is different indicating that there is a significant relationship

**Table 4.** ANOVA analysis level of knowledge by age

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.057	4	.264	.762	.554
Within Groups	21.510	62	.347		
Total	22.567	66			

**Table 5.** ANOVA analysis level of knowledge based on gender

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.124	1	.124	.359	.551
Within Groups	22.443	65	.345		
Total	22.567	66			

**Table 6.** ANOVA analysis level of knowledge based on history of acne vulgaris

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.400	1	.400	1.174	.283
Within Groups	22.167	65	.341		
Total	22.567	66			

**Table 7.** ANOVA analysis level of knowledge based on sources of information

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.362	5	1.072	4.450	.003
Within Groups	8.917	37	.241		
Total	14.279	42			

#### 4. Discussion

In this study, the level of knowledge of gym users at the Grand Olympus Gym was measured through a questionnaire that was divided into three categories, namely good knowledge (76%-100% correct percentage), sufficient knowledge (56%-75% correct percentage), and less knowledge (correct percentage <56%).<sup>[3]</sup> Several factors affect knowledge, namely level of education, experience, age, culture, interests, sources of information, and media. In addition, there are also external factors, namely according to Notoatmodjo (2012), the results of

several experiences and observations that occur in the field (community) that a person's behavior including the occurrence of health behavior, begins with a person's experiences and the presence of external factors (physical and non-physical environment).<sup>[4]</sup>

The lack of knowledge of the respondents in this study was proven by the insight or understanding of the respondents regarding the relationship between consuming milk protein and the incidence of acne vulgaris. According to table 6, most gym users at the Grand Olympus Gym have less knowledge about the relationship between consuming milk protein and the incidence of acne vulgaris. From 67 respondents, 40 people (59.7%) had less knowledge, 24 people (35.8%) had sufficient knowledge and only 3 people (4.5%) gym users had good knowledge.

In this study, it was found that the majority of gym users had a history of suffering from acne vulgaris as many as 46 people (68.7%) and 21 people (31.3%) had never. It can also be shown in research conducted by Perkin (2002), Collier (2008), and Shen (2012) that around 75-98% of adults have suffered from acne vulgaris, especially in their teens. There is also data from the Indera General Hospital in Bali which shows the age range of 15-24 years is the largest group suffering from acne vulgaris as much as 59.1%. At the Grand Olympus Gym, based on research conducted, the age group of 21-25 years is the age group with the most people attending the gym, namely 40 people (59.7%), and also the most who have suffered from acne vulgaris, 27 people (67.5%). According to table 6, the number of respondents who had good knowledge about the relationship between consuming milk protein and the incidence of acne vulgaris was 3 people (6.5%) who had suffered from acne vulgaris. Those who have never suffered from acne vulgaris do not have samples that are classified as good knowledge and can also prove that one's experience is a factor that influences knowledge.

The majority of gym users at the Grand Olympus Gym still do not understand the relationship between consuming milk protein and the incidence of acne vulgaris because most of them cannot answer all the questionnaire questions about the relationship between consuming milk protein and the incidence of acne vulgaris. However, the knowledge of gym users regarding the questionnaire questions in question 1 part C where milk protein is a contributing factor to the incidence of acne vulgaris is quite good because as many as 45 people (67.2) answered this question correctly. Research in Turkey shows that there is a link between milk protein and the incidence of acne vulgaris where a high glycemic load (HGL) diet, high intake of carbohydrates, and consumption of milk can cause acne. Milk can increase IGF-1 levels, and IGF can induce keratinocyte proliferation and apoptosis. There is also increased IGF-1 receptor expression in epidermal keratinocytes which stimulates 5 $\alpha$ -reductase, adrenal androgen and gonadal synthesis, androgen receptor signal transduction. It proves that milk protein supplement induces acneiform lesions.<sup>[5,10]</sup>

In the questionnaire questions, the higher the frequency of drinking milk protein, the higher the severity of acne. As many as 41 people (61.2%) gym users answered correctly. This means that the respondent has knowledge about acne which can get worse if the frequency of drinking protein milk also increases. This is also influenced by several other factors such as stress levels, diet and environmental sanitation. Research in Denmark shows that intake of any type of milk, such as full-fat milk, low-fat milk, and yogurt if consumed, will be more prone to acne. This study also stated that an intake of 1 glass of milk or more per day showed a higher risk of acne compared to 2-6 glasses per week.<sup>[6]</sup> There is also a study at Maiwand Teaching Hospital in Kabul City, Afghanistan where consumption of milk 3 days or more per week is associated with the occurrence of moderate to severe acne.<sup>[7]</sup>

As many as 38 people (56.7%) respondents answered incorrectly in question 4, part C where whey protein milk can increase the severity of acne vulgaris by increasing the release of oil in the skin and only 29 people (43.3%) were correct on that question. Research conducted in Brussels, Belgium showed that four primary pathogenic factors interact to produce acne lesions. First, it is increased and altered sebum production under androgen control followed by changes in keratinization leading to comedones, *Cutibacterium acnes* follicular colonization, and release of inflammatory mediators into the skin. IGF-1 present in milk protein stimulates the proliferation of basal keratinocytes and increases sebum production and it also participates in increasing the circulating effect of androgens. This study also identified that five healthy adult men (age 19-35 years, mean 27.6 years) who consumed whey protein milk to increase muscle mass had the development of acne on the face and back. The severity of acne was determined using the Global Acne Grading System (GAGS) and the five men showed moderate acne severity, with a score of 19-30. Then, all five men were advised to stop using whey protein milk. Acne lesions cleared completely in one man 6 weeks after discontinuation of milk whey protein supplementation along with the combined use of topical retinoid treatment and benzoyl peroxide.<sup>[8]</sup>

## 5. Conclusion

Based on the research that has been done, the research can conclude that the level of knowledge about the relationship between consuming milk protein and the incidence of acne vulgaris among gym users is less (59.7%). Based on age, 21-25 years have an average level of knowledge in the sufficient category. Based on gender, men and women have an average level of knowledge in the less category. Based on a history of acne vulgaris, gym users who have had acne vulgaris have an average level of knowledge in the sufficient category. Based on sources of information, sources of information from doctors, print media, and lecture materials have an average level of knowledge in the sufficient category.

## 6. Recommendation

There needs to be more intensive education and socialization for gym users regarding the relationship between milk protein consumption and acne outbreaks. This is because the majority of gym users have a poor level of knowledge. Further research needs to be conducted with a larger sample size and wider area coverage to obtain a more representative overview of the level of knowledge.

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