

Level of Knowledge and Behavior of Adolescents Regarding *Acne Vulgaris* Among Medical Students University of Muslim Indonesia

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ABSTRACT

Introduction: *Acne vulgaris* is a common chronic skin disorder that predominantly affects adolescents and young adults, often linked to hormonal changes during puberty. Insufficient knowledge and poor preventive behaviors contribute to its high prevalence. This study aimed to assess the prevalence of *acne vulgaris*, the level of knowledge, and related behaviors among medical students at the University of Muslim Indonesia (UMI), cohorts of 2022 and 2023, and to examine the relationship between knowledge, behavior, and the occurrence of *acne vulgaris*. **Method:** This was a descriptive-analytical study with a cross-sectional design. Data were collected from medical students and analyzed using the Chi-square test to evaluate associations between knowledge, behavior, and *acne vulgaris*. **Results:** Most respondents did not experience *acne vulgaris* (72 students, 69.9%). Knowledge was predominantly at an adequate level (45 students, 43.7%), while behavior was mostly categorized as good (39 students, 37.9%). Statistical analysis revealed a significant association between knowledge and behavior with the occurrence of *acne vulgaris*, indicating that students with better knowledge and positive preventive behaviors had a lower prevalence of *acne*. **Conclusion:** Knowledge and behavior are significantly related to the occurrence of *acne vulgaris* among medical students. Strengthening education and promoting preventive behaviors may help reduce *acne* prevalence in this population.

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INTRODUCTION

Acne vulgaris is a common, chronic inflammatory disorder of the *pilosebaceous* unit, which consists of hair follicles and *sebaceous* glands (Maulida and Topik, 2024). This inflammation is primarily caused by increased sebum production, follicular hyperkeratinization, bacterial colonization, and inflammation. This condition is characterized by the chronic development or recurrence of comedones, erythematous

papules, and pustules. These comedones typically appear on the face but can also occur on the body, neck, and proximal upper extremities (Kampar and Lestari, 2018). Acne vulgaris is a skin condition that can heal on its own, but it has long-term effects that can lead to the formation of permanent scars and is quite distressing due to the loss of self-confidence caused by the lack of facial beauty in the affected individual (Matheus *et al.*, 2018).

Several factors influencing acne vulgaris during puberty include genetics, endocrine factors, diet, sebaceous gland activity, psychological factors, season, bacterial infections (*Propionibacterium acnes*), cosmetics, and other chemicals (Mangapi, Tandilimbong, and Ganisa, 2020). According to the *Global Burden of Disease (GBD)* study, in 2019, acne vulgaris affected 85% of young adults aged 12–25 years (Fadilah, 2021). Acne vulgaris can occur in various age groups, but due to hormonal changes during puberty, it is more common during adolescence. In women, it typically occurs between the ages of 14–17, while in men, it typically occurs between the ages of 16–19. Generally, acne begins to appear between the ages of 12–15, with the peak severity occurring between the ages of 17–21 (Ayudianti and Indramaya, 2014).

Based on research in Southeast Asia, 40–80% of cases are acne vulgaris. According to the Indonesian Cosmetic Dermatology Study Group (PERDOSKI) 2017, acne vulgaris ranks third among the most common skin conditions among patients visiting dermatology departments in hospitals and skin clinics in Indonesia. The highest prevalence is among individuals aged 14–17 years, with 83–85% of women and 95–100% of men aged 16–19 years affected. According to a study in Lampung, acne vulgaris is more common in women (69.7%) than in men (30.3%). Young adults aged 16–25 years account for 53.2% of cases. Cosmetic users are more likely to experience acne vulgaris (59.1%) (Maryanto, 2020). The prevalence of acne vulgaris in Lampung is quite high, with epidemiological data showing that it is more common among young women aged 16–25 years (Sari, Efrilia, and Kamilla, 2023). A study conducted in 2019 on 66 patients with acne vulgaris at Abdul Moeloek Hospital found that 69.7% of women were affected by acne compared to men (30.3%) (Sibero, Anggraini and others, 2019).

Acne vulgaris typically appears during adolescence or young adulthood but can occur at various ages. It is often associated with physical conditions, such as feeling extremely stressed due to numerous problems or, conversely, when feeling very happy. It is no surprise that the prevalence of acne vulgaris is highest among adolescents, as androgen hormones circulating in the blood increase during puberty, which can lead to hyperplasia and hypertrophy of the sebaceous glands (Kristanti and Savira, 2021). Generally, many adolescents struggle with acne vulgaris. In addition to this issue, a lack of knowledge about the causes of acne vulgaris leads to poor dietary control. To prevent acne vulgaris, a low-fat and low-carbohydrate diet can be followed, along with proper skin care, regular cleansing of the skin, stress avoidance, and moderate use of cosmetics. For managing acne cases, adequate information about risk factors, prevention, treatment, and prognosis is crucial. This is done to inform patients about the efforts being made for their treatment and to prevent them from becoming overly concerned or dismissive of acne vulgaris.

A study conducted in Indonesia among high school students at Santo Thomas Medan on acne showed that 46.2% of the knowledge test results were categorized as insufficient, and 69.9% of the attitude test results were considered adequate. Out of 17 people interviewed about their knowledge of how to prevent acne vulgaris, 6 people stated that consuming oily or fatty foods, not washing their faces frequently, and not exercising are causes of acne vulgaris or pimples. Meanwhile, 11 people (65% of the total

respondents) stated that they did not know how to prevent acne vulgaris from recurring, and 11 others mentioned that during their acne episodes, they frequently used medication to eliminate acne. The interview results also revealed that patients with acne still often consume fried foods, rarely exercise, occasionally neglect washing their faces, and frequently squeeze their acne when it appears.

Limited knowledge causes many adolescents to be unaware of the factors contributing to acne vulgaris, which may result in complications such as chronic inflammation, post-inflammatory hyperpigmentation, and permanent scarring. In addition to physical effects, psychological impacts, including reduced self-confidence, anxiety, and body image disturbances, are commonly reported by patients. These consequences highlight the importance of assessing adolescents' knowledge and behaviors as a foundation for more effective prevention and management strategies. Based on these considerations, this study aims to evaluate the level of knowledge and behavior related to acne vulgaris among medical students of the Faculty of Medicine, University of Muslim Indonesia, in the 2022 and 2023 cohorts.

LITERATURE REVIEW

Acne Vulgaris

Acne vulgaris is a skin disease caused by chronic inflammation of the pilosebaceous unit. It consists of non-inflammatory lesions, such as open and closed comedones, as well as inflammatory lesions, such as papules, pustules, and nodules (Teresa, 2020). Acne vulgaris is a medical term referring to various types of acne, ranging from *whiteheads*, *blackheads*, nodules, pustules, cysts, and papules. Acne vulgaris typically appears on the face, shoulders, back, and chest. Acne vulgaris is one of the most common skin health issues (Saragih, Opod and Pali, 2016). Acne vulgaris is an inflammatory skin condition commonly diagnosed in patients from childhood to adulthood. Although traditionally considered to occur primarily in young people (nearly 90% of patients are under 12 years old), there are cases of patients as young as 8 years old who develop this condition, which can persist into adulthood (average age 45 years).

Knowledge

Knowledge is the result of the process of sensing an object through the five senses, namely sight, hearing, smell, taste, and touch. Information received by the five senses is processed by the brain and produces understanding. The more often a person experiences or is exposed to an object, the higher their knowledge will be. Knowledge is also influenced by education, experience, and environment, so each individual may have different levels of understanding of a particular subject (Darsini, Fahrurrozi and Cahyono, 2019). However, hearing and sight are the senses that provide the most knowledge.

A person's actions (*overt behavior*) are influenced by knowledge or cognition (Setiawan and Munawaroh, 2016). Behavior based on knowledge tends to be more directed, rational, and consistent because it is grounded in a correct understanding of something. Individuals with knowledge are more aware of the consequences of their actions, enabling them to make appropriate decisions. Conversely, behavior without a knowledge base is often impulsive, ineffective, and risky, potentially leading to negative outcomes. Therefore, the quality of behavior is highly dependent on the level of understanding an individual possesses (Handayani, Amalia, and Sari, 2022).

Behavior

Behavior is the manifestation of an individual's response to certain stimuli, whether from the external environment or internal conditions. Behavior can be reflected through various forms of expression such as body movements, actual actions, habits, and

the way individuals interact with their environment. Behavior is not limited to speech or verbal expressions alone, but also includes physical actions or gestures that show how a person responds to a situation. In the context of psychology, behavior is understood as the result of learning processes, life experiences, and the influence of biological and social factors that shape how individuals act (Sitohang, Teresa et al., 2022).

Behavior can be defined as a series of reactions or responses made by living beings to a stimulus. These reactions can be spontaneous responses or actions influenced by rational considerations. Behavior also reflects certain patterns formed from repeated activities, whether conscious or unconscious. These reaction patterns include movements or complex sequences of movements that have a specific purpose or meaning. In the context of health, individual behavior plays a crucial role in disease prevention and management, including personal hygiene, dietary patterns, and daily lifestyle habits. Therefore, understanding behavior is essential in public health intervention efforts, including in addressing cases such as acne vulgaris, which is often closely linked to adolescent habits and lifestyle (Sitohang, Teresa, and others, 2022).

METHOD

This study is a descriptive analytical study with a *cross-sectional* design aimed at determining the relationship between the level of knowledge and behavior of medical students at the Faculty of Medicine, University of Muslim Indonesia, and the occurrence of acne vulgaris. This study was conducted by measuring independent and dependent variables simultaneously at a specific time. The research was conducted at the Faculty of Medicine, University of Muslim Indonesia, both *offline* and *online* through the completion of a *Google Form* and interviews. The study took place from August 2024 to September 2024.

The study population consisted of medical students at the University of Muslim Indonesia, with the accessible population being students from the 2022 and 2023 cohorts. The sample was selected using *non-probability sampling* with *purposive sampling*, based on established inclusion and exclusion criteria. The sample size was determined using the Slovin formula, with a population of 719 students and a tolerance error rate of 5%. The calculation resulted in a sample size of 103 students. Inclusion criteria included active students from the 2022 and 2023 cohorts who were willing to complete the questionnaire and had acne vulgaris. Exclusion criteria included students with other skin diseases and those who did not complete the questionnaire.

This study consists of two types of variables, namely independent variables and dependent variables. Independent variables include the level of knowledge and behavior of adolescents toward acne vulgaris. Knowledge level was measured using a questionnaire, with results categorized as good (76-100%), adequate (56-75%), insufficient (40-55%), and poor (<40%) on an ordinal scale. Adolescents' behavior toward acne vulgaris was also measured using a closed-ended questionnaire and classified using an ordinal scale with similar categories. The dependent variable was the occurrence of acne vulgaris, measured using a questionnaire with nominal scale results: yes if acne was found, and no if not found. This study aimed to determine the relationship between adolescents' knowledge level and behavior toward acne vulgaris and the occurrence of acne vulgaris.

Acne vulgaris was assessed through interviews with respondents. Knowledge about acne vulgaris was measured using a questionnaire containing 15 questions with a true (1) or false (0) response scale. Behavior toward acne vulgaris is measured using a Likert scale, consisting of 15 statements with four rating levels: strongly agree (4), agree

(3), disagree (2), and strongly disagree (1). The research process includes planning, implementation, and data collection. The planning stage included problem formulation, preliminary study, research design, and determination of the population and sample. Implementation included obtaining permission, sampling based on inclusion and exclusion criteria, obtaining *informed consent*, conducting anamnesis interviews related to acne vulgaris, and collecting data through questionnaires. Data from questionnaires and observation sheets completed by respondents were collected for further analysis.

RESULTS AND DISCUSSION

Table 1 shows that the study included 103 medical students from the University of Muslim Indonesia, classes of 2022 and 2023. Most respondents were 19 years old (62; 60.2%), followed by 20 years (20; 19.4%), 18 years (11; 10.7%), and 21 years (10; 9.7%). The majority were female (72; 69.9%), while 31 (30.1%) were male.

Table 1. Characteristics of Study Subjects (N= 103)

Characteristics	Categories	Frequency (n)	Percentage (%)
Age (years)	18	11	10.7
	19	62	60.2
	20	20	19.4
	21	10	9.7
Gender	Male	31	30.1
	Female	72	69.9

Bivariate analysis aims to determine the frequency distribution of the research variables, in this case the independent variables are adolescents' knowledge about acne vulgaris and adolescents' behavior towards acne vulgaris. The dependent variable is the occurrence of acne vulgaris.

Table 2. Characteristics of Research Subjects Based on Research Variables (N= 103)

Characteristics	Categories	Frequency (n)	Percentage (%)
Knowledge (N= 73)	Good	3	4.10
	Fair	45	61.64
	Insufficient	15	20.55
	Poor	10	13.7
Behavior (N= 103)	Good	39	37.9
	Fair	23	22.3
	Insufficient	21	20.4
	Poor	20	19.4
Occurrence of Acne Vulgaris (N= 103)	Yes	31	30.1
	No	72	69.9

Based on Table 2, it is known that the majority of students have adequate knowledge about acne vulgaris, with 45 respondents (43.3%) falling into this category, while the smallest number (10 respondents, 9.7%) fall into the poor category. Most students also exhibit appropriate behavior toward acne vulgaris, with 39 respondents (37.9%) in the good category, while the fewest are in the poor category, with 20 respondents (19.4%). Meanwhile, the majority of students do not have acne vulgaris, with 72 respondents (69.9%), while the remaining students who have acne vulgaris number 31 respondents (30.1%).

Table 3. Relationship Between Knowledge Levels of Medical Faculty Students at the University of Muslim Indonesia in the 2022 and 2023 Cohorts and Acne Vulgaris (N= 103)

Knowledge	Incidence of Acne Vulgaris						P
	Yes		No		Total		
	n	%	n	%	N	%	
Good	5	4.9	28	27.2	33	32.0	0.005
Sufficient	20	19.4	25	24.3	45	43.7	
Less	6	5.8	9	8.7	15	14.6	
Poor	0	0.0	10	9.7	10	9.7	

Based on Table 3, out of a total of 103 respondents, 5 respondents (4.9%) had good knowledge and experienced acne vulgaris, while 28 respondents (27.2%) with good knowledge did not experience acne vulgaris. Twenty respondents (19.4%) had adequate knowledge and experienced acne vulgaris, while 25 respondents (24.3%) with adequate knowledge did not experience acne vulgaris. There were 6 respondents (5.8%) with poor knowledge who experienced acne vulgaris, while 9 respondents (8.7%) with poor knowledge did not experience acne vulgaris. A total of 10 respondents (9.7%) had very poor knowledge and did not experience acne vulgaris. Based on these results, it was found that the majority of students with good knowledge did not experience acne vulgaris. Based on the results of the *Pearson Chi-square* test, the value of $p = 0.005$ or less than $\alpha (0.05)$, indicating that there is a relationship between the level of knowledge of medical students at the University of Muslim Indonesia in the 2022 and 2023 cohorts and acne vulgaris.

Table 4. Relationship Between Adolescent Behavior of Medical Faculty Students at the University of Muslim Indonesia in the 2022 and 2023 Cohorts and Acne Vulgaris (N= 103)

Behavior	Incidence of Acne Vulgaris						P
	Yes		No		Total		
	n	%	n	%	N	%	
Good	2	1.9	37	35.9	39	37.9	0.000
Sufficient	10	9.7	13	12.6	23	22.3	
Less	12	11.7	9	8.7	21	20.4	
Poor	7	6.8	13	12.6	20	19.4	

Based on Table 4, out of a total of 103 respondents, 2 respondents (1.9%) had good behavior and experienced acne vulgaris, while 37 respondents (35.9%) with good behavior did not experience acne vulgaris. Ten respondents (9.7%) had adequate behavior and experienced acne vulgaris, while 13 respondents (12.6%) with adequate behavior did not experience acne vulgaris. There were 12 respondents (11.7%) with poor behavior who experienced acne vulgaris, while 9 respondents (8.7%) with poor behavior did not experience acne vulgaris. A total of 7 respondents (6.8%) had very poor behavior and experienced acne vulgaris, while 13 respondents (12.6%) with very poor behavior did not experience acne vulgaris. Based on these results, it can be concluded that the majority of students have good behavior and do not experience acne vulgaris. Based on the results of the *Pearson Chi-square* test, the value of $p = 0.000$ or less than $\alpha (0.05)$, indicating that there is a relationship between the behavior of medical students at the University of Muslim Indonesia in the 2022 and 2023 cohorts and acne vulgaris.

Relationship Between Knowledge Level and Acne Vulgaris

The results of the study indicate that the majority of students have adequate knowledge about acne vulgaris, with 45 respondents (43.3%) falling into this category, while the smallest number, 10 respondents (9.7%), fall into the poor category. Meanwhile, the majority of students did not have acne vulgaris, with 72 respondents (69.9%), while the remaining 31 respondents (30.1%) experienced acne vulgaris. This aligns with a study conducted by Deyab *et al.*, (2020) in Saudi Arabia, which also showed that the majority of students did not have acne vulgaris, accounting for 56% of the total respondents, while the remainder had acne vulgaris. Additionally, the results of the Fisher exact test yielded a value of $p = 0.001$, which is less than α (0.05), indicating that there is a relationship between medical students' knowledge of acne vulgaris.

The study results indicate that the majority of students with good knowledge did not experience acne vulgaris, totaling 28 respondents (27.2%). These findings align with those reported by *et al.* (2021) in Pakistan, which revealed that the majority (30, or 42.1%) of medical students generally had good knowledge about skin conditions such as acne vulgaris, thereby preventing them from experiencing acne vulgaris. This study highlights that their knowledge was acquired through academic curricula, lecture materials, and clinical experience, enabling them to understand the causes, risk factors, and treatment options for acne vulgaris. These findings support the idea that better access to medical information in an academic setting enhances students' understanding of this condition.

Similarly, a study (2021) in Pakistan found that the majority (70, or 60.7%) of medical students had good knowledge about acne vulgaris, while 15 (39.3%) had insufficient knowledge, primarily influenced by their access to academic materials and clinical experience. This study emphasizes that medical education plays a crucial role in enhancing understanding of common dermatological conditions. These findings align with previous research indicating that an academic environment rich in medical information contributes to higher levels of knowledge about acne vulgaris among students.

Another study by Alkhawaja *et al.*, (2021) conducted in Jordan observed that medical students have a higher level of knowledge about various dermatological conditions, including acne vulgaris, compared to the general population. The study results showed that both respondents with acne and those without acne mostly considered acne as a disease and believed that acne can be cured. As many as 46.3% of respondents with acne and 41.3% without acne considered acne to be a contagious disease. Most respondents also believed that squeezing acne could accelerate the healing process. Antibiotics (53.6%) and topical antibiotics (54.8%) were the most commonly recognized types of treatment by patients.

In this study, the Pearson Chi-square test yielded a value of $p = 0.005$ or less than α (0.05), indicating a significant association between the level of knowledge of medical students at the University of Muslim Indonesia in the 2022 and 2023 cohorts and acne vulgaris. Overall, these studies indicate that better access to medical information, personal experience with the condition, and an educational environment that supports health discussions contribute to adequate knowledge about acne vulgaris among medical students, consistent with the results of the studies conducted.

The Relationship Between Adolescent Behavior and Acne Vulgaris.

The results of the study indicate that the majority of students exhibit good behavior toward acne vulgaris, with 39 (37.9%) respondents falling into this category, while the smallest number of respondents, 20 (19.4%), exhibit poor behavior. These results

align with a study conducted by Elsadek *et al.*, (2021) , which used *the Fisher's exact test* and obtained a p-value of 0.005, indicating a correlation between adolescent behavior and the occurrence of acne vulgaris. The study Firlej *et al.*, (2022) explains that psychological stress can increase androgen hormone levels in adolescent girls, which plays a significant role in worsening acne vulgaris conditions.

A study conducted by(2023) also explored the role of poor diet in the pathophysiology of acne, finding that the majority of respondents (71%) with an unhealthy diet could influence skin care behavior in adolescents, ultimately contributing to an increase in the severity of acne vulgaris. In this study, the *Pearson Chi-square* test yielded a value of $\rho = 0.000$, which is less than α (0.05), indicating that there is a relationship between the behavior of medical students at the University of Muslim Indonesia in the 2022 and 2023 cohorts and acne vulgaris.

CONCLUSION

Based on the results of the study, it can be concluded that the majority of adolescents do not have acne vulgaris, with 72 adolescents (69.9%) not having the condition, while the remaining 31 adolescents (30.1%) do have acne vulgaris. Most adolescents have adequate knowledge about acne vulgaris, with 45 adolescents (43.7%) in the adequate category, while the fewest are in the poor knowledge category, with 10 adolescents (9.7%). Additionally, the majority of adolescents exhibit appropriate behavior toward acne vulgaris () in the good category, with 39 adolescents (37.9%), while the fewest exhibit inappropriate behavior in the poor category, with 20 adolescents (19.4%).

There is a relationship between the level of knowledge and behavior of medical students at the University of Muslim Indonesia, class of 2022 and 2023, and the incidence of acne vulgaris. Adolescents with good knowledge levels tend to have lower incidence rates of acne vulgaris. This indicates that the better one's knowledge about the causes, prevention, and management of acne vulgaris, the lower the likelihood of developing the condition. Similarly, good hygiene practices, the use of appropriate skincare products, and healthy lifestyle habits also contribute to reducing the risk of acne vulgaris.

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