

RESEARCH ARTICLE

**CORRELATION BETWEEN ACNE VULGARIS SEVERITY AND QUALITY OF LIFE AMONG UNJANI MEDICAL STUDENTS**  
**(HUBUNGAN DERAJAT KEPARAHAN AKNE VULGARIS DENGAN KUALITAS HIDUP MAHASISWA KEDOKTERAN UNJANI)**

**Hedi Hendrawan Rachmatdinata<sup>1</sup>, Welly Ratwita<sup>2</sup>, Narita Ratukuri Paradila<sup>3</sup>**

<sup>1</sup>Dermatology and Venereology Department, Faculty of Medicine, Jenderal Achmad Yani University, Cimahi, West Java, Indonesia

<sup>2</sup>Pharmacology Department, Jenderal Achmad Yani University, Cimahi, West Java, Indonesia

<sup>3</sup>Faculty of Medicine, Jenderal Achmad Yani University, Cimahi, West Java, Indonesia

Corresponding email: [hedihr@yahoo.co.id](mailto:hedihr@yahoo.co.id)

**ABSTRACT**

Acne vulgaris (AV) is a chronic inflammatory skin disease that commonly affects adolescents and young adults. Medical students are particularly susceptible to AV because of the academic demands and psychological stress they experience. In addition to its physical manifestations, AV can negatively affect psychological and social aspects, potentially reducing quality of life. This study aimed to identify and analyze the correlation between the severity of AV and the quality of life of undergraduate medical students at Jenderal Achmad Yani University (Unjani) from the Class of 2023. This analytical study employed a cross-sectional design. A total of 66 students were selected using consecutive sampling. The severity of acne vulgaris was assessed based on facial photographs evaluated by a dermatologist. Quality of life was measured using the Cardiff Acne Disability Index (CADI) questionnaire. Data were analyzed using Spearman's correlation test. Most respondents had mild acne (65.2%) and reported mild impairment in quality of life (51%). The analysis revealed a significant strong positive correlation between acne severity and impairment of quality of life ( $p = 0.000$ ;  $r = 0.764$ ). Increased acne severity was associated with greater impairment of quality of life. These findings indicate that the more severe acne is associated with greater psychological and social disturbances.

**Keywords:** acne vulgaris, medical students, quality of life

**ABSTRAK**

Akne vulgaris (AV) merupakan penyakit inflamasi kronis pada kulit yang sering terjadi pada remaja dan dewasa muda. Mahasiswa kedokteran termasuk kelompok yang rentan mengalami AV akibat tekanan akademik dan stres. Selain dampak fisik, AV juga berdampak pada aspek psikologis dan sosial, yang dapat menurunkan kualitas hidup. Penelitian ini bertujuan untuk mengetahui dan menganalisis hubungan antara derajat keparahan akne vulgaris dengan kualitas hidup mahasiswa Sarjana Kedokteran Universitas Jenderal Achmad Yani (Unjani)

*angkatan 2023. Penelitian ini menggunakan desain analitik dengan pendekatan potong lintang. Sebanyak 66 mahasiswa diambil sebagai sampel melalui teknik consecutive sampling. Derajat keparahan akne vulgaris dinilai berdasarkan foto wajah yang dievaluasi oleh dokter spesialis kulit. Kualitas hidup diukur menggunakan kuesioner Cardiff Acne Disability Index (CADI). Data dianalisis menggunakan uji spearman. Sebagian besar responden mengalami akne ringan (65,2%) dan gangguan kualitas hidup ringan (51%). Analisis menunjukkan hubungan yang signifikan dan kuat antara derajat keparahan akne vulgaris dengan penurunan kualitas hidup ( $p=0,000$ ;  $r=0,764$ ). Tingkat keparahan akne vulgaris berkorelasi positif dan kuat dengan gangguan kualitas hidup. Semakin berat akne yang dialami, semakin tinggi gangguan psikologis dan sosial yang dirasakan.*

*Kata Kunci: akne vulgaris, kualitas hidup, mahasiswa kedokteran*

## INTRODUCTION

Acne vulgaris (AV) is a multifactorial and epidemic chronic inflammatory skin disease.<sup>1</sup> It affects approximately 9.4% of the global population and is the eighth most common skin disease worldwide.<sup>2</sup> The incidence of AV varies across countries and age groups, with approximately 35% to nearly all adolescents experiencing this condition during their lifetime.<sup>3</sup> According to the Global Burden of Diseases study, approximately 85% of individuals aged 12 to 25 years have experienced AV, and the condition persists into adulthood in nearly half of these individuals.<sup>3</sup> According to *Dermatologi Kosmetika Indonesia*, the incidence of AV continues to increase every year.<sup>4</sup> Approximately 95% of male adolescents and 85% of female adolescents experience AV, making it one of the most common reasons for dermatologist consultations.<sup>5</sup>

Acne vulgaris has a multifactorial etiology and is characterized by both non-inflammatory lesions, such as open and closed comedones, and inflammatory lesions, including papules, pustules, and nodules of varying sizes and severity.<sup>6</sup> AV commonly appears on visible areas of the body, such as the face, neck, and back, often resulting in aesthetical concerns.<sup>7</sup> Although its definitive cause remains unknown, AV is influenced by internal factors, including genetics, hormones, and ethnicity, as well as external factors such as diet, stress, environmental exposure, cosmetic use, and certain medications.<sup>8</sup> Four major mechanisms contribute to the development of AV: increased sebum production, hyperproliferation of pilosebaceous follicles, *Cutibacterium acnes* colonization, and inflammation.<sup>9</sup> AV typically develops between 12 and 15 years of age and often becomes more severe between 17 and 21 years of age.<sup>10</sup> During puberty, increased androgen levels enlarge the sebaceous

glands and stimulate sebum production, thereby contributing to the development of AV.<sup>11</sup> Facial AV may lead to psychosocial problems by reducing self-confidence and social comfort, and it may also result in long-term post-inflammatory hyperpigmentation, ultimately affecting quality of life.<sup>12</sup> In 2017, Sampelan et al. reported that among 42 adolescents with AV, 64.3% experienced mild anxiety, 19% experienced moderate anxiety, and 16.7% experienced severe anxiety.<sup>13</sup>

According to the World Health Organization (WHO), quality of life is an individual's perception of their life condition as a whole, affected by cultural contexts, value systems, and their personal goals and aspirations. It is influenced by several domains, including physical health, psychological well-being, social relationships, and the environment.<sup>14</sup> Individuals with acne are affected not only by the physical manifestations of the disease but also the psychological impact associated with the condition. The presence of AV may impact their daily activities and social interactions, affecting their overall quality of life.<sup>15</sup> Healthcare professionals are encouraged to routinely assess patients' psychological well-being and provide counseling regarding potential mental health problems.<sup>16</sup> Quality of life in patients with AV is commonly assessed using evidence-based instruments or scales. The

use of quality of life questionnaires helps medical professionals to evaluate how far AV has impacted the patients' lives, evaluate the effectivity of therapy, and adjust plans for future treatments.<sup>5</sup>

University students are in a transitional stage towards young adulthood, a critical period for physical, emotional, and social development. Medical students, in particular, experience substantial academic demands and heavy workloads, busy schedules, and inadequate sleep, all of which may contribute to stress and adversely affect their mental and social well-being.<sup>17</sup> Evaluating the quality of life of medical students is important for assessing their physical, psychological, and social well-being. Such assessments also provide insight into the impact of AV severity on students' mental and emotional condition.<sup>18</sup> In 2021, Rozana et al. reported no significant correlation between AV severity and quality of life among 57 participants.<sup>19</sup> In contrast, in 2024, Sutrisno et al. reported a significant correlation between AV severity and quality of life.<sup>20</sup> Based on these previous findings, this study aimed to determine the correlation between AV severity and the quality of life among undergraduate medical students from the Class of 2023 at the Faculty of Medicine, Jenderal Achmad Yani University.

## **MATERIALS AND METHODS**

This was an analytic cross-sectional study, in which the variables were observed and evaluated at a single point in time.<sup>21</sup> The subjects were 66 undergraduate medical students from the Class of 2023 at the Faculty of Medicine, Jenderal Achmad Yani University. The subjects were selected using non-probability sampling, specifically consecutive sampling, which involved all individuals who met the study criteria, resulting in a sample that was representative of the target population. The inclusion criteria were as follows:

1. Active undergraduate medical students from the Class of 2023 at the Faculty of Medicine, Jenderal Achmad Yani University.
2. Willing to participate in the study and provide written informed consent.
3. Diagnosed with acne vulgaris.

The exclusion criteria were as follows:

1. Having other facial skin conditions besides AV.
2. Currently taking or having a history of psychiatric medication use.

The study consisted of two variables: the severity of AV as the independent variable and the quality of life as the dependent variable.

The severity of AV was determined based on visible inflammatory skin manifestations and was diagnosed by a

dermatovenereologist. The severity was classified into three categories according to Lehmann's criteria:<sup>9</sup>

1. Mild AV: <20 comedones, or <15 inflammatory lesions, or <30 total lesions.
2. Moderate AV: 20-100 comedones, or 15-50 inflammatory lesions, or 30-125 total lesions.
3. Severe AV: >100 comedones, or >5 cysts, or >50 inflammatory lesions, or >125 total lesions.

Quality of life was assessed using the Cardiff Acne Disability Index (CADI) questionnaire, which evaluates psychological, social, emotional and daily activity domains. The scores were categorized as follows:

1. 0: No impairment in quality of life.
2. 1: Mild quality of life.
3. 2: Moderate impairment in quality of life.
4. 3: Severe impairment in quality of life.

The study began with the preparation phase, which included submitting the research proposal, preparing the questionnaire, and obtaining the ethical approval. Participants were then recruited according to the study criteria and provided written informed consent before participation. After informed consent was obtained, the respondents completed the CADI questionnaire, and facial photographs were taken for evaluation by a

dermatovenereologist to determine the severity of AV. After data collection was completed, all data collection was compiled and analyzed using SPSS version 26. Univariate analysis was performed to describe the distribution of the variables, while Spearman’s rank correlation test was used for bivariate analysis to evaluate the correlation between AV severity and quality of life.

This study received ethical approval from the Ethics Committee of the Faculty of Medicine, Jenderal Achmad Yani University (Approval No. 016/UM1.03/2025). All participants provided written informed consent after receiving information regarding the study objectives, benefits, potential discomforts, and confidentiality. Participation was voluntary, and no coercion was involved. The study was conducted at Jenderal Achmad Yani University, Cimahi, from February to April 2025.

**RESULTS AND DISCUSSION**

This study involved 66 respondents. The respondents’ characteristics, including age and sex, were analyzed as baseline characteristic for examining correlation between AV severity and quality of life, as shown in Table 1.

**Table 1** Respondent characteristics

| Characteristic | Number | Percentage |
|----------------|--------|------------|
| Age            |        |            |
| 19 years       | 22     | 33.3%      |
| 20 years       | 38     | 57.6%      |
| 21 years       | 6      | 9.1%       |
| Sex            |        |            |
| Male           | 8      | 12.1%      |
| Female         | 58     | 87.9%      |

Most respondents were 20 years old (57.6%) and the majority were female (87.9%). During puberty, circulating androgen hormones increase significantly. This stimulates hypertrophy and hyperplasia of the sebaceous glands, leading to increased sebum production and contributing to the high prevalence of AV among adolescent and young adults.<sup>22</sup>

Regarding acne severity, most respondents had mild AV (Figure 1), followed by experienced moderate AV (Figure 2), whereas only one respondent had severe AV (Table 2). These findings are consistent with those of Sutrisno et al. (2024), who reported that most medical students at Muhammadiyah University Surabaya had mild AV (80%).<sup>20</sup> Similarly, Sebayang (2022), reported that most respondents had mild AV (71.7%).<sup>21</sup>



**Figure 1** Respondent with Mild acne vulgaris.



**Figure 2** Respondent with moderate acne vulgaris.

**Table 2** Distribution of acne vulgaris severity

| Degree of Severity | Male | Female | Total      |
|--------------------|------|--------|------------|
| Mild               | 5    | 38     | 43 (65.2%) |
| Moderate           | 2    | 20     | 22 (33.3%) |
| Severe             | 1    | 0      | 1 (1.5%)   |

The distribution of AV severity among respondents varies across studies because of the complex interaction of multiple biological mechanisms and risk factors. Biologically, the process involves clogged pores caused by excessive sebum

production and dead skin cells. Inside these clogged pores, *Cutibacterium acnes* may multiply, colonize, and trigger inflammation in the skin.<sup>23</sup> This mechanism is then further strengthened by hormonal factors, certain diet patterns, stress, environmental conditions, the use of cosmetics, and consumption of certain drugs that may trigger or worsen the condition.<sup>7</sup>

According to Table 2, most respondents were female, although the only respondent with severe acne was male (Figure 3). Theoretically, the prevalence of AV tends to be higher in males due to androgen hormones. These hormones strongly stimulate the sebaceous glands, and males generally exhibit greater androgen activity, making them more susceptible to more severe AV.<sup>22,24</sup> On the other hand, the higher number of female respondents with AV may be associated with hormonal factors, cosmetic use, and the frequency of facial treatments.<sup>25</sup> Approximately 60 to 70% of women experience worsening acne lesions about one week before menstruation, which is associated with increased progesterone levels during the luteal phase. In addition, the use of cosmetics may also trigger acne, especially if the products are comedogenic, clog pores, and cause formation of acne lesions.<sup>13</sup>

Globally, the prevalence of AV is approximately 25% higher among females than males.<sup>26</sup> According to Zhu et al. (2021), the prevalence was 10,911.8 per 100,000 population among females and 8,727.8 per 100,000 population among males.<sup>26</sup> The Global Burden of Disease Study 2019 also reported that the age-standardized rate (ASR) of AV among females was approximately 1.3 times higher than that of men.<sup>27</sup>

In this study, the only respondent with severe acne was male. This is in line with a previous study by Agarwal et al., who reported that although AV is more prevalent among females, severe acne is more commonly observed among males (23.73%) than females (10.64%).<sup>28</sup> Similarly, Witkam et al. reported in a multiethnic study that males were found to have a stronger association with severe acne during late puberty.<sup>29</sup>



**Figure 3** Respondent with severe acne vulgaris.

Most of the respondents in this study experienced mild impairment in quality of life due to AV, as shown in Table 3.

**Table 3** Frequency distribution of quality of life impairment

| Quality of Life     | Male | Female | Total      |
|---------------------|------|--------|------------|
| No impairment       | 1    | 3      | 4 (6.1%)   |
| Mild impairment     | 3    | 31     | 34 (51.5%) |
| Moderate impairment | 3    | 22     | 25 (37.9%) |
| Severe impairment   | 1    | 2      | 3 (4.5%)   |

This distribution shows that AV affected the quality of life of most medical students, although the majority experienced only mild or moderate impairment. These findings are consistent with those of Sutrisno et al., who reported that most students at Muhammadiyah University Surabaya experienced mild impairment in quality of life (50%).<sup>20</sup> Similarly, Sebayang reported that the majority of medical student respondents experienced mild impairment in quality of life (85%).<sup>21</sup> Morshed et al. stated that AV affects patients not only physically but also psychosocially, particularly among late adolescents and young adults. Quality of life impairment is associated with reduced self-confidence, social anxiety, and decreased comfort in daily activities.<sup>16</sup>

As shown in Table 3, although there were fewer male respondents, the results

indicate that AV impaired the quality of life of both male and female respondents. Female patients may be more vulnerable to psychosocial effects of skin conditions such as AV because of self-perception, societal pressure, and aesthetic standards. Quality of life impairment was also observed among male patients, although to a lesser extent, particularly in those with more severe AV.<sup>1</sup>

Table 4 below shows the CADI score distribution according to respondents' sex. The CADI scores were used to evaluate the impact of AV on quality of life, with higher scores indicating greater impact.

**Table 4** Mean CADI score by sex

| Sex    | N  | Mean | SD   | Min | Max |
|--------|----|------|------|-----|-----|
| Male   | 8  | 6.63 | 4.37 | 0   | 14  |
| Female | 58 | 5.09 | 2.88 | 0   | 12  |
| Total  | 66 | 5.27 | 3.10 | 0   | 14  |

Compared to male respondents, female respondents had a lower mean CADI score and a narrower distribution of scores, indicating that although there were more female respondents, their perceived impact of AV on quality of life was relatively more consistent and generally less severe. Among the 66 respondents, the overall mean CADI score was 5.27 with 3.10 SD, indicating that AV generally had a moderate impact on quality of life, although the severity of impairment varied among individuals, with CADI scores ranging from 0 to 14.

The correlation between AV severity and quality of life was evaluated using bivariate analysis with Spearman's rank correlation test (Table 5).

**Table 5** Correlation between acne vulgaris severity and quality of life

| Variable               | Correlation Coefficient | P-value |
|------------------------|-------------------------|---------|
| Acne vulgaris severity | 0.764                   | 0.000   |

The results showed that the p-value was lower than the level of significance ( $p\text{ value}=0.000<0.05$ ), indicating a significant correlation between AV severity and the quality of life of undergraduate medical students from the Class of 2023 at Jenderal Achmad Yani University. The correlation coefficient of 0.764 shows a strong correlation as it falls between the 0.600-0.799 ranges. This positive coefficient indicates that the correlation between both variables is linear. This finding suggests that greater AV severity was associated with greater impairment in quality of life, as reflected by higher CADI scores.

These findings are consistent with those of Dabash et al., who reported a significant correlation between CADI scores and acne severity among medical students.<sup>30</sup> In addition, Morshed et al. also reported that acne is associated with self-esteem and psychological distress. These effects are particularly pronounced among

individuals aged 17–21 years, who are in the process of developing their identity and social relationships.<sup>16</sup> Sebayang's findings also support these results, demonstrating a correlation between AV severity and the quality of life of medical students in UISU in 2018. The study reported a correlation coefficient of 0.933, indicating a strong positive correlation between the two variables.<sup>21</sup>

The correlation between AV severity and quality of life varied according to the degree of acne severity (Table 6). Among patients with mild AV, there was a weak positive correlation between acne severity and quality of life ( $r = 0.358$ ;  $p = 0.018$ ), indicating that as the severity of the mild acne increased, quality of life tended to decline significantly. In patients with moderate AV, the correlation was stronger ( $r = 0.713$ ;  $p < 0.001$ ), suggesting that increasing AV severity had greater impact on quality of life. However, because there was only one case of severe AV, correlation analysis could not be performed for this severity category.

**Table 6** Correlation between acne vulgaris severity and quality of life according to severity category

| Variable               | n  | Correlation Coefficient | P-value |
|------------------------|----|-------------------------|---------|
| Acne vulgaris severity |    |                         |         |
| Mild                   | 43 | 0.358                   | 0.018   |
| Moderate               | 22 | 0.713                   | 0.000   |
| Severe                 | 1  | -                       | -       |

Overall, these findings indicate that as acne severity increased, the impact on patients' quality of life became greater, with the strongest correlation observed among patients with moderate AV.

This study also found a strong and statistically significant correlation between AV severity and quality of life in both female and male respondents. Among female respondents, the correlation coefficient was 0.754 with a  $p$ -value = 0.000, indicating that greater acne severity was associated with greater impairment in quality of life. Among male respondents, the correlation coefficient was even higher, 0.922, with a  $p$ -value = 0.001, indicating a very strong positive correlation between AV severity and quality of life impairment. However, this correlation should be interpreted with caution because only eight of the 66 respondents were male. Therefore, further studies with a more balanced distribution of respondents are recommended.

The limitations of this study include the fact that it only involved undergraduate medical students from the Class of 2023 at the Faculty of Medicine, Jenderal Achmad Yani University, which may limit the generalizability of the findings to a broader population. In addition, other factors that may influence both AV severity and quality of life, such as lifestyle, skin care practices, hormonal disturbances, and genetic factors,

were not evaluated. Furthermore, the cross-sectional design limits the ability to establish a causal relationship between the variables studied.

## CONCLUSION

The majority of the Class of 2023 undergraduate medical students at the Faculty of Medicine, Jenderal Achmad Yani University, had mild acne vulgaris (AV) and mild impairment in quality of life. There was significant positive correlation between the severity of AV and the quality of life impairment. This indicates that the higher AV severity was associated with greater impairment in quality of life.

## CONFLICT OF INTEREST

The authors declare that there were no conflicts of interest related to this research or the preparation of this manuscript.

## ACKNOWLEDGEMENTS

The authors would like to express their sincere gratitude to all individuals and institutions who contributed to the completion of this research and the preparation of this manuscript.

## BIBLIOGRAPHY

1. Ibrahim NK, Nagadi SA, Idrees HJ, Alghanemi LG, Essa RI, Gari WS. Acne vulgaris: prevalence, predictors, and factors influencing quality of life of female medical students at King Abdulaziz University, Jeddah. *J Dermatology Dermatologic Surg.* 2019;23(1):7–12.
2. Vasam M, Korutla S, Bohara RA. Acne vulgaris: A review of the pathophysiology, treatment, and recent nanotechnology based advances. *Biochem Biophys Reports.* 2023;36:101578.
3. Indramaya DM, Umborowati MA, Manuputty AG, Widiatma RR, Lydiawati E, Setyaningrum T. Kualitas hidup pasien dewasa muda dengan akne vulgaris derajat sedang di Indonesia. *Berk Ilmu Kesehatan Kulit Dan Kelamin.* 2019;31(3):110–5.
4. Sibero HT, Anggraini DI. Prevalensi dan gambaran epidemiologi akne vulgaris di Provinsi Lampung. *JK Unila J Kedokt Univ Lampung.* 2019;3(2):308–12.
5. Chernyshov P V, Zouboulis CC, Tomas-Aragones L, Jemec GB, Manolache L, Tzellos T, et al. Quality of life measurement in acne. Position paper of the European Academy of Dermatology and Venereology Task Forces on quality of life and patient oriented outcomes and acne, rosacea and hidradenitis suppurativa. *J Eur Acad*

- Dermatology Venereol. 2018;32(2):194–208.
6. Teresa A. Akne vulgaris dewasa: etiologi, patogenesis dan tatalaksana terkini. J Kedokt Univ Palangka Raya. 2020;8(1):952–64.
  7. Giovanni A, Wasono HA, Sani N, Panonsih RN. Hubungan diet tinggi lemak dengan kejadian akne vulgaris pada siswa SMKN Tanjungsari Lampung. Arter J Ilmu Kesehat. 2020;1(4):313–8.
  8. Sole FRT, Suling PL, Kairupan TS. Hubungan antara mencuci wajah dengan kejadian akne vulgaris pada remaja laki-laki di Manado. e-CliniC. 2020;8(1).
  9. Ilmu Penyakit Kulit dan Kelamin. 7th ed. Universitas Indonesia Publishing; 2021.
  10. Maler T, Suhartina S, Nasution M. Hubungan Antara Indeks Massa Tubuh terhadap Kejadian Akne Vulgaris pada Mahasiswa Kedokteran Universitas Prima Indonesia. J Pendidik Dan Konseling. 2022;4(6):1553–68.
  11. Wulandari R, Pravitasari DN, Indradi R, Putri AN. Analisis Faktor Risiko Akne Vulgaris Pada Pelajar. CoMPHI J Community Med Public Heal Indones J. 2022;3(2):122–9.
  12. Oliviti O, Serena P, Mutia M. The Relationship Between the Severity of Acne Vulgaris and the Quality of Life of Prima Indonesia University Medical Faculty Students. Int J Soc Heal. 2023 Nov 14;2:846–55.
  13. Sampelan MG, Pangemanan D, Kundre R. Hubungan timbulnya acne vulgaris dengan tingkat kecemasan pada remaja di SMP N 1 Likupang Timur. J Keperawatan UNSRAT. 2017;5(1):111202.
  14. World Health Organization (WHO). WHOQOL: Measuring quality of life. 1997;
  15. Zaidhan E, Rahmi KH. Gambaran Kecenderungan Kecemasan Sosial Pada Emerging Adulthood yang Memiliki Permasalahan Acne Vulgaris. J Pendidik Tambusai. 2025 Jun;9(2 SE-Articles of Research):16873–9.
  16. Morshed ASM, Noor T, Uddin Ahmed MA, Mili FS, Ikram S, Rahman M, et al. Understanding the impact of acne vulgaris and associated psychological distress on self-esteem and quality of life via regression modeling with CADI, DLQI, and WHOQoL. Sci Rep. 2023;13(1):21084.
  17. Aziz T, Suryanti S, Ramanda W. Faktor–Faktor yang Berhubungan Dengan Timbulnya Acne Vulgaris Pada Mahasiswi Angkatan 2021 Fakultas Kedokteran Universitas

- Batam. Zo Kedokt Progr Stud Pendidik Dr Univ Batam. 2022;12(1):58–67.
18. Seo EH, Kim S-G, Lee J-H, Dickey CC, Kim MY, Ghumman RK, et al. Psychosocial factors influencing quality of life among medical students. *Psychiatry Investig.* 2023;20(11):1077.
  19. Rozana Y, Rosmaini R. Hubungan Derajat Keparahan Akne Vulgaris Dengan Kualitas Hidup Mahasiswa Fakultas Kedokteran Universitas Baiturrahmah Angkatan 2017. *Baiturrahmah Med J.* 2021;1(2):26–31.
  20. Sutrisno S, R Zhenia Islami W, Yuli Wahyu R, Syafarinah Nur HA. Hubungan Antara Derajat Keparahan Akne Vulgaris dengan Kualitas Hidup Mahasiswa Fakultas Kedokteran Universitas Muhammadiyah Surabaya. *Hub Antara Derajat Keparahan Akne Vulgaris dengan Kualitas Hidup Mhs Fak Kedokt Univ Muhammadiyah Surabaya.* 2024;2(2):1–9.
  21. Sebayang J. Hubungan Tingkat Keparahan Akne Vulgaris dengan Kualitas Hidup pada Mahasiswa dan Mahasiswi FK UISU Angkatan 2018. Fakultas Kedokteran, Universitas Islam Sumatera Utara; 2022.
  22. Meliala AA, Lubis RAS. Hubungan akne vulgaris dengan gejala ansietas pada mahasiswa Fakultas Kedokteran Universitas Muhammadiyah Sumatera Utara. *J pandu husada.* 2020;1(2):101–6.
  23. Ramli R, Malik AS, Hani AFM, Jamil A. Acne analysis, grading and computational assessment methods: an overview. *Ski Res Technol.* 2012;18(1):1–14.
  24. Arora MK, Yadav A, Saini V. Role of hormones in acne vulgaris. *Clin Biochem.* 2011;44(13):1035–40.
  25. Gomarjoyo F, Kartini A, Nuryanto MK. Hubungan Jenis Kelamin, Indeks Massa Tubuh Dan Perawatan Wajah Dengan Derajat Keparahan Akne Vulgaris. *J Kebidanan Mutiara Mahakam.* 2019;7(1):31–40.
  26. Zhu Z, Zheng H, Li J. Global, regional, and national burdens of acne vulgaris in adolescents and young adults aged 10-24 years from 1990 to 2021: a trend analysis. *Br J Dermatol.* 2024;
  27. Magnitude and temporal trend of acne vulgaris burden in 204 countries and territories from 1990 to 2019: an analysis from the Global Burden of Disease Study 2019\*. *Br J Dermatol.* 2022;186(4):673–83.
  28. Agarwal D, Mathur DK, Paliwal V. Psychological Morbidity in Young

- Adults with Acne Vulgaris: A Hospital-based Study. *J Clin Diagnostic Res.* 2023;17(2).
29. Witkam WCAM, Dal Belo SE, Pourhamidi S, Raynaud E, Moreau M, Aguilar L, et al. The epidemiology of acne vulgaris in a multiethnic adolescent population from Rotterdam, the Netherlands: a cross-sectional study. *J Am Acad Dermatol.* 2024;90(3):552–60.
30. Dabash D, Salahat H, Awawdeh S, Hamadani F, Khraim H, Koni AA, et al. Prevalence of acne and its impact on quality of life and practices regarding self-treatment among medical students. *Sci Rep.* 2024;14(1):4351.