The Relationship of Fast Food Consumption Behavior towards Severity of Acne Vulgaris in Male Students

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ABSTRACT

Introduction: Acne vulgaris has the highest prevalent skin disease in the world, with food is one of the most common triggers in adolescents. Availability of fast food has influenced young adults eating pattern. This study aims to determine the relationship between frequency of fast food consumption and severity of acne vulgaris in male students. **Methods:** This cross-sectional study was conducted on 129 male students. Frequency of fast food consumption and severity of acne vulgaris was measured using a modified FFQ questionnaire and GAGS score. Data were processed with STATA and analyzed using Chi-square. **Results:** The result showed that 65.89% male students often consumed fast food and the majority of respondents experienced mild acne vulgaris (55.81%). There was a significant relationship between frequency of fast food consumption and severity of acne vulgaris (p=0.020). **Conclusion:** The results of this study suggest a significant relationship between frequency of fast food consumption and severity of acne vulgaris among male students.

Keywords: Acne vulgaris, fast food, male student.

ABSTRAK

Pendahuluan: Akne vulgaris merupakan penyakit kulit dengan prevalensi tertinggi di dunia, dengan makanan sebagai salah satu faktor umum penyebab akne vulgaris pada dewasa muda. Kehadiran makanan cepat saji dapat memengaruhi pola makan pria dewasa muda. Penelitian ini bertujuan untuk mengetahui hubungan frekuensi konsumsi makanan cepat saji dengan derajat keparahan akne vulgaris pada mahasiswa. **Metode**: Penelitian *cross-sectional* dengan sampel 129 mahasiswa. Frekuensi konsumsi makanan cepat saji dan derajat keparahan akne vulgaris diukur menggunakan kuesioner FFQ termodifikasi dan skor GAGS. Data diolah secara statistik menggunakan instrumen STATA dan analisis bivariat menggunakan metode *Chi-square*. **Hasil**: Hasil penelitian menunjukkan 65,89% responden sering mengonsumsi makanan cepat saji dan mayoritas responden mengalami akne vulgaris derajat ringan sebesar 55,81%. Terdapat hubungan bermakna antara frekuensi konsumsi makanan cepat saji terhadap derajat keparahan akne vulgaris (p= 0,020). **Simpulan**: Hasil penelitian ini menunjukkan adanya hubungan yang signifikan antara frekuensi konsumsi makanan cepat saji dan tingkat keparahan jerawat vulgaris di kalangan mahasiswa pria. **Mariani Santosa, Cindy Anastasia, Robi Irawan, Lonah, Yuliana, Erwin Yantho. Hubungan Perilaku Konsumsi Makanan Cepat Saji terhadap Tingkat Keparahan Akne Vulgaris pada Mahasiswa Pria.**

Kata Kunci: Akne vulgaris, makanan cepat saji, mahasiswa pria.

Introduction

Acne vulgaris (AV) is a self-limiting chronic inflammatory condition of pilosebaceous unit, characterized by comedones, papules, pustules, and nodules with varying degrees of severity.[1] Cause of AV is the activity of *Cutibacterium acnes*, influenced by dehydroepiandrosterone (DHEA) hormone, especially in adolescence. While commonly occurring on the face, AV can also manifest on the upper arms, torso, and back.[2]

According to the Global Burden of Disease (GBD) study, the worldwide global prevalence of acne vulgaris is 9.4%, ranking as the eighth highest prevalent skin diseases globally. The highest prevalence, reaching 85%, was among adolescents aged 12–25 years.[3] Among females, the highest prevalence of acne vulgaris occurs in the age group of 14–17 years, with a prevalence of 83%–85%, and among males in age 16–19 years with the prevalence of 95%–100%.[4] Based on study in Cosmetic Medicine Division of the URJ Skin and Genital Health RSUD Dr. Soetomo, hormonal factors and cosmetics are the most common triggers for acne vulgaris in women, while stress and diet are the predominant triggers for acne vulgaris in men.[5]

Among factors that can worsen acne vulgaris is the consumption of high-glycemic foods, such as dairy products, fast food, and chocolate, leading to an increase in growth

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factors like insulin that stimulate epidermal follicular hyperproliferation.[2] Fast food contains relatively high calories, fat, protein, sugar, and salt, while being low in fiber.[6] Fast food typically contains saturated fats, making it high in cholesterol.[7] According to Wasitaatmadja, S. (2011), the consumption of high-cholesterol foods can stimulate sebum production, leading to an increase in comedogenic and inflammatory elements, the formation of free fatty acid fractions triggering inflammation, and sebum resistance that may result in acne. Additionally, the sugar content in fast food is one of the factors that can influence the level of IGF-1 in blood, affecting sebaceous gland growth, and increase lipid production, hence enhance acne through the induction of keratinocyte proliferation and epidermal hyperplasia.[8] The presence of fast food in the Indonesian food industry can influence the eating habits of teenagers.[6]

Based on the study conducted by Rahma (2018) on students at SMA Negeri 6 Makassar, there was no significant correlation found between the consumption of fast food and the occurrence of acne vulgaris.[9] However, study conducted by Nur (2018) on students at SMA Negeri 19 Makassar revealed a significant correlation between the consumption of fast food and the occurrence of acne vulgaris.[10] Both studies differed in terms of exclusion criteria for respondents. In the study on SMA Negeri 19 Makassar, a family history of acne vulgaris was excluded, which might influence genetic factors, one of the triggers for acne vulgaris. This study remains controversial, given that acne vulgaris is also multifactorial.

The widespread prevalence of fast food in Indonesia, influencing the eating habits of adolescents in this modern era, can trigger the onset of acne, especially in teenagers. The high incidence of acne vulgaris in adolescent males and the continuous rise in fast food consumption serve as reasons why researchers are interested in examining the correlation between the frequency of fast food consumption and the severity of acne vulgaris in male students. This study is unique as it focused on students who enjoyed consuming fast food. The high prevalence of acne vulgaris in adolescent males was the primary characteristic of this study. This fact is reinforced by the lack of studies on the relationship between fast food consumption and the severity of acne vulgaris in adolescent males in Indonesia. The severity of acne vulgaris is measured using The Global Acne Grading System (GAGS), while a modified Food Frequency Questionnaire (FFQ) is utilized to assess the frequency of fast food consumption.

Methods

This study was a cross-sectional study. The data were collected in August to October 2023 in Fakultas Kedokteran dan Ilmu Kesehatan (FKIK) Unika Atma Jaya. The sample was male students from School of Medicine and Health Science Atma Jaya Catholic University of Indonesia who met the inclusion criteria. Data was collected using Google Forms for demographic questionnaires and a modified FFQ questionnaire. The study then proceeded with face-to-face meetings to capture photos of acne lesions on the face, chest, and/or back of students, followed by scoring based on the GAGS.[11] An ethical clearance agreement has been obtained from the ethics commissions of the School of Medicine and Health Sciences at Atma Jaya Catholic University of Indonesia, with number 03/05/KEP-FKIKUAJ/2023.

This study was conducted on 129 respondents. The collected data were analyzed through univariate and bivariate analyses using the STATA statistical data processing tool. Univariate analysis aimed to describe each variable in the form of frequency distribution tables. Bivariate analysis is conducted using Chi-Square test to determine whether there was a significant relationship between the frequency of fast food consumption and the severity of acne vulgaris.

Results

The total respondents were 129 male students with age ranging between 18 to 20 years old, with the majority being 18 years old (**Table 1**).

The results showed that 37 students (28.68%) had no acne vulgaris, 72 students (55.81%) had mild severity, and 20 students (15.50%) had moderate severity (**Figure**). No students were found with severe acne vulgaris lesions. Based on the modified FFQ questionnaire, most respondents consumed fast food frequently (>2 x/week), totaling 85 students (65.89%), while those who did not frequently consume fast food were 44 students (34.11%).

The results of this study suggested there was an association between acne vulgaris and the consumption of fast food. Fast food with a high glycemic index and fat content will trigger insulin hormone secretion and Insulin Growth Factor 1 (IGF-1) synthesis. High levels of the insulin hormone will increase the activity of the pilosebaceous glands to produce sebum and if there is a blockage in the follicles it can trigger acne vulgaris.[12] Meanwhile, plasma IGF-1 will stimulate follicular epithelial growth and keratinization which is related to the severity of acne vulgaris.[13]

There was a significant relationship between the frequency of fast food consumption and the severity of acne vulgaris (p=0.020) **(Table 2).**

Discussion

This study was conducted on 129 male students, with the majority aged 18 years old (55.80%), and 65.89% respondents consumed fast food frequently. The majority

Table 1. Characteristics of subjects.

Characteristics	Frequency (n)	Percentage (%)
Age (Years)		
18	72	55.80
19	41	31.80
20	16	12.40
Fast Food Consumption		
Once or twice per week	44	34.11
More than twice per week	85	65.89
Acne Vulgaris		
No lesion	37	28.68
Mild lesion	72	55.81
Moderate lesion	20	15.50

Figure. Severity of acne vulgaris.

No Lesion | Mild Lesion | Moderate Lesion

Table 2. Relationship of fast food consumption behavior towards severity of acne vulgaris in male students.

	Severity of Acne Vulgaris							
	No Lesion		Mild Lesion		Moderate Lesion			
Fast Food Consumption	n	%	n	%	n	%	Total	p value
Once or twice per week	7	15.91	26	59.09	11	25.00	44	0.020*
More than twice per week	30	35.29	46	54.12	9	10.59	85	0.020*
Total	37	28.68	72	55.81	20	15.50	129	0.020*

of respondents (55.81%) had mild acne vulgaris lesions. These results aligned with the study conducted by Syahputra, *et al*, on UISU Medical Faculty students, the majority of respondents had mild acne vulgaris, and there was a correlation between dietary habits and acne vulgaris.[14] These results were also coherent with the study by Fajri, *et al*, which proved that fast food consumption behavior is related to the severity of acne vulgaris among students.[12] Additionally, previous study by Afnanita, *et al*,[15] also showed that poor dietary habits influenced the occurrence of acne vulgaris, with mild severity as the majority, consistent with this study.

The results of the bivariate analysis indicate a significant relationship between the frequency of fast food consumption and the severity of acne vulgaris (p=0.02). This result aligned with the study conducted by Nur (2018) on students at SMA Negeri 19 Makassar, which showed a significant relationship between fast food consumption and the occurrence of acne vulgaris.[11] This is also in line with the findings of Melnik (2015), which associates key components of fast food with the occurrence of acne vulgaris.[16]

Food is one of the factors that can increase sebum levels on the skin, especially foods high in fat, carbohydrates, and sugar.[12] Generally, fast food contains high calories, fat, sugar, and sodium (Na) but is low in nutrition, vitamins, and minerals.[17] Excessive consumption of fast food will increase free radicals, leading to excess oil production in the skin. This condition should be countered by sufficient intake of vitamin A and vitamin C.[12] High levels of fat and sugar will stimulate insulin hormone, triggering a decrease in blood glucose. Increased insulin levels will enhance the secretion of Insulin Growth Factor 1 (IGF-1), which can elevate androgen levels, sebum secretion, and hyperkeratosis of hair follicles in sebaceous glands, affecting lipid excretion, thereby inducing or worsening acne.[18] Physiologically, sebaceous glands lubricate the skin and eliminate dead skin cells, but excessive production can clog pores. Additionally, increased sebum production can lead to blockage of facial pores, triggering an inflammatory process.[12]

The results are not consistent with the study conducted by Eka, which found no significant relationship between fast food consumption and the occurrence of acne vulgaris in students at FK USU 2007.[19] The difference in results was because the study was dominated by female respondents who could be influenced by hormonal conditions.[20] Androgens have an essential role in the formation of acne lesions, while estrogens have the opposite effect in inhibiting androgen secretion. The activity of the sebaceous glands is highly dependent on the androgen/estrogen ratio. Around 60%-70% women will experience worsening acne lesions during the premenstrual period, as well as during premenopause, pregnancy, and the use of progestin-containing contraceptives. During this period, there is a relative increase in androgen hormones, the activity of which becomes greater as compared to estradiol.[21]

The result of this bivariate analysis also contradict the findings of a previous study conducted by Rahma Yanti (2018). This discrepancy may be attributed by the uneven distribution of male and female respondents in Rahma's study, with a smaller number of male respondents compared to female.[9] The inconsistency between these two studies may be attributed by the presence of cosmetics and hormonal instability during menstruation in female respondents, which has been proven to be the most significant factors triggering acne vulgaris in women.[5]

There were still limitations in this study, such as exclusion of stress factor, which was also one of the most significant factors triggering acne vulgaris in males. Respondents might fill the questionnaires based on the memory of their fast food consumption, which might lead to study bias.

Conclusion

The results of our study suggest a significant relationship between frequency of fast food consumption and severity of acne vulgaris among male students. These results may support the hypothesis that foods with high sugar and fat content can trigger fluctuations of androgen and insulin, resulting in increased sebum production as one of acne causing factors. Future study should exclude the factor of stress, as it is also one of the most significant


triggers of acne vulgaris in males.

REFERENCES

1. Zaenglein AL, Graber EM, Thiboutot DM. Ch. 80. Acne vulgaris and acneiform eruptions. In: Goldsmith LA, Katz Gilchrest BA, Paller AS, Leffell DJ, Wolff K, editors. Fitzpatrick's dermatology in general medicine, 8e. McGraw Hill; 2012.
2. Sutaria AH, Masood S, Schlessinger J. Acne vulgaris. StatPearls [Internet]. 2022 Jan. Available from: https://www.ncbi.nlm.nih.gov/books/NBK459173/.
3. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C, Ezzati M, et al. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012;380(9859):2163-96. DOI:10.1016/S0140-6736(12)61729-2).
4. Afriyanti RN. Akne vulgaris pada remaja. J Majority [Internet]. 2015 [cited 2022 Aug 6];4(5). Available from: https://juke.kedokteran.unila.ac.id/index.php/majority/article/view/616.
5. Ayudianti P, Indramaya DM. Retrospective study: Factors aggravating acne vulgaris. J Berkala Ilmu Kes Kulit Kelamin. 2014;26(1):41–7.
6. Widyastuti DA. Pengaruh kebiasaan konsumsi junk food terhadap kejadian obesitas remaja [Internet]. 2018. Available from: osf.io/7d8ey.
7. Kementerian Kesehatan. Hindari makanan tinggi kolesterol - Penyakit tidak menular Indonesia [Internet]. Available from: https://p2ptm.kemkes.go.id/tag/hindari-makanan-tinggi-kolesterol .
8. HMIG UNDIP. Giziklopedia; 2022
9. Yanti Rahman R. Hubungan makanan cepat saji terhadap timbulnya acne vulgaris di SMAN 6 Makassar. Universitas Muhammadiyah Makassar [Internet]. 2018. Available from: https://digilibadmin.unismuh.ac.id/upload/5520-Full_Text.pdf
10. Fitri Syam N. Hubungan makanan cepat saji terhadap timbulnya acne vulgaris di SMA Negeri 19 Makassar. Universitas Muhammadiyah Makassar [Internet]. 2018. Available from: https://digilibadmin.unismuh.ac.id/upload/7927-Full_Text.pdf.
11. Adityan B, Kumari R, Thappa DM. Scoring systems in acne vulgaris. Indian J Dermatol Venereol Leprol. 2009;75(3):323–6. DOI: 10.4103/0378-6323.51258.
12. Fajri L, Minerva P. The relationship of fast food towards the event of acne vulgaris in students. Internat J Natural Sci Engineering. 2022;6(2):55–63. DOI: 10.23887/ijnse.v6i2.51640.
13. Bajelan A, Ghaebi M, Javadi M, Barikani A, Beheshti A, Bargahi M, et al. The association between the incidence of acne vulgaris and lifestyle factors including dietary habits, physical activity, and bathing frequency. J Skin Stem Cell. 2021;7(3):e114161. DOI: 10.5812/jssc.114161.
14. Syahputra A, Anggreni S, Handayani DY, Rahmadhani M. Pengaruh makanan akibat timbulnya acne vulgaris (jerawat) pada mahasiswa mahasiswi FK UISU tahun 2020. J Kedokt STM [Internet]. 2021;4(2):75–82. DOI: 10.30743/stm.v4i2.62.
15. Afnanita S, Nola S, Mardalena E. Faktor-faktor yang mempengaruhi timbulnya acne vulgaris pada remaja remaja santri pesantren Babun Najah. JKT. 2023;27;4(3):3144-51. DOI: 10.31004/jkt.v4i3.17274.
16. Melnik BC. Linking diet to acne metabolomics, inflammation, and comedogenesis: An update. Clinical, Cosmet Investig Dermatol. 2015;8:371–88. DOI: 10.2147/CCID.S69135.
17. Sinaga L. Pengaruh pola konsumsi makanan cepat saji terhadap kadar kolesterol siswa kelas XI SMA Negeri 8 dan SMA Pangudi Luhur Yogyakarta. Sanata Dharma University; 2016.
18. Yang J, Yang H, Xu A, He L. A review of advancement on influencing factors of acne: An emphasis on environment characteristics. Front Public Health 2020;8:450. DOI: 10.3389/fpubh.2020.00450.
19. Eka Parda Bancin B. Hubungan konsumsi makanan cepat saji terhadap kejadian akne vulgaris pada mahasiswa FK USU Stambuk 2007 [Internet]. 2010. Available from: https://123dok.com/document/nzwv21lq-hubungan-konsumsi-makanan-terhadap-kejadian-vulgaris-mahasiswa-stambuk.html.
20. Borzyszkowska D, Niedzielska M, Kozłowski M, Brodowska A, Przepiera A, Malczyk-Matysiak K, et al. Evaluation of hormonal factors in acne vulgaris and the course of acne vulgaris treatment with contraceptive-based therapies in young adult women. Cells 2022;11(24):4078. DOI: 10.3390/cells11244078.
21. Bagatin E, Freitas THP, Rivitti-Machado MC, Machado MCR, Ribeiro BM, Nunes S, et al. Adult female acne: A guide to clinical practice. Anais brasileiros de dermatologia. 2019;94(1):62–75. DOI: 10.1590/abd1806-4841.20198203.