

The Association Between Refined Carbohydrate Intake, Acne Severity, And Quality Of Life Among IIUM Students: A Cross-sectional Study

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ABSTRACT

Background: Acne vulgaris is a common skin condition affecting adolescents and young adults. Recent interest has grown around the role of diet, particularly refined carbohydrates in acne development. However, evidence remains mixed, and the psychosocial burden of acne is often underexplored. This study aimed to determine the pattern of refined carbohydrate intake among IIUM students, examine its association with acne severity, and assess the relationship between acne severity and quality of life. **Methods:** A cross-sectional study was conducted among IIUM undergraduate students using a self-administered questionnaire that assessed dietary intake, acne severity, and quality of life. Refined carbohydrate intake was analysed through food frequency data. Correlations between refined carbohydrate intake, acne severity, and quality of life were assessed using Pearson's correlation coefficient. **Results:** The mean daily intake of refined carbohydrates among participants was high (292.45 ± 220.35 g/day), with sugar and rice being the main contributors. However, no significant association was found between refined carbohydrate intake and acne severity. In contrast, acne severity showed a significant negative correlation with all domains of quality of life, including self-perception ($r = -0.456$), role-emotional ($r = -0.454$), role-social ($r = -0.369$), and acne symptoms ($r = -0.602$) with $p < 0.001$. **Conclusion:** While no link was found between refined carbohydrate intake and acne severity, the results highlight the strong impact of acne on quality of life among university students. This suggests a need for more holistic acne management strategies that address both physical and psychological aspects.

Keywords:

Acne vulgaris; refined carbohydrates; acne; quality of life; students

INTRODUCTION

Acne vulgaris is one of the most common chronic inflammatory skin conditions, primarily affecting adolescents and young adults. Although it is not life-threatening, acne can have a significant impact on appearance, self-esteem, and psychosocial well-being. In many cases, individuals with acne experience emotional distress, low self-confidence, and social withdrawal, making it not only a dermatological concern but also a condition that affects overall quality of life (Alasbi et al., 2021; Lim et al., 2022).

The etiology of acne is multifactorial, involving genetics, hormonal regulation, environmental exposures, and lifestyle factors (Rygula et al., 2024). Among the modifiable factors, diet has received increasing attention, particularly the role of high-glycemic and refined carbohydrate foods such as rice, bread, noodles, and sugar-sweetened

beverages. Refined carbohydrates are a type of carbohydrate that undergoes extensive processing, resulting in the removal of their natural fiber, vitamins, and minerals (Joshua, 2024). These foods may influence acne pathogenesis through their impact on insulin and insulin-like growth factor-1 (IGF-1) levels, leading to increased sebum production, hyperkeratinization, and inflammation (Christ et al., 2019; Melnik, 2015). However, evidence remains mixed. Some studies have reported a significant association between high refined carbohydrate intake and greater acne severity (Aslam et al., 2025; Roengritthidet et al., 2021), while others have found no clear link (Suppiah et al., 2018).

Beyond its dermatological effects, acne has been shown to adversely affect mental health and social functioning. Students with acne often report difficulties with self-perception, emotional stability, and social interactions, with more severe acne linked to poorer quality of life (Tasneem et al., 2023; Duru & Örsal, 2021). University

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students may be particularly vulnerable due to their transition into adulthood, exposure to academic and social pressures, and frequent consumption of carbohydrate-rich convenience foods (Pop et al., 2021; Cheng & Wong, 2021). In Malaysia, rice and sugar remain dietary staples (Ali Zainuddin et al., 2014), which may increase the relevance of exploring how refined carbohydrate intake interacts with acne severity and quality of life among students.

Despite growing research internationally, there is still limited evidence in Malaysia that simultaneously examines dietary patterns, acne severity, and their psychosocial consequences among young adults. Understanding these relationships is crucial for developing more effective, holistic strategies for acne prevention and management that address both physical and psychological aspects.

Therefore, this study aimed to identify refined carbohydrate intake among IIUM students, examine the association between refined carbohydrate intake and acne severity, and determine the relationship between acne severity and quality of life.

MATERIALS AND METHODS

This was a cross-sectional study among 377 undergraduate students from IIUM (Gombak, Kuantan, and Pagoh). The sample size was based on Krejcie and Morgan (1970), and convenience sampling was used.

Data Collection Instruments

Data were gathered through a self-administered online questionnaire consisting of four sections:

1. Sociodemographic characteristic - age, gender, kulliyah, campus, and year of study.
2. Refined carbohydrate intake - assessed using a modified Food Frequency Questionnaire (FFQ) adapted from the Malaysian Adult Nutrition Survey 2014 (MANS), which included common local carbohydrate sources such as rice, bread, noodles, and sugar-sweetened beverages. Mean daily intake (grams/day) was calculated using standard conversion factors (Norimah, et al., 2008).
3. Acne severity - evaluated using the Global Acne Grading System (GAGS), which scores acne lesions across six anatomical regions (forehead, cheeks, nose, chin, chest, and upper back). Scores range from 0 (none) to >39 (very severe), and severity is categorised as mild, moderate, severe, or very severe (Gorelick et al., 2015).
4. Quality of life - assessed using the Acne-Specific Quality of Life (Acne-QoL) scale, which comprises four domains: self-perception, role-emotional, role-social, and acne symptoms. Items were scored on a 7-point Likert scale,

with higher scores indicating less impairment (Gupta, 1998).

Ethical Approval

Ethical approval was obtained from the IIUM Research Ethics Committee (IREC 2025-KAHS/DNS17).

Statistical Analysis

Data was analyzed using SPSS Version 29. Descriptive statistics were used for sociodemographic data, refined carbohydrate intake, acne severity, and quality of life scores. Spearman's correlation test was used to examine associations between refined carbohydrate intake, acne severity, and quality of life. A p-value of <0.05 was considered statistically significant.

RESULTS

Sociodemographic Characteristics

A total of 377 students participated in this study. The majority were female (82.5%), Malay (98.4%), and aged between 21–23 years. Most participants were from the Kuantan campus (64.7%). The sociodemographic characteristics of the respondents are presented in Table 1.

Table 1: Sociodemographic Characteristics Of Respondents

Sociodemographic Variables	Frequency	n (%)
Gender		
Male	66	17.5
Female	311	82.5
Age		
18-20	96	25.5
21-23	268	71.1
>24	13	3.5
Race		
Malay	371	98.4
Indian	1	0.3
Chinese	2	0.5
Others	3	0.8
Campus		
Gombak	106	28.1
Kuantan	244	64.7
Pagoh	27	7.2
Year		
1	99	26.3
2	118	31.3
3	133	35.3
4	26	6.9
5	1	0.3

Refined Carbohydrate Consumption

The distribution of refined carbohydrate intake is shown in Table 2. The mean daily intake of refined carbohydrates among participants was 292.45 ± 220.35 g/day. Rice contributed the highest proportion (119.52 ± 87.63 g/day), followed by sugar (104.45 ± 156.39 g/day), bread, roti canai, noodles, pasta, and cereal.

Table 2: Refined Carbohydrate Intake among Respondents

Food items	Mean \pm SD
Rice	119.52 \pm 87.63
Porridge	15.36 \pm 41.62
Noodle	6.12 \pm 8.31
Pasta	1.20 \pm 2.23
Bread	26.80 \pm 58.55
Roti Canai	14.70 \pm 29.08
Cereal	3.70 \pm 15.13
Sugar	104.45 \pm 156.39
Total CHO	292.45 \pm 220.35

Acne Severity

The distribution of acne severity is shown in Table 3. Based on the Global Acne Grading System (GAGS), 80.6% of the students had mild acne, 13.5% had moderate acne, 5.6% had no acne, and only one student (0.3%) had severe acne.

Table 3: Distribution of acne severity among respondents

Food items	N (%)
None	21 (5.57)
Mild	304 (80.64)
Moderate	51 (13.53)
Severe	1 (0.26)
Very Severe	0

Quality of Life

The mean total quality of life (QoL) score was 78.44 ± 27.49 . Among the four domains, acne symptoms and self-perception were the most affected. The results are presented in Table 4.

Table 4: Quality of life by domain

Domain	Mean \pm SD
Self-perception	19.91 \pm 8.72
Role-social	19.91 \pm 8.72
Role-emotional	17.92 \pm 6.73
Acne-symptoms	20.90 \pm 5.63
Mean of Total Score	78.44 \pm 27.49

Association Between Refined Carbohydrate and Acne Severity

The correlation analysis is presented in Table 5. There was no significant correlation between refined carbohydrate intake and acne severity (p -value < 0.05).

Table 5: Correlation and significance value between refined carbohydrate intake and acne severity

Food items	R	p-value (< 0.05)
Rice	0.016	0.753
Porridge	0.74	0.151
Noodle	0.072	0.163
Pasta	-0.005	0.916
Bread	0.082	0.111
Roti Canai	0.081	0.114
Cereal	0.016	0.751
Sugar	0.079	0.127

Association Between Acne Severity and Quality of Life

Acne severity was significantly negatively correlated with all QoL domains: self-perception ($r = -0.456$), role-emotional ($r = -0.454$), role-social ($r = -0.369$), and acne symptoms ($r = -0.602$), with all p -values < 0.001 . These results are shown in Table 6.

Table 6: Correlation of acne severity and quality of life

Aspects	r	p-value (< 0.05)
Self-perception	-0.456	0.0001
Role-emotional	-0.454	0.0001
Role-social	-0.369	0.0001
Acne symptoms	-0.602	0.0001

DISCUSSION

Refined Carbohydrate Consumption and Acne Severity

The mean daily intake of refined carbohydrates among students was found to be high, with rice and sugar contributing the largest proportion. This finding is in line with the Malaysian Adult Nutrition Survey (MANS) 2014, which reported rice as the most frequently consumed staple food among Malaysian adults, with an average intake of almost 298 g/day (Ali Zainuddin et al., 2014). This reflects the cultural and dietary context in Malaysia, where rice is considered the main source of energy in daily meals.

Despite this high intake, no significant association was found between refined carbohydrate consumption and acne severity in this study. This aligns with the findings of Suppiah et al. (2018), who reported no significant associations between acne severity and the intake of sweets, fried snacks, ice cream, or sugar-sweetened beverages among Malaysian young adults. These results

suggest that refined carbohydrate intake alone may not be a strong predictor of acne development or severity, at least within this population.

However, contrasting evidence exists. A recent study by Aslam et al. (2025) demonstrated that participants with higher intakes of refined carbohydrates and sugary foods had greater acne prevalence. The proposed mechanism is that high-glycemic diets may increase insulin and insulin-like growth factor-1 (IGF-1) activity, which in turn stimulates androgen production, enhances sebum secretion, and promotes inflammation, all of which are key factors in acne pathophysiology (Melnik, 2015; Christ et al., 2019). Such discrepancies across studies may be attributed to variations in dietary assessment methods, differences in sample size and population characteristics, or genetic and hormonal factors that influence acne expression.

Although no relationship between refined carbohydrate intake and acne severity was observed in this study, the consistently high intake of refined carbohydrates remains a concern for other health outcomes. Evidence has shown that diets high in refined carbohydrates increase the risk of obesity, metabolic syndrome, insulin resistance, and type 2 diabetes (Mahzari & Mamun, 2020; Clemente-Suárez et al., 2022). Therefore, from a public health perspective, interventions promoting balanced diets with reduced refined carbohydrate consumption are still essential among university students.

Acne Severity and Quality of Life

A finding of this study was a significant negative correlation between acne severity and all quality-of-life domains, including self-perception, role-emotional, role-social, and acne symptoms. Students with more severe acne reported substantially lower quality-of-life scores, suggesting that acne exerts a broad psychosocial impact. The strongest effects were seen in the domains of self-perception and acne symptoms, highlighting the personal and visible nature of acne as a condition that directly affects confidence and self-image.

These results are consistent with previous studies across different cultural settings. Tasneem et al. (2023) reported that increasing acne severity was associated with heightened psychological distress and depressive symptoms among young adults. Similarly, Duru and Örsal (2021) and Nandy and Shrivastava (2024) emphasized the negative influence of acne on self-esteem, emotional well-being, and social participation. Together, these findings confirm that acne is not only a dermatological problem but

also a condition that significantly influences mental health, social functioning, and overall well-being.

For university students, these effects may be particularly pronounced. Young adulthood is a critical period marked by academic pressures, social interactions, and identity formation. Acne during this stage may interfere with confidence in academic or professional settings, reduce social participation, and contribute to anxiety or depressive symptoms. These psychosocial burdens underline the importance of adopting a holistic approach to acne management that extends beyond pharmacological or topical treatments. Incorporating psychological counseling, peer support, or mental health services may help address the emotional and social challenges faced by students with acne.

Strengths and Limitations

This study adds to the limited Malaysian data exploring both dietary intake and quality of life in relation to acne. The use of validated tools, such as the Global Acne Grading System and Acne-QoL scale, strengthens the reliability of the findings. However, several limitations should be acknowledged. The cross-sectional design prevents causal inferences, and self-reported dietary intake may be prone to recall bias. Furthermore, the study population consisted mainly of female students from one university, which may limit generalizability to other groups.

CONCLUSION

Refined carbohydrate intake among IIUM students was high, but no significant association was found with acne severity. Acne, however, significantly reduced quality of life, affecting self-perception, emotions, social roles, and symptoms. This study highlights the importance of managing acne holistically by including psychological support, not just treating the physical condition.

ACKNOWLEDGEMENT

The authors would like to thank the Kulliyah of Allied Health Sciences, International Islamic University Malaysia (IIUM), for their support in facilitating this study.

REFERENCES

Alasbi, G. M., Riaz, F., Kidwan, H. N., Zanah Abdullah, Z. A., Ashfaq, T., Ghazwani, E. Y., & Ahmad, R. A. (2021). Impact of acne on quality of life among university students. *World Family Medicine Journal /Middle East Journal of Family Medicine*, 19(2).

- <https://doi.org/10.5742/mewfm.2021.93985>
- Ali Zainuddin, A., Nadzri Jai, A., Baharuddin, A., Mahadir Naidu, B., Ying Ying, C., Siew Man, C., Nordin, F., Hashim, H., Guat Hiong, T., Yi Yi, K., Kuang Hock, L., Kuang Kuay, L., Manickam, M., Azahadi Omar, M., Fadhli Mohd Yusoff, M., Aznuddin Abd Razak, M., Fuad Mohd Anuar, M., Naim Muhammad Rasidi, M., Ani Ahmad, N., ... Aris, T. (2014a): Vol. I. *National Health And Morbidity Survey 2014 : Malaysian Adult Nutrition Survey Volume I Methodology And General Findings Contributors*.
- Ali Zainuddin, A., Nazri Jai, A., Husna Zainudeen, A., Baharudin, A., Mahadir Naidu, B., Ying Ying, C., Siew Man, C., Zhuo Lin, C., Paiwai, F., Nordin, F., Leng Huat, F., Jan Jan Mohamed, H. B., Akmal Abd Hamid, H., Ismail, H., Mat Hassan, H., Mutalip, H., Abu Saad, H., Tee Guat Hiong, H., Sulaiman, J., ... Kaur, J. (2014). National Health and Morbidity Survey 2014b: Vol. II Survey Findings. In *National Health and Morbidity Survey*.
- Aslam, M. B., Hafeez, M. A., & Khan, I. U. D. (2025). Unveiling the Role of High Glycemic Diets on Acne Formation. *Indus Journal of Bioscience Research*, 3(3), 123–127. <https://doi.org/10.70749/IJBR.V3I3.814>
- Cheng, S.-H., & Wong, S. E. (2021). Stress, Emotional Eating and Food Choices Among University Students During the Covid-19. *Malaysian Journal of Social Sciences and Humanities (MJSSH)*, 6(9), 335–346. <https://doi.org/10.47405/mjssh.v6i9.983>
- Christ, A., Lauterbach, M., & Latz, E. (2019). Western Diet and the Immune System: An Inflammatory Connection. In *Immunity* (Vol. 51, Issue 5, pp. 794–811). Cell Press. <https://doi.org/10.1016/j.immuni.2019.09.020>
- Clemente-Suárez, V. J., Mielgo-Ayuso, J., Martín-Rodríguez, A., Ramos-Campo, D. J., Redondo-Flórez, L., & Tornero-Aguilera, J. F. (2022). The Burden of Carbohydrates in Health and Disease. In *Nutrients* (Vol. 14, Issue 18). MDPI. <https://doi.org/10.3390/nu14183809>
- Duru, P., & Orsal, O. (2021). The effect of acne on quality of life, social appearance anxiety, and use of conventional, complementary, and alternative treatments. *Complementary Therapies in Medicine*, 56. <https://doi.org/10.1016/j.ctim.2020.102614>
- Gorelick, J., Daniels, S. R., Kawata, A. K., Degboe, A., Wilcox, T. K., Burk, C. T., & Douse-Dean, T. (2015). Acne-Related Quality of Life Among Female Adults of Different Races/Ethnicities. *Journal of the Dermatology Nurses' Association*, 7(3), 154–162. <https://doi.org/10.1097/JDN.000000000000129>
- Gupta, M. A., Johnson, A. M., & Gupta, A. K. (1998). The development of an Acne Quality of Life scale: reliability, validity, and relation to clinical severity. *British Journal of Dermatology*, 139(3), 435–440.
- Joshua, J. (2024). Deciphering carbohydrate quality: A guide to making healthier dietary choices. *Journal of Experimental Food Chemistry*, 10(02), 473. <https://doi.org/10.37421/2472-0542.2024.10.473>
- Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. *Educational and Psychological Measurement*, 30(3), 607–610.
- Lim T H, Badaruddin N S F, Foo S Y, M A Bujang, & P Muniandy. (2022). *Prevalence and psychosocial impact of acne vulgaris among high school and university students in Sarawak, Malaysia*.
- Mahzari, M., & Mamun, A. (2020). Does consumption of refined carbohydrates predict the incidence of type 2 diabetes mellitus? a systematic review and meta-analysis. In *Romanian Journal of Diabetes, Nutrition and Metabolic Diseases* (Vol. 27, Issue 2, pp. 168–179). Romanian Society of Diabetes, Nutrition and Metabolic Diseases. <https://doi.org/10.46389/rjd-2020-1027>
- Melnik, B. C. (2015). Linking diet to acne metabolomics, inflammation, and comedogenesis: An update. In *Clinical, Cosmetic and Investigational Dermatology* (Vol. 8, pp. 371–388). Dove Medical Press Ltd. <https://doi.org/10.2147/CCID.S69135>
- Nandy, P., & Shrivastava, T. (2024). Exploring the Multifaceted Impact of Acne on Quality of Life and Well-Being. *Cureus*. <https://doi.org/10.7759/cureus.52727>
- Norimah AK, Safiah M, Jamal K, Haslinda S, Zuhaida H, Rohida S, et al. Food consumption patterns: findings from the Malaysian Adult Nutrition Survey (MANS). *Mal J Nutr*. 2008;14:25–39.
- Pop, L. M., Iorga, M., Muraru, I. D., & Petrariu, F. D. (2021). Assessment of Dietary Habits, Physical Activity and Lifestyle in Medical University Students. *Sustainability 2021, Vol. 13, Page 3572*, 13(6), 3572. <https://doi.org/10.3390/SU13063572>
- Roengritthidet, K., Kamanamool, N., Udompataikul, M., Rojhirunsakool, S., Khunkhet, S., & Kanokrungees, S. (2021). Association Between Diet and Acne Severity: A Cross-sectional Study in Thai Adolescents and Adults. *Acta Dermato-Venereologica*, 101(12). <https://doi.org/10.2340/actadv.v101.569>
- Ryguła, I., Pikiewicz, W., & Kaminiów, K. (2024). Impact of Diet and Nutrition in Patients with Acne Vulgaris. In *Nutrients* (Vol. 16, Issue 10). <https://doi.org/10.3390/nu16101476>
- Suppiah, T. S. S., Sundram, T. K. M., Tan, E. S. S., Lee, C. K., Bustami, N. A., & Tan, C. K. (2018a). Acne vulgaris and its association with dietary intake: A Malaysian perspective. *Asia Pacific Journal of Clinical Nutrition*, 27(5), 1141–1145. <https://doi.org/10.6133/apjcn.072018.01>
- Tasneem, T., Begum, A., Chowdhury, M. R. K., Rahman, S., Macassa, G., Manzoor, J., & Rashid, M. (2023). Effects

of acne severity and acne-related quality of life on depressive symptoms among adolescents and young adults: a cross-sectional study in Bangladesh. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1153101>