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The Correlation between Acne Vulgaris and Body Mass Index among Undergraduate Males in Al Balqa Applied University

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ABSTRACT

Background: Acne vulgaris (AV) is a common dermatological condition among young adults. Emerging evidence suggests a possible association between body mass index (BMI) and acne presentation. However, this relationship remains underexplored

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Keywords
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in the Jordanian population.
Objective: To examine the association between BMI and acne characteristics among male undergraduate students at Al-Balqa Applied University.
Methods: A cross-sectional study was conducted among 376 male students aged 18–25 years. BMI, acne severity, subtype, and treatment patterns were assessed using structured questionnaires. Statistical tests were applied to explore associations between BMI and acne-related variables.
Results: BMI was significantly associated with acne subtype and treatment choice. Overweight individuals showed a higher prevalence of cystic acne and were more likely to use oral medications, while underweight and obese participants were more likely to report no treatment. Acne severity did not differ significantly by BMI.
Conclusion: BMI appears to influence acne subtype and treatment behavior but not severity. These findings highlight the importance of considering BMI in clinical assessments of acne among young adults.

Introduction

Acne vulgaris (AV) is a chronic inflammatory skin condition that commonly affects the pilosebaceous units, with lesions typically appearing on the face, upper trunk, and occasionally other parts of the body. It is considered the eighth most prevalent skin disorder globally, affecting approximately 79% to 95% of young individuals, particularly adolescents aged 12 to 18 years [1-2]. Among adult women over 25 years, around 30% report symptoms of AV when visiting dermatologists [3]. The condition manifests in various forms, ranging from non-inflammatory lesions (open and closed comedones) to inflammatory lesions such as papules, pustules, nodules, and cysts [2, 4]. Severe cases are characterized by nodules and cysts exceeding 5 mm, which may cause scarring and long-term psychosocial consequences.

AV originates from pilosebaceous units, where sebaceous glands and hair follicles produce sebum that can become blocked, creating an environment conducive to the growth of Cutibacterium acnes (formerly Propionibacterium acnes), a bacterium that plays a key role in inflammation [2]. Acne can significantly impact patients' social lives, self-image, and mental health, and is often associated with depression, stress, and anxiety. Economically, acne treatment poses a substantial burden, with estimated costs in Germany reaching up to 400 million euros annually [2].

Recent studies have explored the potential link between acne and various factors such as hormones, genetics, stress, cosmetics, diet, and notably, obesity. Obesity is a growing global health concern, and body mass index (BMI), a key measure of obesity, has been proposed as a potential contributing factor to acne severity and presentation [3]. Some research suggests that a high BMI may worsen AV through

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increased sebum production, whereas other studies found no significant association between BMI and acne severity [1, 4-6].

A cross-sectional study in Nigeria observed a higher frequency of acne in teenagers with elevated BMI, although severity was unaffected [7]. Similarly, a Lithuanian study reported overweight or obese children were more likely to have acne [8]. However, a case-control study in Iraq found a statistically significant correlation between higher BMI and increased acne severity [6], while other studies in Saudi Arabia and Iran reported no consistent relationship [1, 4].

Despite the global interest in this topic, there is a lack of published research in Jordan examining the association between BMI and acne. This gap is particularly notable given the rising rates of both obesity and dermatological conditions among youth.

This study aims to assess the correlation between BMI and acne characteristics among male university students aged 18 to 25 in Jordan, focusing on acne severity, subtype, treatment patterns, and psychosocial impact.

Material And Method

Study Design

This study employed a cross-sectional observational design, which involves analyzing data from a population at a single point in time to determine the prevalence and potential associations between variables, in this case, body mass index (BMI) and acne characteristics. Data were collected between April 2024 and January 2025 at Al-Balqa Applied University in Al-Salt City, Jordan. Eligible participants were male undergraduate students aged 18 to 25 years. A structured questionnaire and clinical acne evaluation were used to collect data on acne type, severity, treatment pattern, and BMI.

Participants were selected using simple random sampling. Inclusion criteria consisted of healthy males aged 18 to 25 years with no chronic diseases or family history of severe acne. Exclusion criteria included individuals outside the specified age range, females, those with chronic illnesses, or a significant family history of acne.

A minimum sample size of 365 was calculated to achieve a 5% margin of error and a 95% confidence level, assuming a 50% response distribution. The calculation was performed using the Statulator online sample size calculator. A total of 376 participants were eventually included in the study.

Data Collection

Data were collected using a structured, hand-delivered questionnaire administered to eligible male undergraduate students at Al-Balqa Applied University. The questionnaire captured demographic information, clinical characteristics of acne vulgaris, including subtype, severity, duration, and affected areas, as well as BMI measurements and psychosocial impact. BMI was determined by recording height and weight, while acne assessment was conducted in a designated examination room on campus. Trained researchers evaluated acne type (comedonal, papulopustular, or nodulocystic) and severity (mild, moderate, or severe) based on standardized dermatological criteria. A pilot study involving 30 participants was conducted prior to full data collection to ensure the clarity and feasibility of the tools used.

Ethical Considerations

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Ethical approval was obtained from the Ethics Committee of Al-Balqa Applied University. Written informed consent was secured from all participants. Confidentiality and privacy were maintained throughout the study. Participants were informed of their right to withdraw at any time without consequence. Data were anonymized, coded, and securely stored in a password-protected digital format accessible only to the research team.

Statistical Analysis

All collected data were entered into Microsoft Excel and analyzed using Jamovi version 2.3 (released in 2023). Descriptive statistics were used to summarize demographic and clinical data. Continuous variables (e.g., age and BMI) were presented as mean ± standard deviation. Categorical variables (e.g., acne severity, subtype) were analyzed using Pearson's chi-square test to assess associations with BMI. A p-value <0.05 was considered statistically significant.

Results

As shown in Table 1, the study included 376 males (mean age 21.8 ± 3.4 years, BMI 24.2 ± 4.8, range 13.8–63.5), with most classified as normal weight (61.2%), followed by overweight (24.5%), obese (8.8%), and underweight (5.6%). Over half (51.9%) were smokers, and 46.8% had acne for less than six months. Acne primarily affected the face (87.2%), followed by the back (41.8%) and chest (25.3%). The most common subtype was pimples (74.5%), with raised firm lumps (22.1%) and cystic acne (3.5%) being less frequent. Most had mild acne (76.1%), while 22.9% had moderate and 1.1% had severe acne. Over half (53.5%) didn't receive treatment, 31.4% used topicals, and 15.2% were on oral medications.

Table 1. Demographic and Clinical Characteristics of the study sample.

Patients Characteristics	**Overall (N=376) Mean(SD) n(%)**
Age	21.8 (3.4)
BMI	24.2 (4.8)
BMI Category	
Underweight	21 (5.6%)
Normal	230 (61.2%)
Overweight	92 (24.5%)
Obese	33 (8.8%)
Smoking (Yes)	195 (51.9%)
Acne Characteristics	
Duration of Acne (Years)	
<0.5	176 (46.8%)
0.5-1	66 (17.6%)
1-2	100 (26.6%)
>2	34 (9.0%)
Location on Body	

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Face Acne	328 (87.2%)
Chest Acne	95 (25.3%)
Back Acne	157 (41.8%)
Acne shape	
Pimples (Whiteheads/Blackheads)	280 (74.5%)
Raised firm lumps / Superficial lumps containing pus	83 (22.1%)
Deeper hard lumps containing pus / Larger pockets (cysts) containing pus	13 (3.5%)
Severity	
Mild	286 (76.1%)
Moderate	86 (22.9%)
Severe	4 (1.1%)
Treatment	
No Treatment	201 (53.5%)
Topical	118 (31.4%)
Oral treatment (Antibiotic or Roaccutane)	57 (15.2%)

Comparison of Acne Characteristics, Severity, and Treatment Across BMI Categories

Acne duration did not significantly differ across BMI categories (P=0.28), with most participants experiencing acne for less than six months. However, BMI was significantly associated with acne subtype (P=0.02), as pimples (whiteheads/blackheads) were most common in normal-weight individuals (80.0%), while cystic acne was more frequent in the overweight group (7.6%). Acne severity showed no significant variation across BMI groups (P=0.08), with mild acne being predominant in all groups and moderate acne slightly more common in overweight (32.6%) and obese (30.3%) individuals. Treatment choice varied significantly by BMI (P=0.02), with oral medications (e.g., antibiotics, Roaccutane) more commonly used by overweight (22.8%) and normal-weight (13.5%) individuals, while underweight (66.7%) and obese (69.7%) individuals had the highest no-treatment rates. Acne's impact on work or study was not significantly associated with BMI (P=0.12), though slightly more overweight individuals (8.7%) reported interference. Overall, BMI was significantly linked to acne subtype and treatment choice, while acne severity and its impact on daily activities did not vary significantly across BMI groups. Table 2 summarizes results of comparison of acne characteristics, severity, and treatment across BMI categories.

Table 2. Comparison of Acne Characteristics, Severity, and Treatment Across BMI Categories

	N	Underweight	Normal	Overweight	Obese	Test Statistic
		(N=21)	(N=230)	(N=92)	(N=33)	
Duration of Acne (Years)	376					P=0.28
<0.5		0.3 7/21	0.5 116/230	0.5 42/92	0.3 11/33	
0.5-1		0.2 5/21	0.2 35/230	0.2 19/92	0.2 7/33	
1-2		0.4 9/21	0.3 58/230	0.2 21/92	0.4 12/33	
>2		0.0 0/21	0.1 21/230	0.1 10/92	0.1 3/33	

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Acne shape	376					**P=0.02**
Pimples (Whiteheads/Blackheads)		0.7 14/21	0.8 184/230	0.6 59/92	0.7 23/33	
Raised firm lumps / Superficial lumps containing pus		0.2 5/21	0.2 43/230	0.3 26/92	0.3 9/33	
Deeper hard lumps containing pus / Larger pockets (cysts) containing pus		0.1 2/21	0.0 3/230	0.1 7/92	0.0 1/33	
Acne Severity	376					P=0.08
Mild		0.8 16/21	0.8 187/230	0.7 60/92	0.7 23/33	
Moderate		0.2 5/21	0.2 41/230	0.3 30/92	0.3 10/33	
Severe		0.0 0/21	0.0 2/230	0.0 2/92	0.0 0/33	
Treatment	376					**P=0.02**
Oral treatment (Antibiotic or Roaccutane)		0.0 1/21	0.1 31/230	0.2 21/92	0.1 4/33	
No Treatment		0.7 14/21	0.5 114/230	0.5 50/92	0.7 23/33	
Topical		0.3 6/21	0.4 85/230	0.2 21/92	0.2 6/33	
Stop working or studying : Yes	376	0.1 2/21	0.0 9/230	0.1 8/92	0.0 0/33	P=0.12
Not at All		0.6 13/21	0.5 120/230	0.6 58/92	0.7 22/33	
A little		0.2 5/21	0.4 100/230	0.3 25/92	0.2 7/33	
A lot		0.1 3/21	0.0 9/230	0.1 7/92	0.1 4/33	
Very much		0.0 0/21	0.0 1/230	0.0 2/92	0.0 0/33	

Discussion

This study investigated the association between body mass index (BMI) and acne vulgaris among male undergraduate students at Al-Balqa Applied University. The results showed that while BMI was not significantly associated with acne severity, it had a notable relationship with acne subtype and treatment patterns. Normal-weight participants predominantly exhibited mild acne, while overweight individuals showed a higher prevalence of nodulocystic (cystic) acne—an inflammatory subtype typically associated with more severe clinical presentations.

These findings are supported by previous studies, such as those by Alowairdhi et al. and Lajevardi et al., which reported a higher incidence of inflammatory acne in overweight individuals [1, 4]. This may be attributed to increased sebaceous gland activity and altered hormonal profiles, particularly elevated androgen levels, which are more common in individuals with higher BMI and are known contributors to acne pathogenesis. Moreover, adipose tissue acts as an endocrine organ, releasing pro-inflammatory cytokines and influencing insulin resistance, both of which can exacerbate acne [6, 8].

Variation in treatment patterns across BMI categories was also observed. Overweight and normal-weight individuals were more likely to use oral treatments, whereas underweight and obese participants were less likely to seek treatment. These differences may be influenced by perceived disease severity, access to healthcare, or cultural attitudes toward skin conditions. The higher treatment avoidance among obese and underweight individuals may also suggest

underlying psychosocial barriers or lower treatment-seeking behavior, a finding consistent with .[Anaba et al., who noted similar patterns in adolescents [7

Interestingly, the study revealed that normal-weight participants reported higher levels of embarrassment or shyness due to acne than overweight or obese individuals. This might be explained by differing expectations regarding body image or more active social engagement among normal-weight individuals. Although BMI did not significantly affect social activity levels, frustration with acne treatment was more frequently reported by overweight participants, indicating a need for improved education and support in managing acne across all BMI .categories

The findings of this study are consistent with the broader literature exploring the relationship between obesity and dermatological conditions. However, unlike some studies that identified a statistically significant relationship between BMI and acne severity [6], this study did not find such a direct link. The discrepancy could be attributed to differences in sample characteristics, geographic or environmental influences, or methodological limitations such as the study's cross-.sectional design

Despite its strengths, the study has several limitations. The cross-sectional design limits the ability to infer causality between BMI and acne-related outcomes. Additionally, the reliance on self-reported data may introduce recall bias, and the exclusion of female participants restricts the generalizability of the findings. Future studies should incorporate longitudinal designs and consider factors such as hormonal profiles, dietary intake, and stress levels. Including female participants would also provide a more comprehensive view of gender-related differences in acne .patterns

This research is significant as it contributes to understanding the multifactorial relationship between BMI and acne presentation in a Jordanian male population—an area with limited prior investigation. By highlighting associations with acne subtype and treatment-seeking behaviors, the findings support the need for BMI-tailored counseling and treatment strategies in dermatological care.

Conclusion

This study highlights a previously underexplored association between body mass index (BMI) and acne characteristics among young adult males in Jordan. While BMI was not linked to acne severity, it significantly influenced acne subtype and treatment behavior. The importance of this research lies in its contribution to local evidence, emphasizing the need for clinicians to consider BMI when assessing acne and tailoring management plans. Encouraging early treatment and awareness, especially among underweight and obese individuals, may enhance care outcomes and address psychosocial impacts.

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