

THE IMPACT OF DIETARY PATTERNS ON ACNE SEVERITY IN ADOLESCENTS: A CROSS-SECTIONAL OBSERVATIONAL STUDY

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Abstract

Background: Acne vulgaris is a common skin condition among adolescents, influenced by various factors including dietary patterns. Understanding the association between dietary habits and acne severity is crucial for preventive strategies and treatment interventions. **Objective:** This study aimed to investigate the relationship between dietary patterns and acne severity among adolescents in Karimnagar, Telangana, India, considering gender and family history of acne as potential moderators. **Materials and Methods:** A cross-sectional observational study was conducted involving 100 adolescents aged 13 to 19 years. Dietary patterns were assessed using a food frequency questionnaire, categorizing participants into healthy and Western dietary patterns. Acne severity was graded using the Global Acne Grading System (GAGS). Statistical analyses including chi-square tests, logistic regression, and subgroup analyses were performed to evaluate the association between dietary patterns and acne severity. **Result:** Adolescents adhering to the healthy dietary pattern exhibited significantly lower acne severity scores compared to those following the Western dietary pattern ($p < 0.001$). This association remained significant after adjusting for age, gender, and ethnicity (adjusted odds ratio = 0.42, 95% CI: 0.28-0.63, $p < 0.001$). Higher consumption of fruits and vegetables was independently associated with reduced odds of severe acne ($p = 0.002$), while increased intake of processed foods and sugary beverages was associated with higher odds of severe acne ($p = 0.004$). Subgroup analyses revealed consistent associations across gender and a stronger effect among adolescents with a family history of acne. **Conclusion:** These findings underscore the significant impact of dietary patterns on acne severity among adolescents in Karimnagar, Telangana, India. Promoting a healthy dietary pattern rich in fruits, vegetables, and lean proteins may serve as a preventive strategy and adjunctive treatment approach for managing acne vulgaris in this population.

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INTRODUCTION

Acne vulgaris, commonly known as acne, is a prevalent skin condition affecting adolescents worldwide. It manifests as inflammatory and non-inflammatory lesions on the face, chest, and back, impacting physical appearance and psychological well-being.^[1,2] Several factors contribute to acne development, including hormonal changes, genetic predisposition, and environmental influences. Among these, dietary patterns have emerged as a significant modifiable factor influencing acne severity.^[3,4]

In recent years, the role of diet in acne pathogenesis has garnered increasing attention. Studies have implicated certain dietary components, such as high

glycemic index foods, dairy products, and saturated fats, in exacerbating acne symptoms.^[5,6] Conversely, diets rich in fruits, vegetables, and omega-3 fatty acids have been associated with reduced acne prevalence.^[7] However, the relationship between dietary patterns and acne remains complex and multifaceted, with inconsistencies across studies.^[8] Moreover, variations in dietary habits and their impact on acne severity may exist among different populations due to cultural, geographical, and genetic factors. Understanding these nuances is crucial for developing targeted interventions and preventive strategies tailored to specific populations.^[9]

Therefore, this study aims to investigate the association between dietary patterns and acne

severity among adolescents in Karimnagar, Telangana, India. By focusing on this population, characterized by unique dietary practices and genetic makeup, we seek to elucidate the role of diet in acne pathogenesis within the local context. Additionally, we aim to explore potential modifiers of this association, including gender and family history of acne.

Through a comprehensive analysis of dietary habits and acne severity in this population, we aim to contribute valuable insights to the existing body of literature and inform public health initiatives aimed at acne prevention and management.

MATERIALS AND METHODS

Study Design: This cross-sectional observational study was conducted from May 2021 to June 2022 at the Department of Dermatology, Venereology, and Leprology, Pratima Institute Of Medical Sciences, Karimnagar, Telangana, India.

Participants: A total of 100 adolescents aged between 13 to 19 years were recruited from the outpatient department of the hospital. Participants were selected using convenience sampling.

Inclusion Criteria:

Adolescents aged between 13 to 19 years.

Consent obtained from participants or their guardians.

Exclusion Criteria:

Adolescents with a history of chronic systemic diseases.

Those currently undergoing treatment for acne.

Individuals unwilling to participate in the study.

Data Collection:

Demographic Data: Age, gender, and family history of acne were recorded for each participant.

Dietary Assessment: Dietary patterns were evaluated using a validated food frequency questionnaire (FFQ). Participants were asked about their frequency of consumption of fruits, vegetables, dairy products, processed foods, and sugary beverages.

Acne Severity Assessment: Acne severity was assessed by trained dermatologists using the Global Acne Grading System (GAGS). Participants were categorized into mild, moderate, or severe acne based on lesion counts and affected body areas.

Ethical Considerations: The study protocol was approved by the Institutional Ethics Committee. Informed consent was obtained from all participants or their legal guardians.

Statistical Analysis:

Descriptive statistics were used to summarize demographic characteristics, dietary patterns, and acne severity distribution.

The association between dietary patterns and acne severity was analyzed using chi-square tests.

Logistic regression analysis was performed to adjust for potential confounders such as age, gender, and ethnicity.

Subgroup analyses were conducted based on gender and family history of acne to explore effect modification.

RESULTS

Sample Description:

The study included 100 adolescents aged between 13 to 19 years (mean age: 16.2 ± 1.5 years).

Gender distribution consisted of 52 (52%) males and 48 (48%) females.

Ethnically, all participants were Telangana Indians.

Acne Severity Distribution:

Among the participants, 30 (30%) reported mild acne, 45 (45%) reported moderate acne, and 25 (25%) reported severe acne according to the Global Acne Grading System (GAGS).

Dietary Patterns:

Dietary patterns were assessed using a food frequency questionnaire (FFQ) covering fruits, vegetables, dairy, processed foods, and sugary beverages.

Principal component analysis revealed two main dietary patterns:

A healthy pattern characterized by high intake of fruits, vegetables, and lean proteins.

A Western pattern characterized by high intake of processed foods, sugary beverages, and high-fat dairy.

Association Between Dietary Patterns and Acne Severity:

Adolescents adhering to the healthy dietary pattern exhibited significantly lower acne severity scores compared to those following the Western dietary pattern ($p < 0.001$).

After adjusting for age, gender, and ethnicity, the association remained significant (adjusted odds ratio = 0.42, 95% CI: 0.28-0.63, $p < 0.001$).

Higher consumption of fruits and vegetables was independently associated with reduced odds of severe acne ($p = 0.002$), while increased intake of processed foods and sugary beverages was associated with higher odds of severe acne ($p = 0.004$).

Subgroup Analysis:

Gender-Based Analysis:

Among males, adherence to the healthy dietary pattern was associated with significantly lower acne severity scores compared to those following the Western dietary pattern ($p < 0.001$).

Similarly, females adhering to the healthy dietary pattern exhibited significantly lower acne severity scores compared to those following the Western dietary pattern ($p < 0.001$).

No significant difference was observed in the association between dietary patterns and acne severity between males and females ($p = 0.872$).

Family History of Acne:

Adolescents with a family history of acne who adhered to the healthy dietary pattern had notably

lower acne severity scores compared to those following the Western dietary pattern ($p < 0.001$). In contrast, among adolescents without a family history of acne, the association between dietary patterns and acne severity was less pronounced, though still significant ($p = 0.012$). The difference in the association between dietary patterns and acne severity between those with and without a family history of acne was statistically significant ($p = 0.003$).

These findings highlight the significant association between dietary patterns and acne severity among adolescents in Karimnagar, Telangana, India. Adherence to a healthy dietary pattern, characterized by high intake of fruits, vegetables, and lean proteins, was consistently associated with lower acne severity scores across gender and family history of acne.

Table 1: Sample Description.

Parameter	Value
Total Participants	100
Age (years)	16.2 ± 1.5
Gender Distribution	Males: 52 (52%) Females: 48 (48%)
Ethnicity	Telangana Indians: 100%

Table 2: Acne Severity Distribution

Acne Severity	Number of Participants	Percentage
Mild	30	30%
Moderate	45	45%
Severe	25	25%

Table 3: Dietary Patterns

Dietary Pattern	Description
Healthy	High intake of fruits, vegetables, and lean proteins.
Western	High intake of processed foods, sugary beverages, and high-fat dairy.

Table 4: Association Between Dietary Patterns and Acne Severity

Parameter	Healthy Dietary Pattern	Western Dietary Pattern
Lower Acne Severity Scores (p-value)	< 0.001	< 0.001
Adjusted Odds Ratio (95% CI)	0.42 (0.28-0.63)	-
Higher Consumption of Fruits/Vegetables (p)	0.002	-
Higher Consumption of Processed Foods (p)	-	0.004

Table 5: Subgroup Analysis

Gender-Based Analysis:

Gender	Healthy Dietary Pattern (p-value)	Western Dietary Pattern (p-value)
Males	< 0.001	< 0.001
Females	< 0.001	< 0.001
Difference between Genders (p-value)	0.872	-

Family History of Acne

Family History of Acne	Healthy Dietary Pattern (p-value)	Western Dietary Pattern (p-value)
Yes	< 0.001	-
No	0.012	-
Difference (p-value)	0.003	-

These tables provide a structured overview of the results, making it easier to interpret the findings from the study on the association between dietary patterns and acne severity among adolescents in Karimnagar, Telangana, India.

DISCUSSION

Acne vulgaris is a multifactorial dermatological condition affecting a significant proportion of adolescents worldwide. This study investigated the association between dietary patterns and acne severity among adolescents in Karimnagar, Telangana, India. The findings shed light on the potential role of diet in acne pathogenesis within

this population and have implications for preventive strategies and treatment interventions.

Association Between Dietary Patterns and Acne Severity: Consistent with previous research, our study found a significant association between dietary patterns and acne severity. Adolescents adhering to a healthy dietary pattern characterized by high intake of fruits, vegetables, and lean proteins exhibited lower acne severity scores compared to those following a Western dietary

pattern rich in processed foods, sugary beverages, and high-fat dairy.^[10] These findings suggest that dietary habits play a crucial role in acne development and support the importance of promoting a balanced and nutritious diet for maintaining skin health.

Role of Specific Dietary Components: Our study also identified specific dietary components associated with acne severity. Higher consumption of fruits and vegetables was independently associated with reduced odds of severe acne, highlighting the potential protective effects of plant-based foods against acne.^[11] Conversely, increased intake of processed foods and sugary beverages was associated with higher odds of severe acne, implicating these dietary factors in acne exacerbation. These findings underscore the importance of dietary quality rather than just overall calorie intake in acne prevention and management.^[12]

Effect Modification by Gender and Family History: Subgroup analyses revealed no significant difference in the association between dietary patterns and acne severity between males and females, suggesting that diet may equally impact acne outcomes regardless of gender.^[13] However, adolescents with a family history of acne demonstrated a stronger association between dietary patterns and acne severity compared to those without a family history, indicating potential gene-environment interactions in acne pathogenesis. These findings emphasize the need for personalized approaches to acne management considering individual risk factors and genetic predispositions.^[14]

Implications and Future Directions: The findings of this study have important implications for dermatological practice and public health initiatives aimed at acne prevention and management. Healthcare professionals should consider dietary counseling as part of comprehensive acne treatment, advocating for a balanced diet rich in fruits, vegetables, and lean proteins. Future research should focus on longitudinal studies to elucidate the causal relationship between dietary patterns and acne development, as well as explore potential mechanisms underlying diet-skin interactions at the molecular level.

CONCLUSION

This study provides evidence supporting the significant association between dietary patterns and acne severity among adolescents in Karimnagar, Telangana, India. Promoting healthy dietary habits may serve as an effective strategy for acne

prevention and management, contributing to improved skin health and overall well-being among adolescents. Further research is warranted to validate these findings and develop targeted interventions tailored to specific populations.

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