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THE RELATIONSHIP BETWEEN NUTRITIONAL CONSUMPTION AND ACNE SEVERITY IN YOUNG ADULTS

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ABSTRACT
THE PURPOSE of this study was to examine the relationship between the severity of acne vulgaris and dietary habits among young Bulgarian women. METHODS: Sixty women with an average age of 26.8 ± 7.3 years, all diagnosed with acne, participated in the study. The severity of acne was determined using the Global Acne Grading System (GAGS). Dietary intake was assessed through the Food Frequency Questionnaire (FFQ) method. RESULTS: The participants with severe and very severe acne reported significantly higher daily consumption of milk (p=0.04) and sweets (p=0.02). They also had a higher frequency of consuming foods rich in saturated fats and omega-6 fatty acids, such as pastries, sausages, red meat, and sunflower oil. Additionally, the study found that the inadequate intake of whole grain bread, vegetables, fruits, legumes, and nuts among the participants contributed to deficiencies in vitamins and antioxidants, which may further exacerbate acne. CONCLUSION: Nutrition affects acne severity and can be incorporated into personalized prevention and treatment strategies.

Keywords: skin disease, women, dietary intake, milk products

INTRODUCTION

Acne vulgaris is a chronic inflammatory skin condition that affects the pilosebaceous unit, with a complex pathogenesis involving multiple interrelated factors. These include increased sebum production, altered follicular keratinization leading to comedone formation, colonization of hair follicles by *Cutibacterium acnes*, and the release of pro-inflammatory mediators (1). Acne vulgaris affects approximately 85% of adolescents and young adults, making it one of the most prevalent dermatological disorders worldwide (2). Although genetic predisposition is a key determinant, environmental influences and lifestyle factors—particularly dietary habits—play an increasingly recognized role in the onset, severity, and persistence of acne (3, 4). In recent years, growing scientific interest has focused on nutrition as a modifiable risk factor. Evidence suggests that certain dietary components can influence hormonal pathways, insulin signaling, and systemic inflammation, thereby exacerbating or alleviating acne symptoms (5, 6). The purpose of this study was to examine the relationship between dietary habits and acne severity in young women in Bulgaria.

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MATERIALS AND METHODS

A cross-sectional, observational study was conducted between September 2024 and March 2025.

The study included patients with *Acne Vulgaris*, who voluntarily participated after providing written informed consent. Participants were recruited from the outpatient Dermatology practices, practices of Obstetrics and Gynecology, and Endocrinology. Inclusion criteria for the study were: female gender, age between 14 and 40 years, diagnosed *Acne Vulgaris*, and absence of systemic dermatological therapy in the past 3 months. The severity of acne was evaluated by a dermatologist and stratified according to the Global Acne Grading System (GAGS) as described by Doshi et al. (7). The dietary habits

of the participants were assessed using the FFQ method. A validated food frequency questionnaire (FFQ) was used, containing 85 foods and beverages, grouped by categories, respectively: foods rich in carbohydrates (cereals, potatoes, confectionery, honey), dairy products (milk, yogurt, cheese, cottage cheese), vegetables and fruits, oils and fats, protein sources (meat, fish, eggs, legumes and nuts) and beverages - tonic, non-alcoholic and alcoholic. For each food and beverage, the participants described their usual frequency of consumption over the past year in one of the following 7 categories: over 1 per day, once a day, 5-6 times a week, 2-4 times a week, once a week, 1-3 times a month, under 1 per month. Data were analyzed using SPSS v.26. The χ^2 test and independent samples t-test were applied. A p-value of <0.05 was considered statistically significant.

RESULTS

The study included 60 women diagnosed with acne vulgaris, with a mean age of 24.3 ± 7.5 years (median: 23 years). Nearly half of the cohort presented with severe acne ($n = 29$; 48.4%), whereas 21 participants (35%) exhibited moderate acne. Mild and severe forms of acne were observed in 10 participants (16.6%), with 5 participants (8.3%) affected by each form, respectively **(Table 1).** Severe and moderate acne predominantly affected young women aged 19–30 years (median: 24 years), very severe acne was primarily observed in participants under 18 years (median: 16 years), while mild acne was more common among women over 30 years (median: 37 years).

Table 1. *Distribution of participants according to acne severity based on GAGS (n=60)*

Acne severity (GAGS)	Score range	n (%)
Mild	1–18	5 (8.3 %)
Moderate	19–30	21 (35.0 %)
Severe	31–38	29 (48.4 %)
Very severe	≥39	5 (8,3 %)

Complex carbohydrates, sugary, and chocolate products

The dietary consumption of foods rich in complex carbohydrates among the studied group of women is presented in **Figure 1**. The intake of whole-grain bread and whole-grain products (more than once a day) is below the recommendations for all forms of acne and is significantly lower in severe forms of the disease ($p = 0.003$) (8). The frequency of white bread consumption increases with the severity of acne, in severe forms (12.5 % consume more than once daily), while in very severe forms of acne, 50 % consume it 2–4 times per week. Patients with mild and moderate forms consume significantly more potatoes with appropriate culinary processing and less rice compared to patients with very severe forms of acne ($p = 0.007$). A high frequency of consumption of fried potatoes and pastries is observed. Half of the patients with very severe forms consume pastries 5–6 times per week, and 6.2 % of all participants consume them more than once daily.

An increased consumption of sugary and chocolate products above the recommendations for healthy eating is observed in all forms of acne. More than one-third (37.5 %) of the participants consume sweets 2–4 times per week, and 12.6 % — even more frequently. The weekly frequency of sweet consumption is approximately twice as high in severe and very severe forms of acne ($p = 0.02$). Half of the women with very severe acne consume chocolate every day, and 12.4 % of those with severe forms consume it more than once daily.

Dairy products and fats

The frequency of dairy food consumption is significantly lower in women with mild acne (on average once per week) compared to moderate and severe forms (2–4 times per week) ($p = 0.04$). Foods rich in saturated fats and omega-6 fatty acids (baked goods, sausages, sunflower oil) are consumed more than 5 times per week by 72 % of participants with severe forms of acne.

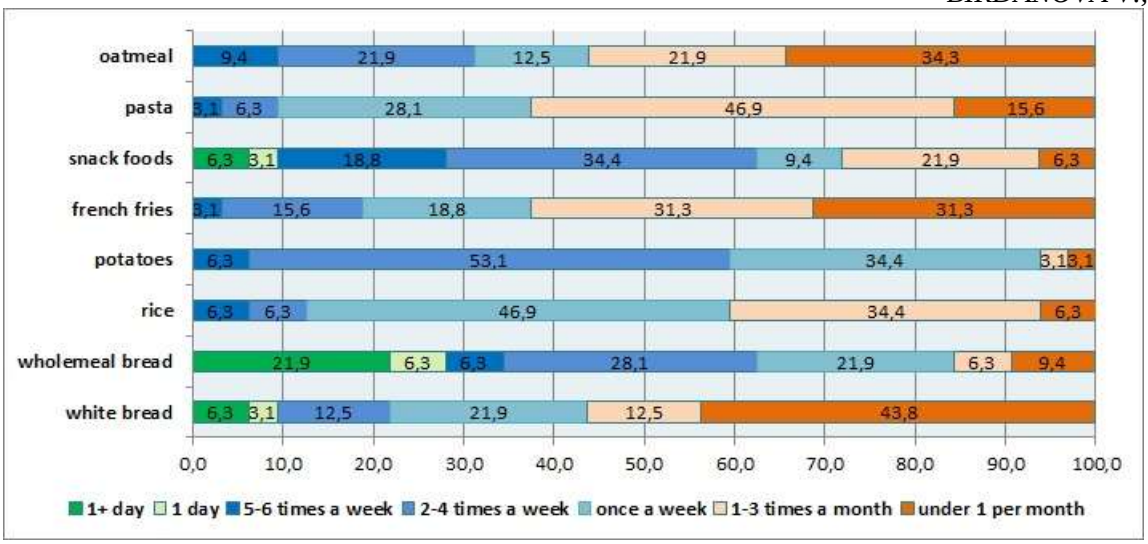

Figure 1. Frequency of consumption of foods rich in complex carbohydrates among patients with acne vulgaris (n=60)

Fruits and vegetables

The consumption of fresh vegetables according to recommendations (once or more than once daily) is reported in 56.2 % of the participants. The daily intake of vegetable juices and smoothies is twice as high in mild and moderate forms (50 %) compared to severe forms (27.8 %). Fresh fruits are consumed daily by 43.3 % of patients, with the usual intake being 1 fruit per day in mild and moderate forms and 2 fruits per day in severe and very severe forms. The daily consumption of fruit juices is about four times higher in patients with severe forms (27.8 %) compared to those with mild and moderate forms of acne (7.1 %).

Protein-rich foods

Meat consumption meets the recommendations in 18.8 % (up to 3 times per week), and fish in 50 % (more than once per week) of the participants. Very high consumption of meat (red and poultry) is observed. Red meat is consumed daily by 31.3 % of patients with acne and by 50 % of those with very severe forms of acne. The intake of legumes (2–4 times per week) meets the recommendations for healthy eating. The frequency of nut consumption is below the recommendations in one-third (31.3 %) of the study group and in all participants with severe forms of acne.

Beverages and alcohol

No significant differences were found in the frequency of consumption of tonic, soft drinks, and alcohol among women with different forms of acne. However, two-thirds (66.7 %) of women with mild acne rarely consume sugary soft drinks (approximately once per month), whereas in women with other forms of acne, a higher frequency of consumption (once per week or more often) is observed in 50 % of cases.

DISCUSSION

The findings of the present study suggest that dietary intake of specific foods may play a significant role in the pathogenesis and clinical severity of acne. Our results revealed a statistically significantly higher frequency of consumption of high-glycemic foods (including rice, bakery products, and confectionery) among young Bulgarian women with more severe forms of acne. High-glycemic index and load foods are known to stimulate insulin secretion and activate the insulin-like growth factor (IGF-1) pathway. Interventional studies have demonstrated that low-glycemic diets can significantly reduce both the number and severity of acne lesions (9-11). Consistent with this evidence, our study found that the consumption of whole grains—sources of dietary fiber, vitamins, and micronutrients with a lower glycemic load—was significantly lower among women with severe and very severe acne.

In addition, we observed greater daily consumption of fruits, fruit juices, and sugar-sweetened beverages in women with severe acne. In contrast, women with mild to moderate forms of the disease reported a higher intake of vegetable juices and smoothies. These findings further underscore the differential effects of foods with varying glycemic indices on acne severity.

Although our results indicate a relationship between dairy product intake and acne severity ($p = 0.04$), evidence from meta-analyses offers a more nuanced perspective. Specifically, only skimmed and low-fat milk, but not whole milk, has been associated with acne, likely due to its higher content of bioactive proteins (e.g., whey) that stimulate IGF-1 production (12, 13). Conversely, fermented dairy products (e.g., yogurt), as natural sources of probiotics, may be considered for inclusion in dietary interventions when combined with low-glycemic foods and antioxidants, as they may help suppress the growth of *Cutibacterium acnes* (14).

Our findings also revealed a higher and more frequent intake of foods rich in saturated fatty acids, omega-6 polyunsaturated fatty acids, and trans fats, such as processed red meats, sausages, margarines, and pastries, particularly among women with severe and very severe acne. Although these differences did not reach statistical significance, the consumption of these foods substantially exceeded recommendations for healthy eating. The pro-inflammatory effects of saturated fats, previously reported in international studies, may partially explain these observations, as such fats can stimulate *Cutibacterium acnes*-mediated inflammation through interleukin-6 (IL-6) release (15, 16).

Furthermore, the insufficient intake of fresh vegetables, fruits, and nuts observed in our study may adversely affect acne progression due to potential deficiencies in vitamins A, C, and E, as well as zinc, nutrients with well-documented antioxidant and anti-inflammatory effects on skin health. Roengritthidet et al. (2021) identified vegetable consumption (OR 0.74; 95% CI 0.62–0.89) as a factor associated with reduced acne severity in a study of 2,467 Thai adolescents and adults. The protective effects of plant-based foods are primarily attributed to their antioxidant nutrients (vitamins C, E, and polyphenols), which help mitigate oxidative stress, particularly in severe acne. In addition, reduced intake of dietary fiber may disrupt gut microbiota balance, contributing to systemic inflammation (17, 18). The study demonstrates a clear association between unhealthy dietary habits and increased acne severity in young women. Reducing the intake of high-glycemic foods and foods rich in saturated fatty acids, ensuring a balanced consumption of dairy products, and increasing the intake of plant-based foods rich in fiber, vitamins, and antioxidants may improve patients' conditions and serve as a useful non-pharmacological approach to acne management.

CONCLUSION

Diet is a modifiable factor influencing the severity of *Acne vulgaris* and can be integrated into preventive and therapeutic strategies for young patients.

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