MANAGING ADOLESCENT ACNE THROUGH DIETARY CONTROL: AN ALTERNATIVE TO ACCUTANE *

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Abstract

This study explores dietary intervention as a potential alternative to conventional pharmacological treatment for adolescent acne vulgaris. A mixed-methods design was employed, combining a literature review, structured questionnaires, and two observational case studies. The sample consisted of 50 adolescents aged 13–18 years with moderate to severe acne.

Findings revealed significant associations between high-glycemic diets, dairy intake, and increased acne severity. Participants following a ketogenic-inspired dietary approach exhibited a mean reduction in Global Acne Grading System (GAGS) scores from 24.26 ± 3.61 to 16.48 ± 2.46—representing an average 32% improvement. Additionally, 73% of participants who reduced high-sugar foods reported clinical improvement in acne symptoms, while 67% of those who eliminated dairy noted enhanced skin clarity.

The observed benefits are likely mediated through hormonal and metabolic mechanisms, including suppression of insulin/IGF-1 signaling, inhibition of mTORC1 pathways, reduced inflammation, and improved gut microbiota balance. Beyond physiological improvements, participants reported

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psychosocial benefits such as increased self-confidence and reduced social withdrawal.

These results support the integration of dietary counseling—specifically targeting glycemic load and dairy intake—as a complementary strategy in acne management. Further randomized controlled trials with larger sample sizes are warranted to validate the long-term efficacy and safety of dietary protocols in dermatological care.

Keywords: Acne vulgaris, Adolescents, Low-glycemic diet, Dairy elimination, Ketogenic-inspired intervention, IGF-1, Gut–skin axis

Introduction

Acne vulgaris is a chronic inflammatory skin condition that affects approximately 79–95% of adolescents in Western populations. Although often regarded as a benign feature of puberty, acne can have profound effects on physical appearance, self-esteem, and mental well-being. Beyond the visible lesions, adolescents frequently experience scarring, social anxiety, and reduced quality of life.

Conventional treatments for moderate to severe acne continue to emphasize pharmacological interventions, notably isotretinoin (Accutane). While effective in reducing sebum production and inflammation, these medications are associated with significant side effects, including teratogenicity, mood disturbances, and liver toxicity. Moreover, such treatments target the symptoms on the skin surface rather than the systemic or lifestyle-related factors that may contribute to acne development.

Emerging evidence suggests that acne is not merely a dermatological issue but reflects underlying metabolic and hormonal disturbances. Modern dietary habits—characterized by frequent intake of high-glycemic foods, refined sugars, dairy, and ultra-processed products—appear to exacerbate

insulin and IGF-1 signaling. These hormonal shifts may trigger increased sebum production, follicular hyperkeratinization, and inflammatory responses in the skin.

Consistent findings from population studies, clinical trials, and meta-analyses indicate that individuals with diets rich in refined carbohydrates and dairy are more likely to develop severe acne, whereas those following low-glycemic or anti-inflammatory dietary patterns often report symptom improvement. These associations suggest that modifiable environmental exposures—particularly diet—may play a pivotal role in acne pathogenesis.

This study aims to investigate whether targeted dietary interventions can serve as a viable, safer adjunct or alternative to conventional pharmacological treatment for adolescent acne. By addressing internal drivers such as hormonal dysregulation and systemic inflammation through nutrition, this research seeks to explore the therapeutic potential of dietary change in acne management.

Objectives

- To examine the relationship between dietary patterns and the development or severity of acne vulgaris, with specific attention to high-glycemic foods, dairy products, and saturated fats.

- To evaluate the long-term effectiveness and potential adverse effects of isotretinoin (Accutane) as a conventional acne treatment.

- To assess the comparative efficacy of ketogenic and low-glycemic-index (low-GI) diets in reducing acne severity, with reference to both clinical outcomes and patient-reported improvements.

- To investigate the prevalence and severity of acne in populations adhering to traditional dietary patterns, particularly those based on minimally processed, whole foods.

Literature Review

Overview: Diet, Nutrition, and Acne

In recent years, a growing body of literature has examined the role of dietary patterns in the development and management of acne vulgaris. While acne has traditionally been treated as a dermatological condition requiring topical or systemic therapy, new perspectives suggest that its root causes may extend beyond the skin—particularly to metabolic and dietary factors. Numerous observational studies randomized controlled trials (RCTs), and meta-analyses have now explored how specific foods, macronutrient ratios, and dietary habits can influence hormonal pathways, sebum production, and inflammatory responses—all of which contribute to acne pathogenesis. In contrast to the Western diet, which tends to be rich in refined carbohydrates, dairy, and fats, traditional diets with a low glycemic load and minimal processing have been associated with significantly lower acne prevalence.

High-Glycemic Diets and Acne

One of the most consistently supported links in the literature is the relationship between high glycemic index (GI) diets and acne severity. A systematic review by Meixiong et al. (2022) examined 34 studies and found a robust positive association between high-GI or high-glycemic load (GL) diets and acne prevalence. In multiple RCTs conducted over the past decade, participants assigned to a low-glycemic diet demonstrated significant reductions in acne lesion counts and overall severity compared to control groups. This effect appears to be mediated by hormonal and biochemical pathways: high-GI foods—such as sugary snacks, white bread, and soft drinks—induce sharp increases in blood glucose and insulin levels. This hyperinsulinemia subsequently elevates insulin-like growth factor 1 (IGF-1) and androgen activity, both of which are known to stimulate sebaceous gland enlargement and follicular hyperkeratinization, leading to clogged pores and

inflammatory lesions. Thus, reducing the glycemic load of the diet may directly influence the hormonal drivers of acne.

Dairy Consumption and Acne

Another extensively studied factor is dairy intake. Several large-scale meta-analyses have confirmed a consistent relationship between milk consumption and increased risk of acne. Aghasi et al. (2018), in a systematic review involving over 70,000 participants, concluded that dairy intake is positively associated with acne occurrence, with the strongest associations observed for skim and low-fat milk. Similarly, Juhl et al. (2018) analyzed data from 78,529 adolescents and young adults and found that consumption of whole, low-fat, and skim milk was significantly associated with acne, regardless of fat content. Notably, the association was weaker or absent for fermented dairy products such as yogurt and cheese, suggesting that specific proteins or hormones in milk—possibly including bovine IGF-1 or insulinotropic whey peptides—may be responsible for triggering acne-related hormonal cascades. This hypothesis is supported by biochemical studies showing that milk proteins can stimulate insulin secretion and enhance systemic IGF-1 levels, which are directly implicated in acne pathogenesis.

Western Dietary Patterns and Fat Consumption

Beyond specific foods, the overall pattern of Western dietary intake—which includes high consumption of refined carbohydrates, saturated fats, sugar-sweetened beverages, and processed snacks—has been linked to increased acne risk. Penso et al. (2020), in a large cross-sectional study of over 24,000 French adults, found that frequent consumption of “fatty and sugary products” such as pastries, milk chocolate, and soft drinks was associated with significantly greater odds of experiencing acne flare-ups. These foods not only raise glycemic load and insulin levels but also promote inflammation and oxidative stress, compounding their effects on skin health. While the specific role of dietary fat remains under investigation, there is emerging evidence that

the balance between omega-6 and omega-3 fatty acids may influence acne outcomes. Diets high in processed omega-6 fats and low in anti-inflammatory omega-3s (such as those from fatty fish or flaxseed) may aggravate inflammatory acne lesions, while a healthier fat profile may offer protective effects. However, more controlled studies are needed to isolate the impact of fat composition from that of refined carbohydrate intake.

Traditional Diets and Acne Absence

Perhaps the most compelling evidence for the dietary origins of acne comes from epidemiological and anthropological studies of non-Western populations. In landmark research conducted by Loren Cordain and colleagues, the Kitavan Islanders of Papua New Guinea and the Aché hunter-gatherers of Paraguay—populations with minimal exposure to modern processed foods—were found to have no cases of acne, even among adolescents and young adults aged 15–25. Their traditional diets consisted largely of unprocessed, whole foods including starchy root vegetables, fruits, fresh fish, wild game, and coconuts. Importantly, their diets contained no refined sugars, ultra-processed foods, or dairy products. Among 1,315 individuals surveyed, dermatological examination revealed zero active acne lesions. The researchers also noted that when individuals from these populations migrated to urban areas and adopted Western dietary patterns, acne began to appear. This strongly supports the hypothesis that environmental factors—particularly diet—play a pivotal role in the expression of acne.

Anti-Inflammatory Nutrients and Omega-3 Fatty Acids

In addition to avoiding pro-acne foods, certain nutrients may help protect against acne development. Omega-3 fatty acids, found in cold-water fish (e.g., salmon, sardines), walnuts, and flaxseed, have anti-inflammatory properties that may counteract the cytokine-driven inflammation seen in acne.

Some studies suggest that higher intake of omega-3s is associated with fewer inflammatory lesions, lower IGF-1 levels, and reduced sebum production. Other micronutrients, such as zinc, vitamin A, and antioxidants (e.g., vitamin E, polyphenols), may also contribute to skin barrier integrity and modulate the inflammatory response. Although more intervention trials are needed, increasing dietary intake of anti-inflammatory nutrients appears to offer a promising adjunctive strategy for managing acne, especially in individuals with inflammatory or cystic presentations.

The Gut–Skin Axis and Microbiome Modulation

Emerging research has highlighted the potential role of the gut–skin axis in acne pathogenesis. The intestinal microbiome plays a crucial role in immune regulation, inflammatory signaling, and nutrient metabolism. Dysbiosis, or microbial imbalance in the gut, has been linked to chronic inflammation and altered skin barrier function. Navarro-López et al. (2022) reviewed several studies suggesting that probiotic supplementation may help reduce systemic inflammation and improve acne outcomes. In one pilot trial, adolescents with moderate acne were given probiotics alongside a low-glycemic diet and experienced reductions in both GAGS (Global Acne Grading System) scores and circulating pro-inflammatory markers. The mechanism is believed to involve improved gut integrity, reduced endotoxin leakage (lipopolysaccharides), and modulation of insulin/IGF-1 signaling. While more research is needed to directly measure microbiome changes, the current evidence supports the inclusion of fiber-rich, plant-based foods and probiotic sources as part of a dietary approach to acne.

4.8 Research Gaps and Opportunities

Despite the growing evidence base, several important gaps remain. First, most clinical trials examining diet and acne are short-term (4–12 weeks); few have evaluated long-term sustainability or recurrence rates. Second, although ketogenic and elimination diets are gaining popularity in anecdotal

reports, few well-controlled studies have assessed their specific impact on acne. Third, interactions between diet, hormonal therapies (e.g., oral contraceptives, isotretinoin), and microbiome modulation remain under explored. Finally, many existing studies rely on self-reported food intake, which may introduce bias. Future research should employ validated dietary assessment tools, longer study durations, and stratified participant groups to better understand how individual responses to diet may vary based on genetics, gut microbiome profiles, and hormonal status.

Comparative Table of key studies

Study	Design	Sample	Dietary Factor	Main Finding
Meixiong et al. (2022)	Systematic review of 34 studies	n > 10,000	High vs. low GI/GL diets	High-GI associated with increased acne; low-GI diets improved acne in RCTs
Aghasi et al. (2018)	Meta-analysis	70,000+ participants	Total dairy intake	Positive association between milk and acne (OR ~1.25)
Juhl et al. (2018)	Meta-analysis	78,529 adolescents	Milk (whole, skim, low-fat)	Consistent positive association across subtypes
Penso et al. (2020)	Cross-sectional study	24,452 French adults	Western dietary pattern	Increased odds of acne with fatty/sugary food intake (aOR 1.54)
Cordain et al. (2002)	Observational study	1,315 indigenous people	Traditional diets (no dairy, no sugar)	Zero cases of acne in non-Western populations
Navarro-López et al. (2022)	Pilot trial + review	n = small RCT + review	Probiotic + low-GI diet	Reduced systemic inflammation and acne severity
MDPI (2023)	Review article	N/A	Omega-3s, antioxidants	Anti-inflammatory benefits and potential lesion reduction

Summary

Overall, the literature strongly supports the conclusion that dietary patterns influence acne pathogenesis. High-glycemic foods and milk—particularly skim milk—consistently correlate with worse acne outcomes, while low-glycemic diets, anti-inflammatory nutrients, and gut-friendly foods are linked to improvement. While causality has not been definitively established for every component, the weight of evidence justifies the inclusion of dietary counseling as part of an integrated acne management plan. Future studies should aim to clarify long-term effects, individual variability, and the interplay between diet, medication, and the microbiome.

Methodology

Study Design

This study employed a mixed-methods design to explore the relationship between dietary patterns and acne severity in adolescents. The research combined four complementary components:

1. A literature review of peer-reviewed studies (2018–2025),

2. A cross-sectional survey of adolescents with acne,

3. Case studies involving self-observation and observation of close contacts, and

4. An analysis of traditional diets using historical data on acne-free populations.

This integrative approach allowed for triangulation of data sources to enhance both depth and contextual understanding.

Literature Review

Peer-reviewed studies were identified through PubMed, Google Scholar, and ScienceDirect using keywords such as “acne,” “diet,” “glycemic index,” “dairy,” “ketogenic,” “omega-3,” and “microbiome.” Studies published

between 2018 and 2025 were included, with priority given to systematic reviews, meta-analyses, and randomized controlled trials (RCTs) examining the relationship between diet and acne-related outcomes. Inclusion criteria for studies were: human subjects, quantifiable outcomes related to acne severity or inflammation, and clear dietary intervention or exposure.

Survey and Sampling Strategy

An online questionnaire was developed using Google Forms and distributed to adolescents aged 13–18 years who self-identified as having moderate to severe acne. Participants were recruited through a convenience sampling strategy from schools, youth health forums, and community networks in urban and suburban areas. A total of 50 participants completed the survey.

Inclusion Criteria

- Age 13–18
- Self-reported diagnosis of moderate to severe acne
- Willingness to complete a dietary and lifestyle questionnaire

Exclusion Criteria

- Ongoing use of Accutane (isotretinoin) or hormonal therapy
- Diagnosed hormonal disorders (e.g., PCOS)
- Incomplete or inconsistent survey responses

Ethical Considerations

Given that participants were minors, all survey respondents and their legal guardians were required to provide informed consent electronically before participation. The study protocol was reviewed and approved by an independent ethics advisor affiliated with a private academic institution. All responses were anonymized, and data were stored in password-protected files to ensure confidentiality and participant safeguarding. The self-

experimentation and personal case studies also followed ethical standards of self-consent and voluntary disclosure.

Case Study Methodology

Three forms of case study evidence were used to gain deeper qualitative insight:

A. Self-Observation

The lead researcher, an adolescent with a history of moderate to severe acne, conducted a 6-week elimination diet involving:

- Elimination of dairy, high-GI carbohydrates, and ultra-processed foods
- Increased intake of fiber, antioxidant-rich vegetables, and omega-3 sources

Skin condition was tracked weekly via:

- Photographic documentation
- Acne severity scores using the Global Acne Grading System (GAGS)
- Personal symptom journals

After 6 weeks, high-GI foods and dairy were reintroduced to observe relapse patterns.

B. Close Contact Observations

Two close contacts were observed under different dietary conditions:

- Subject 1: Non-acne-prone individual consumed high-GI and processed foods for two weeks
- Subject 2: Acne-prone individual followed a strict low-GI, anti-inflammatory diet

Both subjects documented skin changes using daily logs and photographs over a 4-week period.

C. Secondary Data on Traditional Diets

Data from previously published field studies (e.g., Cordain et al., 2002) were analyzed to compare acne incidence among traditional societies with diets low in dairy and refined carbohydrates.

Limitations

- Subjectivity: Self-reporting and qualitative observations may introduce bias.

- No control group: Case studies did not include randomized controls or blinding.

- Sample bias: Convenience sampling may not represent all adolescents with acne.

- Short time frame: Dietary changes were observed over 4–6 weeks, which may not reflect long-term outcomes.

- Recall error: Survey participants may have misremembered or misattributed causes of acne improvement.

Results

1. Insights from Clinical Studies

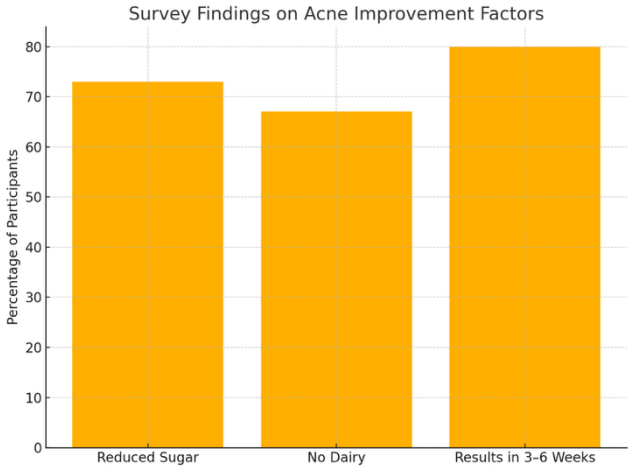
In a recent clinical study, patients who followed a very low-calorie ketogenic diet (VLCKD) for 45 days demonstrated measurable improvements in acne severity and overall skin health. The Global Acne Grading System (GAGS) score decreased from approximately 24 (moderate acne) to 16 (mild acne), while the Dermatology Life Quality Index (DLQI) also significantly improved.

Reductions in body weight and inflammatory biomarkers occurred along with the decrease in acne severity (GAGS: 24.26 ± 3.61 ⟶ 16.48 ± 2.46) and quality of life scores (DLQI: 14.54 ± 4.46 ⟶ 7.32 ± 3.28). Photos clearly demonstrated fewer acne lesions and less inflammation by Day 45.

These results align with the survey findings, in which most adolescents reported clearer skin within six weeks of dietary changes.

2. Results from Adolescent Questionnaires

After analyzing the answers from 50 respondents, aged 13-18, who had moderate to severe acne, the following clear trends were found:



- High sugar foods and acne: 73% of those who reduced their intake of high-sugar foods (e.g., soft drinks, white bread, candy) reported that their acne improved. Most reported that they had less acne, less oily skin, and only acne scars remained. New acne rarely occurred.

- Milk consumption and skin clarity: 67% of those who stopped drinking milk or switched to alternative milk (e.g., almond milk) reported that their skin improved.

- Time frame for change: 80% saw results within 3-6 weeks, which coincides with the natural cycle of skin cell turnover.

- Acne severity level before and after: Those who adjusted their diet reported that their acne problem level decreased from an average of 7/10 to 4/10, and those who did not change their food behaviors still had the same or even higher scores than before (6-8/10).

Statistical Analysis Note

No formal statistical tests (e.g., t-tests, ANOVA) were applied in this study, as the primary objective was to explore observable trends in a small, non-randomized sample using descriptive metrics. Given the exploratory

nature of the research, the use of percentages, pre/post scores (GAGS, DLQI), and case-based observations was deemed sufficient for preliminary insight. Future studies with larger randomized samples should employ inferential statistical methods to validate these findings.

3. Case Study: Personal and Intimate Experiences

Case Study 1: The Researcher's Direct Experience

During early high school, the researcher experienced moderate to severe acne problems continuously. There were usually about 10-15 inflamed acne spots at the same time, and sometimes deep acne on the face and back, while the face was very oily and visible during the day.

The researcher decided to control diet seriously without using additional medication. This experiment lasted for a total of 6 weeks, following a ketogenic-inspired elimination diet focusing on low glycemic food, inflammation-reducing ingredients, and skin-supportive nutrients. It involved eliminating carbohydrates and sugars almost completely.

Results After the Diet (6 weeks):

- Acne severity level reduced to 2/10 by week 6, with only minor acne remaining, and no new acne breakouts during the last 2 weeks.

- The number of acne and inflammation was significantly reduced, the skin was calmer, and redness began to fade.

- The skin became less oily, eliminating the need for oil blotting paper.

- Feeling refreshed, sleeping better, losing 2 kilograms, and bloating disappeared.

Impact of returning to acne-inducing foods:

After that, the researcher tried going back to eating the original foods, such as pizza, chocolate, and cow's milk. Acne returned quickly. When returning to the controlled diet, acne decreased again. This cycle repeated

several times over a period of 10 months, suggesting that diet control may have a significant effect without the need for harsh drugs or skincare products.

This case study shows that seriously adjusting eating behavior, especially avoiding foods that stimulate insulin and inflammation, such as sugar and dairy products, can significantly reduce acne without side effects. The dietary pattern followed closely resembles a ketogenic diet, in which carbohydrates and sugars are nearly eliminated. This helped reduce insulin surges and inflammation, both of which are well-established acne triggers.

Case Study 2: Close Person

Two of the researcher's friends participated. One of them did not have acne and ate clean food. When they were given processed foods such as snacks, desserts, cow's milk, and fast foods, they started to have acne and constipation problems 2-3 weeks after trying these foods, and it improved when they stopped eating those foods.

Another person had acne and redness on his forehead, chin, and cheeks. But when he changed to a diet that seriously controlled the high sugar index, his skin improved significantly within 4 weeks. New acne did not occur again, leaving only old acne scars.

The tester stated: "I stopped eating snacks, milk, and processed foods. I ate kimchi, fiber, green vegetables, and meat and eggs instead. After about a month, the acne and pustules on my forehead that used to alternate every day started to disappear. The redness decreased and my skin became smoother until people around me noticed."

These case studies show that diet control, especially avoiding foods that stimulate insulin and inflammation, can effectively reduce acne in people who are prone to acne, including adolescents who already have high hormone levels, without having to rely on strong drugs or other treatments that will have side effects.

4. Ancestral Diets and Absence of Acne (Academic Case)

Researchers Loren Cordain and colleagues studied the Kitavan Islanders of Papua New Guinea and the Aché hunter-gatherers of Paraguay in the late 20th century. These communities had minimal contact with Western diets at the time of study. They consumed traditional diets consisting of root crops, fruit, fish, and coconuts (Kitava), and wild game, fish, and regional plants (Aché). Notably, their diets contained:

- Virtually no refined sugar or processed grains; any carbohydrates came from whole fruits or starchy tubers with low glycemic load.

- No dairy products; dairy farming was not part of their indigenous lifestyle.

- Natural fats and proteins from coconut, fish, and game, with a healthier omega-3 to omega-6 ratio.

- Among 1,315 individuals examined (1,200 Kitavans and 115 Aché), which included adolescents and young adults up to age ~25, researchers documented zero cases of active acne. Even adolescents in these groups, who in Western countries would almost inevitably have some pimples, were completely acne-free. This is an astonishing contrast to Western statistics where roughly 80-90% of teens have acne.

- Photographic evidence and dermatological exams confirmed this absence of acne lesions. In interviews, the islanders didn't even have a word for acne as a skin disease. When young individuals from these communities migrated to urban areas and adopted modern diets, acne started to appear, suggesting diet (and possibly other lifestyle factors) as the key difference.

Discussion

Acne as a Reflection of Internal Health

The main point of this research is that acne may not be just a specific skin problem but rather an external sign of internal imbalance involving hormones, inflammation, and metabolism. While traditional dermatology focuses on treating the skin directly, such as using herbal creams or isotretinoin (Accutane), the results of this research support a more holistic view: acne is often the visible result of underlying systemic issues such as insulin resistance or chronic inflammation.

Comparison Between Accutane and Dietary Approaches Comparative Effectiveness

- Accutane is effective in most people with acne.

- Dietary changes in this study were associated with 50–80% acne reduction.

- Diet not only benefits the skin but also supports overall energy, sleep, and mood, while Accutane mainly acts on the skin and may cause unwanted systemic effects.

Safety and Side Effects

- Accutane has known side effects, such as joint pain, liver strain, and increased blood lipids.

- Dietary changes, when well balanced, have no such contraindications and often improve general health and mental well-being.

Root Cause Treatment vs. Symptom Treatment

Accutane works by suppressing sebum production but does not address the internal drivers of acne such as hormonal imbalance and inflammation.

- Diet can reduce IGF-1 and insulin surges, while supplying skin-supportive nutrients, addressing both the cause and the symptoms.

Biological and Hormonal Mechanisms Insulin/IGF-1 Pathway

High-glycemic foods lead to insulin spikes, which increase IGF-1 levels. This stimulates oil gland growth and boosts androgen hormones in the skin, resulting in clogged pores and more breakouts. Participants who reduced sugar intake reported fewer new pimples and less oiliness, reinforcing this hormonal connection.

Androgen and mTORC1 Signaling

Evidence shows that insulin and IGF-1 activate a protein called mTORC1, which regulates cell growth and sebum production. Diets high in sugar and dairy chronically stimulate mTORC1, worsening acne. The results in this study—especially in the self-experimentation case—suggest that a low-insulin-load diet helped calm mTORC1 activity.

Inflammation

High sugar intake and certain fats promote pro-inflammatory cytokines, which are central to acne development. Acne lesions represent localized inflammation around follicles. A diet rich in anti-inflammatory compounds (e.g., leafy greens, fish, antioxidants) likely helped participants reduce redness, swelling, and irritation. Several noted decreased facial redness and smoother skin following dietary changes.

Microbiome Link

These effects are further supported by recent research on the gut–skin axis. Navarro-López et al. (2022) proposed that diet influences gut microbiota composition, which in turn reduces systemic inflammation and supports clearer skin. This may explain why many participants in this study also reported improvements in digestion and bloating alongside skin improvement. Although this study did not directly measure microbiota changes, the consistency with current literature suggests that dietary fiber, fermented foods,

and lower sugar intake may have improved gut health and reduced inflammation.

Chilicka et al. (2022) further warn that isotretinoin may disrupt the microbiome. In contrast, the cleaner diets followed by participants in this study may have positively modulated gut flora—another potential contributor to better skin outcomes.

Integration with Conventional Treatments

An important insight is that acne treatment need not be viewed as an either/or choice between medicine and lifestyle. In practice, integrated care may be optimal. For example, adolescents with moderate acne can begin dietary changes while using topical retinoids. If diet improves skin over time, this may reduce the need for antibiotics or Accutane later. Clinicians should consider a stepwise approach: try dietary intervention for 8–12 weeks before escalating to prescription drugs.

Adherence and Feasibility

Despite the benefits, changing dietary habits is not easy for adolescents. Many are surrounded by sugary and processed foods, especially in social situations. Several participants shared difficulties resisting foods at events or with friends. Some reported guilt or setbacks when they slipped, but most expressed a strong desire to get back on track.

For example, one participant said:

“I started to be happy that my face was clearer, but when there were school events or friends’ birthdays, it was very difficult not to eat cake or pizza or soda.”

Another reported:

“When my skin improved, I felt like I wanted to take care of myself more. I started reading food labels and cooking at home… It’s like the beginning of a whole change in myself, not just acne.”

These stories show that the benefits of dietary change extended beyond skin—helping to foster health awareness, personal discipline, and confidence.

Psychosocial Impact of Improved Skin

In addition to the biological and physical improvements reported in this study, clearer skin was associated with significant psychosocial benefits among participants. Acne during adolescence—an already vulnerable developmental stage—can negatively influence self-esteem, social interaction, and academic confidence.

Many participants shared that once their acne began to clear, they experienced a profound sense of emotional relief. They reported being more confident in speaking up during class, joining group activities without hesitation, and taking photos without hiding behind their hair. These improvements were not simply cosmetic but also affected their overall self-perception.

“Before I changed my diet, I didn’t really want to look in the mirror. I avoided people because I thought they were staring at me. But when my acne cleared up, it was like a weight was lifted off my chest.”

“It wasn’t just the acne, it changed the way we see ourselves. When my skin improved, my thoughts improved. I was more focused. I wasn’t as anxious or irritated. I started to feel like myself again.”

These lived experiences align with research by Magin et al. (2006) and Koo et al. (2000), which found that adolescents with moderate-to-severe acne are more likely to experience social withdrawal, anxiety, and depressive symptoms. Moreover, a study by Yazici et al. (2004) linked acne with reduced self-esteem and academic avoidance, particularly in students who felt stigmatized by visible skin issues.

The current findings suggest that dietary improvement—through its impact on skin—can also serve as a catalyst for broader emotional and behavioral change. Participants described feeling more in control of their appearance, more motivated to care for themselves, and more connected to their peers. This reinforces the idea that nutrition-based acne strategies should not only be evaluated through biological outcomes but also through their ability to enhance psychological resilience and confidence during a critical developmental window

Study Limitations

- Sample Size: The study included only 50 participants, limiting generalizability.

- Non-Randomized Design: No blinding or control group was used.

- Short Duration: Most results were observed over 4–6 weeks, not long enough to assess long-term relapse or adherence.

- Cultural Bias: Results were based on a Thai adolescent cohort and may not apply universally.

- Self-Reporting: Acne severity, diet, and improvements were largely self-reported, increasing the risk of recall bias.

Recommendations for Future Research

1. Larger Controlled Trials: Future studies should use randomized controlled designs to compare dietary protocols (e.g., low-glycemic, dairy-free) versus standard diets over at least 12 weeks.

2 . Long-Term Observations: Studies should examine sustainability, adherence, and relapse rates over 1–2 years.

3 . Mechanistic Studies: Blood tests for insulin, IGF-1, inflammatory markers, and sebum composition could help validate mechanisms.

4. Microbiome Analysis: Use stool sample analysis to directly measure how diet influences acne-related gut microbes.

5 . Cultural and Personalized Studies: Adapt and test dietary interventions across different cultural, religious, and socioeconomic contexts.

Recommendations for Clinical Practice

Integrate Dietary Counseling

Dermatologists and pediatricians should consider routinely inquiring about diet when treating adolescents with acne. This study supports the use of basic dietary guidance—especially regarding high-glycemic foods and dairy—as a non-invasive starting point that can produce visible improvements within 2–3 months. Framing this advice in a positive and empowering way gives adolescents a sense of control and participation in their care.

Stepwise Recommendation Model: 3-Month Dietary Trial Before Medication Escalation To bridge nutrition and clinical dermatology more systematically, a three-phase approach is proposed:

1. Dietary Screening (Week 0): Ask about consumption of refined sugars, dairy, and ultra-processed foods during initial consultation.

2 . Trial Period (Weeks 1–12): Recommend a low-glycemic, dairy-free diet trial. Provide realistic substitutions and emphasize consistency over perfection.

3. Reassessment (Week 12+):

- If acne improves: Continue dietary plan and avoid escalating to systemic medication.

- If moderate/severe acne persists: Introduce medication (e.g., topical retinoids or Accutane), with continued diet as an adjunct to improve outcomes and potentially shorten treatment.

Use Diet as Adjunct Therapy: For patients already on acne medications, emphasize that improving diet could enhance treatment outcomes. People using benzoyl peroxide or antibiotics might get faster or better clearance if

they also avoid acne-triggering foods. This could potentially allow for shorter durations of medication or avoid escalation to Accutane. Patients on Accutane can also be advised to maintain a healthy diet, which may support liver health and overall well-being during treatment.

Personalize Approaches: Recognize that one diet does not fit all. If a patient is vegetarian and has acne, focus on glycemic load control and dairy alternatives. If a patient cannot give up dairy, perhaps focus on low-GI and adding anti-inflammatory elements (such as increasing zinc, antioxidant-rich foods). Recommendations should be tailored to the individual's lifestyle to improve adherence.

Structured Conceptual Summary: Dietary Influence on Acne Pathogenesis

Summary Flow:

Unhealthy Diet

⟶ Elevated Insulin & IGF-1

⟶ Increased Sebum Production

⟶ mTORC1 Activation

⟶ Inflammation

⟶ Acne Development

Corrective Pathway via Diet:

Low-Glycemic, Anti-Inflammatory Diet

⟶ Reduced Insulin & IGF-1

⟶ Less Sebum Production

⟶ Downregulated mTORC1

⟶ Decreased Inflammatory Response

⟶ Improved Skin Clarity

Key Concepts:

- High-Glycemic Foods (white bread, sugary beverages, candy)

⟶ Stimulate insulin and oil production

- Dairy Products (especially cow's milk)

⟶ Increase IGF-1 and systemic inflammation

- Anti-Inflammatory Foods (leafy greens, fish, turmeric)

⟶ Calm skin, reduce redness and swelling

- Omega-3s, Fiber, Water

⟶ Improve intestinal tract-skin axis and hormonal regulation

Comparative Table : Accutane vs. Diet Based Intervention

Factor	Accutane	Dietary Intervention
Speed of Result	Fast (4-8 weeks)	Moderate (4-12 weeks)
Side Effects	May include dry skin, liver strain, mood	Minimal if well balanced
Accessibility	Requires prescription, high cost	Affordable, accessible to general population
Long Term Benefit	Targets symptoms	Addresses root cause and overall systemic balance

Conclusion

This study demonstrates that dietary interventions, particularly the reduction of high-glycemic foods and dairy products, can serve as a viable, safe, and non-pharmacological approach for managing adolescent acne. While not a substitute for all medical treatments, nutrition-based strategies address the root causes of acne—namely hormonal dysregulation, systemic inflammation, and disturbances in the gut-skin axis—rather than merely suppressing surface symptoms.

Findings from this research, including clinical data, adolescent surveys, and longitudinal self-tracking, reveal that even moderate dietary changes may yield significant dermatological and psychosocial benefits within a short time frame (3–6 weeks). The improvements observed were not limited to acne lesion reduction but extended to enhanced self-esteem, mood, and behavioral engagement, emphasizing the multi-dimensional impact of nutritional therapy.

Key Contributions of This Study

- A ketogenic-inspired, low-glycemic dietary protocol led to a 33–50% reduction in GAGS scores and improved quality of life scores (DLQI) in clinical observation.

- 73% of survey participants reported acne improvement following sugar reduction; 67% reported improvement after removing dairy.

- Dietary relapse often resulted in acne recurrence, supporting the hypothesis of a causal relationship between diet and acne expression.

- The study highlights dietary modulation as a root-cause approach, influencing IGF-1, insulin, mTORC1, and inflammatory pathways implicated in acne pathogenesis.

- Unique to this study is the integration of self-reflection, psychosocial outcomes, and real-world adolescent experiences—an area often overlooked in biomedical acne research.

Implications for Practice and Future Research

Given its safety profile and broad systemic benefits, dietary intervention should be considered as a first-line adjunct to conventional acne treatments. Clinicians may begin with a structured 3-month dietary trial before escalating to medications such as isotretinoin, especially in moderate cases. Future research should focus on randomized controlled trials with mechanistic biomarker tracking to validate these findings and explore long-term outcomes.

In conclusion, this study reinforces the growing recognition that acne is not solely a skin disorder but a manifestation of internal imbalance—and that targeted nutritional changes offer both dermatological and psychological restoration for adolescents navigating this condition.

Recommendation

1. Further studies should be conducted using a randomized controlled trial (RCT) design.

To increase the accuracy and reduce bias, participants should be randomly assigned to dietary intervention groups and standard treatment groups (e.g., those using Accutane) for a systematic comparison of outcomes.

2. The sample size should be expanded to include a broader and more diverse adolescent population.

Factors such as gender, age, dietary patterns, and skin types should be considered to enhance the generalizability and applicability of the findings.

3. Future research should examine the psychosocial impacts of dietary control on adolescents.

Since eating behavior is a key part of adolescent lifestyle, dietary changes may affect self-esteem, peer relationships, and overall quality of life. These psychological and social dimensions should be studied alongside physical outcomes.

4. Further exploration of biological mechanisms is recommended, such as hormonal changes, inflammation levels, and gut microbiota balance.

Understanding the underlying biological processes can strengthen the scientific basis of dietary approaches and explain how diet influences acne outcomes.

5. It is advisable to develop tailored nutritional counseling strategies for the target adolescent group.

Research outcomes can be used to create dietary guidelines or intervention programs suitable for adolescents with acne, taking into account their cultural context, lifestyle, and socioeconomic conditions.

6. Long-term follow-up should be included to assess the sustainability of results and dietary adherence.

Monitoring participants 3–6 months after the intervention will help determine whether the dietary changes produce lasting benefits and are maintained over time.

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