

Consumption of dairy in teenagers with and without acne

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Background: Recent literature has implicated dairy as having a potential acne-inducing effect.

Objectives: The aim of this study was to investigate the link between dairy consumption and acne in teenagers. We tested the hypothesis that teenagers with facial acne consume more dairy than those without acne.

Methods: A case-control study was conducted among 225 participants, ages 14 to 19 years, with either moderate acne or no acne. Moderate acne was determined by a dermatologist using the Global Acne Assessment Scale. Participants who met inclusion criteria then completed up to three 24-hour diet recall interviews using the Nutrition Data System for Research software and food and nutrient intake were compared between groups.

Results: The amount of low-fat/skim milk consumed by participants with acne was significantly higher ($P = .01$) than those with no acne. No significant difference was found among total dairy intake, saturated fat or trans-fat, or glycemic load. No significant difference was found for total energy intake or body mass index.

Limitations: Limitations include self-report of diet and portion size, and association does not determine causation.

Conclusions: Consumption of low-fat/skim milk, but not full-fat milk, was positively associated with acne. (J Am Acad Dermatol <http://dx.doi.org/10.1016/j.jaad.2016.04.030>.)

Key words: acne; acne vulgaris; dairy; diet; glycemic index; glycemic load; milk; skim milk.

Acne vulgaris affects approximately 45 million individuals in the United States.¹ The pathogenesis of acne is a complex process that involves multiple factors, including innate immunity, hormonal influences, and genetics. The impact of environmental factors including the role of diet in acne pathogenesis is still being elucidated.

Early research into a link between diet and acne yielded mixed results. Dairy² and diets high in iodide³ were suggested to worsen acne. Other studies tested foods commonly thought of as acne triggers and found no association.^{4,5} The discussion

was quiescent for years until a study found virtually no acne in select non-Westernized populations, leading researchers to infer that a Western diet may be to blame.⁶ Subsequent studies suggested an association between dairy, particularly skim milk, and acne. In 2005, Adebamowo et al⁷ found that milk intake was increased among adolescents with acne in a retrospective analysis of women who had experienced acne in their teenage years. Two studies of large cohorts of adolescent boys and girls with acne found the association to be stronger with skim milk.^{8,9} Other studies implicated glycemic load and

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milk consumption.¹⁰⁻¹² Much of this prior research was flawed with design errors, recall bias, small sample size, and use of nonvalidated food diaries for data collection.

METHODS

This study used a case-control method to study dietary intake in people aged 14 to 19 years. We recruited 225 participants from dermatology and pediatric clinics at the Hershey Medical Center in Hershey, PA, and Pinnacle Health System in Harrisburg, PA. The institutional review board at Pennsylvania State College of Medicine approved the study. A total of 120 participants with moderate facial acne, evaluated by a dermatologist using the Global Acne Assessment Scale, were included in the acne group. The control group was composed of 105 participants with no evidence of acne. Participants completed a questionnaire that included information on height and weight, medications, and dietary restrictions. Participants on medications requiring dietary alteration, and those previously on isotretinoin or starting oral contraceptive pills within the last 6 months, were excluded. Participants with dietary dairy restrictions, such as lactose intolerance or vegans, and those with a history of eating disorder were also excluded. Participants completed up to 3 telephone interviews using a 24-hour diet recall technique and the Nutrition Data System for Research software. Telephone interviews were conducted at random and included 2 weekdays and 1 weekend day to obtain an accurate sampling of the participants' typical food intake. Specific data regarding intake of milk and other dairy products along with nutrient totals for the acne group were compared with those of the control group.

Statistical methods

The primary outcome variables in this study were dairy intake values, including total daily dairy serving, and total daily servings of full-fat (3.5%), reduced-fat (2%), and low-fat (1%)/fat-free (skim, nonfat) milk and other dairy products. The program grouped low-fat and skim milk into 1 measurement that was inseparable in analysis. Other measured outcome variables included total energy intake and total daily carbohydrates/fat/protein intake. The main independent variable in this study was acne. Descriptive statistics, such as mean and SD of these

continuous variables, were constructed, firstly for all subjects and then for subjects in the acne and control groups separately. The relationships between the outcome variables and the group variable were examined by linear mixed models for repeated measurements: group (acne vs control) served as the primary independent variable while adjusting for

multiple demographic variables, including age, gender, and body mass index. Variance components covariance structure was used in the linear mixed model while other covariance structures were explored and examined. The demographic variables were compared between 2 groups by 2-sample *t* test or χ^2 test when appropriate. All hypothesis tests were 2-sided and analyses

were performed using statistical software (SAS, Version 9.3, SAS Institute, Cary, NC). The significance level used was .05.

RESULTS

Table I shows the demographics of acne and control groups. The average age of patients with acne was 16.9 (SD 1.5) years compared with 16.7 (SD 1.4) years for participants in the control group. The acne group was 50.8% female and the control group was 56.2% female. The average body mass index was 22.8 (SD 3.7) in the acne group and 23.8 (SD 5.7) in the control group.

The relationship between consumption of dairy products and acne is shown in Table II. The average dairy consumption of the combined groups was 2.51 servings of dairy per day. The total dairy consumption in the acne group was slightly higher than that of the control, reaching statistical significance with a *P* value of .02. There were no statistically significant differences in the total amount of full-fat (*P* = .95) and reduced-fat (*P* = .36) dairy between the 2 groups. The total low-fat/fat-free dairy consumption also differed between the 2 groups with a *P* value of .03. In looking at milk specifically, the group with acne consumed 0.61 servings of low-fat/skim milk per day compared with 0.41 servings in the control group, with a *P* value of .01. There were no significant differences in the consumption of whole or reduced-fat milk between the 2 groups (*P* = .75 and .44, respectively). When low-fat/skim milk is removed from total dairy consumed, the difference between the acne and control groups loses statistical significance (*P* = .23, not shown in Table II).

CAPSULE SUMMARY

- Several studies have implicated a role for dairy consumption in acne vulgaris.
- This study shows that low-fat/skim milk, but not full-fat milk, is positively associated with moderate acne.
- Studies documenting the impact of dietary interventions are needed before dietary recommendations can be made.

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