

## SHORT COMMUNICATION

### Dietary Regimes for Treatment of Acne Vulgaris: A Critical Review of Published Clinical Trials

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Acne is one of the most common inflammatory skin diseases (1). It occurs primarily among teenagers and young adults; however, many continue to experience the disorder in adult life, and the prevalence of adults with acne is increasing (2).

The standard treatment for acne vulgaris include various topical treatments, long-term use of low-dose antibiotics, or isotretinoin. As there is increasing and widespread antibiotic resistance, other treatment alternatives are needed. Complementary treatments for acne have been discussed in a recent Cochrane review (3); one of these was dietary change. During the past 10 years, an increasing number of epidemiological studies have shown a connection between a high intake of milk products and acne in western societies (4–7). Case-control studies have further supported this idea (8, 9). The molecular basis for such a connection includes signalling pathways (10, 11). Epidemiological data indicate an association between acne and the intake of food with a high glycaemic load (HGL) (12–14) but additional clinical studies are needed (3, 13).

The aim of this study is to review published placebo-controlled clinical intervention studies to determine whether there is evidence to support dietary treatment for acne vulgaris.

## METHODS

A systematic review of publications from the PubMed database was performed. Inclusion criteria were: (i) clinical trial publications; (ii) written in English (Table SI<sup>1</sup>).

A total of 27 articles met the inclusion criteria. Of these, 20 publications were excluded when read in full-text due to one of the following 4 exclusion criteria: (i) conventional acne treatment was included in the trial; (ii) the trial examined the effect of a dietary supplement, such as vitamins or probiotics; (iii) the hypothesis in the trial did not match the aim of this study; and (iv) the trial was not an intervention study. Of the 7 included publications, one was a duplicate, and thus 6 articles remained (Table SII<sup>1</sup>).

Analysis and determination of the quality of the studies was based on a questionnaire from SBU (the Swedish Council on Health Technology Assessment) (15). The following parts were categorized into low, average or high risk for bias: A1=Selection bias; A2=Performance bias; A3=Detection bias; A4=Attrition; A5=Reporting bias; A6=Other considerations.

When A1–A6 had been evaluated, the risk for bias was summarized into one of the following: low risk, average risk or high risk.

## RESULTS

Four of the 6 included studies investigated whether a low glycaemic load (LGL) diet could improve symptoms of acne vulgaris (Table SIII<sup>1</sup>). Only 2 of these achieved significance in terms of a decrease in acne lesions (16, 17, 20, 21).

Two studies tested the hypothesis that chocolate could worsen or cause acne vulgaris. The result of the first study, from 1969, showed no correlation; instead some subjects showed ameliorated acne with chocolate, which was contrary to the hypothesis (18). The second study, from 2014, showed a significant increase in acne lesions following intake of cacao-filled capsules (19).

Four studies showed a low risk for bias after the quality assessment and 2 showed an average risk. The study from 1969 had the highest risk for bias (Table SII<sup>1</sup>) (18). This was a single-blinded study and the randomization method was not described. The reader could not assess the method used for grading acne and the reasons for drop-outs were not given.

The study by Reynolds et al. (20) also received an average risk for bias. All the participants, even those assigned to the HGL diet, were given the information that a LGL diet might improve acne. The randomization method was not described and the study had a drop-out rate of 26%.

The 2007 study (16) had a drop-out rate of 22%, but no other increased risks, which resulted in a low total score (Table SIII<sup>1</sup>). The same applied to the 2008 study (21), which had a drop-out rate of 43%. There were no drop-outs in the Kwon study (17), which had a low score in all parts of the quality assessment. The latest study, from 2013 (19), had one participant (8%) who dropped out. Still, it received an average risk in that section, as the reason for the drop-out was not revealed.

## DISCUSSION

We found only 6 studies which performed an actual clinical intervention; all concerning HGL and/or chocolate, and only 3 of these gave significant results. However, there are also other aspects of food intake that may aggravate acne. Today, there are persuasive data that dairy products made from cow's milk have a negative effect on teenage acne (4, 5), but intervention studies have not been performed.

<sup>1</sup><http://www.medicaljournals.se/acta/content/?doi=10.2340/00015555-2231>

A problem with the 6 studies included in our review is that they all have quite small study populations (13–65 participants). Another issue is the acne-grading system used, which might influence the results. Four of the studies used the “Leeds Acne Grading System”, one used the International Global Assessment (IGA), and the 6<sup>th</sup> study did not use any specific method; the researchers merely counted all the lesions (inflammatory, non-inflammatory, pustules and comedones) on the left side of the face. Two of the studies showed a decrease in lesion counts with an LGL diet. Fulton’s trial from 1969 was the first clinical trial regarding dietary habits and acne (18). This study has later been criticized (18, 22). The second, more recent, study that tested the hypothesis of chocolate as a cause of acne (18) presented contrary results, indicating that cacao might aggravate acne.

This is an area that requires further research; in particular studies with larger sample sizes are required. Although there is convincing evidence of a correlation between different foods and acne vulgaris, there are no intervention studies supporting that dietary regimes are of clinical relevance or can be used in clinical practice. The area also has to be widened; trials including restriction of milk products are desirable. A combination of a LGL diet and restricted intake of cow’s milk should perhaps be applied as the intervention in a study.

In conclusion, the question of diet as a treatment for acne cannot be answered with the studies reviewed in this paper; more research is needed. This conclusion is in accordance with recent reviews (3, 13), in which the authors examined various complementary treatments for acne and the connection between acne and nutritional factors. The answer will be derived from the combination of published placebo-controlled intervention studies, case-controlled clinical studies, epidemiological surveys and biochemical research linking nutrient signalling to the pathogenesis of acne.

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