

Qualitative Research

Effects of Dairy Products on Crohn's Disease Symptoms Are Influenced by Fat Content and Disease Location but not Lactose Content or Disease Activity Status in a New Zealand Population

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ABSTRACT

Background Dairy products have been perceived as having the potential to cause adverse effects in individuals with Crohn's disease (CD) and are often avoided, potentially increasing the risk of osteoporosis and related morbidity associated with inadequate dietary calcium intake.

Objective To evaluate the self-reported effects of dairy products on CD symptoms and to determine whether these effects differed between types of dairy products consumed and disease state or location.

Design Secondary analysis of dietary survey and clinical data from participants in the Genes and Diet in Inflammatory Bowel Disease study based in Auckland, New Zealand.

Subjects/setting One hundred and sixty-five men and women diagnosed with CD for which both dietary survey data and clinical information were available.

Statistical analyses performed χ^2 analysis was conducted to assess whether significant differences in the proportions of responses relating to a worsening of CD symptoms from individual dairy products were evident between individuals with active or quiescent CD, or ileal or colonic

disease locations. Odds ratios with confidence interval were calculated to determine whether CD location was associated with risk of any type of adverse reaction to milk products. Logit scales were utilized to depict self-reported CD symptoms associated with individual dairy product consumption for ileal and colonic CD patients.

Results Dairy products had no effect on self-reported CD symptoms for most people. Dairy products with a high fat content were most frequently reported to worsen perceived CD symptoms. Clinically, self-reported CD activity status did not influence responses to dairy products; however, colonic inflammation was more frequently associated with adverse CD effects in comparison to ileal CD involvement.

Conclusions Research outcomes question the necessity of dairy product avoidance in CD patients and illustrate the highly individual nature of dairy product tolerance in this clinical population.

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Crohn's disease (CD) is a debilitating form of inflammatory bowel disease that can affect any location of the gastrointestinal tract, resulting in considerable morbidity (1). The incidence of CD in a New Zealand-based epidemiological study was 16.5/100,000 per year, (2), higher than in many Western countries and, thus, affecting a substantial proportion of the New Zealand population.

Dairy products have often been perceived as having the potential to cause adverse effects in individuals with CD and so are often avoided, potentially increasing the risk of osteoporosis and related morbidity associated with inadequate dietary calcium intake.

There are several hypotheses proposed to explain this perceived adverse effect. Perhaps the most frequently reported theory relates to the prevalence of lactose intolerance in CD patients. A higher prevalence of lactose malabsorption, as diagnosed by hydrogen breath testing, in individuals with CD has been reported in comparison to controls (3). Allergy to major milk proteins may be another reason that a small number of CD patients report adverse effects from dairy products (4). In addition, individuals with CD might be susceptible to secondary lactose

intolerance. During the periods of the acute gastrointestinal inflammation characteristic of CD, quantities of lactase, the lactose digesting enzyme, may decline in the duodenal mucosa, resulting in the gastrointestinal discomfort associated with lactose maldigestion (5). Thus, disease state (active or quiescent) can affect response to dairy products in this clinical population.

Disease location may further influence tolerance to dairy products in individuals with CD. Barrett and colleagues reported a higher proportion of lactose malabsorption in patients with ileal CD in comparison to colonic CD (3). As lactase is located within small intestinal villi, this is the primary site of lactose digestion (6). Thus, individuals with inflammation located within this region of the gastrointestinal tract may have difficulties with lactose intolerance and, thus, perceive that adverse CD symptoms are associated with consumption of dairy products.

The aim of this study was to evaluate the self-reported effects of dairy products on CD symptoms and to determine whether these perceived effects differed between types of dairy products consumed, disease state, or location. The identification of dairy-mediated effects on CD symptoms may facilitate the provision of more targeted dietary advice on dairy products for this clinical population.

METHODS

This study was based on a secondary analysis of dietary survey and clinical data from 165 adults with CD. All subjects were white participants in the Genes and Diet in Inflammatory Bowel Disease study, which was an observational study based in Auckland, New Zealand (7). Subjects were selected on the basis that a complete set of dietary and clinical data was available.

The original study was approved by the New Zealand Multi-Region Human Ethics Committee (MEC/04/12/011). Access to the data for this secondary analysis met ethical approval and all information utilized was coded to protect the anonymity of participants.

Clinical Data

Clinical information including age, inflammatory bowel disease diagnosis, and latest Montreal classification illustrating latest CD location (8) was provided after evaluation of patient medical notes and secondary patient investigation by an experienced gastroenterologist as a part of the Genes and Diet in Inflammatory Bowel Disease study. Individuals with a latest Montreal classification of L1, indicating ileal involvement, were grouped into the Ileal Involvement group. Although individuals with a classification of L2, indicating isolated colonic involvement, were classified as the Colonic Involvement group. To ensure that effects observed could be attributable to either colonic or ileal disease locations, individuals with a classification of L3 and L4 (indicating ileocolonic and upper gastrointestinal disease in the presence of classifications of L1 to L3, respectively (9), were excluded from this part of the analysis.

Additional clinical information was sought from the dietary questionnaire whereby subjects self-reported current disease activity status (active or quiescent).

Dietary Data

For the purpose of this study, dairy products were categorized to include ruminant milk (inclusive of sheep, cow, and goat varieties), yogurt, butter, custard, ice cream, cream, and cheese.

The original dietary questionnaire utilized for this study was developed in conjunction with CD patients and aimed to identify foods that were considered either beneficial or detrimental to self-reported CD symptoms. Dietary data were reassessed 6 months after completion in a subset of CD patients with consistent results indicating good survey reliability. All data were cross-checked independently by two researchers to ensure accuracy. The complete dietary questionnaire is described in more detail elsewhere (7).

Self-reported data on effects of dairy products were extracted from this dietary questionnaire, which required participants to indicate whether particular foods items made their inflammatory bowel disease condition “definitely worse,” “probably worse,” “had no effect,” “probably better,” or “definitely better.” Subjects reporting that particular dairy products made their condition either “definitely” or “probably worse” were categorized as having CD symptom worsening associated with consumption of that food. Similarly, those reporting a “definitely” or “probably better” effect of a particular dairy product on their CD condition were categorized as having a beneficial effect on CD symptoms from consuming that food. Several open-ended questions within the questionnaire were also analyzed to determine qualitative information about perceived effects on CD condition associated with particular dairy products. These questions included:

- Is there a difference with the type of cheese eaten? If so, please outline.
- Is there a difference with the type of yogurt eaten? If so, please outline.

Both quantitative and qualitative information about the frequency and nature of having any form of adverse reaction (such as nausea or bloating) to milk products was extracted from this supplementary questionnaire after an analysis of open-ended questions including:

- Have you ever had an adverse reaction to a milk product?
- What were your adverse symptoms after consuming milk products?
- Have you seen a health professional about your reactions to milk products (if applicable)?
- Have you been formally diagnosed with an intolerance or allergy?

Data Analysis

Qualitative data (including reports on symptoms of adverse reactions to dairy products and of symptomatic differences from different types of dairy products consumed) were categorized accordingly and the proportion of individuals responding to each category was calculated.

χ^2 analysis was conducted to assess whether substantial differences in the proportions of responses relating to a worsening of CD symptoms from individual dairy prod-

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