

# THE SPECIFIC CARBOHYDRATE DIET FOR INFLAMMATORY BOWEL DISEASE

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## THE POST [ | ] VOLUME 2 NUMBER 1

LAKEHEAD UNIVERSITY'S INTERDISCIPLINARY UNDERGRADUATE RESEARCH JOURNAL

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**Abstract:** Dietary treatments have been looked at as a method of controlling and reducing the number of exacerbations associated with inflammatory bowel disease. This method of treatment is relatively new and under-researched but is hypothesized to induce drug-free remissions. This meta-analysis compares two exploratory survey-style studies that look at the effect of the Specific Carbohydrate Diet (SCD) on individuals with Inflammatory Bowel Disease (IBD). Kakodkar, Farooqui, Mikolaitis, & Mutlu's 2015 article, "The Specific Carbohydrate Diet for Inflammatory Bowel Disease: A Case Series" obtained a sample size of 50 participants using convenience sampling. Medical records, a three-day diet diary, a structured survey of their medical history and a validated disease activity index were used to collect data from this population. Suskind, Wahbeh, Gregory, Vendettuoli & Christie's 2014 article, "Nutritional Therapy in Pediatric Crohn Disease" used convenience sampling and had a sample size of seven. All participants had Inflammatory Bowel Disease and were using the SCD to treat it. The second study further narrowed its criteria by restricting the population to pediatric patients. A retrospective chart review was used to study this population. Both studies found that the SCD could be effective in managing IBD, but due to their limitations and in order to provide conclusive evidence, it is clear that more research needs to be done.

**Keywords:** Specific Carbohydrate Diet, Inflammatory Bowel Disease, Nutritional Therapy, Drug-Free Remission, Crohn Disease, Pediatric

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**I**nflammatory bowel disease (IBD) includes both Crohn's disease and ulcerative colitis, and is a condition of idiopathic origin in which parts of the human body's digestive system become chronically inflamed. One of the primary treatments for IBD is dietary therapy. This paper will examine two studies that assess the effectiveness of the Specific Carbohydrate Diet (SCD) as a therapy. Kakodkar, Farooqui, Mikolaitis, & Mutlu's 2015 article "The Specific Carbohydrate Diet for Inflammatory Bowel Disease: A Case Series" and Suskind, Wahbeh, Gregory, Vendettuoli, & Christie's 2014 article "Nutritional Therapy in Pediatric Crohn Disease: The Specific Carbohydrate Diet" both examine the effectiveness of the Specific Carbohydrate Diet as treatment for patients diagnosed with IBD. Health care professionals – especially nurses – ought to be

aware of the impact of diet on a patient diagnosed with IBD, in order to most effectively manage patient assessment as well as patient education sessions. Education of health care professionals on the relative effectiveness of specific diets will, in turn, allow a patient to receive the most accurate information and the most effective treatment possible.

### **Problem Statement and Purpose**

The purpose of each of the articles identified above is to determine whether the Specific Carbohydrate Diet is an effective treatment for inflammatory bowel disease. Kakodkar et al. (2015) state that they "report on the largest series of patients with IBD following the SCD to date and describe their clinical characteristics" (p. 1226). Suskind et al. (2014) write that their research looks at a "retrospective chart review of ... pediatric patients with Crohn disease on low specific complex carbohydrate diets, that is, the SCD" (p. 87). No relationship between variables is clearly stated in either of the studies, but inferences can be made in both cases that they are looking for a negative relationship between the SCD and exacerbations of the disease. The population studied in Kakodkar et al. includes patients of all ages with inflammatory bowel disease on the SCD. In contrast, the population in Suskind et al. is comprised of pediatric patients with Crohn's disease who are being treated with the SCD. Both sets of researchers indicate that the SCD is a potential treatment for inflammatory bowel disease, making these studies significant for health care professionals and the population of people who suffer from IBD.

### **Review of the Literature and Theoretical Framework**

Kakodkar et al. (2015) identify their focus and their dependent variable as inflammatory bowel disease. These researchers explain that Specific Carbohydrate Diet (their independent variable) is "a dietary program that claims to induce and maintain drug-free remission in patients with IBD" (p. 1226). The article by Kakodkar et al. does not conceptually define inflammatory bowel disease, but their study population was operationally defined to include any patient who was diagnosed with IBD. The SCD is conceptually defined to include "carbohydrate foods consisting of monosaccharides only", it furthermore "excludes disaccharides and most polysaccharides" (p. 1226). The writers go on to

operationally define SCD by outlining what foods are included and excluded from the diet. There is no theoretical framework articulated but the relationship between these two variables is implicit in the literature review. Kakodkar et al. further state that there is a gap in the literature in that "neither the characteristics of patients who are following the SCD nor the benefits of this diet have been well described in the medical literature" (p. 1226).

Suskind et al. (2014) identify their dependent variable, Crohn disease, as "chronic intestinal inflammation in the absence of a recognized etiology" (p. 87), and operationally consider their study population as anyone who has been diagnosed with Crohn's by a medical professional. Here, the independent variable is also SCD and is operationally and conceptually defined by what foods are excluded from the diet. These researchers outline the relationship between these variables without using a theoretical framework by saying that "the (SCD) diet purports decreased intestinal inflammation by restoring the balance of bacteria within the bowels" (p. 87). Gaps in literature are implicit when these writers point out that diet as treatment for this condition has not been scientifically evaluated (p. 87).

## Hypotheses / Research Questions

Neither study has a clear-cut research question or hypothesis, probably because they are both preliminary in nature and can be considered exploratory. Both state that they are looking to study the clinical characteristics of patients with inflammatory bowel disease following the SCD (Suskind et al., 2014, p.87; Kakodkar et al., 2015, p. 1226). Both also imply in their respective literature reviews that they expect to find a negative relationship between exacerbations of inflammatory bowel disease symptoms (dependent variable) and the use of the SCD (independent variable).

## Sample

In the article by Kakodkar et al. (2015), convenience sampling is employed, which is the "use of the most readily accessible persons or objects as participants in a study" (LoBiondo-Wood & Haber, 2013, p. 263). Kakodkar et al. write that "subjects were recruited [from across the continental United States] through advertisements posted on SCD message boards and websites as well as through

our own gastroenterology clinics" (p. 1226). This type of sampling is probably the most appropriate study design, considering the population that fits the inclusion criteria is not very large. The sample is representative, since only people with inflammatory bowel disease that are on the SCD were included. Due to the specificity of the population being studied, the results are clearly only applicable to other people with inflammatory bowel disease who are on the SCD, or are considering it as a possible treatment. There were 50 participants, which is a fairly large sample, and their only task was to "send in their medical record along with a structured survey of their medical history, a 3-day diet diary, and a validated disease activity index" (p. 1226). Due to the relatively low time commitment, these researchers did not have to worry about sustaining their participants.

Convenience sampling was also used in the research by Suskind et al. in 2014. These researchers "initiated a retrospective chart review of children with Crohn disease seen at Seattle Children's Hospital from January 2005 to December 2012 who had been receiving SCD dietary therapy" (p. 87), although it is unclear how they determined which hospital to use. Convenience sampling is appropriate for this study due to the small population of participants who fit the research criteria, but these researchers could have expanded their search to other hospitals to get a larger sample; in fact, their study only had seven participants. Still, because this was a retrospective chart review, the authors were not compelled to maintain their sample. The sample that was selected reflects the population outlined in the study's purpose (pediatric patients with Crohn's on the SCD).

## Research Design

The research by both studies considered in this paper can be viewed as survey studies in which "detailed descriptions of existing variables are collected, and the data (is) used to justify and assess current conditions and practices or to make more plans for improving health care practices" (LoBiondo-Wood & Haber, 2013, p. 236). Both studies are exploratory in nature as "neither the characteristics of patients who are following the Specific Carbohydrate Diet nor the benefits of this diet have been well described in the medical literature" (Kakodkar et al., 2015, p. 1226). Also, there is a concern that "many diets have

been reported to be efficacious without scientific evaluation" (Suskind et al., 2014, p. 87). The survey study is the most appropriate research design because the authors of each article are filling information gaps in an under-researched topic.

### **Internal Validity**

In the article by Kakodkar et al. (2015), internal validity is affected by a history threat, or "another specific event [which] may affect the dependent variable, either inside or outside the experimental setting" (LoBiondo-Wood & Haber, 2013, p. 236). In this study, the use of immunosuppressive medication to decrease inflammation is identified as a history threat. Here, the study's internal validity is in question because it is hard to determine whether remission has occurred because of medication or diet. In response to the history threat, homogeneous sampling could not be considered a control because only some of the participants were on immunosuppressants.

Selection bias also affected this study's internal validity. Kakodkar et al. (2015) write that their limitations include their "choice of [...] subjects, all of whom were in remission, biasing [their] findings toward including patients with IBD who [...] benefited from SCD and were following it for months" (p. 1231). Plus, owing to participants' varying degrees of adherence to the SCD, one can assume that instrumental threats, which LoBiondo-Wood & Haber (2013) identify as "changes in the variable or observational techniques" also potentially affect internal validity (p. 208). It seems the study by Kakodkar et al. is lacking sufficient study controls. The only control that was used was constancy in data collection or the "ability of the data-collection design to hold the conditions of the study to a cookbook-like recipe" (LoBiondo-Wood & Haber, 2013, p. 204). All of the participants were required to fill out the same surveys and send in the same information, all around the same period of time, creating consistency.

In the article by Suskind et al. (2014), a history threat is evident in the form of other therapies used by study participants previous to the SCD. These other therapies include enteral nutrition therapy, use of mesalamine, and use of mesalamine with prednisone – all extraneous variables that could skew results (p. 88). Therapies used by study participants before using the SCD may well have had an effect on how well the diet worked, and introduce questions as to

whether results were due to diet at all. As well, the difference in the amount of time on the SCD creates an instrumentation threat because the variance in time equates to a variance in the independent variable. Suskind et al. write that the "duration of the SCD therapy ranged from 5 to 30 months" (p. 88). Just like the study by Kakodkar et al. (2015), the only control used is consistent data-collection procedures. This is easy to identify, as the data-collection consisted solely of retrospective chart reviews. Also, this study was conducted over 7 years, and therefore also must be evaluated in terms of a maturation effect – knowledge and treatments may have changed over the years in which the data was compiled. All in all, for each study, controls were not substantial enough to negate threats to internal validity.

### **External Validity**

Both articles are quite generalizable to the population for which this area of study is relevant (patients with inflammatory bowel disease). Of course, the research by Suskind et al. (2014) will only be useful for pediatric patients. Selection effect (selection of participants in a way that randomization cannot occur) was the only condition that affected the studies. Neither study had a control group that allowed for randomization; however, considering the exploratory nature of these studies, this concern should not be considered as greatly affecting external validity.

### **Research Approach**

Both studies used a nonexperimental, descriptive/exploratory survey which must be considered appropriate because SCD is a relatively new therapy option.

### **Methods**

Kakodkar et al. (2015) collected their survey data:

from patients with IBD following the SCD living within the continental United States. Subjects were recruited through advertisements posted on SCD message boards and websites as well as through [their] own gastroenterology clinics. Subjects mailed their medical records and filled out a structured survey of their

medical history, a 3-day diet diary, and a validated disease activity index. (p. 1226)

This data-collection method was consistent for all participants in their study.

Suskind et al. (2014) collected their data through "a retrospective chart review of children with Crohn disease seen at Seattle Children's Hospital from January 2005 to December 2012 who had been receiving SCD dietary therapy" (p. 87). This remained constant for each participant involved in the study.

Kakodkar et al. (2015) ensured that the rights of all the individuals involved in their research were protected by keeping their identities confidential. They were not compelled to implement any intervention which protected the patients from discomfort and harm in order to ensure fair treatment. In a voluntary study, the participant's right to self-determination is necessarily maintained. Kakodkar et al. identify that "the Rush University Medical Center Institutional Review Board approved the study protocol and all participants provided written informed consent (and child assent, if appropriate)" (p. 1229).

In their study, Suskind et al. (2014) safeguarded the rights of the participants also by keeping participant identities anonymous and confidential. Because their study was a retrospective chart review, participants were not influenced to be on the SCD in any way because of this study. There was no informed consent required of this group due to the nature of the study (as there is no need to gain informed consent for a chart review). As well, it should be noted that the study protocol was approved by the Seattle Children's Hospital institutional review board (p. 87).

For their research, Kakodkar et al. (2015) relied on available data and records, and had participants fill in their medical records. This data was then used to describe the sample as well as to outline disease progression and treatment effectiveness (to study the relationships between the variables). Questionnaires were also used in the study, which were a "structured survey of [a patient's] medical history, a 3-day diet diary, and a validated disease activity index" (p. 1226). More specifically, "a structured survey called the Gastrointestinal Symptom Severity Checklist [was used, where] each subject is asked to rate one symptom at a time on a visual analog scale from 0 to 10" (p. 1226). Quality of life was measured using "a validated instrument, the Short Quality of Life in

Inflammatory Bowel Disease Questionnaire (SIBDQ). Subjects also rated their self-adherence to the SCD and the effectiveness of the SCD on a visual analog scale of 0% to 100%" (p. 1227). All of the survey techniques used would be considered Likert-type scales because they all involve "a list of statements for which responses are varying degrees of agreement or opinion" (LoBiondo-Wood & Haber, 2013, p. 204). The combination of these techniques was a very thorough way of studying this phenomenon.

Suskind et al. (2014) solely used records and available data in the form of chart reviews as their instrument for data collection. This collection method is very appropriate to find a variety of quality and reliable information on the patient's disease process and treatments, but the use of only one type of collection method is not as thorough as the different types of instruments used in the study by Kakodkar et al. in 2015. This data collection instrument was used in Suskind et al. for both describing the sample and for determining the relationship between inflammatory bowel disease and the SCD.

## Reliability and Validity

No explicit measure of reliability or validity was used in either study.

## Analysis of Data

In Kakodkar et al. (2015), the degree to which each patient experienced each symptom associated with inflammatory bowel disease was measured ordinally (measured subjectively on a scale of 1-10). The degree to which each patient adheres to the Specific Carbohydrate Diet and their perceived quality of life were also measured ordinally (measured subjectively on a scale of 0% - 100%). The reasons each patient chose to follow the SCD, the level of education of each participant, the location of their disease, the patient's gender, the medications the patient is on, and the "forbidden foods" in each patient's diet were all measured nominally (the variables or events were classified into categories). The duration of disease and duration of diet were recorded using interval measurements. To analyze these results, descriptive statistics were used in the form of measures of central tendency. The appropriateness of the measures of central tendency in relation to the level of measurement of each item can be

considered somewhat accurate. Kakodkar et al. tended to summarize data results using the mean, though it would likely have been more appropriate to use the mean for the interval measurements and mode and median for nominal and ordinal measurements, respectively. Kakodkar et al. used tables and figures that were very clear and appropriately labeled. They were concise in their wording and results when they needed to be, but their titles were also very descriptive and clear. For example, "Table 2. Gastrointestinal Symptom Severity Checklist (GSSC) results for cohort of 50 patients with inflammatory bowel disease in remission following use of the Specific Carbohydrate Diet" very clearly describes what is being measured, what the sample population is, and what tool is being used to measure the data (p. 1227) .

In the article by Suskind et al. (2014), the height, weight, age and BMI of patients, as well as their albumin levels, hematocrit percentages, and levels of c-reactive protein and stool calprotectin were measured using interval measurements (measured on a scale with equal intervals between each number). The location of the disease in each patient was measured nominally. The extent of exacerbation of symptoms was measured ordinally. Only the averages of the results were mentioned, so it is unclear what measure of central tendency was used to evaluate the results, and it is even unclear whether they used statistics at all. Using a correct measure of central tendency would have been more appropriate, and more appropriately in-depth for the purposes of their study.

## Conclusions, Implications, and Recommendations

Kakodkar et al. (2015) interpreted results in relation to the purpose of their study (i.e. to look at the clinical characteristics of people on the SCD with inflammatory bowel disease). They write that "survey results suggest that SCD can potentially be an effective tool in the management of some patients with IBD" (p. 1231), and go on to describe other characteristics of the patients and treatment. They admit that their "limitations include the choice of [...] subjects, all of whom were in remission, biasing [...] findings toward including patients with IBD who [...] benefited from SCD and were following it for months" (p. 1231). They further conclude that "if following the SCD changes the microbiome significantly and/or reverses some of the dysbiosis reported in patients with IBD, this may be a low-cost intervention to induce and maintain remission" (pp.

1231-1232). Kakodkar et al. make generalizations slightly beyond the scope of their findings by inferring that the results of their study are appropriate for all patients with inflammatory bowel disease. They mitigate their remarks by also suggesting "further interventional studies of SCD and diet therapies in general for IBD are urgently needed" (p. 1232).

Suskind et al. (2014) also interpreted their results relative to their study purpose. They determined that the Specific Carbohydrate Diet's "efficacy in improving symptoms and reducing mucosal inflammation has been clearly demonstrated in children with Crohn disease" (p. 88). The authors identify the following limitations in their study: "its retrospective and descriptive nature, small sample size, as well as the inability for us to know the true number of patients trialing the SCD and therefore the true efficacy of the diet" (p. 88). Pertaining to nursing practice and health care in general, Suskind et al. conclude that the Specific Carbohydrate Diet may be useful as a dietary treatment of inflammatory bowel disease (p. 90). They suggest that "the SCD may be a possible therapeutic option for pediatric patients with Crohn disease", but go on to say that "further prospective studies are required to fully assess the safety and efficacy of any specific diet in patients with pediatric Crohn disease" (pp. 90-91).

### **Application and Utilization**

Both studies put forward definitive findings that the Specific Carbohydrate Diet is a beneficial treatment for people with inflammatory bowel disease. The studies each had appropriate purpose, review of literature, research design, external validity, research approach, sound methods and were ethical; however, both studies' downfalls are located in their absence of controls to minimize the effects of threats in study design to internal validity, and in their sample bias. In the study by Kakodkar et al. (2015), participation was voluntary, which introduced a bias in the sense that it was more likely for people to join the study if the SCD diet worked for them. In the study by Suskind et al. (2014), the study population was quite small, therefore limiting its generalizability. Considering the nature of the studies (descriptive/exploratory, nonexperimental studies) the results can be legitimately interpreted as valid and useful for demonstrating the potential use of the SCD therapy; each study further identifies more research should be done on this topic. There is not yet a great deal of extant research on

the SCD, but so far, studies have shown the usefulness of dietary treatments (such as exclusive enteral nutrition) to create remission in patients with inflammatory bowel disease.

These same studies suggest that the SCD can be used as a treatment and lower the use of immunosuppressants in these patients. Kakodkar et al. (2015) do not outline any risks to using SCD as a treatment, but Suskind et al. (2014) point out:

the SCD does limit the variety of foods a child can eat. This may affect total energy intake and may result in suboptimal weight gain and growth. Patients receiving the SCD should have close follow-up, including anthropometric measurements and nutritional intake evaluation. (p. 90)

Application of this treatment into nursing practice would necessarily involve dietary consultation, a lot of teaching about nutrition and diet, and continuous monitoring of the disease remission throughout the treatment process. These interventions require a certain amount of effort and time on the part of the health care team. This effort must be balanced against the benefits and cost-savings that would happen if a patient with inflammatory bowel disease were able to use diet solely as a treatment for this disease. I think at this point in the research process, the Specific Carbohydrate Diet should definitely be offered as an option for treatment of the inflammatory bowel diseases, but using medication for controlling inflammation should not be ruled out. Each patient should be made aware that using SCD to mitigate IBD is still a relatively under-researched treatment. It is possible to replicate and extend this research in another clinical setting and it is clear that more in-depth research should be done which includes randomized control trials.

The Specific Carbohydrate Diet is a great opportunity and shows exciting promise to provide alternative therapies for patients with inflammatory bowel disease. Research on the SCD suggests the possibility of patients living without having to rely on medication. I think that further research would greatly benefit this therapy and the patients that suffer from inflammatory bowel disease. From here, more study should be done. Further studies must be taken to the next level using research designs that improve internal validity, and so create the conditions that will allow this treatment to be put into regular practice.

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