The Anti-inflammatory Diet:  
A empirical study to how to Manage Chronic Pain

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ABSTRACT

Background The number of people suffering from chronic diseases, like chronic pain, has increased dramatically over the last three decades (1). Chronic pain is recurring pain that can last for months or years and can drastically reduce the quality of a person’s life (2). Because chronic pain can be resistant to conventional medical treatments, the search for alternatives to alleviate pain has led to diet (1). Evidence suggests that some types of dietary interventions such as consumption of an anti-inflammatory diet may have significant effects on chronic pain. Research findings have shown that an anti-inflammatory diet has demonstrated a reduction in pain and an improvement in physical function and vitality (3).

Objective This quasi-experimental study compared consumption of a typical Western diet (diet WD) to a Pain Free/anti-inflammatory diet (diet PF) and evaluated the impact of the anti-inflammatory diet on specific daily activities like walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleeping.

Design Participants consumed a typical Western diet (diet WD) for one week followed by consuming a 28-day Pain Free/anti-inflammatory diet (diet PF). Chronic pain was self-reported using a standard 0-10 Numeric Pain Scale. Daily food records to assess compliance and five electronic questionnaires were used to collect data. Subjects/Setting Potential subjects responded to a social media posting. Reported inclusion criteria: (a) having chronic pain; (b) consuming a typical Western diet, also known as the standard American diet, with meat or fish or eggs or dairy; (c) having access to a computer with the internet; and (d) being 21 years or over. This study consisted of 18 individuals who met the inclusion criteria with 12 participants completing the five week study.

Statistical analysis SPSS was used to analyze data. A paired t-test compared pain level post diet WD to post diet PF to answer the first research question. A non-parametric Friedman’s test compared participant’s pain level per activity post diet WD to post diet PF to answer the second research question. A statistical significance level of (p<0.05) was used. Descriptive statistics were used to examine participant demographic characteristics and self-reported data.

Results A sample of 12 participants completed the five week study. The self-reported daily food records were assessed and compliance to the diet of 75% or greater was achieved by 100% (n=12). Participants self-reported weight and 1-11 pounds was lost by the conclusion of the study. Pain was significantly reduced (p<0.001) when following diet PF compared to diet WD. Pain level reduction was consistent for each of the specific daily activities measured (p<.03).

Conclusions This study found that 100% of participants who followed a specific 28-day pain-free diet plan were able to successfully use this diet intervention to alleviate their chronic pain in specific daily activities. Further research with larger samples is needed to determine whether following an anti-inflammatory diet may be a viable choice to alleviate chronic pain.

Keywords: Anti-inflammatory Diet, Chronic Pain

INTRODUCTION

The number of people suffering from chronic diseases, like chronic pain, has increased dramatically over the last three decades. Chronic pain is recurring pain that can last for months or years and can drastically reduce the quality of a person’s life (1). Chronic pain is a costly health problem in the U.S. due to increased medical expenses, lost income, lost productivity, and compensation payments (2).

Chronic pain is often resistant to conventional medical treatments and the use of drugs for pharmacologic pain management can have long term side effects. The search for alternatives to alleviate chronic pain has included diet interventions. It has been suggested that changes in dietary consumption in the past century have caused stress in the body (1).

Examination of diet as a whole through analysis of dietary patterns has become a new area of research to address the complex diet-disease paradigm (4). Scientific literature indicates that a
number of dietary interventions have been shown to have anti-inflammatory effects. These interventions can activate and support the body’s natural defense against pain (2). A number of epidemiological studies worldwide have documented a link between various dietary patterns and markers of inflammation (4). Systemic low-grade inflammation is a common denominator in many chronic illnesses, like chronic pain. Many chronic inflammatory diseases have been linked to diet and modifying it could prevent, delay or even heal these diseases (5).

It is the position of the Academy of Nutrition and Dietetics (AND) that dietary intervention positively impacts health outcomes across the life span and that prevention is the most effective method to address chronic disease. Although the positive impacts of dietary changes have been clearly demonstrated, less than 1% of US adults have a diet considered healthful (6).

The Western diet or standard American diet consists of a high intake of saturated fatty acids, industrially produced trans fatty acids, processed foods, low or poor intakes of mono- and polyunsaturated fatty acids, and micronutrients (7). The Western diet includes an abundance of foods and beverages with added sugars and fats that displace nutrient-dense foods. Overconsumption of energy dense foods creates an imbalance in energy intake that has led to an increase in obesity, heart disease, diabetes mellitus, certain cancers, and metabolic dysfunctions.

An anti-inflammatory diet involves consuming foods which favor the production of anti-inflammatory chemicals in addition to reducing consumption of dietary components or foods that directly activate the inflammatory response of the innate immune system. The goal of the anti-inflammatory diet is to reduce silent inflammation (9). An anti-inflammatory diet involves consuming a predominately plant based diet. A healthy, plant-based diet maximizes consumption of nutrient dense plant foods like vegetables, fruits, beans, peas, lentils, soybeans, seeds, nuts, and whole grains while minimizing processed foods, oils, and animal foods (10). It has been suggested that consuming a plant based diet has demonstrated a reduction in pain and disease activity and an improvement in physical function and vitality (3).

Two studies have shown promising connections between diet and alleviating chronic pain. A study in Finland explored the effects of consuming a strict vegan diet to alleviate fibromyalgia symptoms. The intervention group reported a significant decrease in pain (p = .005) during the three month vegan diet period. However, after shifting back to the omnivorous diet, the pain symptoms gradually reappeared (11). Another study examined the anti-inflammatory effects of a low arachidonic acid (AA) diet and fish oil supplementation in patients with rheumatoid arthritis (RA). One group consumed a normal Western diet (WD) and the other group consumed an anti-inflammatory diet (AID) providing an AA intake of less than 90mg/day. The results indicated that the combination of a reduction of AA in the diet along with the fish oil supplementation allowed the participants in the intervention group to report an overall improvement of 31% for joint parameters like less tender and swollen joints, and reduce their dependence on NSAIDs and corticosteroid drugs (12).

The goal of the current study was to identify whether there is a relationship between consuming an anti-inflammatory diet to decrease chronic inflammation and alleviating chronic pain, and the impact of the anti-inflammatory diet on specific daily activities like walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleep.

**METHODS**

Approval from the Institutional Review Board (IRB) at D’Youville College was obtained before this quasi-experimental study was conducted. A one week session identified as diet WD was consumed and included foods typically found in a Western diet like processed meat, refined-grain products, french fries, high-fat dairy products, sweets and snacks. Immediately following this, participants were instructed to follow diet PF for four weeks. This included a 28-day pain free diet plan identified in an electronic book, Diet for A Pain Free Life with plant based foods such as vegetables, fruits, beans, peas, lentils, fish, soybeans, seeds, nuts, and whole grains, as well as fish, dairy, and eggs. Participants volunteered for this study by responding to a social media posting. The researcher used a pre-screening phone survey questionnaire to assess that the inclusion criteria were met. To be included in the study, participants verbally answered yes to: (a) having chronic pain; (b) consuming a typical Western diet, also known as the standard American diet, with meat or fish or eggs or dairy; (c) having access to a computer with the internet; and (d) being 21 years or over. Respondents who answered no to the group of questions were excluded. Participants included were asked to review and sign an informed consent form and return it to the researcher via email, mail, or fax prior to starting the study. They were advised that if
they experienced increased pain while participating in the study that they should discontinue the diet and consult their private physician. Participants were able to complete the five week study in their homes. Participants were provided with an electronic questionnaire through SurveyMonkey at baseline to complete. Each electronic questionnaire included a 0-10 Numeric Rating Scale (13) as a pain intensity instrument to determine the participant’s perceived level of pain. Participants were asked to record food consumed daily for five weeks and provided with a seven day form and food record instruction form. The food record forms were reviewed by the researcher and assessed a score for compliance to the diet for foods and drinks consumed in each diet. Participants were provided with a list of foods from diet WD which would be acceptable to consume for the first one-week session. At the end of the one-week session following diet WD, an electronic questionnaire through Survey Monkey was filled out at the participant’s home. Participants were supplied online with an electronic book titled Diet for a Pain Free Life which contained a structured 28-day meal plan to follow as well as a list of acceptable foods, snack choices, and recipes. Permission was received from the author to use the 28-day diet plan as listed in the book, as well as supplemental diet and recipe information provided by the McIlwain Medical Group. Completed food record forms were returned to researcher weekly by email, mail, or fax. Three identical electronic questionnaires through Survey Monkey were completed after 14 days, 21 days and at the conclusion of the 28-day consumption of diet PF.

Statistical Analysis

Population. A convenience sample was used for this study. Participants were recruited through a social media posting. A sample of 18 participants met the inclusion criteria and 12 participants completed the five week study.

Data Collection Procedure. Demographic data collected through the electronic surveys used to describe the sample included participant’s age, gender, ethnicity, highest degree of education completed, length of time having chronic pain, pain on average, and use of medication. Descriptive statistics were used to categorize participants using frequencies and percentages. The self-reported weight data were used to track changes in pounds during the study. The self-reported height and weight data were converted to body mass index (BMI) and a mean for the participants was used to compare BMI post diet WD to post diet PF. Descriptive statistics using frequencies and percentages were used to evaluate BMI.

The reported data from the food record forms was obtained from each participant for five weeks and assessed a compliance score which was categorized using frequencies and percentages. Quantitative data gathered using the a 0-10 Numeric Pain Scale included participant’s self-reported level of pain today, level of pain on average, and level of pain affecting ability to walk, climb stairs, carry or handle objects, dress, personal grooming, and sleep.

Research question one. Does consumption of an anti-inflammatory diet alleviate chronic pain? Question number 1 on the post WD questionnaire regarding level of pain today was compared to question number 1 regarding level of pain today on the post PF questionnaire from 28-days. Participants used the 0-10 Numeric Rating Scale to indicate pain level. A mean pain score was calculated and a paired t-test was used to evaluate the difference in scores.

Research question two. Does the anti-inflammatory diet alleviate chronic pain on specific daily activities like: walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleeping? Question number 2 regarding level of pain per activity on the post WD questionnaire was compared to question number 2 regarding level of pain per activity on the post PF questionnaire after 14 days, 21 days and 28-days. Using the 0-10 Numeric Rating Scale the pain level for each daily activity, walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleeping was indicated. A mean pain score for each diet and for each activity was calculated and evaluated using a non-parametric Friedman’s test.

RESULTS

A sample of 12 participants met the inclusion criteria and completed the five week study. The participants were mostly female, middle aged and older, white, educated, and reported having chronic pain for over 5 years. Refer to table A-1 for a description of the sample including age, gender, ethnicity or race, highest degree of education completed, the length of time having chronic pain, the pain on average and the use of medication. The daily food records self-reported by participants were assessed for compliance to the diet and 75% or greater was achieved by 100% (n=12). All participants self-reported weight and 25% (n=3) lost 1-3 pounds 15 ounces, 42% (n=5) lost 4-7 pounds 15 ounces, and 33% (n=4) lost 8-11 pounds 15 ounces by the conclusion of the five week study. The mean BMI after consuming diet WD was 29 and the mean BMI after consuming diet PF was 28. Both were categorized as overweight. Using statistical program SPSS, a paired t-test indicated there was a statistical difference (p<0.001) between
reported pain level after diet WD as compared to pain level after diet PF (Figure A-2). A statistically significant difference was found in the pain level reported post diet WD and that reported post diet PF for all activities: walking (p<0.001), climbing stairs (p<0.001), carry or handle objects (p<0.001), ability to dress (p<0.03), personal grooming (p<0.001), and sleeping (p<0.001) (Figures A-2-7).

DISCUSSION

This study evaluated whether participants were able to reduce their chronic pain by switching from consuming a Western diet to consuming an anti-inflammatory diet. Even though the sample size of 12 was small, both research questions were answered with statistical significance. There was a decrease in chronic pain levels reported between using diet WD and diet PF and a decrease in chronic pain levels reported in each daily activity indicated such as walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleeping.

Two similar studies between non-medical interventions, like diet, and alleviating chronic pain disorders have indicated similar results. One study explored the effects of consuming a strict vegan diet to alleviate fibromyalgia symptoms. Both the control group eating an omnivorous diet and the intervention group reported high pain levels at rest prior to the study. The intervention group reported a significant decrease in pain during the three month vegan diet period. However once the intervention group was again introduced to an omnivorous diet with fish and meat, the pain symptoms reappeared. In a second study involving participants with rheumatoid arthritis, two groups were observed for eight months. The control group consumed a normal Western diet while the intervention group consumed an anti-inflammatory diet with a low arachidonic acid and fish oil supplementation. The participants in the anti-inflammatory group reported having less tender and swollen joints. These findings are similar to this study in that participants reported having higher chronic pain levels prior to the study and lower pain levels after consuming an anti-inflammatory diet intervention.

Other considerations include the effect of weight loss on chronic pain levels. While the primary purpose of diet was not specifically to lose weight each person who completed this study lost weight ranging from 1-11 pounds. This weight loss may have contributed to a reduction in pain levels and warrants further investigation.

A limitation not originally expected by the researcher included difficulties involving the electronic communication with participants. People who had high security settings on email accounts, who did not regularly check email, or who was not computer savvy needed extra assistance. The electronic surveys administered through SurveyMonkey had to be sent numerous times. The electronic book used for the study was not always received by people initially and ended up in an email junk folder which the non-computer savvy people could not locate. Another issue involved returning the completed food records. Some participants lacked the technology to scan and email or to fax the documents weekly. The researcher was very involved to ensure the timely completion of the surveys around specific dates, the receipt of the electronic book, and the assistance in receiving the food records and to answer participant’s questions throughout the five weeks.

The timing of the study during the year may have had an effect on the results. The recruitment of participants occurred at the end of October and into the beginning of November. All participants were following the diet during the Thanksgiving holiday with some following the diet through December holiday season. The researcher observed on the food record forms how compliance to the diet was affected by the holidays.

The researcher received subjective feedback at the conclusion of the participant’s five week involvement in the study which is worth mentioning. Participant’s made observations about how they felt they were affected by the anti-inflammatory diet or which foods caused them to feel more chronic pain. Some comments to note include “I would definitely say this was worth the time and effort. My greatest indicator of success has been sleep”; after the diet finished, “I have felt worse since adding sweets back in”; “I am starting to have more good days than bad (pain wise) and caffeine seems to be playing a role in my pain levels”; “I plan on starting an exercise routine because the pain is controlled and I feel motivated”; “pain is more manageable”; “I’m going to continue sticking to the menu of foods that I have been eating due to the noticeable difference I feel with my arthritis, my joints aren’t as sore”; “I definitely have more energy! I’m going to continue to eat this way. I don’t crave sweets and have no stomach issues”; “Definitely worth the effort as I have even less pain than ever and was not as tired. I definitely see a correlation between diet/stress reduction/exercise and pain/fatigue”.

The researcher was able to conclude that with this small sample, the results were positive for using this dietary intervention to reduce chronic
pain. The participants indicated that they were able to use this alteration in diet to reduce their chronic pain levels in multiple daily activities. The implications of this study demonstrate that an anti-inflammatory diet may be a viable consideration that can be used by practitioners. Future research suggestions may include eliminating more foods to learn of their effects on chronic pain and inflammation as well as doing a more detailed evaluation of macronutrient breakdown while consuming an anti-inflammatory diet.

CONCLUSIONS

This study found that participants who followed a specific 28-day pain-free diet plan were able to successfully reduce their chronic pain in specific daily activities: walking, climbing stairs, carrying or handling objects, dressing, personal grooming, and sleeping. Further research with larger samples is needed to determine whether following an anti-inflammatory diet may be a viable choice to alleviate chronic pain.

References


