

Celiac Disease and Colic

Abstract

This experiment was used to determine if there is a correlation between celiac disease and colic. Celiac and colic have similar symptoms, recognizing the similarities is cause to see if colic could be a precursor to celiac disease, as stated in my hypothesis. Should the two be related, testing for celiac disease as an infant with colic could lead to much earlier diagnosis in millions of people.

The procedure of this project was to create a questionnaire. I then created a web site which I sent to key celiac groups. Next, I created survey boxes and put them with pads of surveys and distributed them across the United States. The survey asked the participants to answer a few questions such as: "Do you have celiac disease or gluten intolerance?" Of those who fit within this group, the questions inquired if they had colic as an infant.

The results of this experiment were overwhelming; it proved my hypothesis true that there is a correlation between the two health issues. I found 39% of people with celiac or gluten intolerance to have had colic as an infant. I believe, this percentage is significant enough for doctors to start checking infants with colic for celiac disease. Now people who have celiac disease or gluten intolerance will not have to suffer as long and can make the necessary lifestyle changes to ease their suffering much earlier in life.

My conclusion states how this will hopefully change the world, or at least the lives of people who have celiac disease.

Acknowledgements

I would like to thank my parents for helping me succeed in this project. My mother helped me with the whole process of my *Celiac Research Project*. I would like to thank all the places that I had survey boxes at: Jimbo's Natural Foods in Carlsbad and Carmel Valley in California, Dr. Adrienne LaJoie at Coastal Gastroenterology, Dr. Fishbein and Dr. Kagalwalla, at the Central Dupage Hospital in Chicago, Illinois, Healthy Creations in Encinitas, California, The Center for Advanced Medicine in Encinitas, California, and Sweet Christine's Gluten-Free Confections in Kennett Square, Pennsylvania. I would also like to thank Dr. Kimberly Newton and everyone at Wm. K. Warren Medical Research for Celiac Disease for letting me tour their research center. Finally, I would like to thank Ms. Culley for making this all possible.

Introduction

Statement of Purpose:

People in the United States are suffering from celiac disease. The disease goes undiagnosed far too often simply because physicians do not test for it or misdiagnose it. The diagnosis rate in the U.S. is substantially longer than that in Europe and other countries. This fact alone demonstrates that better testing in the United States would help people to know they have the disease and suffer a shorter period of time before making dietary lifestyle changes.

Question:

Is there a correlation between celiac disease and colic?

Hypothesis:

If individuals diagnosed with colic as infants have a high diagnoses rate for celiac disease, then doctors should recognize colic as a precursor to celiac disease and thus test for celiac disease in these infants.

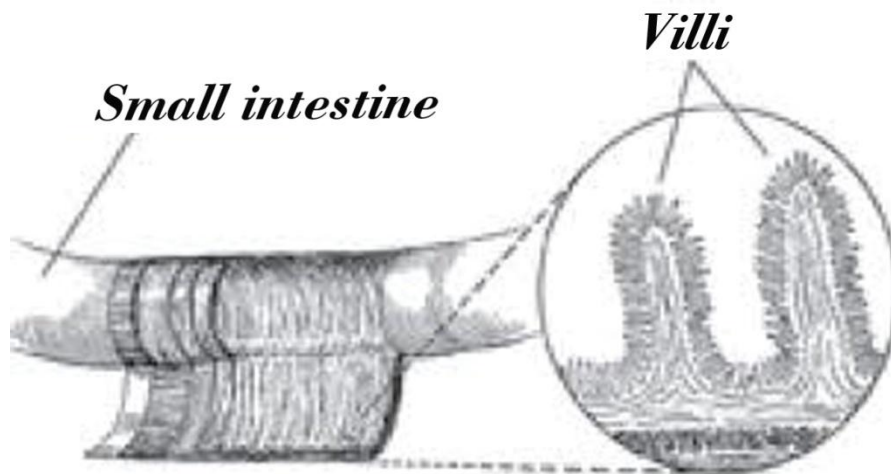
Review of Literature

As of October 31, 2010, the population of the United States was 310,606,826. Interestingly enough, 20% of Americans, 62,121,365 people, had colic as an infant. Furthermore, over three million people have been diagnosed with celiac disease. Celiac disease and colic overwhelmingly share many similar symptoms; affecting the digestive system. No significant studies have been conducted to establish if there is a correlation between the two.

Colic, predominantly found in infants, is thought to be severe cramping in organs such as the stomach and intestines. Most doctors admit they do not know the exact cause of colic. The discomfort may occur if the baby's digestive system has not developed sufficiently to process food, or it may occur if there are allergies. Indigestion or constipation may cause gas to form in the intestines, which then causes what is known as colic. Some medications are thought to temporarily relieve the gas pains and reflux which occurs during colic episodes. A baby's only way to show discomfort is to cry, which can lead to even more discomfort as he inhales more air. Many mothers with colicky babies often feel frustrated with their inability to comfort their incessantly crying child. About 20% of all infants suffer from colic, with episodes of crying can that can go on for hours with no apparent reason. The cause of colic is not known (Coran, 2010).

Celiac disease is an inherited autoimmune disorder that causes intolerance to certain proteins called gluten. The word *gluten* is a Latin word meaning *glue*. Gluten is the substance in flour that makes dough elastic and thick. The term is used most often in reference to wheat flour, but gluten also occurs in rye, barley, and certain other cereal flours.

Celiac disease causes the immune system to attack and destroy its own tissue in the small intestine. The lining of the small intestine has finger like carpeting called villi. Villi help the blood stream absorb nutrients from food, as it passes through the small intestine. The condition of celiac disease can destroy the villi and make individuals unable to absorb any nutrients or get rid of waste (Nelsen, 2010).



Celiac disease has been diagnosed in over 2 million Americans or about 1 out of every 133 people. Symptoms of this disorder include abdominal bloating, severe stomach aches, fatigue, headaches, chronic diarrhea, vomiting, heart burn, reflux, infertility, inability to concentrate (ADD/ADHD), depression, muscle aches, and inability for weight gain or loss.

Celiac is diagnosed in several ways: blood tests, stool test, and endoscopy. Saliva testing can detect gluten intolerance but is not an acceptable diagnostic tool for celiac disease (Korn, 2002).

The available forms of blood testing are:

- Ant-tissue Transglutaminase (tTG-IgA) – This is the most common test, and used when an individual is known to be in a risk group.
- Ant-endomysium antibody test (EMA-IgA) – This is very similar to the ant-tissue but not as sensitive.

Both of these tests measure an individual's immune system's response to gluten in the food they eat. People with celiac disease who eat gluten have higher than normal levels of certain antibodies in their blood. Antibodies are produced by the immune system when the body feels threatened. For people with celiac, this autoimmune disorder tells the body that gluten is dangerous, and the body begins its fight.

- Gene tests (HLA-DQ2) and (HLA-DQ8) – These tests do not look for antibodies but for the celiac disease gene in one's DNA. For people who have celiac, the HLA types DQ2 and DQ8 on chromosome six are necessary, but not sufficient, for developing the condition. In other words, someone with these two HLA types has a strong genetic predisposition to develop celiac disease, but the predisposition alone is not enough – there must also be a trigger of some sort. Some people who have these genes do not have celiac disease, or have not yet developed it.

The most widely accepted diagnosis lies in endoscopy. Endoscopy is an examination of an organ, in this case, the small intestines. The endoscopy procedure is performed by inserting an endoscope down into the small intestine and taking a biopsy of tissue from the intestine wall, (World Book Online. 2010; The University of Chicago Celiac Disease Center, 2010).

There is no cure, treatment, or medication available for celiac disease sufferers. The only way to eliminate or reduce symptoms is to completely remove gluten from one's diet. Even a trace of gluten by way of cross contamination can make some seriously ill.

Gluten intolerance is similar yet different from celiac disease. Gluten intolerance reacts as an allergy to gluten, whereas celiac is an autoimmune disorder as well. The villi of the small intestine are destroyed by the body's negative response to gluten caused by celiac disease. The continual destruction in the small intestine can lead to many other illnesses such as intestinal lymphoma, a type of cancer.

There has not been significant research conducted on the possible correlation between celiac disease and colic. One small study conducted by the University of Texas Health Science Center in Houston, Texas in 2009, examined 36 babies and suggested that there may be some connection. The study was called, *Colic in Babies May be Caused by Gut Bacteria*, states "We believe that the bacterium may be sparking an inflammatory reaction, causing the gut inflammation. Inflammation in the gut of colicky infants closely compared to levels in patients with inflammatory bowel disease. Colic could prove to be a precursor to other gastrointestinal conditions such as irritable bowel syndrome, celiac disease and allergic gastroenteropathies."

There is still a need for in depth research studies to determine if colic in infants relates to celiac disease.

Experiment

Materials:

- Website (www.celiacresearchproject.com)
- Six survey boxes with signs
- Questionnaire pads

Procedure

Step 1: Create a survey to identify relationship between celiac disease or gluten intolerance and colic.

Step 2: Make professional looking survey boxes.

Step 3: Turn surveys into padded tear away forms.

Step 4: Set up survey boxes at eight strategic site locations across the country.

Step 5: Create a website to collect the survey data.

Step 6: Begin collecting surveys.

Step 7: E-mail gluten free organizations such as R.O.C.K. (Raising Our Celiac Kids) nationwide and ask organizations to share survey with their participants.

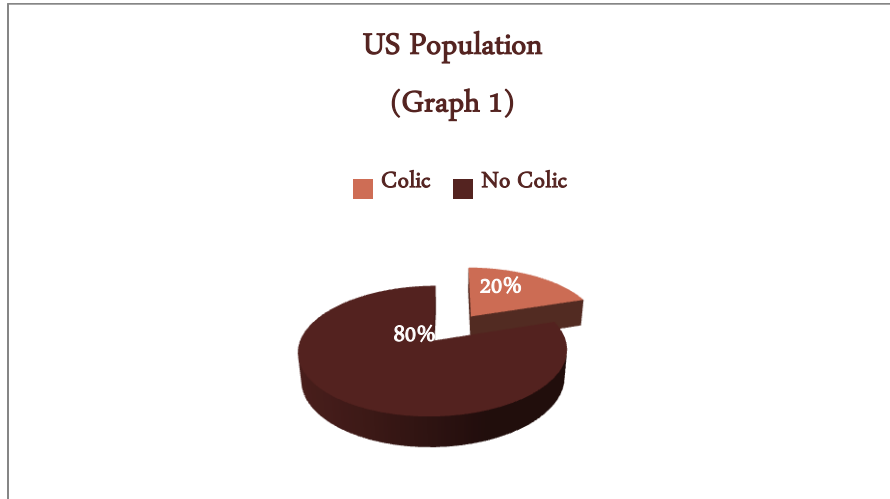
Step 8: Finish collecting surveys and take survey boxes down.

Step 9: Calculate results of data.

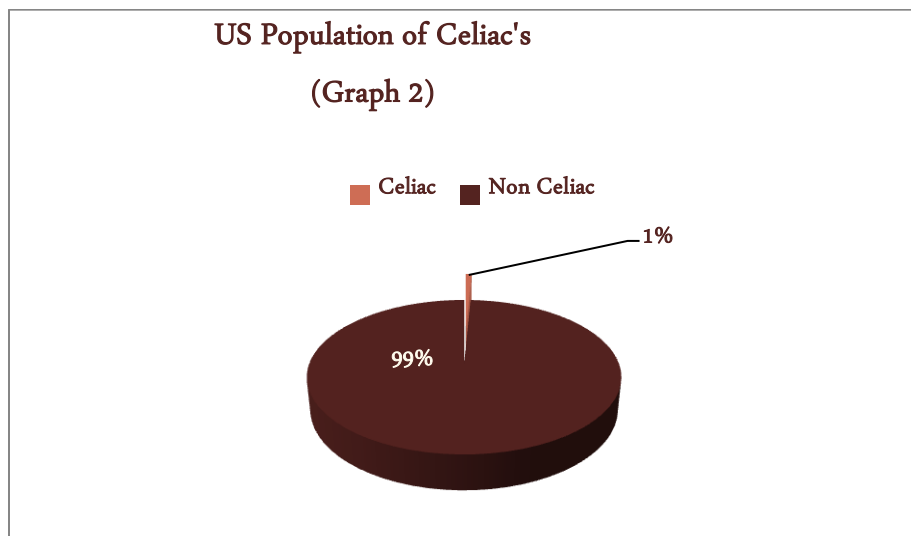
Step 10: Post results on website (www.celiacresearchproject.com)

Findings / Results

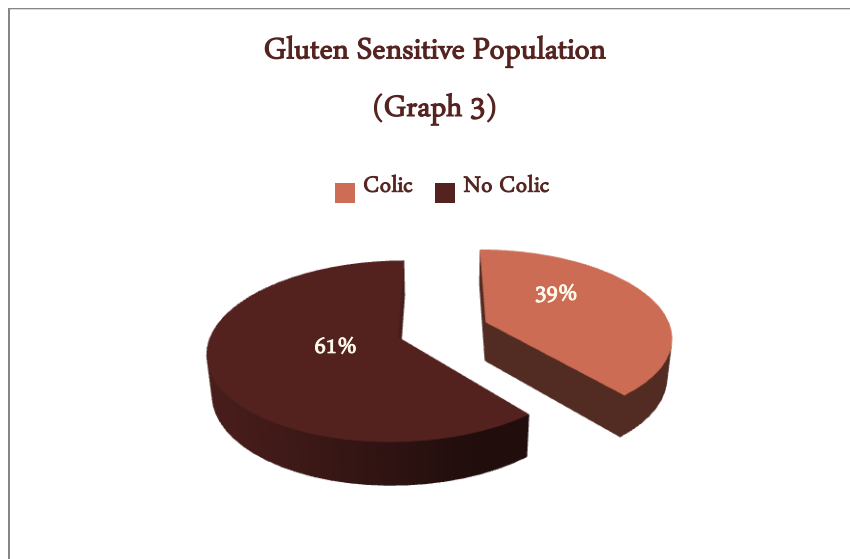
The U.S. population on October 31, 2010 was 310,606,826. Of that number, those with colic are 62,121,365, 20%, as my chart shows.



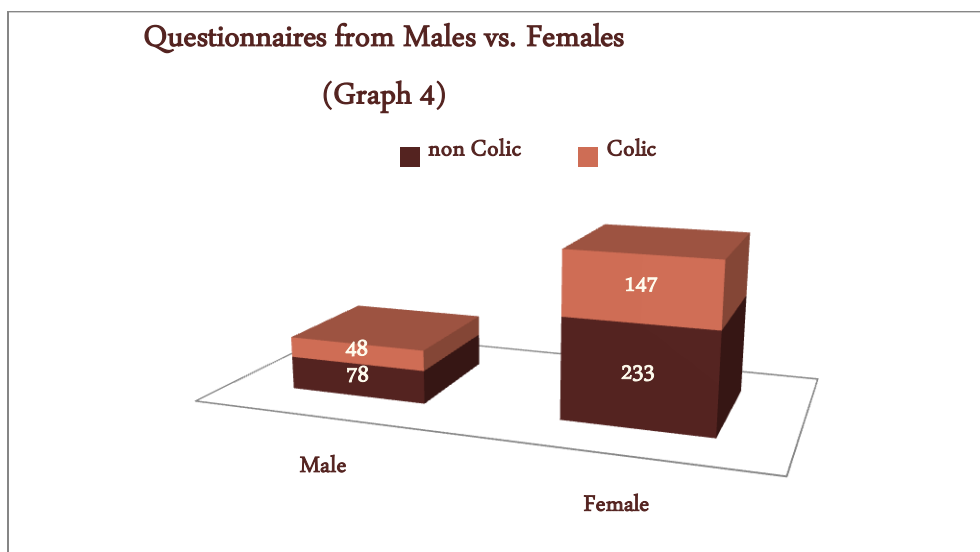
This chart shows that people currently diagnosed with celiac disease are 1% of Americans or over 3 million people.



I surveyed 511 people who have celiac disease or gluten intolerance. Of those 511 people with celiac disease or gluten intolerance 39%, or 199 people, also had colic. There were 61% or 312 people who did not have colic. This is noteworthy because of the high percentage of those individuals with both, indicating a relationship between the two.



Interestingly, the distribution is the same for females and males.



Conclusion

I have proven my hypothesis correct; there is significant correlation between celiac disease and colic. My hypothesis stated that if there was a correlation, colic could be a precursor to celiac disease. My study shows that the population of celiac and gluten intolerant people have a colic incident rate of 39%. Therefore, if an infant has colic they could also have celiac and gluten intolerance or they could be part of the 20% of people with colic in the normal population. Hopefully doctors will take these findings into consideration and start searching for celiac in infants with colic, instead of letting them suffer for years undiagnosed. Dr. Kimberly Newton MD, Director of the Pediatric Celiac Disease Center of Rady Children's Hospital/UC San Diego, stated in an interview, "Celiac disease is a very common disorder that could be affecting as many as 1 in 100 Americans, and yet most of these individuals remain undiagnosed. Research projects (such as Jacquelyn's), that identify potential risk factors for future celiac disease development, are extremely important to aid in helping health-care providers identify at-risk individuals, so that they may be tested, diagnosed and treated in a timely manner before complications of untreated celiac disease develop."

Hopefully my project will change the world, or at least the many lives of people with celiac disease.

Recommendation / Application

My recommendation to the medical community is for infants with colic to be tested for celiac disease with the most precise test, (the genetic test followed by endoscopy), if they do have celiac disease they would be diagnosed much earlier in life and be able to change their diet to be gluten free. This would cause infants and people in general to suffer fewer years or even decades in their lives.

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Appendices

Dear Participant,

I am conducting a survey as part of my science project for this upcoming 2010-2011 school year. My objective is to identify if there is a link between colic and celiac disease. The results of this study could aid the medical profession in numerous ways.

The survey involves answering only six questions and will only take a few minutes to complete. **If you are providing information for multiple individuals (self, children, or others), please complete a separate survey for each.** Your participation is voluntary and your responses will be completely anonymous.

After you complete the questionnaire please return it to the box provided at this location or fill out the questionnaire on line at <http://www.celiacresearchproject.com>. The completion and return of the survey indicates permission to use the data in my study.

Thank you for your participation.

Sincerely,

A handwritten signature in cursive script that reads "Jacquelyn Askew".

Jacquelyn Askew

Questionnaire

In an effort to aid in medical research, answer the questions as accurately as possible. If you are providing information for someone other than yourself, please indicate the relationship. If you are providing information for multiple individuals, use separate questionnaires for each individual.

Please circle the correct answer.

1. This information pertains to:

Self or Child or Spouse or Other

2. Is this person male or female?

Male or Female

3. In which year was this individual born? _____

4. Did this individual have colic as an infant?

Yes or No

5. Does this individual have celiac disease or gluten intolerance?

Yes or No

6. Has this individual ever been tested for celiac disease?

Yes or No

If yes, which test was administered? (circle only one, as the highest degree of testing)

Celiac Disease Blood Panel: antibody test

Celiac Disease Blood Panel: genetic test

Endoscopy



This is my Website that I created (www.celiacresearchproject.com).

Wm. K. Warren Medical Research for
Celiac Disease

