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Constipation Prevention In The Elderly

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RUNNING HEAD: CONSTIPATION PREVENTION IN THE ELDERLY

By

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Presented to
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In partial fulfillment of the requirements of
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Constipation Prevention in the Elderly

SIGNATURE PAGE

This thesis for honors recognition has been approved for the Department of Nursing.

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Reader

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Reader
I dedicate this thesis to all of the people who provided help and inspiration.

My late Uncle Jack, who always believed I could be something more and always encouraged me to strive higher.

My husband Roger and my children Charles and Morgan, who survived with less time with me while I pursued my education.

My mother Lois and my mother-in-law Dorothy, who provided countless hours of free child care.

Bill, a special friend whose quality of life was so negatively impacted by constipation that I pursued the topic as my thesis to improve his life.

All of my participants: without their help this thesis would not have been possible.
ABSTRACT

Constipation is a problem that affects more than 33 million adults in the United States and contributes to over 92,000 hospitalizations every year. A quarter of the United States’ elderly population suffers from constipation. Constipation has a number of causes which can be attributed to physical factors, medications diseases and disorders, and decreased cognition. Treatment options include increased fiber and fluid intake, physical activity, and laxatives. The purpose of this study was to determine if increasing daily dietary fiber would decrease constipation. A seven week pilot study was completed that included two women over 65 years of age who consumed an additional 7.5 grams of dietary fiber per day in the form of Pajala porridge. Outcomes measures included daily documentation of laxative use, the number and consistency of bowel movements, and comfort level. A student’s t-test was used to analyze the results. Bowel movement frequency and stool consistency were shown to be statistically impacted by the intervention of Pajala porridge. Further research needs to be done on bowel programs with increased dietary fiber using a larger sample size.


Constipation is a problem that affects more than 33 million adults in the United States and contributes to over 92,000 hospitalizations every year (Tariq, 2008). A quarter of the United States’ elderly population suffers from constipation with an average annual treatment bill of $2253 per nursing home resident (Tariq, 2008). Constipation is “a decrease in a person’s normal frequency of defecation accompanied by difficult or incomplete passage of stool and/or passage of excessively hard, dry stool” (Venes, 2005, “constipation”). Many people self-treat their constipation with laxatives without knowledge of possible implications such as laxative dependence and bowel obstructions (Powell, 2005). There are many non-pharmacological methods for preventing constipation which would decrease a person’s need to use laxatives.

Constipation can impact the quality of a person’s life by interfering with his or her functional state, creating delirium, causing discomfort, fecal incontinence and difficult or painful urination (Tariq, 2008). Constipation can also lead to more serious and life threatening issues such as fecal impaction, bowel obstruction, bowel perforation, and death (Tariq, 2008).

Etiology and Risk Factors

Constipation has a number of causes which can be physical, pharmacological, secondary to other diseases, and due to decreased cognitive factor (Porth, 2007). Medications that can cause constipation include “narcotics, anticholinergic agents, calcium channel blockers, diuretics, calcium (antacids and supplements), iron supplements, and aluminum antacids” (Porth, 2007 p. 621). The many physiological
situations that can cause constipation include pregnancy, inadequate fluid and fiber intake, weak abdominal muscles, obstructive lesions, and, with long-term constipation in the elderly, the rectum and or colon may become dilated allowing for large amounts of stool to build up with minimal urge to defecate. Diseases that cause constipation as a secondary problem include Parkinson’s disease, neurological disorders, and endocrine diseases. Cognitive factors that may contribute to constipation include dementia, poor bowel habits, and resisting the urge to defecate (Porth, 2007).

Impact on the Individual

The severity of the impact of constipation on an individual due to their constipation varies with the severity of the constipation. Constipation can be a mild annoyance or it may become life threatening. An individual may experience pain and discomfort. Hemorrhoids may occur due to increased straining when having a bowel movement (Annells & Koch, 2002). Constipation in the elderly can cause symptoms such as a decrease in functional state, confusion, painful or difficult urination, and incontinent bowels (Tariq, 2008).

There are many medication options to treat constipation. Bulking agents, such as Fibercon and Metamucil, are often tried first to treat constipation and are inexpensive (Tariq, 2008). Stimulant laxatives, such as bisacodyl and docusate sodium, are also inexpensive but may cause unpleasant side effects such as abdominal cramps and flatulence, and should only be used for a short time (Hopfer & Hazard, 2009). Polyethylene glycol has been shown as safe and effective to be used for up to a year (Tariq, 2008). It is now available over the counter and is cost effective. Lubiprostone is
available by prescription to treat constipation, is dosed in 24 micrograms twice a day for adults, and costs $114.28 for 30 pills (Epocrates, 2009).

Psychosocial Impact on Individual and Family

Constipation can be an embarrassing problem. Experiencing embarrassment in asking for toileting assistance is one of the causes of constipation in the elderly (Powell, 2005). Fecal incontinence due to constipation may also be embarrassing. People may be reluctant to seek help from their health care provider in treating their constipation or its complications such as hemorrhoids. Certain treatments such as enemas and suppositories can also cause embarrassment to the constipated individual (Powell, 2005).

The family, especially of an elderly person, may have to undergo role changes when helping an elderly family member with constipation. Adequate hydration, toileting, exercise, and adding bulking agents should be included in constipation management (Tariq, 2008). If the family chooses to personally take care of their loved one, they may have to begin offering toileting assistance. The family may need to facilitate changes in diet by increasing the fiber intake and increasing opportunities to hydrate and exercise. It is the nurse’s role to teach these families exactly how to help their family member.

Impact on Society

Thirty-three million adults in the United States experience constipation with over 2.5 million doctor visits and 92,000 hospitalizations annually. A quarter of elderly people suffer from constipation, and $2,253 is spent to treat residents in nursing homes per year (Tariq, 2008).
Geriatric nurses who work within the community spend a large amount of time treating constipation. Eighty percent of geriatric nurses spend 4 hours a week treating constipation (Annells & Koch, 2002).

Ethical Issues related to Constipation

The primary ethical issue regarding constipation is related to the cost of treating the condition. There is an annual cost of $2,253 per resident to treat constipation in the nursing homes (Tariq, 2008). Many nursing homes order stock supplies of over-the-counter laxatives and do not charge individual residents for the use of these medications so even though not all of the residents may need laxatives, all resident pay for the laxatives through their room charge. Society in turn pays for this misuse of laxatives. Medicare is covering more and more over-the-counter medications, and not all of these laxatives that are being submitted to Medicare are necessary treatment. Medicare also helps to pay for laxatives in the nursing homes when it covers for nursing home charges and the unnecessary use of laxatives in the elderly living at home.

Summary of the Problem

Constipation is a common problem affecting 33 million adults each year. A quarter of the elderly population is affected with an annual cost of $2,253 per resident in nursing homes (Tariq, 2008). There are many pharmaceutical interventions which are often mismanaged. Society often pays for this misuse financially, and the individual pays for this misuse physically. Non pharmacological interventions should be explored before implementing pharmacological interventions. The elderly are a population of people who are especially at risk due to higher rates of medication use, decreased thirst response, decreased mobility, inadequate diet, and co-morbid diseases. The purpose of this thesis is
to determine the efficacy of increasing fiber in the elderly person’s diet to decrease the incidence of constipation.
CHAPTER II

Review of Literature

Articles on constipation prevention have only begun to be published in any useful quantity in the past thirty years. There is a great volume of literature regarding constipation prevention in cancer patients, but there is little literature related to constipation prevention in the elderly. What literature there is gives an idea of the individual’s lived experience with constipation and what interventions have been shown as effective in preventing constipation. While the amount of literature on constipation prevention in the elderly has increased over the past ten years, more effort is needed in the area.

Review of Research

Constipation research has included both quantitative and qualitative methodologies. Quantitative research in the area of constipation often explores the efficacy of interventions including fluid intake, fiber intake, and mobility. Qualitative research explores the experience of living with constipation.

Quantitative research, such as in Kaçmaz and Kaşıkçı’s (2005), Sairanen, Piirainen, Nevala and Korpela’s (2007), and Wisten and Messner’s (2005) studies, focus on implementing a fiber intervention to prevent constipation. In all three of these studies, constipation decreased in the group receiving the fiber intervention. In Greive’s (2006) study, the research focused on staff compliance to established constipation prevention protocols within care facilities. It was shown that greater compliance by staff decreased a person’s constipation.
Qualitative research, such as in Annells and Koch’s (2002) and Friedrichsen and Erichsen’s (2004), focused on the individual’s lived experience with constipation. Annells and Koch’s study was conducted to investigate the impact that constipation has on community nursing. This study utilized the purposeful sampling of ninety participants in a large Australian community who were interviewed in their homes.

This study had a variety of outcomes such as defining constipation in terms of the patient, showing how defecation patterns change through a lifespan, and how the experience can affect a person in terms of suffering. This study also described common situations for the patient such as bowel movements that could not be fully evacuated, having to digitally remove feces, collapsing while defecating, and becoming constipated on vacation, (Annells & Koch, 2002).

This study identified several nursing implications. The nurse should help the patient to digitally evacuate the feces when necessary. The nurse should collaborate with other members of the health care team to treat constipation and impaction. The nurse should provide “accessible, empathetic and useful advice about affordable solutions” (Annells & Koch, 2002, p. 126). This study identified a great need for information about constipation and a need to further expand and develop evidence-based practices.

Friedrichsen and Erichsen’s study (2004) focused on cancer patients. In this study, a sample was purposely selected to provide a rich interview about the individual’s lived experience with constipation. Semi-structured interviews were conducted in the patients’ homes regarding how constipation affected their daily lives.

This study showed three main themes among participants: bodily suffering, mental preoccupation, and avoidance or social isolation. The mental preoccupation often
included fear, anxiety, and helplessness over constipation. Participants spoke of avoiding eating out of fear of filling their bowels again. Social avoidance often included not discussing their constipation with health professionals because of shame or embarrassment.

Many nursing interventions have been identified because of this study. A history conducted by the nurse is important to begin communication about constipation because of the embarrassment and shame a patient may feel. “Usual eliminatory habits, routines, dietary, and fluid intake” should be assessed (Friedrichsen & Erichsen, 2004, p. 325). The patient’s feelings should always be taken into consideration when discussing and implementing interventions. The patient’s preferences should also be taken into consideration when implementing constipation interventions.

*Instruments*

There are many diagnostic tests that can be used to diagnose and assess constipation. Blood tests include a complete blood count, serum urea nitrogen, serum creatinine, serum electrolyte, a thyroid stimulating hormone levels, and occult blood (Tariq, 2008). Abdominal x-rays can show the presence of impacted feces (Tariq, 2008). Additional testing may include colon transit measurements, tests to measure the pressure in the colon and rectum, defecography, which is a barium imaging study of the defecation process, and balloon expulsion testing (Tariq, 2008). A person with long term constipation should have a colonoscopy or sigmoidoscopy preformed (Tariq, 2008).

In addition to laboratory testing there are several assessment tools available that include the Bristol Stool Form Scale, Constipation Assessment Scale, Constipation Visual Analogue Scale, and the Eton Scale Risk Assessment for Constipation (Larkin,
Sykes, Centeno, Ellershaw, Elsner, & Gootjes, et al., 2008). The Bristol Scale has seven categories that indicate the shape and consistency of the stool. The Constipation Assessment Scale assesses abdominal distension, changes in flatus passed, decreased frequency of defecation, presence of liquid stool, fullness of the rectum, size of stool, and the ability to pass stool when feeling the urge to do so.

**Interventions and Guidelines for Constipation Prevention**

Laxatives have long been used as the first line of treatment for constipation, but many other non-pharmacological therapies have been proved as effective for preventing constipation. The National Guideline Clearinghouse (2005) outlined several evidence based interventions to prevent constipation; the first several interventions involve interviewing the client on his or her history including diet and fluid intake, pathological factors that may contribute to constipation, and medication regimen including laxative use. The client should be assessed for physical and cognitive abilities and the abdomen and rectum should also be assessed. The nurse should encourage the client to record their bowel habits, diet, and fluid intake for seven days. The client should also be encouraged to drink 1,500 to 2,000 milliliters of fluid and consume twenty-five to thirty grams of fiber a day. The nurse should provide opportunities to toilet privately and if the client is bedridden, to use the squat position to help ease defecation. Nurses should individualize the client’s physical activity to include walking when physically capable and provide education to the client, family and caregivers. The National Guideline Clearinghouse finally recommends using the interdisciplinary approach to avoid and treat constipation.

Other agencies have also published evidence based interventions for the prevention and treatment of constipation. Thompson Reuters’ Micromedex (2009)
outlined several of the same guidelines as the National Guideline Clearinghouse such as exercise, diet, and walking but also listed some alternative therapies such as yoga, botulism toxin injections into the anal sphincter, and biofeedback. Several herbal remedies to treat constipation were included such as oral preparations of aloe, cascara bark, senna, psyllium, and magnesium.

Carpenito-Moyet (2008) provided several evidence based interventions for the North American Nursing Diagnosis Association, nursing diagnosis of constipation. First the client should establish a regular toileting routine to include toileting after meals, stimulate bowel movement with foods such as coffee or prune juice, use a toilet or commode instead of a bedpan whenever possible, and remain in the bathroom for a suitable amount of time to produce a bowel movement. The client’s privacy, safety, and comfortable and effective positioning should be ensured by the care provider.

Optimal positioning is an intervention that Carpenito-Moyet (2008) expanded on to include the use of a semi-squatting position when able to get onto the toilet or a high Fowler’s position if the patient is bed bound and using a bedpan. The patient should use a fracture bedpan when indicated for comfort. The nurse should stress to the client the importance of avoiding straining and when straining to exhale. Carpenito-Moyet also encourages elevating the client’s legs with a footstool when they are on the commode or toilet.

Another intervention recommended by Carpenito-Moyet (2008) is ensuring adequate exercise. This should include “frequent moderate physical exercise,” (p.180), walking when able, range of motion exercises for bed bound clients, abdominal muscle exercises, and frequent repositioning in bed. Specifically “lifting knees alternately to the
chest, stretching arms out to the side and up over the head” (p. 180) is an effective exercise technique to prevent constipation.

An activity regimen should be developed according to individual ability (Larkin et al., 2008.) There is “evidence to support the link between exercise and faster bowel transit times” (Larkin et al., 2008, p. 801). Carpenito- Moyet (2008) supported the importance of exercise by indicating that “regular physical activity promotes muscle tonicity needed for fecal expulsion. Exercise also increases circulation to the digestive system which promotes peristalsis and easier feces evacuation” (pg. 180).

Finally Carpenito- Moyet (2008) outlined fluid intake and dietary interventions. High fiber foods should be reviewed with the client. When making recommendations, preferences and allergies should be considered. Nurses should encourage a daily intake of 800 grams of fruits and vegetables and a gradually increasing amount of dietary fiber. They should recommend that the client intake two liters of fluids a day. Nurses should consider the client’s preferences and set up a routine for fluid intake. Carpenito- Moyet (2008) suggested that “drinking a glass of hot water thirty minutes before breakfast may stimulate bowel evacuation” (p. 181). Coffee, grapefruit juice, chocolate drinks, cola and tea should be avoided as daily fluid intake as these fluids diurese the client and do not provide hydration.

A diet intended to prevent constipation should include an appropriate amount of fiber and fluids. At least 20 to 30 grams of fiber per day should be consumed to prevent constipation (Registered Nurses Association of Ontario, 2005; Wisten & Messner, 2005). In addition to fiber, a person’s intake of fluids also plays an important role in constipation prevention. At least one and a half to two liters of fluids should be consumed per day to

Constipation prevention and treatment is a continuous cycle of interventions with the aim of maintaining an optimal state of bowel regularity. Larkin et al., (2008) explained that a good preventive measure for constipation is to ensure comfort and privacy of the individual. An awareness of the medication in use that may have constipation as a side effect will help prevent constipation as the effects can be anticipated and interventions can be implemented. Diet performs a large role in the prevention of constipation.

*Pharmacological Interventions for Constipation*

Many treatments exist to prevent and alleviate constipation. Recent experimentation has led to FDA approval of the newly introduced drug, lubiprostone (Tariq, 2008). Lubiprostone is available by prescription to treat long-term constipation and should not be taken by people with a history of intestinal obstruction. It should be taken in the dosage as prescribed, not double dosed and if forgotten taken as soon as possible unless it is almost time for the next dose. Lubiprostone is a liquid capsule and should be taken whole and with meals and eight ounces of water. The patient should drink at least 64 ounces of water a day while on this medication. (Thompson Reuters, 2009).

In addition to lubiprostone, lactulose, a synthetic sugar in liquid form, is also available by prescription for the treatment of long term constipation. This medication should be taken cautiously by people with diabetes mellitus and should not be taken by those people on a lactose free diet (Thompson Reuters, 2009).
In addition to prescription drugs such as libiprostene and lactulose, there are many over-the-counter drugs that also effectively treat constipation but should be used on a short term basis. Polyethylene glycol (PEG) has recently been approved for over-the-counter use, although it was previously available by prescription only. PEG is available in liquid or powder form, both of which should be measured with a measuring spoon and the powder should be mixed with a preferred liquid before taking (Thompson Reuters, 2009). Bisacodyl, mineral oil, docusate sodium and docusate calcium are available for over-the-counter treatment for constipation (Thompson Reuters, 2009).

*The Future of Constipation Prevention*

Research in the area of constipation prevention in the elderly has increased markedly over the past decade but more investigation is needed. Qualitative studies need to further evaluate the experience of living with constipation to determine social conditions that may attribute to this problem and social solutions that may alleviate it. Access to services should be studied as constipation prevention and treatment is a multidisciplinary problem requiring services from physicians, nurses, pharmacists, physical therapists, occupational therapists, and dieticians. Quantitative studies need to further explore the relationship between constipation prevention and variables such as fluid intake, mobility, positioning, and diet. Nurses must be in the foreground of constipation prevention and treatment research as nurses play three critical roles in constipation prevention and treatment: gatekeeper to services, provider of services, and teacher.
CHAPTER III
Methodology

The intent of this quantitative experiment was to introduce a fiber intervention, in the form of Pajala porridge, into the diet of five participants to see if the intervention was effective in preventing constipation. This study is a replication, with some changes due to the small sample size, of Wisten and Messner’s, 2005 study, using Pajala porridge. Participants recorded their bowel movements, laxative use, and level of comfort for two weeks. This data collection period served to provide the baseline or control data. Participants then completed a two week period with no data collection or intervention. Participants were encouraged to use their normal laxative regimen. This two week period was intended to provide a time for the participants’ regular bowel function to return, in the event that the act of writing down their bowel habits had changed their bowel habits.

Next participants consumed 0.18 liters or 6 fluid ounces (three quarters of a cup) of the Pajala porridge, in addition to their normal diet. The porridge yields 7.5 grams of fiber per ¼ quarter serving. The porridge recipe used was ¼ cup of ground flax seeds, prunes, and dried apricots each, 1/8 cup raisins, 1.5 teaspoons salt, and 3.5 cups water. These ingredients were soaked overnight in a saucepan. The following morning 1 cup rolled oats and ½ cup oat bran was added to the saucepan and brought to a boil for 3-5 minutes while stirring to produce 6 servings of porridge. The leftovers were stored in the refrigerator for the next 5 days’ uses. (Wisten & Messner, 2005).

Participants ate this porridge for a one-week period with no data collection. Fiber works best over a period of time; this one week period allowed the participants bowels to be primed with the fiber. Participants then continued to eat the porridge for two more
weeks while monitoring and collecting data on their bowel movements, laxative use, and level of comfort.

Participants used a laxative if they experienced constipation during this study on the third day of no bowel movement. The laxatives used were based on the participant’s physician’s recommendations, on the third day with no bowel movement.

Introduction to Quantitative Methodology

The aim of a quantitative study is to discover a causal relationship among variables (Lusardi, 2004). “A true experimental design is an experiment in which the researcher tries to assess whether an intervention or treatment (independent variable) makes a difference in a desired outcome (dependent variable)” (Lusardi, 2004, p. 200).

One aim of this study was to determine if an increase in dietary fiber in the form of Pajala porridge (the experimental intervention) would decrease constipation as determined by an increase in the frequency of bowel movements and a softening of the stool based on an increased rating on the Bristol Form Stool Scale (Appendix A). The Bristol Stool Form Scale measures a bowel movements form and consistency (hardness or softness) on a scale of one to seven with one being liquid and seven being hard small pellets. A score of four would be the optimal bowel movement form and consistency.

Three basic principles apply to an experimental design: control of variables, random assignment of participants, and an intervention or treatment (Lusardi, 2004). Due to the small sample size, participants completed a baseline period of data collection and then an intervention period of data collection. Participants’ inclusion in both groups negated a need for random assignment.
Control of extraneous variables is important in experimental design, so confounding influences are not exerted on the study results (Lusardi, 2004). The many extraneous variables that promote constipation include medications, diseases, mobility, and age. Disparity between the control and intervention group in these categories could confound the study results. Categorizing variables guarantees that the data analysis will be significant (Fain, 2004). Due to the individual participant’s inclusion in both groups, all extraneous variables were canceled out as they were identically represented in each group.

Replication is important to verify prior findings and shows the extent to which a study can be generalized among other populations (Fain, 2004). This study will provide a basis for comparison to the original Pajala porridge study and other previous studies. A quantitative method further supports the generalization of findings to other populations (Fain, 2004).

Criteria of Participation

Participants in this study were recruited from a senior citizen social club in Helena, MT. Participants included English speaking adults 65 years of age and older who were in general good health. Immobility was not a reason to exclude a participant. Criteria for participation followed the Rome III criteria for constipation. This criterion must have included affirmation of two of the following traits: straining for 25% of defecations, hard or lumpy stool for 25% of defecations, sensation of incomplete evacuation for 25% of defecations, sensation of anorectal blockage for 25% of defecations, or need of manual assistance to complete defecation for 25% of defecations. These symptoms needed to occur over three of the past six months while rarely having
loose stool without a laxative; without a diagnosis of Irritable Bowel Syndrome (Tariq, 2008). Participants with aphagia, dysphagia, and dementia were excluded from participating in the study. Furthermore, participants had to be able to prepare the provided ingredients into the porridge and self record their results in this study as directed in the instructional packet.

Setting of Experiment

People interested in participating met privately with the primary investigator at a blood pressure clinic at the senior citizen social club. Qualification to participate was determined at that time. Participants received a packet including a Bowel Movement Record (Appendix B), instructions (Appendix C), and dry ingredients for the porridge recipe from the primary investigator via mail. This study was conducted in the participants' home over seven weeks. The participants then returned the Bowel Movement Record in the self-addressed stamped envelope included in the packet.

Data Collection Procedures

Data collection included two categories, baseline data that measured the participants’ bowel movements before the intervention and outcome data which measured the intervention’s impact on the participants’ bowel movements. Variable data were not collected as the participants participated in both groups, canceling out the variables. The data collected to show the difference between the baseline period and the intervention period included days with defecation, days that laxatives were used to achieve defecation, consistency of stool on the Bristol Stool Form Scale, and level of discomfort on a scale of zero to ten (Appendix D).
Analysis of Data

Collected data was analyzed using Student’s t-test. Data showing the outcome of the experiment were analyzed using the t-test method. A t-test verifies whether or not the mean of the intervention and control groups is significantly different (Fain, 2004). In this case the t-test shows whether there is a difference between the baseline data and the outcome data.

Ethics of the Study

This study was approved by the Institutional Review Board at Carroll College. Informed consent (Appendix E) was obtained from all participants. All participants were required to obtain an endorsement from their physician (Appendix F) to participate in the study. All participants were informed of their right to withdraw from the study at any time. A statement of confidentiality practices was received by all participants through the informed consent form. Participants were recruited through a senior citizen social club in Helena, Montana via pamphlets. All interested parties contacted the primary investigator. Electronic data generated during this study was password protected on a secure computer. Hard copy data was secured in a locked filing cabinet. All documentation transfers occurred through the mail, and verbal communications occurred via telephone.
CHAPTER 4

Results

The purpose of this thesis was to determine whether increasing fiber in the elderly person’s diet would decrease the incidence of constipation. Four factors were measured with each participant to determine whether constipation was influenced or not. These factors included whether defecation was achieved or not, whether a laxative was used or not, what the stool consistency was according to the Bristol Form Stool Scale with seven being very hard stool and one being liquid stool, and overall comfort level on a scale of one to ten with one being very comfortable and ten being the most uncomfortable. Participants included two women 65 years of age or older. All participant data is outlined in Table 1.

Students T-test was used to analyze data. A 95% confidence interval, or a p-value of 0.05, was used to reject or accept the alternative hypotheses. Full statistical analysis is outlined in Table 2.

Statistical Analysis of Stool Frequency

The alternative hypothesis is that the Pajala porridge would increase the frequency of participants’ bowel movements. The null hypothesis was that the Pajala porridge would not impact participants’ bowel movement frequency. Participant one had a p-value of 0.000556577, rejecting the null hypothesis. Participant two did not meet the assumptions for distribution due to the low number of bowel movements. The two participants combined resulted in a p-value of 0.001408157, rejecting the null hypothesis. There was an overall statistical difference in the increased frequency of bowel movements with the intervention of the Pajala porridge.
Statistical Analysis of Laxative Use

The alternative hypothesis was that the individuals consuming Pajala porridge would have a decreased use of laxatives. The null hypothesis was that the Pajala porridge would not impact participants’ use of laxatives. Participant one had a p-value of 0.041138433, rejecting the null hypothesis. Participant two had a p-value of 0.5; the alternative hypothesis could not be accepted. The two participants combined resulted in a p-value of 0.1609445; the alternative hypothesis could not be accepted.

Statistical Analysis of Stool Softness

The alternative hypothesis was that the Pajala porridge would soften the participants’ stool. The null hypothesis was that the Pajala porridge would not impact participants’ stool softness. Participant one had a p-value of 0.006210723; rejecting the null hypothesis. Participant two had a p-value of 0.35633961; the alternative hypothesis could not be accepted. The two participants combined resulted in a p-value of 0.013337036; the alternative hypothesis was accepted. There was an overall statistical difference in the softness of the participants’ stool. There was not an overall statistical difference in decreased use of laxatives with the intervention of the Pajala porridge.

Statistical Analysis of Overall Comfort

The alternative hypothesis was that the Pajala porridge would decrease the participants’ overall discomfort. The null hypothesis was that the Pajala porridge would not impact participants’ level of comfort. Participant one had a p-value of 5.12878 E-08; rejecting the alternative hypothesis. Participant two had a p-value of 0.234521676; rejecting the alternative hypothesis. The two participants combined resulted in a p-value
of 0.140295034; rejecting the alternative hypothesis. There was not a statistical
difference in the participants' overall comfort.

Summary of Statistical Analysis

The four factors analyzed included defecation frequency, use of laxatives, stool
consistency, and overall comfort. The null hypothesis was that the intervention would not
increase defecation frequency, lower laxative use, decrease the hardness of stool
consistency, or increase overall comfort. The alternative hypothesis was that the
intervention would increase defecation frequency, lower laxative use, decrease the
hardness of stool consistency, or increase overall comfort.

Data analysis showed that the intervention did have a statistically significant
impact for participant one by increasing her defecation frequency, decreasing her laxative
use, and lowering her Bristol Stool measurement by softening her stools. Participant one
did not have statistically significant results for overall comfort. Participant two did not
have statistically significant results in any area. Both participants’ data were combined
for statistical analysis. Differences in overall comfort and laxative use were not
statistically different with the intervention. Stool softness and defecation frequency were
statistically different with the intervention.
CHAPTER 5

Discussion

The aim of this seven-week study on constipation prevention focused on participants’ bowel movement frequency, laxative use, stool softness, and overall comfort. Statistical analysis showed that the intervention of ingesting Pajala porridge did increase participants’ bowel movement frequency and stool softness. It did not decrease the participants’ laxative use or decrease their overall discomfort. There are two unforeseen variables that may have interfered with the outcome for laxative use and overall comfort. Participation in this study was not optimal.

Areas of Interest

The areas of frequency of bowel movement, laxative use, stool softness, and overall comfort were specifically explored in this thesis. Constipation is “a decrease in a person’s normal frequency of defecation accompanied by difficult or incomplete passage of stool and/or passage of excessively hard, dry stool” (Venes, 2005, “constipation”). The first area of interest in this study was a desire to see an increased frequency of bowel movements, related to the ingestion of Pajala porridge, as that would show a decrease in the incidence of constipation. The second area of interest in this study was to see a softening of the stool related to the ingestion of Pajala porridge. This would also show a decreased incidence of constipation as the stool would not be hard and dry and would pass more easily. Bowel movement frequency and stool softness were shown to be statistically influenced by the intervention of the Pajala porridge.

As shown in previous studies, a person with constipation experiences bodily suffering and discomfort (Annells & Koch, 2002; Friedrichsen & Erichsen, 2004). The
third area of interest in this study was to see a decrease in overall physical discomfort related to the ingestion of Pajala porridge, as this would show a decrease in gastrointestinal discomfort caused by constipation through the easier passage of stool.

The final area of interest in this study was a desire to see a decrease in the use of laxatives related to the ingestion of Pajala porridge. Many people self-treat their constipation with laxatives without knowledge of possible implications such as laxative dependence and bowel obstructions (Powell, 2005). Two-thousand two-hundred fifty-three dollars a year per nursing home resident are spent in America to treat constipation (Tariq, 2008); the cost of laxatives may be inhibitory for some elderly to treat their constipation. Unfortunately the participants in this study did not decrease the use of laxatives. Laxative use and overall comfort were not shown to be statistically influenced by the intervention of the Pajala porridge.

*Unexpected Findings*

Through review of the participants’ data, subjective data were inadvertently discovered. There was one participant who would not follow the study parameter of laxative use on the third day of no bowel movement and opted to use a laxative on most days. This gives anecdotal information that laxative overuse is a problem with the elderly in this small rural area. This woman also showed a potential lack of communication with her doctor that could affect her healthcare. Her doctor agreed that she should only use a laxative on the third day of no bowel movement. This theme is similar to one explored by Powell in that embarrassment in asking for help is one of the causes of constipation in the elderly (2005).
Limitations of the Study

Three limitations were identified at the completion of this study. One limitation of this study was the small sample size. Three participants were originally recruited for this study, but one participant elected to discontinue participation before the completion of the study. Residents in this small town were not very willing to discuss such a personal problem. The sample size for the final statistical analysis consisted of two volunteer participants. For this study to be statistically significant, the sample size should have been larger.

The second limitation of this study involved one of the participants not adhering to the parameters of the study. She was asked to only use a laxative on the third day of not having a bowel movement. She used a laxative almost every day of the study and did not report this until after the completion of the study. This use of laxatives may have skewed the results for laxative use, overall comfort, stool softness, and bowel frequency.

The third limitation of the study involved one participant getting sick with gastroenteritis, resulting in an abnormal increase in overall discomfort, bowel frequency, and liquid stool. This occurred during the baseline period for this participant and therefore gave an inaccurate comparison between the baseline period and the intervention period.

Future of Constipation Prevention Research

Activity, diet, hydration, and positioning have been researched and shown to be effective interventions for constipation prevention. However, more research needs to be done in these areas. With elderly patients, oral intake may be inhibited by dysphagia, decreased taste sensation, decreased appetite, inability to feed themselves, and dementia.
Good tasting food choices that are high in fiber need to be developed. New adaptive equipment and ways to physically assist people to independently feed themselves need to be developed and tested to allow oral intake of fiber and fluids by the elderly. This would best be achieved by using an interdisciplinary team approach that combines the skills of nurses, occupational therapists, nutritionists, nurse’s assistants, and most importantly the patient.

Specific activity regimens need to be explored for individuals with full mobility, limited mobility, and no mobility with the intent of aiding gastric motility. Positioning for optimal bowel motility and comfort should be explored for both bedridden individuals and individuals able to use a toilet or commode. This should be developed with the patient, physical therapists, nurses, and nursing assistants.

Constipation prevention is a complex problem that requires a multidisciplinary approach. The patient is an important aspect of the team and should be involved and encouraged to openly participate. Constipation is a problem for many and working proactively with the patient and other team members can vastly improve the quality of life for the patient.
References


### Table 1 Participant Data

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<td>Comfort</td>
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</table>

*defecate 1 = defecation occurred, 2 = defecation did not occur
** laxative 2 = did use a laxative, 1 = did not use laxative
Bristol scale was reversed for the statistical analysis to show a decreasing trend, which would accurately represent the statistical trend.
### Table 2 Summary of Statistical Analysis

<table>
<thead>
<tr>
<th>Participant</th>
<th>P-Value</th>
<th>Participant</th>
<th>P-Value</th>
<th>Combined</th>
<th>P-Value</th>
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<td>0.000556577</td>
<td>Defecation</td>
<td>***</td>
<td>Defecation</td>
<td>0.001408157</td>
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<td>Laxative Use</td>
<td>0.041138433</td>
<td>Laxative Use</td>
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<td>Bristol Stool</td>
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*** did not meet assumptions for distribution
Appendix A Bristol Stool Form Scale

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<tr>
<th>Type</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Separate hard lumps, like nuts (hard to pass)</td>
</tr>
<tr>
<td>2</td>
<td>Sausage-shaped but lumpy</td>
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<tr>
<td>3</td>
<td>Like a sausage but with cracks on its surface</td>
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<tr>
<td>4</td>
<td>Like a sausage or snake, smooth and soft</td>
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<tr>
<td>5</td>
<td>Soft blobs with clear-cut edges (passed easily)</td>
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<td>6</td>
<td>Fluffy pieces with ragged edges, a mushy stool</td>
</tr>
<tr>
<td>7</td>
<td>Watery, no solid pieces ENTIRELY LIQUID</td>
</tr>
</tbody>
</table>

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Master in Medicine at the University of Bristol
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manufactured by Menarini
Appendix B Participant Data Collection Forms

Week 1-2 While not eating the porridge

<table>
<thead>
<tr>
<th>Day of the study</th>
<th>Did you defecate?</th>
<th>Did you use a laxative to achieve defecation?</th>
<th>What number on the Bristol Stool Form Scale would you apply to your stool. Please refer to the included chart and record the number.</th>
<th>Rate your level of comfort today on a scale of 0 to 10, with zero being no discomfort and 10 being extreme discomfort.</th>
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<td>Yes or No</td>
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Appendix B Participant Data Collection Forms (continued)

Week 6-7 While eating the porridge

<table>
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<th>Day of the study</th>
<th>Did you defecate? Yes or No</th>
<th>Did you use a laxative to achieve defecation? Yes or No</th>
<th>What number on the Bristol Stool Form Scale would you apply to your stool? Please refer to the included chart and record the number.</th>
<th>Rate your level of comfort today on a scale of 0 to 10, with zero being no discomfort and 10 being extreme discomfort.</th>
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Appendix C Participant Instructions for Preparing Porridge

Participants were provided with premeasured packages of wet and dry ingredients.

Participants were not told the contents of the packages.

Instructions for preparing porridge

The night before:

Pour contents of package one into a sauce pan add 3 and ½ cups water to the pan.

Refrigerate overnight.

In the morning:

Add the contents of package 2 to the sauce pan. Bring to a boil, stirring occasionally for 3-5 minutes. Add some water if necessary. Makes 6, ¾ cup servings, refrigerate leftovers and reheat single servings. You may add toppings per taste preference.
Appendix D Pain Scale

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<td>No</td>
<td>Some Discomfort</td>
<td>Moderate Discomfort</td>
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<td>10</td>
<td>Severe Discomfort</td>
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No Discomfort

Some Discomfort

Moderate Discomfort
Appendix E Participant Consent Form

Carroll College

Subject Consent Form
For Participation in Human Research

Title of Study: Fiber as an Effective Intervention for Constipation Prevention in the Elderly

You are being asked to participate in a research study about constipation. From this study, the investigator(s) hope to provide continuing evidence that fiber is effective in preventing constipation.

You have been selected to participate in this study because you are 65 years of age or older, experience constipation and are in general good health. If you agree to participate, you will be asked to record you bowel movements for two weeks, do nothing for two more weeks then prepare and consume ¼ cup of the provided porridge every morning for 3 weeks and record your bowel movements on the included Bowel Movement Record during the final two weeks. The study is expected to involve 5 participants and will be conducted over seven weeks.

Participation in this study may involve certain risks; including embarrassment in discussing bowel movements and fecal obstruction. You may benefit from this study by experiencing relief from your constipation.

Funding for this study will be provided by the principle investigator. If you choose to participate, the cost to you will be your time and effort. There will be no financial cost to you.

Your privacy is important to us. Confidentiality of records identifying you will be maintained by password protected computer files with any printed or paper information stored in a locked filing cabinet.

Carroll College cannot be held responsible for injury, accidents, or expenses that may occur as a result of your participation in this project. In addition, Carroll College cannot be held responsible for injury, accidents, or expenses that may occur as a result of traveling to and from your appointments at the site of data collection.

Further information about this research study may be obtained by calling Jessica Barnett at (406) 459-2581. Additional questions about the rights of human subjects can be answered by the Chairman of the Institutional Review Board, John Scharf (406) 447-4457.
Appendix E Participant Consent Form (continued)

I, _________________________ (name of subject), agree to participate in this research. The investigator has thoroughly explained the nature and process of this research to me. I have read the above and understand the discomforts, inconvenience and risk of this study. I understand that I have the right to refuse to participate in this study and that refusal to participate will involve no penalty or loss of benefits to which I am otherwise entitled. I also understand that I may withdraw from the study at any time without penalty or loss of benefits to which I am otherwise entitled. To the best of my knowledge I have no physical or mental condition that would be adversely affected by my participation. I have received a copy of this consent form for my own records.

Signature of Participant

Printed Name of Participant

Signature of Witness

Printed Name of Witness

Date
Appendix F Physician Recommendation Form

Dear Physician,

I have been asked to participate in a research study being conducted by an honors nursing student at Carroll College. This research study is about constipation prevention. The intervention in this study is to eat a special porridge daily for three weeks. This porridge has 7.5 grams of fiber in each ¾ cup serving. I understand that the risks of this study are abdominal discomfort and bowel obstruction. I also understand that to prevent these complications I should drink at least two liters of fluids each day, use a laxative as directed by you, and report to the primary investigator if I have any concerns or fail to have a bowel movement for four days.

As a part of the requirements stipulated by the IRB at Carroll College, I have been asked to contact you about my desire to participate in this study. If you think I should not participate in this study I will not be included in the sample population. On the following page please indicate whether you think I could participate in this study or if I should not participate, what type of laxative you want me to use and how often and any other comments for myself or the primary investigator. You may also call the primary investigator with any questions about this study.

Thank You,

___________________________
Patient

___________________________
Jessica Barnett, Primary Investigator
Appendix 6 Physician Recommendation Form (continued)

Physician, please fill out this form and have me called when it is ready to be picked up.

Check One

____ Yes I think you could participate in this study on constipation prevention.

____ No I do not think that you should participate in this study on constipation prevention.

Laxative to use and dose:

______________________________________________________________

Comments:__________________________________________________

________________________________________________________________

________________________________________________________________

________________________________________________________________

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Physician’s Signature