

GASTROINTESTINAL ILLNESS AND STRESS IN PUBLIC SCHOOL TEACHERS

by

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DEDICATION

This thesis is dedicated to my parents who have always supported my academic career. I would not have been able to accomplish all that I have without their endless guidance, encouragement, and love.

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LIST OF ABBREVIATIONS

Abbreviation	Description
H. Pylori	Helicobacter Pylori
HPA Axis	Hypothalamic-pituitary-adrenal axis
ACTH	Adrenocorticotrophic Hormone
IBS	Irritable Bowel Syndrome
IBD	Inflammatory Bowel Disease
GHQ	General Health Questionnaire
PSS	Perceived Stress Scale
PHQ	Patient Health Questionnaire
SF-36	Short Form 36 Health Inventory
BMI	Body Mass Index

ABSTRACT

The primary purpose of this study is to examine the connection between occupational stress and gastrointestinal disorders in a sample of public school teachers. Research has shown that occupational stress can have detrimental effects on the gastrointestinal system. **Methods:** A total of 3,361 Texas public school teachers teaching grades kindergarten through twelfth grade agreed to participate in this study. Participants were separated into two groups: those who reported gastrointestinal illnesses and those who did not. Demographic variables, teacher-specific comparisons, and psychosocial/health comparisons were utilized within the study. **Results:** Based on the final regression model, African American participants or those of Other racial/ethnic backgrounds were found to have higher levels of gastrointestinal illnesses. For occupational variables, poor teacher attitude was found to be a significant indicator of gastrointestinal illness. Psychosocial and Health comparisons such as high levels of perceived stress, poor physical health quality of life, and somatization disorder were also significant predictors of gastrointestinal stress. **Conclusions:** Special attention should be given to teachers facing occupational, psychosocial, and health related stressors as these stressors may manifest into gastrointestinal illnesses.

CHAPTER I.

LITERATURE REVIEW

The Stress Response

The Biopsychosocial model suggests that there is an interaction between biological, social, and psychological factors. Biopsychosocial stress-induced disorders are disorders caused by stress that affect all three areas of the biopsychosocial model. Stress has been defined as any stimulus, physical or psychological, that causes a change in the body's homeostasis (Cannon, 1965; Drossman, 1994). When the body is faced with a potential threat, it responds through the Hypothalamic Pituitary Adrenal Axis, also known as the HPA Axis. When danger is detected the hypothalamus releases hormones called corticotrophin and arginine vasopressin. These hormones activate the pituitary gland, which in turn release adrenocorticotrophic hormones, also known as ACTH. The ACTH then releases signals to the body to produce cortisol, which prepares the body for fight of flight, dramatically changing the body's homeostasis, causing stress (Stephens & Wand, 2012).

Stress can be psychological or physiological in nature, can be caused by various life events and personality factors, and can have very significant effects on various parts of the body including the central nervous system and immune system. The painful and damaging physiological effects of stress makes this an important area of research.

The study of stress response began with endocrinologist, Hans Selye, who hypothesized that the changes in physiology were due to the body trying to regain

homeostasis. Selye named the cause of the changes in the body's physiology (i.e. extreme cold) as a "stressor", and the body's attempt to regain homeostasis as "stress" (Selye, 1978). Since Selye, psychologists such as Lazarus and Folkman (1984) found that stress is not universal in origin or symptomology. Instead, stress is a highly individualized experience caused by a variety of physical, mental, and emotional stressors that can manifest themselves through several different physical symptoms. One of the many physical symptoms linked to stress is gastrointestinal illness.

Functional Gastrointestinal Disorders

Gastrointestinal Illnesses have had a significant impact on the overall health and wellness of individuals worldwide. These diseases and syndromes do not discriminate between age, gender or ethnicity, and they affect 60 to 70 million Americans annually (Peery et al., 2012). Individuals with these illnesses often experience chronic abdominal pain and bowel symptoms such as constipation, diarrhea, increased pain sensitivity, and loose bowels (Mayer & Tillisch, 2011).

The most common gastrointestinal illnesses include peptic ulcer disease, irritable bowel syndrome, functional dyspepsia, and inflammatory bowel disease, all of which have been tied to the stress response system. Stress-related disorders have been shown to lower overall quality of life and, as discussed in the above paragraph, can lead to an increase in an individual's sensitivity to pain and likelihood of developing a mental illness such as anxiety or depression (Mayer & Tillisch, Perry et al., 2012). Functional Gastrointestinal Disorders can also lead to

increased medical costs and absenteeism at work and school, thus creating a less productive society as a whole (Fischler et al., 2003). One study stated that gastrointestinal diseases cost the United States approximately \$142 billion dollars per year. The same study stated that in 2004, there were roughly 236,000 deaths and 4.6 million hospitalizations due to these diseases (Peery et al., 2012).

Unfortunately, these diseases are grossly under researched due to poor funding. Less than 1% of all funding for digestive diseases are allotted for research on functional gastrointestinal illnesses (Gastrointestinal (GI) functional and motility disorders, 2015). The following sections highlight the current research on and the etiology of these specific gastrointestinal disorders, provide evidence of the link between stress and these disorders, and explain how these diseases can affect an individual's overall health.

Peptic Ulcer Disease

Peptic ulcer disease is a common gastrointestinal disorder that results from a weakening of the protective layer of gastrointestinal mucosa that protects the lining of the gastrointestinal system from stomach acid. Over 500,000 new cases of Peptic Ulcer Disease are reported in America every year. Recent totals suggest that 1 in every 10 Americans will suffer from Peptic Ulcer Disease at some point in their lifetime, making this disease an important one to study (Johns Hopkins University, 2009).

The cause of peptic ulcers is still up for debate. The most common belief is that a form of bacteria called *Helicobacter Pylori* damages the stomach lining

and is responsible for up to 80% of gastric ulcers and 90% of duodenal ulcers (Centers for Disease Control, 2013). However, stress has not been completely ruled out as a factor in peptic ulcer disease. According to a study by Malfertheiner, Chan, and McColl (2009), only 5-10% of individuals infected with H. Pylori actually develop peptic ulcers. Furthermore, H. Pylori infections are decreasing in Western civilizations due to better antibiotics, but the prevalence of peptic ulcers in Western countries is not decreasing. An article by Jones (2006) stated that between 5% and 20% of gastric ulcers have no known organic causes. In other words, neither H. Pylori, nor any other known bacteria or illness, is causing these ulcers, suggesting that the cause may be inorganic in nature. These facts have forced the medical community to recognize that H. Pylori alone is not a sufficient enough explanation for the formation of stomach ulcers, and have spurred new research in the relationship between stress and somatization with the development of Peptic Ulcer Disease.

Although new research in this area is still scarce, correlational data may help fill in the gaps left by H. Pylori research and functional somatization. For example, it has been well documented that factors associated with somatization such as depression, anxiety, and posttraumatic stress disorder are highly correlated with peptic ulcers (Zhang, 2012). Studies also continue to demonstrate that there is a relationship between elevated Adrenocorticotrophic hormone levels and ulcers. A recent study by Fraites (2009) showed that rats with ulcers medicated with Atrazine, an endocrine disruptor, and then subjected to stress, have increased levels of ACTH in their gastrointestinal system. The activation of

the HPA axis leading to the secretion of ACTH to the stomach during times of stress suggests that stress may result in damage to the stomach. Although this research is correlational and researchers have yet to find an infallible causal relationship between stress and ulcer formation, it is apparent that the symptoms of somatization and Peptic Ulcer Disease are highly correlated.

Irritable Bowel Syndrome

Irritable Bowel Syndrome (IBS) is a functional gastrointestinal disorder that causes chronic abdominal pain and bowel symptoms such as constipation, diarrhea, and loose bowels (Mayer & Tillisch, 2011). This disorder does not exhibit abnormal structural, biochemical, or physiological changes that could be held responsible for the symptoms reported, and the ultimate cause of IBS is still unknown (Sykes, Blanchard, Lackner, Keefer, & Krasner, 2002). IBS is a common gastrointestinal disorder and accounts for 13-52% of new referrals in gastroenterology clinics (Walker, Roy-Byrne, & Katon, 1990). Research has estimated that, within the United States, 9-22% of the population experience symptoms of IBS.

As is the case with most gastrointestinal disorders, relatively little is known about IBS. Irritable Bowel Syndrome is categorized as a stress related disorder due to its high correlations with psychological disorders and lack of medical explanation. Patients with IBS have increased levels of anxiety and depression and have more severe health issues than patients without IBS (Drossman, 1994). Studies have shown that individuals with IBS also have a

higher lifetime prevalence of psychiatric disorders than those with other gastrointestinal disorders such as Crohn's Disease, Inflammatory Bowel Disease, and Ulcerative Colitis.

Large bodies of research are also finding that IBS is associated with structural changes in the brain. Individuals diagnosed with IBS have been shown to exhibit decreased grey matter density in widespread areas of their brain, especially areas involved in stress and arousal. Although the reason for decreasing grey matter as a result of IBS is unknown, brain damage from the loss of grey matter may explain why IBS patients report pain in other parts of their body unrelated to the gut (Mayer & Tillisch, 2011). More research needs to be done related to Irritable Bowel Syndrome. The symptoms of IBS and risk factors associated with the disorder are dangerous and can have a significant effect on an individual, leading to an overall lower quality of life.

Functional Dyspepsia

Functional Dyspepsia is a functional gastrointestinal somatization disorder characterized by feelings of fullness, nausea, gastric burning sensations, vomiting, upper abdominal pain, and altered bowel habits (Mayer & Tillisch, 2011). Symptoms of Functional Dyspepsia are highly comorbid with IBS. According to an article by Riedl et al. (2008), co-occurrence between IBS and Functional Dyspepsia may be higher than 80%. However, many of the symptoms of IBS and functional dyspepsia overlap, making it sometimes difficult to differentiate between the two. Like IBS, individuals with Functional Dyspepsia experience

psychiatric illness, anxiety, neuroticism, pain amplification, and have increased rates of history of sexual abuse (Walker et al., 1990; Van Oudenhove et al., 2011).

Inflammatory Bowel Disease

Inflammatory Bowel Disease (IBD) encompasses Crohn's Disease and Ulcerative Colitis. Symptoms of IBD include growth delay, diarrhea, inflamed GI tract, high levels of abdominal pain, intestinal bleeding, and rectal bleeding. As discussed with all functional somatization disorders, individuals with IBD show increased rates of anxiety, stress, and depression compared to individuals who do not have IBD (McCormik et al., 2010). Little is known about the origins of this disorder.

It is easy to see why further research in gastrointestinal illnesses is necessary. These illnesses are highly comorbid with anxiety and depression, they have been linked with loss of brain mass, and they can lead to pain amplification. Moreover, these illnesses affect thousands of individuals' quality of life every day. The symptoms of these diseases can be chronic and even lifelong, and as of yet, treatment and scientific understanding is limited. However, research does support that stress is highly correlated with gastrointestinal illness. Research on common stressors in today's society may lead to a better understanding of gastrointestinal illnesses. One common stressor faced by many individuals is occupational stress.

Occupational Health and Stress

Research has shown that occupational stress can lead to poor mental and physical health. Occupational stress occurs when an individual's perceived job demands exceed his or her perceived resources (Mulholland, Mckinlay, & Sproule, 2013). Poor working conditions, poor job satisfaction, and low levels of perceived job control have been found to cause stress in individuals (Johnson et. al, 2005.) These occupational stressors can affect the body's stress response system causing changes to the immune system and central nervous system. These changes can lead to both mental and physical illnesses (Bartholomew, Ntoumanis, Cuevas, & Lonsdale, 2013; Barutcu & Serikan, 2013). Occupational stress has been linked to physical illnesses such as gastrointestinal disturbances, heart disease, and back pain, as well as psychological illnesses such as depression and anxiety (Johnson, Cooper, Cartwright, Taylor, & Millet, 2005). Job strain and stress has also been linked to coronary heart disease (Kuper & Marmot, 2003). Stress can also cause physical and mental health problems depending on various factors such as the type of an individual's occupation (Johnson et. al, 2005).

Occupational Health Issues in School Teachers

Occupational stress can be characterized by negative emotions triggered by negative demands of an individual's job (Yang, Hu, and Wong, 2009). The teaching profession carries some of the highest occupational risks for stress. Teachers experience more physical health problems, poorer psychological well-being, and lower job satisfaction than most other occupations (Johnson et. al,

2005). The same study found that across 26 occupations, teachers had the second lowest average score on physical illness and mental illness, and the sixth lowest score in job satisfaction, suggesting that teachers experience more physical illness, more mental illness, and lower job satisfaction than most of the other occupations (Johnson et. al, 2005). Research has shown that poor mental and physical health can be triggered by work-related stress. Stressors at work can affect the HPA Axis causing changes to the immune system and central nervous system. These changes can lead to both mental and physical illnesses. Poor physical and mental health can have detrimental effects on not only the teachers themselves, but on the school districts they work for and the students they teach, making this an important area to study (Bartholomew, Ntoumanis, Cuevas, & Lonsdale, 2014).

Occupational stressors leading to poor health in teachers are often due to interpersonal interactions while at work. Reported interpersonal stressors experienced by teachers can include unsupportive coworkers or school administrators, upset parents, and uncooperative students (Bays & Crockett, 2007; Friedman, 2000). The conflict between how the teacher thought the class would operate, and how well the class actually operates may cause distress on behalf of the teacher. Difficult parents with unrealistic expectations of how the class should be set up, or the grades their child should get may also invoke stress and ill health. A study by Watson, Harper, Ratliff, and Singleton (2010), showed that teachers who reported low levels of job satisfaction were also more likely to report lower levels of overall wellness. These conflicts can lead to emotional labor in teachers.

Emotional labor may lead to feelings of anxiety, helplessness, and depression (Yin, Lee, Zhang, & Jin, 2013). These feelings can be exacerbated if the teacher also feels a lack of administrative support. Lack of support and emotional labor can lead to somatic symptoms such as musculoskeletal dysfunction and oral pain (Kovač, Leskošek, Hadžić, & Jurak (2013). The following section will examine the causes of occupational stress in teachers, how that stress affects the teachers' ability to do their job effectively, and the negative effects stressors can have on teacher health.

Job Satisfaction

One of the most important factors of occupational health is job satisfaction. Job satisfaction can be explained as the attitudes and opinions of employees towards their job. Specifically, these attitudes are centered on feelings of contentment, fulfillment, and gratification towards a job, as well as whether their needs while on the job are being met. (Ouyang, Sang, Li, & Peng, 2015; Collie, Shapka, & Perry, 2012). Poor job satisfaction in teachers is often due to interpersonal stressors such as critical communities, upset parents, low levels of support from administrators, and uncooperative students. Occupational frustration and conflict due to these stressors can manifest itself in many ways including role ambiguity, role overload, and effort-reward imbalance.

Role ambiguity occurs when teachers have uncertainty related to not knowing what is expected of them at work. (Kantas, 1997; Koustelios et al., 2004). New changes in state legislation, or lack of administrative support and training may

lead to role ambiguity. Role ambiguity can have significant effects on stress levels (Kuntz, Naswall, & Bockett, 2013). Role overload occurs when teachers do not have the appropriate resources or time to fulfill all the duties the job requires (Kuntz, 2013).

Effort-Reward Imbalance is yet another source of stress in teachers that can lead to negative health effects. Effort-Reward Imbalance occurs when the lack of reciprocity between high efforts at work and occupational rewards causes emotional distress in employees. The reward in Effort-Reward Imbalance can include financial rewards, esteem rewards, career opportunities, and work retention. High levels of Effort-Reward Imbalance have been associated with high levels of attrition and absenteeism, low pay, and lack of administrative support. Individuals experiencing Effort-Reward Imbalance are more likely to be sick and have a longer recovery time than individuals not experiencing Effort-Reward Imbalance (Derycke et. al, 2013). Role overload and ambiguity have been related to significantly higher levels of burnout and significantly lower levels of quality of life, mental health, and physical health (Yang, 2009). These manifestations impair the ability to carry out the responsibilities and duties associated with being a teacher (Bays & Crockett, 2007; Littrell et. al, 1994; Cancio, Albrecht, & Johns, 2013; Friedman, 2000).

Job Control

Job control is a blanket term used to describe the degree to which an individual feels they have the ability to choose their own actions and the authority

to manage their work within their occupation (Park, Jacob, Wagner, & Baiden, 2014; Häusser, Mojzisch, Niesel & Schulz-Hardt, 2010). A study by Schreurs, Emmerik, Notelaers, & De Witte, (2010), found that the amount of perceived job control can significantly predict an employee's impaired general health. In this study, individuals who perceived themselves as having low levels of job control were more likely to report impaired general health than individuals who perceived themselves as having high levels of job control (Schreurs et al., 2010). Another study found that low levels of job control combined with high levels of job demand increased the risk for coronary heart disease (Kuper & Marmot, 2003) suggesting that health can be affected if employees do not feel that they have access to, or control over, the tools necessary to complete a task.

Unfortunately, job control is extremely limited in public schools. School districts often have strict performance standards that must be maintained for funding. Structured curriculum is often put in place leaving teachers with little control over what and how they teach. Teachers' success is often based on the performance of their students on standardized exams. Unruly or unmotivated students can cause stress because teachers cannot control whether or not a student's knowledge will be an accurate representation of what material was covered or how well it was conveyed (Bartholomew et. al, 2014). Low levels of job control in teachers can stretch beyond the school districts as well. State and national government agencies are often evaluating and changing how schools operate. Public education reform and legislation have a heavy pull on what subjects are taught and what information is conveyed to students. State mandated

changes to curriculum have drastically altered how and what teachers teach in their classrooms. Low levels of job control and the pressure to perform within the standards of the school district, and the state in which they work, have led to occupational issues such as increased stress levels and low levels of job satisfaction (Watts & Short, 1990).

Occupational Burnout

Occupational burnout has been defined as the feeling of emotional exhaustion, depersonalization and a negative appraisal of personal accomplishments due to work-related stress in an employee (Friedman, 2000; Johnson et. al, 2005).

Burnout is seen across occupations and is highly related to depression.

Depression, in turn, increases absenteeism, decreases general functioning, and has been linked to ill health in teachers (Rost et al., 2004). Somatic symptoms such as gastrointestinal and cardiovascular illness, back pain and oral problems have also been linked to burnout. However, burnout has also been linked to poor lifestyle choices such as overeating and lack of exercise, which may also affect physical and mental health (Peterson, Demerouti, Bergström, Samuelsson, Åsberg, & Nygren, 2008; Bartholomew et. al, 2014).

Attrition and Absenteeism

Attrition and absenteeism have become major issues for the educational system. According to Boyd, Grossman, Lankford, Loeb, and Wyckoff (2008), one-fourth of all new school teachers will quit the profession within their first

three years of teaching. An article by Alliances for Excellent Education stated that teacher attrition costs the United States roughly 2.2 billion dollars annually (Teacher Attrition Costs United States, 2014). The leading cause of attrition and absenteeism, much like job satisfaction, is lack of administrative support (Littrell, Billingsley, & Cross, 1994). One major impact of absenteeism and attrition on school districts is that it requires the district to replace teachers. Replacements may be difficult to find and recruitment and training is costly for the school districts. An article by Clotfelter, Ladd, and Vigdor (2007), found that over a period of five years, a group of 341,420 teachers accumulated over 2.6 million sick days. This study also estimated that one sick day costs a school district about \$50, equating to roughly 130 million dollars over the five-year period. Finding replacements have more than just monetary consequences. It may also affect the quality of the students' education. Substitute teachers may not be qualified to teach students the information they are required to learn for the day, which can put children behind in school. New hires lack experience and relationships with the students they educate, which may lead to less effective teaching (Bartholomew et al, 2014).

Conclusion

In conclusion, there is still research to be done on the relationship between gastrointestinal disorders and stress. Research has shown that stress plays a large role in the onset, development, and severity of these disorders. However, the vast majority of current literature on gastrointestinal illness is focused on medical treatment of these diseases. Although research on treatment is important, it is only

useful after someone is diagnosed. New research should focus on proactive solutions such as identifying stressors associated with gastrointestinal illness. This new research may lead to preventative strategies that help reduce the number of individuals developing gastrointestinal illnesses.

In order to isolate which stressors may lead to gastrointestinal disorders, it is important to look at current literature on stressors that are more likely to lead to general health problems. Research shows that occupational stress can have long-lasting psychological and physical health effects such as coronary heart disease, anxiety, and depression. This is especially true for teachers who have been reported to have some of the highest rates of occupational stress. This study will determine if occupational stressors in teachers significantly predict gastrointestinal illness. The findings of this study will add to the literature on the physical effects of occupational stress so that prevention strategies can be developed. These strategies could eventually be implemented, increasing overall job climate, job satisfaction, and teacher attitudes while also reducing absenteeism and attrition due to stress and illness.

Purpose

Gastrointestinal illness due to occupational stress in teachers is not well understood. The purpose of this study is to examine the relationship between occupational stress and gastrointestinal issues in teachers. The goal of this study is to help build a body of research examining how occupational stressors are linked to physical ailments and illnesses.

Hypotheses for Occupational Variables

Hypothesis I: It is hypothesized that teachers who report teaching middle school will be more likely to report gastrointestinal illness than teachers teaching elementary or high school.

Hypothesis II: It is hypothesized that teachers who report teaching core courses will be more likely to report gastrointestinal illness than teachers who teach elective courses.

Hypothesis III: It is hypothesized that teachers with a large number of students will be more likely to report gastrointestinal illnesses than teachers with a small number of students.

Hypothesis IV: It is hypothesized that teachers who report higher rates of teacher absenteeism for personal illness will be more likely to report gastrointestinal illness than teachers who have lower rates of absenteeism.

Hypothesis V: It is hypothesized that teachers who report higher rates of teacher presenteeism will be more likely to report gastrointestinal illnesses than teachers who report low rates of presenteeism.

Hypothesis VI: It is hypothesized that teachers who intend to quit the profession in one year will be more likely to report gastrointestinal illnesses than teachers who do not intend to quit in one year.

Hypothesis VII: It is hypothesized that teachers who intend to quit the profession in five years will be more likely to report gastrointestinal illness than those who do not.

Hypothesis VIII: It is hypothesized that teachers who report gastrointestinal illness on average will have worked less years teaching than teachers who do not report gastrointestinal illness.

Hypothesis IX: It is hypothesized that teachers who report lower levels of job satisfaction will be more likely to report gastrointestinal illness.

Hypothesis X: It is hypothesized that teachers who report lower levels of job control will be more likely to report gastrointestinal illness.

Hypothesis XI: It is hypothesized that teachers with negative attitudes will be more likely to report gastrointestinal illness than teachers with positive attitudes.

Hypothesis XII: It is hypothesized that teachers who perceive themselves as working in a negative school climate will be more likely to report gastrointestinal illness than teachers who perceive themselves as working in a positive school climate.

Hypothesis XIII: It is hypothesized that teachers who report high rates of student problems will be more likely to report gastrointestinal illness than teachers who report low rates of student problems.

Hypotheses for Psychosocial and Health Variables

Hypothesis XIV: It is hypothesized that teachers who report high levels of stress will be more likely to report gastrointestinal illnesses than teachers who report low levels of stress.

Hypothesis XV: It is hypothesized that teachers who report poor physical health will be more likely to report gastrointestinal illness than teachers who report good physical health.

Hypothesis XVI: It is hypothesized that teachers who report poor mental health will be more likely to report having gastrointestinal illness than teachers with good mental health.

Hypothesis XVII: It is hypothesized that teachers who meet the criteria for Major Depression will be more likely to report gastrointestinal illness than teachers who do not meet the criteria for Major Depression.

Hypothesis XVIII: It is hypothesized that teachers who meet the criteria for having Somatization Disorder will be more likely to report having gastrointestinal illness than teachers who do not meet the criteria for Somatization Disorder.

Hypothesis XIX: It is hypothesized that teachers who meet the criteria for Anxiety Disorder will be more likely to report having gastrointestinal illness than teachers who do not meet the criteria for Anxiety Disorder.

Hypothesis XX: It is hypothesized that teachers who meet the criteria for Panic Disorder will be more likely to report having gastrointestinal illness than teachers who do not meet the criteria for Panic Disorder.

Hypothesis XXI: It is hypothesized that teachers who report having cardiovascular problems will be more likely to report having gastrointestinal illness than teachers who do not report having cardiovascular problems.

Hypothesis XXII: It is hypothesized that teachers who report having musculoskeletal problems will be more likely to report having gastrointestinal illness than individuals who do not report having musculoskeletal problems.

Hypothesis XXIII: It is hypothesized that teachers who report having neurological problems will be more likely to report having gastrointestinal illness than individuals who do not report having neurological problems.

Hypothesis XXIV: It is hypothesized that teachers who are underweight on the Body Mass Index will be more likely to report gastrointestinal illnesses than teachers who are of a normal body mass.

Hypothesis XXV: It is hypothesized that teachers who are overweight on the Body Mass Index will be more likely to report gastrointestinal illnesses than teachers who are of a normal body mass.

Hypothesis XXVI: It is hypothesized that teachers who are obese on the Body Mass Index will be more likely to report gastrointestinal illnesses than teachers who are of a normal body mass.

CHAPTER II.

METHODS

Participants

This study consisted of a random sample of public school teachers from forty-six Texas school districts. Teachers were contacted via email and invited to participate in an online study over occupational health. A total of 3,361 public school teachers teaching grades kindergarten through twelfth grade agreed to participate in this study. No compensation was given for participation.

Anonymous online surveys were administered using Qualtrics and all data were kept confidential. All emails attained for this study were found through the Public Information Act and on school district websites. This study was approved by the Texas State University Institutional Review Board.

Measures

Demographic Variables. Demographic information was collected from participants during the online study. Participants were asked to report their age, gender, ethnicity, and marital status.

General Health Factors. The General Health Questionnaire, the Perceived Stress Scale the Patient Health Questionnaire and the Short Form 36 Health Inventory were used to assess participant's physical and mental health. The General Health Questionnaire, also known as the GHQ, is a 60-item self-report measure often used in doctor's offices as a patient intake questionnaire (Goldberg, 1972). It is primarily used to identify a patient's current ailments and preexisting conditions.

The General Health Questionnaire covers a wide range of possible health problems such as joint health, neurological health, pulmonary health, musculoskeletal health, and gastrointestinal health. For this study, the GHQ was used specifically to determine the presence of gastrointestinal illness. Gastrointestinal variables in the GHQ included heartburn, stomach or abdominal pain, persistent diarrhea, persistent constipation, ulcers in the stomach, nausea or vomiting, gall bladder. Any participants who reported experiencing these ailments were included as having gastrointestinal illness in this study. Participants were not asked to report specific diagnoses such as Peptic Ulcer Disease, but instead were asked to report if they experience gastrointestinal ailments and symptoms that could be indicative of certain diseases.

The Perceived Stress Scale is used to assess quality of life and the perceived sense of control (2008). It includes ten questions and is rated on a scale of zero to four, with zero being “never” and four being “very often,” with scores ranging from 0 to 40 and higher scores indicating a higher degree of perceived stress. For example, participants were asked, “In the past month, how often have you been nervous or stressed?” Participant answer choices were: never, almost never, sometimes, fairly often, and very often. The Perceived Stress Scale is used often in research and is considered a valid and reliable scale (Cohen, Kamarck, & Mermelstien, 1983).

The Patient Health Questionnaire, also known as the PHQ, is a self-report measure used in evaluating mental disorders such as Major Depressive Disorder, Somatization Disorder, Anxiety Disorder, and Panic Disorder (Kroenke &

Spitzer, 2001). To determine the presence of Major Depression, participants were asked to rate how often they experienced symptoms of depression. Participants were required to respond to questions like, “Over the past two week, how often have you had trouble falling or staying asleep, or sleeping too much?” Participants were asked to respond with, “Not at all,” “Several Days,” “More than half the days,” and “Nearly every day.” To determine Somatization Disorder, participants were asked to respond by indicating whether he or she is “not bothered at all,” “bothered a little,” or “bothered a lot” to questions such as “During the last four weeks, how much have you been bothered by stomach pain?” To determine Anxiety Disorder, participants were asked to answer “None at all,” “Several days,” or “More than half the days” to questions such as “Over the last four weeks, how often have you been bothered by feeling nervous, anxious, on edge, or worrying a lot about different things?” To determine Panic Disorder, participants were asked to respond “Yes or No” to a series of questions such as “Think about your last anxiety attack. Were you short of breath?” The PHQ is considered a reliable predictor for Axis I mental disorders and has been validated against the PRIME-MD.

The Short Form 36 Health Inventory is a quality of life survey that measures eight dimensions of physical and mental health (Ware, 1999). This survey, also known as the SF-36, contains 36 questions that measure dimensions such as general health problems, mental/ physical role limitations, bodily pain, physical functioning, vitality, general health perception, and social functioning. Participants were asked questions such as, “In general, would you say your health

is....” Participants could answer “Excellent”, “Very Good”, “Fair” or “Poor”.

Scores on the SF-36 are scored on a range from zero to one hundred, with higher scores signifying better health. It is standardized with a mean score of fifty and a standard deviation of ten. Both the physical and mental health summary scores have a reliability that exceeds .90. This questionnaire has been widely used in research and is considered reliable and valid (Ware, 1999).

Occupational Factors. Occupational factors such as school type, absenteeism, presenteeism, attrition, job satisfaction, job control, subject taught, average number of students, average number of years teaching, teacher attitudes, school climate and student problems were used for this study.

They hypotheses on school type, subject taught, average number of students, and average number of years teaching were exploratory analyses. School type was determined by asking participants if he or she taught elementary school, middle school, or high school. Absenteeism was determined by asking participants how many days they had missed work during the past four weeks. Participants were asked to discern between the number of absences due to illness and the number of absences due to non-illness. Only absence due to illness was included in this study. Presenteeism, unlike absenteeism, was used to determine how many times a participant attended work despite being sick in the last four weeks. Attrition was determined by asking participants of intent to quit the profession in either one or five years on a scale ranging from one to ten.

The Job Satisfaction Questionnaire was created for this study. This questionnaire measured thirteen areas of job satisfaction, specific to teachers. Satisfaction was rated on an eleven point Likert scale and asked teachers to rate their satisfaction with occupational factors such as support from the community, legislators, administrators, parents, and students. The range of the total score is from 0 to 130 with higher scores indicating greater satisfaction.

Job control, teacher attitudes, school climate, and student problems, were measured using the U.S. Department of Education National Center for Educational Statistics Teacher Questionnaire (2012). The Job Control section of this questionnaire consisted of six questions. Participants were asked questions such as, “How much control do you have over selecting textbooks?” Participants could answer that they had “no control,” “minor control,” “moderate control,” or “a great deal of control.” Scores would range between 6 and 24. Higher scores indicated higher levels of perceived control. The Teacher Attitude section of this questionnaire contains seventeen questions. Participants were asked to respond with “strongly disagree,” “disagree,” “agree,” or “strongly agree” to statements such as “In this school, staff members are recognized for a job well done.” Scores could range between 17 and 68. High scores indicated positive attitude while low scores indicated negative attitude. The School Climate section of this study consisted of seven questions. These questions asked participants to respond with “strongly disagree” “disagree,” “agree,” or “strongly agree” to statements such as “I like the way things are run at this school.” Scores could range from 7 to 28 with higher scores indicating a more positive perceived climate. Student Problems

were determined from a list of ten questions about basic student problems such as absenteeism, apathy, and tardiness. Participants were asked to rate whether these items were “not a problem,” “a mild problem,” “a moderate problem,” or “a serious problem.” Scores could range from 10 to 40 with higher scores indicating more serious student problems.

Statistical Analysis

All analyses were conducted using SPSS version 22. Univariate comparisons between teachers with and without any gastrointestinal disorders were conducted on demographic variables, occupational variables, mental health variables, and physical health variables using Pearson chi-square tests for categorical variables and Independent samples t-tests for continuous variables. Age, gender and ethnicity were controlled for in all subsequent analyses. A simultaneous binomial logistic regression was used to determine the factors that are most associated with gastrointestinal illness. Several variables were significant at the univariate level and were used in the multivariate analysis. However, only some variables were included in the logistic regression. All demographic variables, such as age, gender, and ethnicity were included. However, number of years teaching, job satisfaction, job control, job climate, student problems and panic disorder, cardiovascular problems, musculoskeletal problems, neurological problems, and body mass index were not included in in the logistic regression due to multicollinearity between variables. Pairwise deletion was used to control for missing data. The significance criterion for this study was set at an alpha level of $p < .05$.

CHAPTER III.

RESULTS

Demographic Variables

The descriptive for the demographic variables are detailed in Table 1. The data used for this study were screened for outliers and missing values. At the univariate level, females were more likely than males to have gastrointestinal disorders, [$X^2(1)=19.581$, ($p<.001$).] When comparing ethnicity, African Americans, Hispanics and other ethnic groups were more likely than Caucasians to report having gastrointestinal illnesses, [$X^2(6)=20,582$, ($p<.001$).] There was not a significant difference in age between teachers experiencing gastrointestinal illness and those who were not, [$t(2754.821) = -1.741$, $p>.05$]. Age, ethnicity, and gender were included as control variables in all subsequent analyses.

Teacher Specific Comparisons

For the teacher-specific comparisons portion of this study, we found that school type was not significant. There was no significant difference between elementary, junior high, and high school teachers in reporting gastrointestinal illnesses. Subject taught was not significant. There was no difference between teachers who taught core courses and those who taught electives in reporting gastrointestinal illnesses. The average number of students per class was also found to not be significant. There was no difference between teachers who had a large number of students and those who had a small number of students when

reporting gastrointestinal illnesses. Absenteeism due to personal non-illness was not a significant predictor of gastrointestinal stress.

Teacher Specific variables can be found in Table 2. Teachers with low levels of job satisfaction were more likely to report gastrointestinal illness ($p < .001$). Participants who report low levels of job control were significantly more likely to present with gastrointestinal problems ($p < .001$). High levels of absenteeism due to personal illness and high levels of presenteeism were also indicative of gastrointestinal illness among participants ($ps < 0.001$). Likewise, teachers who reported having gastrointestinal issues also reported a higher level of student related problems and poorer workplace climate ($p < 0.001$). Participants reporting gastrointestinal problems were also more likely to have poorer attitudes toward their jobs and were more likely to intend to quit the teaching profession within in the next one to five years. ($p < 0.001$).

Psychosocial and Health Comparisons

Psychosocial variables and health variables were also assessed in this study (see Table 3). For the psychosocial comparisons portion of this study, univariate comparisons showed that teachers with gastrointestinal disorders had significantly higher levels of perceived stress on the Perceived Stress Scale ($p < .001$). Furthermore, teachers with lower scores on the physical and mental composites of the SF-36 Quality of Life Scale were more likely to indicate gastrointestinal illness ($ps < .001$).

Major Depression was found to be a significant predictor of gastrointestinal illness such that those who reported major depression were more likely to also report having some gastrointestinal illness ($p < .001$). Participants with somatization disorder were also found to be significantly more likely to report gastrointestinal illness ($p < .001$). Anxiety Disorders were found to be a significant predictor of gastrointestinal illness. Participants who reported having anxiety had a higher likelihood of reporting that they had gastrointestinal illnesses than those who did not report having anxiety disorders ($p < .001$). Finally, panic disorders were also found to be a significant predictor of gastrointestinal illness. Like major depression, somatization, and anxiety, participants who reported having a panic disorder were more likely to report having gastrointestinal illnesses ($p < .001$).

For the health comparisons of this study, body mass index was a significant predictor of gastrointestinal illness. Participants who fit the criteria for being of normal weight ($p < .001$) or overweight ($p < .001$) were less likely to report gastrointestinal illnesses than participants who were obese ($p = .002$). Participants were more likely to report gastrointestinal illness if they reported having cardiovascular problems ($p < .001$). Participants who reported gastrointestinal illness were significantly more likely to have comorbid musculoskeletal problems ($p < .001$). Similarly, participants reporting neurological problems were also more likely to report gastrointestinal illnesses ($p < .001$).

Logistic Regression

A binomial logistic regression was run to test the variables with the strongest associations with reported gastrointestinal illness (See Table 4). A total of 1,205 participants were included for this regression. Only variables significant at the univariate level were included in this model, with some excluded due to multicollinearity issues. The logistic regression analysis revealed that age and gender were not significant predictors of gastrointestinal illness. However, there was a significant difference in ethnicity, such that African Americans were twice as likely to report gastrointestinal illnesses compared to Caucasians ($p=.05$). Also, all participants belonging to the “Other” group, with “Other” indicating that the participant was neither African American, Caucasian, or Hispanic, were 2.2 times more likely to report having gastrointestinal problems than Caucasians ($p=.03$). Unlike the univariate comparisons, Hispanics were not significantly more likely to report gastrointestinal illness compared to Caucasians in the multivariate model.

Out of the Occupational Variables, teacher attitude was the only significant variable in the final model, showing that, within this sample, individuals with negative attitudes were more likely to report gastrointestinal illness ($p=.002$). In the final model, both absenteeism and presenteeism were not significant predictors of gastrointestinal stress. Similarly, intention to quit the profession after five years was not a significant predictor of stress. However, multicollinearity between absenteeism and presenteeism may account for these null results.

For the general health factors, the final model showed that lower scores on the physical composite of the SF36, indicating poorer physical health, were indicative of gastrointestinal illness in participants. The Perceived Stress Scale also had significant results. Individuals with higher scores on the Perceived Stress Scale were more likely to report gastrointestinal illness while lower levels of stress were indicative of gastrointestinal health ($p < .001$). Participants meeting the criteria for somatization disorder were 3.13 times more likely to report gastrointestinal illness ($p < .001$). However, Major Depression and Anxiety Disorder were not significant in the final logistic regression. This was likely due to multicollinearity between the two variables. Body Mass Index was also not a significant indicator of gastrointestinal problems. Overall African American ethnicity, teacher attitude, poor physical health, high levels of stress, and meeting criteria for Somatization Disorder were the factors most associated with gastrointestinal illnesses.

CHAPTER IV.

DISCUSSION

The present study represents an examination of Texas teachers exhibiting symptoms of gastrointestinal illness. The purpose of this study is to identify key demographic, occupational, and psychosocial factors associated with gastrointestinal illness in teachers and to run a logistic regression that would help identify the occupational and psychosocial variables most associated with gastrointestinal illness. Previous studies have shown that teachers experience high levels of occupational stress and that these stressors can lead to physical and mental health problems (Johnson et. al, 2005; Peterson, et. al, 2008; Bartholomew et. al, 2014). The ultimate objective of this study was to predict the factors that are most associated with the presence of gastrointestinal illnesses for individuals in a high-stress occupation, with the aim of using this information to develop more effective treatment and prevention strategies.

Basic demographic variables such as age, ethnicity and gender were taken into consideration for the study. Age was not found to be a significant predictor of gastrointestinal illness. This study also found that participants who were male had a lower risk of developing gastrointestinal illnesses than participants who reported being female. This aligns with previous research showing that females are at a greater risk of developing gastrointestinal conditions (Chang, Toner, Fukudo, Guthrie, Locke, Norton, & Sperber, 2006). However, this study had an overwhelming majority of females, which may have had an effect on the results of the study. This study also found that individuals who were Caucasian, or Hispanic

were less likely to report having a gastrointestinal illness than African Americans, or participants from Other Racial/Ethnic backgrounds. There is currently no research to compare these findings to.

Occupational Variables

The school type (elementary, middle or high school) was not a significant predictor of gastrointestinal illness in this study. This refutes Hypothesis I, which stated that teachers who teach middle school would report higher rates of gastrointestinal stress. Rates of gastrointestinal stress were relatively equal across grade levels, suggesting that simply teaching a certain grade level does not make one more susceptible to gastrointestinal illness. The subject taught was also not a significant predictor of gastrointestinal stress. There were no differences between participants teaching core courses such as Math and English versus those teaching extracurricular courses such as band or theatre. This refutes Hypothesis II that teaching core courses would be associated with gastrointestinal illness. Average class size was not a significant predictor of gastrointestinal stress either. This refutes Hypothesis III, which states that teachers with more students will experience higher rates of gastrointestinal illness. However, these findings are comparing many different schools, some of which may have been larger than others. These results may have been different if we compared class sizes within a single school district. These results may have also been skewed due to the fact that teachers who teach extracurricular activities such as physical education or band expect to have large numbers of students and plan their class accordingly.

Higher rates of absenteeism, higher rates of presenteeism, and higher likelihood of quitting the profession after five years were all significantly correlated with teachers reporting gastrointestinal illness. These variables are unique because they can be considered, more than any other variable, to be a consequence, versus a predictor, of gastrointestinal illness due to occupational stress. Participants who reported higher rates of absenteeism were more likely to report experiencing gastrointestinal illness. This finding supports Hypothesis IV that teachers reporting high rates of absenteeism would be more likely to report gastrointestinal illness. This finding is important because, as addressed earlier in this study, absenteeism in teachers can be extremely costly and detrimental to student learning (Clotfelter et al., 2007). High rates of presenteeism were also significant predictors of gastrointestinal illness in teachers. These findings support Hypothesis V and highlight the importance of employee health in teachers. Teachers who choose to come to work ill compromise their ability to teach effectively. This section of the study cannot say with complete certainty that the participants were absent, present while sick, or planning on quitting because of their gastrointestinal illness. However, these findings line up with past research showing that occupational stress can lead to attrition and absenteeism (Littrell et al., 1994).

Teachers' intent to quit after one year was not significant, refuting Hypothesis VI, however, intent to quit after five years was a significant predictor of gastrointestinal stress, supporting Hypothesis VII. Like absenteeism, attrition can have costly consequences for school districts. When a teacher quits, he or she

must be replaced. This process can cost school districts millions of dollars and countries billions of dollars (Attrition Costs in the United States, 2014). Number of years teaching was not significant, refuting Hypothesis VIII which stated that teachers who had less experience teaching would be more likely to report gastrointestinal illness.

Several occupational factors such as low levels of job satisfaction, job control, poor workplace climate, and student problems were assessed. Individuals who reported low levels of job satisfaction were more likely to report gastrointestinal illness, in this study, supporting Hypothesis IX. These findings also support the research by Collie, Shapka, and Perry (2012), which suggested that job satisfaction is important for overall quality of life. Job control was also significant. Participants who reported low levels of job control were more likely to report lower levels of gastrointestinal illness aligning with Hypothesis X. This finding is supported in the literature. Research has shown that job control can directly affect an individual's general well-being (Schreurs et al., 2010). Teacher attitude was also a significant predictor of gastrointestinal illness, supporting Hypothesis XI. Poor teacher attitudes were correlated with gastrointestinal illness while positive teacher attitudes were not. The research cited in this study discussed how job satisfaction and job control are significantly correlated with administration. If administrators relinquish control and allow employees to make their own decisions concerning their own jobs, employee satisfaction and health could increase (Schreurs et al., 2010).

On a similar note, workplace climate and student problems were also significant predictors of gastrointestinal illness, corroborating Hypothesis XII and XIII. School climate consists of how a teacher perceives the social atmosphere of the school; including their peers, administrators, parents and students. Teachers who perceive that they work in a positive school climate would most likely have positive relationships with the people they encounter at school on a daily basis. Teachers who perceive themselves as working in a negative school climate may have poor relationships with the people they see on a while at work (Collie et al., 2012) Student problems were measured by asking teachers about problems such as students cutting class, student tardiness, student apathy, lack of parent involvement, and poor student health. These problems may cause student grades to degrade. Misattributions of these factors may reflect negatively on the teachers instead of on the students.

Psychosocial and Health Variables

Perhaps the most interesting findings in this study were the significant associations between perceived stress and the physical quality of life index with the presence of gastrointestinal illness. Participants who reported higher levels of stress and more physical health complaints were more likely to report gastrointestinal illness. This corroborates Hypothesis XIV and known research. Hypothesis XV and Hypothesis XVI were also supported by this study, showing that both the physical and mental composites of the SF-36 were significant predictors of gastrointestinal stress. These findings suggest that teachers who

lower physical and mental health were more likely to experience gastrointestinal illness. As mentioned earlier in this study, teachers carry some of the highest risk for occupational stress and experience more physical health problems than most other occupations (Johnson et. al, 2005). These results show that there is a definite correlation not only between occupational stressors and pain, but more specifically, between occupational stressors and gastrointestinal conditions.

Psychosocial indicators were also assessed in this study. The Patient Health Questionnaire was used to assess whether participants met the criteria for major depression, anxiety disorder, somatization disorder and panic disorder. This study found that all four disorders; Major Depression, Somatization Disorder, Anxiety Disorder, and Panic Disorder were significant predictors of gastrointestinal illness in teachers. These findings support Hypothesis XVII, Hypothesis XVIII, Hypothesis XIX, and Hypothesis XX. All of these hypotheses stated that participants who met the criteria for a Psychosocial Disorder was a significant predictor of gastrointestinal illness. Past research has shown there are high levels of comorbidity between gastrointestinal illnesses and psychological disorders, specifically depression and anxiety (Walker et al., 1990; Van Oudenhove et al., 2011). These findings support those of Mayer and Tillisch who found that there is evidence of a brain-gut axis that links stressors to abdominal pain (2012).

This study also suggested that specific health ailments can affect gastrointestinal illness. Teachers reporting cardiovascular problems were more likely to report gastrointestinal illness, supporting Hypothesis XXI and

substantiating Kuper and Marmot's research on the risk of coronary heart disease and job strain (2003). Similar findings were found with musculoskeletal and neurological problems. Teachers who reported musculoskeletal and neurological problems were more likely to report having gastrointestinal illness. These findings supported Hypothesis XXII and Hypothesis XXIII.

Body Mass Index was found to be significant on all three variables. Teachers who were obese all were more likely to report gastrointestinal illness. This finding supports Hypotheses XXIV, XXV and XXVI which stated teachers falling into the normal weight or overweight categories would be less likely to report gastrointestinal illness, and those who were classified in the obese category for BMI would be more likely to report gastrointestinal illness. To the author's knowledge, no research has been done on BMI and gastrointestinal illness. Further research may lead to a better understanding of these results.

The final simultaneous logistic regression analysis found several variables to be significantly associated with the presence of gastrointestinal disorders. There were no significant differences between age and gender and gastrointestinal disorders. However, African American teachers and teachers belonging to the "Other" category, with "Other" referring to not Caucasian, African American or Hispanic, were significant indicators of gastrointestinal illness. Thorough research has not been done on ethnicity and predisposition to gastrointestinal illness, indicating that more research should be conducted in this area.

Several occupational variables were left out of the final logistic regression. Job satisfaction, job control, school climate and student problems

variables were all removed due to multicollinearity. Out of the Teacher-Specific Comparisons, only teacher attitude, absenteeism due to personal illness, presenteeism, and attrition were included in the final model. Only teacher attitude was found to be significant, such that positive attitudes were correlated with gastrointestinal health while negative attitudes were correlated with gastrointestinal illness. To the author's knowledge this is the first study showing a correlation between teacher attitude and gastrointestinal illnesses. However, teacher attitude is very similar to feelings of job satisfaction and job control, both of which have been linked to increased stress and lead to decreased levels of physical and mental well-being (Watts & Short, 1990). Although absenteeism, presenteeism and attrition were significant in initial comparisons, none were significant predictors of gastrointestinal illness in the logistic regression model. It is believed that there may have been multicollinearity between the three factors causing them to not be significant.

The final logistic regression model had several significant findings from variables in the Psychosocial and Health Comparisons. Perceived Stress was found to be a significant factor in predicting gastrointestinal illness, further validating that stress and gastrointestinal disorders are highly correlated. The Physical Composite on the SF-36 was also found to be a significant predictor of gastrointestinal pain in teachers. Although this study only shows a correlation between the two variables, physical pain and gastrointestinal pain could coexist due to a common factor such as stress. Somatization Disorder was also found to be a significant predictor of gastrointestinal illness in participants. Somatization is

most often explained as a biopsychosocial stress-induced disorder, which suggests that the disorder is caused by stress and affects interactions between biological, social, and psychological factors. Somatization is a stress-induced disorder characterized by the presence of multiple physical ailments that have no medical explanation (Harvey & Wessely, 2013). Research on somatization often finds a relationship with inflammatory bowel disease, ulcers, and non-ulcer dyspepsia (Riedl et al, 2008; Nimnuan, Rabe-Hesketh, Wessely, & Hotopf, 2001; Sapolsky, 1898). As discussed earlier in this paper, gastrointestinal illnesses such as IBS, IBD, and Functional Dyspepsia are often considered stress-induced somatoform disorders. Studies such as this help the scientific community to better understand the underlying stressors responsible for somatoform disorders.

Limitations

Although the model used for this study did find that there are relationships between gastrointestinal illnesses with poor physical health and occupational stressors, there are some limitations. One limitation is that the participants in this study were Texas teachers. Legislation, mandatory state testing, and environment may have affected participants of this study differently than teacher populations in other states and countries. Another limitation is that this sample was overwhelmingly comprised of Caucasian women. A population that is more diverse in gender and race may yield different results. Further studies should focus on a more diverse group of participants. Another possible limitation of this study is that all the data used for this study were collected through self-report measures, including the gastrointestinal illness indicator. Several of the questions

were personal in nature, which could have biased the responses. Participants may have been dishonest when taking the survey, thus possibly jeopardizing the validity of this study. This is especially true of the questions on physical and mental health. Participants may have been dishonest due to the social stigmas attached to certain diseases and disorders. Finally, the survey used for this study contained approximately 479 questions. Boredom and fatigue may have impacted the accuracy and truthfulness of participants' answers. Despite these limitations, this study aims to add to the research on occupational stressors and health problems in teachers in order to help teachers effectively manage their stress.

Conclusion

The findings in this study show that there are high correlations between occupational health, stress, and gastrointestinal disorders. However, why these variables are correlated is not well understood. Further understanding of occupational stressors and gastrointestinal illnesses in teachers may help lead to more effective prevention, treatment and coping techniques. Research should focus on eliminating job related stressors such as low levels of job control and low levels of job satisfaction. These changes could improve teachers' attitudes, which could improve their physical, psychological, and occupational lives. A better understanding of the occupational stressors causing gastrointestinal illness may lead to preventative techniques that decrease the onset and severity of these diseases. Reducing the number of gastrointestinal diseases will cut down on healthcare costs and improve overall physical and psychological health. Lowering the rates of gastrointestinal illnesses may also lead to occupational advantages in

schools such as lower rates of absenteeism and presenteeism in teachers, lower rates of reported student problems, increased job satisfaction and improved employee attitude. Together, these changes can lead to a more productive educational system.

APPENDIX SECTION

Table 1. Demographic Variables

Variables	Gastrointestinal Illness N = 1276	No Gastrointestinal Illness N = 1507	Statistical Comparison <i>p</i> value
Age: Mean (St. Dev)	44.34 (11.2)	43.57 (11.9)	NS
Gender: %			
Male	18.4%	25.3%	<i>p</i> < .001
Female	81.6%	74.7%	
Ethnicity (%)			
African American	6.3%	9.4%	<i>p</i> < .001
Caucasian	66.3%	68.8%	
Hispanic/Latino	23.6%	18.1%	
Other	3.8%	3.8%	

Table 2. Teacher-Specific Comparisons

Variables	Gastrointestinal Illness N = 1276	No Gastrointestinal Illness N = 1507	Statistical Comparison <i>p</i> value
School Type %			
Elementary	44.7%	41.1%	NS
Middle/Junior High	22.4%	23.2%	NS
High School	32.8%	35.7%	NS
Subject Taught %			
Core Courses	60.2%	61.1%	NS
Average Number of Students Per Class mean (st.dev)	22.02 (10.138)	22.76 (7.824)	NS
Absenteeism mean days per last 4 weeks (st.dev)			
Personal Illness	.95 (2.446)	.50 (1.409)	<i>p</i> < .001
Personal Non-Illness	.66 (1.099)	.69 (1.647)	NS
Presenteeism Mean days present while ill per last four weeks mean (st.dev)	3.02 (4.421)	1.95 (3.219)	<i>p</i> < .001
Attrition- Intent to quit Scale 0-10 with 10 being 100% likely mean (st.dev)			
Within 1 Year	3.24 (3.493)	2.52 (3.302)	<i>p</i> < .001
Within 5 Years	5.44 (3.80)	4.93 (3.842)	<i>p</i> = .001
Number of Years Teaching mean (st. dev)	13.42 (9.251)	13.06 (9.623)	NS
Job Satisfaction mean (st. dev)	52.43 (20.20)	60.37 (20.11)	<i>p</i> < .001

Table 2. Continued

Job Control mean (st. dev)	16.94 (3.92)	17.42 (3.85)	$p < .001$
Teacher Attitudes mean (st. dev)	16.04	18.42 (8.32)	$p < .001$
School Climate	40.87 (8.14)	43.88 (8.23)	$p < .001$
Student Problems	26.21 (6.31)	24.84 (6.53)	$p < .001$

Table 3. Psychosocial Comparisons

	Gastrointestinal Illness N=1188	No Gastrointestinal Illness N=1368	Statistical Comparison <i>p</i> value
Perceived Stress Scale mean (st.dev)	20.96 (6.67)	16.35 (6.960)	<i>p</i> <.001
SF-36 Quality of Life mean (st.dev)			
Physical Composite	48.26 (9.739)	53.03 (8.035)	<i>p</i> <.001
Mental Composite	37.84 (12.753)	45.22 (11.853)	<i>p</i> <.001
Axis I Psychopathology %			
Major Depression	31.2%	11.3%	<i>p</i> <.001
Somatization Disorder	50.2%	16.6%	<i>p</i> <.001
Anxiety Disorder	26.7%	9.2%	<i>p</i> <.001
Panic Disorder	13.7%	4.2%	<i>p</i> <.001
Comorbidity with Health Problems			
Cardiovascular	51.4%	28.9%	<i>p</i> <.001
Musculoskeletal	81.9%	51.9%	<i>p</i> <.001
Neurological	67.9%	34.6%	<i>p</i> <.001
Body Mass Index			
Normal	28.0%	36.0%	<i>p</i> =.002
Overweight	30.2%	31.9%	
Obese	41.9%	32.1%	

Table 4. Logistic Regression Analysis

	B	Wald χ^2	p-value	Odds Ratio/ 95% CI
Demographic Variables				
Age	.01	2.74	.090	1.01 [.99, 1.02]
Male Gender	-.28	2.62	.110	.76 [.54, 1.06]
<u>Race/Ethnicity (Ref: White)</u>				
African American	.69	3.83	.050	2.01 [.99, 4.04]
Hispanic	.53	1.50	.220	1.70 [.73, 3.99]
Other	.79	4.46	.030	2.20 [1.06, 4.59]
Occupational Factors				
Teacher Attitude	-.05	9.37	.002	.95 [.92, .98]
Absent (illness)	.05	0.52	.470	1.05 [.92, 1.21]
Present (while ill)	.019	1.22	.270	1.02 [.98, 1.06]
Attrition (5 years)	.01	1.14	.710	1.01 [.97, 1.04]
General Health Factors				
Perceived Stress Score	.05	14.63	.000	1.05 [1.02, 1.08]
SF-36 Physical Composite	-.04	20.71	.000	.96 [.95, .98]
Major Depression	.16	.62	.430	1.18 [.79, 1.76]
Somatization Disorder	1.15	49.21	.000	3.13 [2.27, 4.35]
Anxiety Disorder	.25	1.34	.248	1.28 [.84, 1.95]
<u>BMI (Reference: Normal)</u>				
Overweight	-.13	.57	.450	.88 [.63, 1.23]
Obese	.19	1.34	.250	1.21 [.87, 1.69]
Constant	1.53	3.61	.060	

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