

2015

The Association Between Asthma Management and Routine Posture Exercise

Anne-Marie Lydie Coleman
Walden University

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Walden University

College of Health Sciences

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Review Committee

Dr. Peter Anderson, Committee Chairperson, Public Health Faculty
Dr. Gwendolyn Francavillo, Committee Member, Public Health Faculty
Dr. Diana Naser, University Reviewer, Public Health Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2015

Abstract

The Association Between Asthma Management and Routine Posture Exercise

by

Anne-Marie Lydie Coleman

MPH, Walden University, 2009

BS, University of Florida, 2005

Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of
Doctor of Philosophy

Walden University

June 2015

Abstract

Asthma cannot be cured, but it can be managed. Asthma management is a public health issue that is complex. Medication, asthma triggers, age, and the environment are all factors that impact asthma management. There is a gap in research in terms of what lifestyle characteristics need to be in place in order for adults to manage asthma. Shaw found that posture care is a lifestyle variable that should be explored as it relates to asthma management in older adults. The Life University Clinic (Marietta, GA) sees asthmatic patients daily and teaches them about a posture care routine through a program called *Straighten Up*. Based on the health belief model, this study explored how the Straighten Up routine exercises impacted asthma management in adult asthmatic patients with severe asthma ($n = 304$). Ordinal regression and logistic regression was used to analyze the relationships between using the Straighten Up posture exercises (independent variable) for 3 months with 3 dependent variables: patients' sleep patterns (night time awakenings due to asthma), use of quick relief medication, and hospitalizations (ER Visits) due to asthma. Straighten Up posture exercises reduced night time sleep interruptions, but not hospitalizations due to asthma or the use of quick relief medications. For persons with asthma, Straighten Up could be an additional tool to manage their asthma and reduce the known impacts of sleep deprivation including accidents, memory loss, and heart disease. For organizations who serve asthmatics, Straighten Up could be an additional resource to share with the population they serve. As a result of this study, Straighten Up exercises are recommended for adult asthmatics with severe asthma as part of their asthma management plan.

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Dedication

I am thankful for all of my friends, family, and the Life University staff for all your support and encouragement during this process. I appreciate your patients with me and how you simply believed in me. Thank you for providing the emotional support I needed during this time. Lastly, I would like to thank my husband, who consistently provided support during the long nights. I share this accomplishment with each one of you.

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Chapter 1: Introduction to the Study

Introduction

Asthma is a public health issue affecting adults and children (King & Hanania, 2010). Asthma morbidity and mortality is always on the increase worldwide (King & Hanania, 2010). The burden of asthma in recent years is enormous and the cost to manage asthma increases over time (Meltzer et al., 2012). Even with new and innovative research and practice, asthma cannot be cured; however, it can be managed (Meltzer et al., 2012). With this in mind, asthma management is an imperative part of saving lives for both children and adults. Translating research into public health practice is challenging as it relates to asthma management because there are many variables (Meltzer et al., 2012). For example, environmental triggers are complex in regards to asthma management. What may trigger one asthmatic (i.e. environmental tobacco smoke) may not affect another (King & Hanania, 2010; Meltzer et al., 2012). Limiting exposure to environmental triggers and controlling asthmatics' symptoms are the focus of asthma management. Comorbid conditions present additional challenges in asthma management practice (Shenolikar, Song, Anderson, Chul Chu, & Cantrell, 2011). Shenolikar et al. (2011) found that asthma as a chronic condition almost always occurred with the presence of other health concerns. While focus of asthma management is often targeted toward school-age children, King & Hanania, 2010 noted that asthma symptoms are more severe in older adults. There is a gap in research in terms of what lifestyle characteristics need to be in place in order for adults to manage asthma. Shaw (2011) found that posture care is a lifestyle variable that should be explored as it relates to asthma management in

older adults. Life University is implementing an innovative initiative called Straighten Up model exercises, which teaches older adults exercises that can be implemented at home to help straighten their posture (Kirk, 2006).

This study explored the relationship among adult asthmatics with severe asthma who are implementing the Straighten Up model exercises as instructed by the chiropractors at Life University. The results of this study may contribute to the growing body of information regarding asthma management in older adults and how posture care as a lifestyle variable comes into play. Many elements and variables arise with asthma management. Posture is one of many lifestyle changes that have an impact (Shaw, 2011). Because asthma can be managed but not cured, management must be ongoing (King & Hanania, 2010). The study captured a specific group of asthmatics who were committed to implementing a posture care routine taught by chiropractors. Following the study participants' progress revealed a tool that could be used to maintain a learned behavior over time to see positive change as it relates to asthma and its comorbid factors. The information this study provides leads to positive social change by helping to save the lives of asthmatics, and by decreasing the health care cost of asthma management, a growing public health issue (Shenolikar et al., 2011). Asthma is a public health issue, and the results of this study may contribute to the growing body of knowledge related to asthma management, allowing for future researchers to better understand asthma management research and practice.

This chapter will provide a background to the study and a summary of the literature review, the problem statement, and why this study was needed. The research

questions, scope of the study, and its limitations will be noted in this chapter, along with the research questions and proposed hypotheses.

Background

Morrison, T., Callahan, D., Moorman, J., & Bailey, C. (2009) reported over 20 million people living in the United States have asthma. King & Hanania, 2010 argued the impact is more severe among older adults. Meltzer et al. (2012) found that asthma affects the patient's day-to-day activities and emotional wellbeing. Asthma management costs over 20.7 billion dollars to treat annually (Meltzer et al., 2012). Asthma management is a major public health issue and is directly related to health care cost, morbidity, and mortality (Hart & Millard, 2010). So the question is how can one identify if asthma is well managed across the board from one patient to another despite all the unique variables? Hart and Millard (2010) noted the *rules of two*. The rules of two utilize three variables that assist public health practitioners in determining if asthma is well managed. The three variables are: night time awakenings due to asthma, emergency room (ER) visits due to asthma, and use of quick reliever medication. The *rules of two* is an evidence-based finding and served as a guide for asthma management in this study.

This study could contribute to filling a gap in research regarding asthma management. First, it focused on adults, which is a need because current research mainly targets school-age children (McGhan, Reutter, Hessel, Melvin, & Wilson, 2002). Second, it explored the relationship between posture and asthma management in depth. Third, researchers have noted how the Straighten Up modules have impacted posture and other

areas of health; this study continued this inquiry and focused on how the Straighten Up modules impacts asthma management (Kirk, 2006; McGhan et al., 2002).

The results of the study may be used for several aspects of positive social change. The study results may be used to help asthmatics and their health care providers decide on asthma management strategies and allow asthmatics to be health consumers as it relates to developing their asthma management plans. The Straighten Up models are exercises that may aid in not only posture care but weight loss; this could be important because obesity is a comorbidity of asthma. Also, this is something that most asthmatic patients can do for free in the comfort of their home, making it accessible and sustainable. The target audience of this intervention is often times not focused on as it relates to asthma management, so this study is needed to help researchers and care providers learn more on how to help this specific group of asthmatics. It may reduce cost for asthma care in adult asthmatics with severe asthma and save lives. The Straighten Up model is new and this study was needed to determine whether this routine contributes to preventative care as it relates to asthma. The results of this study may help to empower asthmatics and their loved ones to overcome barriers and make behavioral changes that may lead to positive social change.

Problem Statement

Asthma is a chronic condition that has become a public health issue. The prevalence of asthma is noted in children; however, adults are also impacted (McGhan, et al., 2002). The Center for Disease Control (CDC) reported that 18.7 million adults ages 18 years and older are affected by asthma; the CDC also noted that in 2008, an estimated

603,748 adults in Georgia had asthma (CDC, 2013). This number has increased over the years, so the prevalence of asthma in adults living in the state of Georgia has increased (McGhan, et al., 2002).

Lopes et al. (2007) explained that asthma is a chronic condition that affects the airways, and is characterized by hypersensitivity to various triggers (i.e. pollen). The hypersensitivity results in some of the symptoms associated with asthma (i.e. wheezing and chest tightness) (Lopes et al., 2007). There are different classifications of asthma based on how well it is managed. No matter what classification, an asthma attack causes asthmatics to experience muscle tightness, inflammation, and excess mucus. All of these three physical changes that an asthmatic patient experiences over time lead to airway resistance. Lopes et al. (2007) noted that both respiratory and nonrespiratory muscles are impacted by the physical changes caused by asthma.

For years researchers have studied multiple variables to help reduce the burden of asthma; of these variables is the link between asthma management and posture. Shaw (2011) noted how asthmatic patients are often observed to have a posture that involves slumping in the upper back area which can have an effect on lung functioning (Shaw, 2011). With asthma being a chronic disease affecting the lungs, posture is centered in as a key variable to explore in learning its relationship with asthma management (Shaw, 2011). Several studies have focused on children, as the prevalence of asthma is growing in children (Brandao et al., 2011); however, thousands of adults die of asthma each year (Lopes et al. 2007). Therefore, this study fills a gap in the literature concerning adult

asthmatics and focused on the relationship between asthma management and posture in adults.

Life University is a chiropractic school in Georgia. Life University is known for using the Straighten Up model. Kirk (2006) noted the Straighten Up model has influenced improvement in posture and promoted spinal health behaviors. The main purpose of this study was to use quantitative methods to test a possible link between asthma management and posture when the Straighten Up model is used in adult patients with asthma.

Purpose of the Study

This is a quantitative study using secondary data. The intent of the study was to explore how the Straighten Up posture exercises could contribute to asthma management in adult asthmatics with severe asthma. The dependent variable for this study is asthma management; asthma management is determined by use of quick relief medications, hospitalization due to asthma, and night time sleep patterns. The independent variable is the Straighten Up posture exercises. In Chapter 3, more information is provided on the covariates for this study. Age of onset of asthma, obesity (BMI), age, gender, pregnancy status; and race are all covariates that must be kept in mind in interpreting the results of this study.

Research Questions

The research question for this study is as follows: What is the relationship between implementing the Straighten Up exercises (independent variable) for III months among adults with severe asthma and asthma management (dependent variable)

techniques (use of their quick relief medications, 2. hospitalization due to asthma during the three months period, and 3. night time sleep patterns (are asthma patients not sleeping through the night due to asthma), after controlling for the asthmatic patients age, ethnicity, weight, and gender? There were three null and alternative hypotheses for this study.

H_1 There is no relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months,

H_{1a} : There is a relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months.

H_2 : There is no relationship between hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{2a} : There is a relationship between the hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_3 : There is no relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{3a}: There is a relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

Theoretical Framework

The health belief model (HBM) was the theoretical framework for the study; Boskey (2008) noted how researchers and scientists use the HBM to predict health behaviors, which is closely related to primary prevention. The understanding behind the HBM is an individual will take a health related action (in this case the Straighten Up exercises), if that individual feels that a negative health condition (in this case an asthma episode) can be avoided. In addition, the HBM is rooted in the individual's belief that the recommended intervention can be achieved successfully as a result of education received (in this case Life University teaching the asthmatic patients the Straighten Up exercises), and if they follow through with it the condition will be avoided or get better (Boskey, 2008). More information about the HBM and how it can be applied to this study is noted in Chapter 2.

Nature of the Study

This was a quantitative study using secondary data. The data were provided by Life University; therefore, there was no need to collect original data. Life University teaches adult patients, some of whom are asthmatics, how to implement the Straighten Up model exercise. SPSS version 22 was used to analyze the raw data, which allowed for predictions. I used quantitative methods to separate the three factors that are barometers

of asthma management. The three factors are: (a) use of quick relief medication, (b) hospitalization (ER) due to asthma, and (c) night time awakenings due to asthma. This allowed me to view statistical evidence of how each variable may be influenced by the Straighten Up model intervention, which in turn allowed me to test the hypotheses.

Definitions

Asthma: Asthma is a long-term or chronic disease of the lungs. Asthma is the over-sensitization to certain triggers such as pollen or dust. This over-sensitization means the body overreacts to a certain trigger. Asthma can be managed with proper care (CDC, 2014).

Asthma action plan: is a document that tells you what to do in an asthma emergency when you see certain symptoms. It also tells you how to properly give certain medications (CDC, 2014).

Asthma episodes: physical changes in the lungs when an asthmatic is exposed to triggers (CDC, 2014).

Asthma Management: strategic approach between patient and health care providers to avoid and control asthma triggers by having a plan which included medication (CDC, 2014).

Controller Medication: medications used to treat asthma with or without the presence of triggers (CDC, 2014).

Environmental Control: removing environmental triggers (CDC, 2014).

Overweight: Being 20% over normal weight, when Body Mass Index is between 25-29 (CDC, 2013).

Posture care: the position of the body through muscle coordination that affects all internal organs (CDC, 2014).

Reliever Medication: used to treat sudden asthma episodes (CDC, 2014).

Risk factors: agent in the environment that stimulates or causes an increase in asthma symptoms (CDC, 2014).

Straighten Up model: series of exercise designed to improve spinal health and overall quality of life (Kirk, 2006).

Triggers: is a stimulus variable that when present increases the likelihood of an asthma episode (CDC, 2014).

For this study, the Straighten Up model was the independent variable and asthma management was the dependent variable. Implementing the model allowed me to evaluate its impact on the dependent variable, in this case asthma management. For this research, asthma management was determined by night time awakenings due to asthma, use of quick relief medication, and hospitalization due to asthma.

Asthma management encompasses multiple variables. In this study covariates were observed because they can affect the outcome of the study. In this section some of the covariates of this study are noted. Saint-Pierre, P. P., Bourdin, A. A., Chanez, P. P., Daures, J. P., & Godard, P. P. (2006) noted that asthma is more difficult to control if asthmatics are overweight or obese. Lunardi et al. (2011) noted how age of onset contributes to asthma management as it relates to posture. Saint-Pierre, P. P., Bourdin, A. A., Chanez, P. P., Daures, J. P., & Godard, P. P. (2006) noted how older adult asthmatics have more of a problem with asthma management, meaning age impacts asthma

management. Godfrey et al. (2006) noted how asthma is more prevalent and severe in women. Oraka, E., Iqbal, S., Flanders, W., Brinker, K., & Garbe, P. (2013) reported that African Americans are more likely to have asthma, and are more likely to have uncontrolled asthma leading up to hospitalization. All these covariates will be controlled for in this study as they influence asthma management.

Assumptions

An assumption that is often made as it relates to asthma management is if an asthmatic is doing all they need to control their asthma then they will not have an asthma episode. This cannot be demonstrated to be true as new triggers develop often and asthma management does not guarantee being free of episodes, nor the need for asthma medications and hospitalization. Therefore, adult asthmatics with severe asthma who are implementing the Straighten Up model exercises and other asthma management techniques as noted by their health care providers may still experience asthma episodes. These assumptions were made by Ramos (2006) who noted the growing public health issues associated with asthma in adult patients.

As it relates to the study design, quantitative methodology using secondary data assumes the researcher is objective and is independent from what is being researched. Although the purpose of the study was simply to explain and predict and researcher bias is not present, that is not a guarantee. For example, the primary data may not have been collected without any bias. Also, in the study the adult asthmatics are self-reporting how the intervention affected asthma management, and the chiropractors are documenting this as part of a routine visit. With this in mind, there is the possibility for misinterpretation or

socially desirable responses. Nolte, S., Elsworth, G. R., & Osborne, R. H. (2013) noted how bias as a result of social desirability is a concern in research when using self-reported data.

Scope and Delimitations

The research problem focuses on adult asthmatics with severe asthma as the target population due to the fact that this group experiences the most problems with asthma management and control. The use of quick relief medication, hospitalization due to asthma (ER visits), and night time awakenings due to asthma were all identified as barometers to identify and predict the intervention's impact on the study participants for these are key things present when asthma is not controlled, so if asthma is controlled, fewer of these three factors are present.

In order to clearly draw out any correlations, internal validity is important. In this study, having a set group of participants who are indeed diagnosed as adults with severe asthma before the intervention is implemented is crucial in determining any correlations keeping in mind the covariates and the comorbidities of asthma. This impacts internal validity as the selection process may have involved bias from the primary data collection. Faustini et al. (2012) noted how internal validity is important to consider and plan for when conducting research studies.

There are different classifications of asthma as noted in Chapter 2. In this study the results will only be applied to adults with severe asthma, not those with other classification of asthma diagnosis. Also, this study is focused on a group of adult asthmatics who are receiving chiropractic care at Life University, so this excludes those

who may receive chiropractic care in other settings or not receiving any care at all. Lastly, this study is focused on the participants implementing the intervention not those who are just receiving chiropractic care in general at Life University, Marietta, GA. Power of analysis was calculated using Raosoft database. To calculate the sample size and identify this correlation at a 5% margin of error, 95% confidence interval, 1,000 person population size (asthmatic clients at Life University), and 50% response distribution resulting in a needed sample size of 278 participants. The power analysis noted above shows that at least 278 participants are needed to represent this group to show significance in the study results (Raosoft, 2014). Generalizability is discussed more in chapter three. In this case the independent variable (Straighten Up model) is influenced by other factors, so all the threats to external validity at some point come into play with the independent variable. Also, the sample population of 278 allowed room for generalizability.

Limitations

The Life University Chiropractors and or students taught the study participants how to use the Straighten Up model exercises, this addressed the concern of the study participants learning from trained professionals and ensured consistency in the information the participants received. However, it posed a limitation because receiving training from a student versus an experienced chiropractor on how to implement the intervention varies greatly. Also, the study participants are reporting whether or not the intervention was implemented as trained three times a week. The researcher had no way of confirming if in fact that is true. Lastly, there may be other factors contributing to

successful asthma management; for example, undocumented diet/nutrition limits the researcher in identifying if the intervention is in fact the only contributing factor towards asthma management.

Significance

This study may contribute to filling a gap in research regarding asthma management. First, it focused on adults which are a need, for much of the current research is targeting school age kids (McGan et al., 2002). Secondly, it explored the relationship between posture and asthma management more in depth. Lastly, several studies have noted how the Straighten Up model have impacted posture and health. This study could expand these results and focus more on how the Straighten Up model impact asthma management (Kirk, 2006; McGan et al., 2002).

The results of this study could give asthmatic patients an additional tool for asthma management. It demonstrates how the Straighten Up model could help reduce chronic conditions. Also, the results of this study could open the door for more research regarding the relationship between posture and asthma, and help save lives, which would lead to positive social change. The results of this study have the potential to give asthmatics and their loved ones something that would provide empowerment towards asthma management. The HBM speaks to the impact of self-empowerment, and how it directly affects sustainability of behavioral change. Public health practice around asthma is complex as so many variables are involved with asthma management. The results of this study could aid in professional practice of asthma management where providers and patients would be interested in posture care in developing management plans. Most

asthmatic patients have an asthma action plan, where clearly defined steps are outlined to guide an outside party of what to do in the event an asthmatic person is having an asthma episode. The results of this study could help practitioners add steps in the model asthma action plans about how to posture the patient. Also, the results could be used even when asthma is well managed as a preventative measure. Positive social change includes self-empowerment that is sustained and eventually influences the greater community, and bridging the gap between research and practice.

Summary

Asthma Management is a public health issue for asthma cannot be cured, only managed. Each year adults and children die of asthma, and adults with severe asthma are among those most impacted by asthma. This research tested a new and innovative intervention called the Straighten Up model exercises. In chapter one, a full introduction of the study was presented as well as the key variables (independent and dependent) and how they may correlate to any covariates of the study. The research question and hypotheses were introduced, and how answering these questions may contribute to bridging an identified gap in the literature. Positive social change was discussed in chapter one, and how this study may contribute to overall social change in one's community. In chapter 2 the full literature review is provided, starting with noting the relationship between asthma management and posture care. Posture care is one of many lifestyle factors related to asthma management (Boskey, 2008). Hospitalization (ER visits) due to asthma is related to the scope of the study; ER visits due to asthma is a sign of poor asthma management. The use of quick relief medication is also explored in the

literature review, for it too provides insight in regards to whether or not asthma is being managed properly. Night time awakenings are another factor discussed, for it too serves as a barometer for asthma management in adult patients with severe asthma. Lung functioning and its relationship to posture is a variable in the scope of the study and was presented in the literature review. All of the co-morbid factors are presented in the literature, and how they should be considered in interpreting the results of this study.

Chapter 2

Introduction

The prevalence of asthma is noted in children, but its impact is felt in adults as well (McGhan et al., 2002). Ramos et al. (2006) discussed the growing public health and clinical problem associated with asthma in the adult population ages 19-64 years. Morrison et al., (2009) reported over 20 million people living in the United States have asthma. The CDC reported that 18.7 million adults ages 18 years and older are affected by asthma yearly. King et al., (2010) noted an estimated 103 per 100,000 adults have asthma. King et al., (2010) additionally reported asthma symptoms in older adults are usually more severe in comparison to younger asthmatics. Also, misdiagnoses are very common in older adults; as a result, the symptoms of asthma go untreated, causing further health problems for the patient. The CDC also noted in 2008 an estimated 603,748 adults in Georgia had asthma (CDC, 2010). The high prevalence of asthma has an impact on the economy in regards to the health care system. Meltzer et al., (2012) noted the total direct cost of treating asthma patients in the United States was \$20.7 billion in 2010.

Asthma does not only impact a patient's health for a short time, it affects normal day-to-day activities and emotional health as well (Meltzer et al., 2012). Shenolikar et al., (2011) noted in 2005 an estimated 12.2 million people reported having at least one asthma attack. In addition to this, Shenolikar et al., (2011) reported in 2002 that 11.8 million work days were lost as a result of asthma, and on average total annual cost of patients with asthma is \$ 4,912. After comparing medical cost of asthmatics to non-

asthmatics, Shenolikar et al., (2011) noted total medical cost of asthmatics was three times higher in comparison to non-asthmatics.

This study will contribute to filling the gap in research regarding asthma management. First, it will focus on adults, which is a need, for much of the current research targets school-aged children (McGhan et al., 2002). Second, it will explore more the relationship between posture and asthma management. Third, researchers have noted how the Straighten Up model have impacted posture and other areas of health; this study would continue this inquiry and focus on how the Straighten Up model could impact asthma management (Kirk, 2006: McGhan et al., 2002).

This chapter will highlight the literature search that identifies the gap in the research, the strategy used to conduct the literature search, the theoretical framework this study will be based on, including the role of self-management in asthma, the definition of asthma, the relationship with asthma management and posture, hospitalization, quick relief medication, and sleep patterns. Covariates are noted and a summary outlining the findings is provided.

Literature Search Strategy

The following search engines were used to conduct the literature review:

Academic Search Complete; Business Source Complete; CINAHL Plus with Full Text; Cochrane Central Register of Controlled Trials; Cochrane Database of Systematic Reviews; Cochrane Methodology Register; Communication & Mass Media Complete; Computers & Applied Sciences Complete; Database of Abstracts of Reviews of Effects;

eBook Collection (EBSCOhost); Education Research Complete; ERIC; GreenFILE; Health and Psychosocial Instruments; Health Technology Assessments; Hospitality & Tourism Complete; LGBT Life with Full Text; Library, Information Science & Technology Abstracts; Mental Measurements Yearbook; Military & Government Collection; NHS Economic Evaluation Database; NTIS; Political Science Complete; Primary Search; PsycARTICLES; PsycBOOKS; PsycCRITIQUES; PsycEXTRA; PsycINFO; Regional Business News; Research Starters – Education; SocINDEX with Full Text; Teacher Reference Center; PsycTESTS; International Security & Counter Terrorism Reference Center; and AMA Marketing Watch.

The key words that were used to identify peer reviewed articles were: Asthma Management AND Adults AND Posture, Asthma AND Posture, Asthma AND Positioning, Asthma Management, Posture AND Asthma Care, Health Belief Model AND Asthma Management. The literature search focused on peer reviewed articles published in the past 10 years.

Theoretical Construct

As noted earlier asthma cannot be cured, however, it can be managed. Managing asthma involves many key variables working together to help the asthmatic patient achieve management. Boskey (2008) noted how health is multi-dimensional, and certain key factors need to constantly work together to reach optimal health. These factors include biological makeup, psychological processes, and the social environment. The

theoretical framework for this dissertation is embedded in the Health Belief Model (HBM). Glanz et al., (2002) noted the HBM has been used for years to motivate the general public to engage in making healthier choices regarding health as a way to decrease health disparities. The HBM is shaped on the basis of a person's readiness to change health-related behavior as a result of perceived susceptibility, perceived severity, perceived advantages, and perceived disadvantages. Boskey (2008) noted how researchers and scientists use the HBM to predict health behaviors, and, as noted earlier, health behaviors are closely linked to chronic disease prevention (e.g. asthma). The thought process behind the HBM is an individual will take a health related action (in this case the Straighten Up exercises) if that individual feels that a harmful health condition (in this case an asthma episode) can be prevented. In addition to this, the HBM is rooted in the individual's belief that the recommended intervention can be achieved successfully as a result of education received (in this case Life University teaching the asthmatic patients the Straighten Up exercises), and the belief that if he or she follows through with the recommended tasks the condition will be avoided or improve (Boskey, 2008). The HBM was chosen as the theoretical foundation for this research because this theory has a history of helping individuals or groups of people to get excited about health regarding different public health issues, whether it is related to behavioral change or social change (Glanz, Lewis, & Rimer, 2002). Generally, the HBM concludes that if a person believes there are benefits associated with a recommended behavior; and those benefits outweigh the cost, time, and any other related factors of inconvenience, and that it's possible for him or her to gain control of the disease at hand; then, it's possible to stimulate a positive

health related behavior (Boskey, 2008). The HBM can be related to asthma. Asthma as noted earlier is associated with a host of symptoms that can worsen over time causing pain and leading to hospitalization or death. With proper education using various methods, however, persons with asthma can be motivated and empowered to make healthier choices that could result in increased control of asthma. Unlike other chronic disorders, asthma cannot be cured; the goal is to get all patients to learn how to manage asthma (O'Laughlen & Rance, 2012). All asthma interventions could benefit from using the HBM.

Health Belief Model and Self-Efficacy

The HBM since the early 1990s has been used in program planning, implementation, and evaluation (Janz & Becker, 1984). Harrison et al., (1992) reported how the HBM is used as a guide in planning health education programs and communicating those programs to the general population. Green (2009) reported the HBM was developed by Hochbaum, Rosenstock, and Kegels who were social scientists. The original purpose of the HBM was created to explain and predict a health behavior from patterns of belief regarding a free health screening program.

The Health Belief Model and self-efficacy go hand in hand. Bokey (2008) noted how self-efficacy is concerned with a person's attitude, awareness, and ability to make a change. An individual can have high or low self-efficacy. Bokey (2008) noted that persons with asthma should feel good about their understanding of what asthma is and how to manage their asthma based on their individual type and classification of asthma in following their Asthma Action Plan. Zebracki et al., (2004) discussed how people with

asthma need to be optimistic about their ability to manage their asthma, avoid common indoor and outdoor triggers, use asthma medications effectively, and their overall knowledge of the disease. Outcome expectancy and perceived expectancy are both needed in asthma management (Zebracki & Drotar, 2004). Asthma management takes into account lots of moving parts working together; self-efficacy, especially in adult asthmatics; is needed for optimal health for persons with asthma (Bokey, 2006). The National Asthma Education and Prevention Program NAEPP noted how imperative it is to provide asthma patients effective education to help with asthma management (NAEPP, 2007). The NAEPP in 1989 worked with an expert panel to write standards for diagnosing, treating, and educating asthma patients. The report with the standardized guidelines was last updated in 2007, but was first published in 1992 as The Expert Panel Report: Guidelines for the Diagnosis and Management of Asthma (EPR-1). The last updated version in 2007 (EPR-3) noted a stronger need to educate, promoting the use of Asthma Action Plans and promoting the importance of self-management as a requirement for managing asthma long term (NAEPP, 2007). The role of self-efficacy, in relation to the Health Belief Model, continues to come up even in the national guidelines related to asthma care.

The NAEPP is not the only guideline to consider related to asthma care and management. The Healthy People 2020 should also be taken into account. The U.S. Department of Health and Human Services has released a comprehensive set of national public health objectives. These objectives share a strategy for each specific public health issue being addressed (USDHHS, 2009a). Asthma control and prevention is a key part of

the Healthy People 2020 goals. All the objectives surrounding respiratory care have contributed to helping asthmatics get motivated to learn how to manage their asthma. Peer reviewed articles are also communicating the same message with the impact of self-management. Barlow et al., (2002) noted the importance of getting asthmatics engaged in the management process. For this research, I will study the impact of the Straighten Upon asthma management in adult asthmatics with severe asthma. The Health Belief Model and self-efficacy both are rooted in the concept of individuals playing an active role in changing their behavior and or lifestyle to achieve optimal health (Boskey, 2008). Asthma management takes many variables working together to save lives (O'Laughlen et al., 2012). Of those variables, the asthmatics belief and attitude that he or she can make those changes as needed is the reasoning behind the Health Belief Model being chosen as the theoretical framework of this study.

Self-Management

Lorig and Holman (2003) noted how self-management is common in behavioral health interventions. Gibson et al., (2003) explained how asthma self-management should include information regarding signs and symptoms, triggers and how to avoid them, different types of medication, the medication delivery devices, Asthma Action Plan, and the importance of following the treatment plan.

In the past few years, meta-analyses and reviews have explored how asthma self-management interventions have been reducing the severity of asthma in the general population (Gibson Ram, & Powell, 2003; Guevara, Wolf, Grum, & Clark, 2003). Unfortunately, the overwhelming majority has reported interventions regarding children,

not adults, which is a gap in the literature; hence, this dissertation is focused on adults with severe asthma as the target audience. The relationship with posture care as a dependent variable needs to be explored; for, little is known about how one impacts the other (Shaw, 2011). Shaw (2011) reported on a study where a relationship was identified between asthma and posture; however, the study participants did not have severe asthma so the focus of this dissertation is to explore this relationship in more depth, targeting those with severe asthma. Murphy et al., (2012) discussed how the 2007 Third Expert Panel Report for National Asthma Education and Prevention Program (NAEPP) serving as a guideline defined asthma as well-controlled based on two main categories levels of impairment (presence of symptoms, use of quick relief medication and hospitalization) and asthma risk (loss of lung function). The purpose of this study is to identify if the Straighten Up model exercises have any impact to asthma management in reducing the use of quick relief medication, hospitalization, and night time awakenings due to asthma.

Key Variables and/or Concepts

Literature Related to Defining Asthma

Lopes et al., (2007) explained how asthma is a long term or chronic disease that affects the airways and is characterized by hypersensitivity to various triggers (e.g., pollen, mold, grass, flowers, animal dander, bad weather, strong emotions, strong odors, dust mites, allergies, and environmental tobacco smoke). Lopes et al., (2007) describe the airways as small tubes that carry air in and out of the lungs. The hypersensitivity

results in some of the symptoms (e.g. wheezing, chest tightness, shortness of breath, and coughing) associated with asthma leading to an asthma episode (Lopes et al., 2007). During an asthma episode, there are three physical changes that happen in the airways. First, the muscles surrounding the airways begin to tighten, squeezing the airway and making it hard to breath in and out (Lopes et al., 2007). Subsequently, the sides of the airways swell. This swelling, called inflammation causes the narrow airway to become narrower (Lopes et al., 2007). Lastly, the airways produce mucus, further narrowing the airways. The excess mucus production is another reason why those who have asthma have chest congestion (Lopes et al., 2007). There are different classifications of asthma based on how well it's managed. Regardless of the classification, an asthma episode causes asthmatics to experience muscle tightness, inflammation, and excess mucus. All of these three physical changes an asthmatic patient experiences overtime lead to airway resistance (Lopes et al., 2007). The short term element of asthma is muscle tightening (bronchoconstriction) and the long term or chronic element is swelling (inflammation of the airways) (Lopes et al., 2007; Sawicki et al., 2010).

Lopes et al., (2007) noted how both respiratory and non-respiratory muscles are impacted by the physical changes caused by asthma. Some of the symptoms are mild and with treatment go away and at times the symptoms worsen (Lopes et al., 2007; Sawicki et al., 2010). The key to effective asthma management is to treat the symptoms when they first surface so they will not worsen over time. When symptoms worsen, emergency care may be needed and at times may result in death (Lopes et al., 2007; Sawicki et al., 2010).

Asthma cannot be cured but can be managed (Lopes et al., 2007; Mangold & Salzman, 2005). The root cause of asthma is unknown; however, more often than not genetics and environmental factors are key influences. Asthmatics are provided with an Asthma Action Plan to follow (Lopes et al., 2007; Mangold et al., 2005). The plan outlines some steps to take when certain signs and symptoms surface. The Asthma Action Plan has three sections, one for each of the asthma zones: green (no symptoms are present), yellow (slow down, some symptoms are present), and red (stop to get emergency care). The Asthma Action Plan should be updated every year and provides instructions for managing asthma depending on what zone the asthmatic patient is in, what medicines should be used, and how to manage an asthma attack (Lopes et al., 2007; Mangold et al., 2005).

Asthmatic patients are also provided with medication(s) to manage their asthma. Again, the medication(s) are not to cure asthma but to help manage symptoms (Lopes et al., (2007). Asthmatics have quick reliever medications and controller medications (Conner & Buck, 2013; Sawicki et al., 2010). The quick reliever medications (i.e. short acting beta agonists or SABAs) are to help manage asthma symptoms when they first surface, and are to be taken only when signs and symptoms are present to treat the short term conditions (bronchospasm) of asthma (Conner et al., 2013; Lopes et al., 2007; Sawicki et al., 2010). On the other hand, controller medications (i.e. inhaled corticosteroids) are to be taken every day to help control asthma symptoms even if the signs and symptoms are not present, treating the long-term conditions (swelling and mucus) of asthma (Conner et al., 2013; Lopes , et al., 2007). Unlike quick reliever

medications, controller medications should not be taken during an asthma episode or during the presence of signs and symptoms (Conner et al., 2013; Lopes et al., 2007). Asthma severity is determined by taking into account two separate factors, risk and impairment. A physician would conclude risk by considering the likelihood of an asthma episode, decline in lung function, or risk of side effects from medication (Conner et al., 2013; Sawicki et al., 2010). Impairment is determined by the frequency and intensity of asthma symptoms noted above.

There are different types of asthma classifications: intermittent asthma, mild persistent, moderate persistent, and severe persistent Asthma (Lopes et al., 2007; Sawicki et al., 2010). An asthmatic's asthma classification can change over a period of time depending on how well controlled the symptoms are. During the intermittent classification an asthmatic will see symptoms at least twice a week and will have nighttime symptoms that cause them to wake up two times a month (Lopes et al., 2007; Murphy et al., 2012); Sawicki et al., 2010). When patients are classified with mild persistent asthma, symptoms are present two times a week and nighttime symptoms are present three to four times a month (Ather, Chung, Gregory, & Demissie, 2004) ; Lopes et al., 2007; Sawicki et al., 2010). During the moderate persistent asthma classification, asthmatics will see symptoms daily and are often using their quick relief medication daily, and nighttime symptoms are present more than once a week but are not happening every night at this stage (Lopes et al., 2007; Sawicki et al., 2010). Lastly, severe persistent asthmatics experience asthma symptoms throughout the day, are up every night with asthma symptoms, and use quick relief medication daily (Lopes et al., 2007;

Sawicki et al., 2010). If asthma is well managed and controlled, asthmatics classified with severe persistent asthma will see a decrease in the use of quick reliever medications. For this reason, this study will focus on adult asthmatics who are classified with severe asthma.

Posture and Straighten Up

For years, researchers have studied multiple variables to help reduce the burden of asthma. One of these variables is the link between asthma management and posture. Shaw (2011) noted asthmatic patients are often times observed to have a posture that involves slumping in the upper back area which can have an effect on lung function. With asthma being a chronic disease affecting the lungs, posture is a key variable to explore as it relates to its relationship with asthma management (Shaw, 2011). Children at times are the focus in studies related to asthma, as the prevalence of asthma is growing in children (Brandao et al., 2011). However, adults die of asthma each year (Baptist et al., 2012). Therefore, the purpose of this dissertation is to focus on the relationship between asthma management and posture in adults.

Shaw (2011) noted how respiratory muscles are impacted by bad posture. Shaw (2011) compared the effects of aerobic and diaphragmatic breathing and posture with 66 inactive asthmatics who had moderate persistent asthma. The study participants were randomly put into eight weeks of training (Shaw, 2011). The training occurred three times a week. The participants were placed either in the Aerobic Training (AT), the Diaphragmatic Breathing Training (DBT), or a placebo group with no exercise (No)

(Shaw, 2011). Shaw (2011) reported the DBT group not only performed diaphragmatic breathing but also inspiratory resistive breathing, but the control group did not receive any structured exercise regimen. Shaw (2011) noted the participants were matched by age and gender, and two weeks before participating in the study these participants confirmed having daily asthma symptoms. Baseline measurements were taken of all the participants. BMI, stature, pulmonary function, and posture were the baseline measurements recorded, and SPSS was used to analyze the data (Shaw, 2011). No changes in posture were identified, but did show some major changes in pulmonary function. Shaw (2011) concluded and identified a gap for future research on the relationship between exercise training on posture and asthmatics with a different classification of asthma (for example severe asthmatics, a different severity of asthma).

Life University is known for using Straighten Up. Straighten Up is an initiative to help people be active as a way to change lifestyle behavior (Kirk, 2006). Kirk (2006) noted how the Straighten Up model has influenced improvement in posture and promotes spinal health behaviors. Each year over 200 billion dollars are allocated towards spinal disabilities, so investigating in preventative care is imperative (Kirk, 2006). Bad posture (or forward head posture) is associated with increased mortality due to chronic diseases and functional disabilities. Kirk (2006) noted how the Straighten Up has helped participants with posture care and improved spinal health, but no direct relationships to specific health conditions (i.e. asthma) have been investigated. Therefore, this dissertation will use quantitative methods to test whether there is a link between asthma management and posture when Straighten Up is used in adult patients with severe

asthma. Also, this study will investigate more the relationship between posture and asthma management. Researchers have noted how the Straighten Up model have impacted posture and health, this study would continue this inquiry and focus more on how the Straighten Up impacts asthma management (Kirk, 2006; McGan et al., 2002). In conclusion, the results of this study could help asthmatic patients have an additional tool for asthma management. It could help demonstrate how the Straighten Up will help reduce chronic conditions. Also, the results of this study could open the door for more research in the relationship between posture and asthma and help saves lives, which will lead to positive social change.

Asthma Management and Hospitalization

Ather et al., (2004) noted how asthma is ranked in the top ten most common chronic conditions in the United States. In 2002, asthma related costs were approximately \$14 billion, of that amount \$3.1 billion dollars were spent on hospitalization (Ather et al., 2004). Some patients get charged prematurely, but Ather et al., (2004) argued that if asthma is well managed in asthmatics, hospitalization and costs associated with it would decrease. Kamble et al., (2009) reported in 2007, 37.2 billion dollars was spent in asthma treatment. Shegog et al., (2004) discussed how asthmatic patients' hospitalization or not is a factor to consider in asthma management. If asthma is not properly managed and the symptoms are not controlled when triggers are present this results in patient hospitalization. Arther et al., (2004) noted how costly it is when patients get to the point of being hospitalized, so avoiding this would save lives and

money. For this reason, this study will focus on how the Straighten Up exercise could potential decrease hospitalization due to severe asthma.

Asthma Management and Quick Relief Medication Use

Sawicki et al., (2010) discussed how from 2000-2007 health claims on asthmatic patients were examined as they related to quick relief medication use. How well asthma is managed can be seen in how often the asthmatic patient uses quick relief medications and get hospitalized which are both very costly (Sawicki et al., 2010). Sawicki et al., (2010) examined uncontrolled asthma events as two more oral steroid fills in a twelve months period, five or more short-acting beta agonist (SABA) fills over twelve months period, or an asthma-related hospitalization or emergency room visit. Although the researchers looked at asthmatic patients' ages from 1-56, (range is outside of the population for this dissertation) this study would give us insight on the adult population as well, for only 44% of the participants were under 18 years of age. As noted above, Sawicki et al., (2010) argued how the researchers defined asthma as being uncontrolled by quick relief medications being filled five or more times in one year or having one asthma hospitalization or emergency room visit in one year. Mixed regression models were used and comparisons were made on costs of patients with controlled asthma and those with uncontrolled asthma (Sawicki et al., 2010). In 2002-2003; 39% of the patients had more than one uncontrolled asthma event as a result of looking only at the frequency of using quick relief medications. Sawicki et al., (2010) also reported males and adults had higher likelihood of uncontrolled asthma episodes related to quick relief medication

leading to hospitalization and emergency room visits. Over the span of the entire study time frame (2000-2007) the rate of uncontrolled asthma events decreased, simply looking at the use of quick relief medications and not hospitalizations and emergency room visits (Sawicki et al., 2010). All in all, Sawicki et al., (2010) showed how the use of quick relief medications and hospitalizations or emergency room visits has a direct relationship with how well asthma is controlled. Elliott et al., (2006) argued less than 50% of adult asthmatics use their quick relief medications as prescribed, so there is a need to identify different tools to help adult asthmatics gain optimal health. Hart et al., (2010) reported how the Baylor University Medical Center at Dallas developed the Rules of Two. A simple way to identify if asthma is well managed by applying a simple rule of two to the following four questions: Have asthma symptoms or take your quick-relief inhaler more than Two times a week? Awaken at night with asthma symptoms more than Two times a month? Refill your quick-relief inhaler more than Two times a year? Measure your peak flow at less than Two times 10 (20%) with asthma symptoms? Keeping in mind the consistent themes in the literature, this dissertation will focus on quick relief medication use and hospitalization as variables in the relationship between asthma management and posture care when Straighten Up is applied.

Literature Related to Asthma and Sleep Patterns

Annakkaya et al., (2013) noted that some asthma symptoms worsen at night, so how well an asthmatic patient sleeps through the night is an indicator of how well the asthma is managed. Krouse et al., (2007) reported that asthmatics reported more daytime

sleepiness and more difficulty remaining asleep in comparisons to non-asthmatics. Janson et al., (2009) also researched the relationship between sleep patterns and asthmatic patients. With 98 asthmatic participants compared to non-asthmatics Janson et al., (2009) noted sleep patterns from analyzing patients' survey answers and sleep diary entries (in a week long diary). Participants with moderate and severe asthma had difficulty falling asleep (28%) and difficulty remaining asleep (44%) (Janson et al. 2009). Janson et al., (2009) argued that not managing asthma well contributes to the challenges asthmatics have in maintaining sleep, and that proper asthma management can be observed by measuring nighttime patterns.

Annakkaya et al., (2013) examined how Obstructive Sleep Apnea Syndrome (OSAS) influences the severity of asthma and its impact on asthma management in adult asthmatics in Turkey. Although this study was not performed in the United States, it can be used to learn about the relationship with asthma management and sleep patterns. Sleep pattern is a key variable to explore as it relates to asthma management because during sleep symptoms worsen at night (Annakkaya, Akın, Balbay,Arbak,Toru, 2012). With 50 asthmatic patients, Annakkaya et al., (2013) used questionnaires to gather baseline information about the patients' sleep patterns. Epworth Sleepiness Scale was used to examine daytime sleepiness. After all the questionnaires were examined, the asthmatic participants were also examined overnight using a polysomnography test at a sleep laboratory. The researchers were looking for the presence of snoring, witness apnea, excessive daytime sleepiness, apnea, hypopnea, OSAS severity, and sleep efficiency (Annakkaya et al., 2013). SPSS was used to analyze the data. Annakkaya et

al., (2013) reported using Mann Whitney U test, Kruskal-Wallis test, Chi-Square Test, and Spearman's Correlation Test to identify correlations, and statistical significant was considered $P < 0.05$. Annakkaya et al., (2013) concluded 40% of the participants had OSAS, and 16% of the 40% are asthmatics. Furthermore, Annakkaya et al., (2013) noted that OSAS has a higher prevalence in asthmatics in comparison to non-asthmatics. No relationship was determined between asthma severity and OSAS, but a weak correlation was determined between OSAS severity and asthma control ($p = 0.05$, $r = -0.279$). OSAS was shown to influence how well asthmatics were able to manage asthma. Krouse et al., (2007) also explored the impact sleep can have on asthmatics. Over 70% of asthmatics experience nighttime awakenings (Krouse et al., 2007). The three physical changes that take place during an asthma episode may occur during the night (Krouse et al., 2007). Examinations of the studies reveal a consistent theme in the relationship between asthma management and nighttime sleep patterns. Thus, nighttime sleep patterns will be a key variable to study as it relates to asthma management and the Straighten Up model exercises. This dissertation, will seek to identify if when the Straighten Up model exercises are used in asthmatic patients are they sleeping better through the night.

Asthma Management and Covariates

Asthma management encompasses lots of variables. In this study covariates will be observed for they can affect the outcome of the study. In this section some of the covariates of this study are noted. Saint-Pierre et al., (2006) noted that asthma is more difficult to control if asthmatics are overweight or obese. Lunardi et al., (2011) noted how age of onset contributes to asthma management as it relates to posture. Baptist et al.,

(2010) noted how older adult asthmatics have more of a problem with asthma management. Charlton et al., (2013) argued how pregnancy can make asthma management more challenging. Godfrey et al., (2006) noted how asthma is more prevalent and severe in women. Oraka et al., (2013) reported that African Americans are more likely to have asthma, and are more likely to have uncontrolled asthma leading up to hospitalization. All these covariates will be observed in this study as they influence asthma management.

Summary

Through the literature review, I explored research in multiple areas including asthma self-management and education; the HBM's role in asthma management and the role it could play in explaining the Straighten Up exercises' potential relationship to asthma management in adults with severe asthma. The Healthy People 2020 objectives were discussed. Shaw (2011) revealed a gap in the research as it relates to asthma management and posture care in adults with severe asthma. Asthma research is often targeted towards children. This presents a substantial gap in the literature related to this topic; for, asthma education for adults, as it relates specifically to posture care and routine exercises, is a completely different approach than asthma care related to children. In the next chapter, I will describe the methodology, sample size, and instruments used to analyze the secondary data from Life University.

Chapter 3: Research Methods

Introduction

Asthma not only impacts a patient's health for a short time, it affects long-term day-to-day activities and emotional health as well (Meltzer et al., 2012). Shenolikar et al., (2011) noted in 2005 an estimated 12.2 million people reported having at least one asthma attack. In addition to this, Shenolikar et al., (2011) reported in 2002 that 11.8 million work days were lost as a result of asthma, and on average total annual cost of a patient with asthma is \$ 4,912. After comparing medical cost of asthmatics to non-asthmatics, Shenolikar et al., (2011) noted total medical cost of asthmatics was three times higher in comparison to non-asthmatics.

The purpose of this study is to use quantitative methods to test whether there is a link between asthma management and posture when the Straighten Up model is used in adult patients with asthma. The results of this study may contribute to filling the gap in research regarding asthma management. First, the study focused on all adults both male and female. This focus is a need for much of the current research targets school-age children (McGhan et al., 2002). Second, the study explored more of the relationship between posture and asthma management. Third, researchers have noted how the Straighten Up model has impacted posture and other areas of health; this study continued this inquiry and focused on how the Straighten Up model could impact asthma management and contribute to positive social change (Kirk, 2006; McGhan et al., 2002).

This chapter will discuss the research design and rationale, the methodology, threats to validity, the ethical procedure that were followed, and provides a summary that will introduce the final chapter.

Research Design and Rationale

Kirk (2006) noted how the Straighten Up model has helped participants with posture care and improved spinal health, but no direct relationships to specific health conditions, e.g., asthma, have been investigated. Therefore, this research used quantitative methods using secondary data from Life University to test whether there is a link between asthma management and posture when Straighten Up is used in adult patients with severe asthma. For this study the independent variable was the Straighten Up experience and the dependent variable was asthma management. This study analyzed the use of quick relief medication, hospitalizations due to asthma, and night time awakens due to asthma as variables used to determine if asthma is being managed. There are several covariates that were taken into account during this study. Saint-Pierre et al., (2006) noted that asthma is more difficult to control if asthmatics are overweight or obese. Lunardi et al. (2011) noted how age of onset contributes to asthma management as it relates to posture. Baptist et al. (2010) noted older adult asthmatics have more of a problem with asthma management. Charlton et al. (2013) argued pregnancy could make asthma management more challenging. Godfrey et al., (2006) noted asthma is more prevalent and severe in women. Oraka et al. (2013) reported African Americans are more likely to have asthma and are more likely to have uncontrolled asthma leading to

hospitalization. All these covariates (weight, race, age of onset, sex, age, and pregnancy) were used as independent variables in the analysis.

This study sought to answer the following research question using a quantitative design using secondary data from Life University: What is the relationship between adults implementing the Straighten Up posture modules for three months, and use of their quick relief medications, hospitalization due to asthma during the three months period, and night time sleep patterns (are asthma patients not sleeping through the night due to asthma)? The secondary data provided by Life University was numerical and analyzed further. With the data already collected and readily available there were no time or research constraints.

The Life University Clinic serves Georgia residents. Life University states their mission “is to empower each student with the education, skills and values needed for career success and life fulfilment based on a vitalistic philosophy” (www.life.edu). The vitalistic approach is “the understanding and principle that all living systems are self-organizing, self-developing, self-maintaining and self-healing”. Life University clinic called the “Center for Health and Optimum Performance” is open to the general public. The target audience are adults ages 18-68. The clinic provides members of the community with chiropractic care, nutrition information, and wellness coaching to help make patients stay connected to the daily decisions that will influence health.

Life University is known for using the Straighten Up model. Straighten Up is a health imitative initiative design to help people be active as a way to change lifestyle behavior (Kirk, 2006). Kirk (2006) noted how the Straighten Up model influenced

improvement in posture and promoted spinal health behaviors. Each year over 200 billion dollars are invested or allocated towards spinal disabilities, so investigating in preventative care is imperative (Kirk, 2006). Poor posture (or forward head posture) is associated with increased mortalities due to chronic diseases and functional disabilities.

All Life University patients receive instructions about how to implement the Straighten Up model. Also, the Life clinic documents all chronic diseases for each patient if any are present, including asthma. If the patient reports being an asthmatic, data is collected on quick relief medication, hospitalizations, and sleeping patterns. At every clinic visit the patient is asked to report out on if he/she was hospitalized due to asthma since the last visit, and how many times the quick relief medication is used daily. With sleeping through the night being an indicator of asthma management, asthmatic patients at the Life University clinic are asked at every visit to report on sleep patterns; specifically, the number of times woken up due to asthma symptoms is documented. With this in mind, I would use the internal data Life University is already collecting as secondary data to identify whether or not there is a link between asthma management and posture when the Straighten Up model are used in adult patients with severe asthma.

The study presented by Shaw (2011) revealed a gap in the research as it relates to asthma management and posture care in adults with severe asthma. Shaw (2011) reported on an 8 week intervention that a group of asthmatics participated in; however, it was not for adults with severe asthma, and the intervention was not the Straighten Up exercises focusing on upper body and lower back posture. Asthma research is often targeted towards children, so not many studies focused on asthma management in adults. This

presents a gap in the literature related to this topic; for, asthma education for adults as it relates specifically to posture care and routine exercises is a completely different approach in comparison to asthma care related to children. Using a quantitative design allowed for more hypotheses to be tested bringing numerical statistical findings to test relationships between chosen variables among asthmatic adult patients with severe asthma.

Methodology

Target Population

The target population for this research study was adult asthmatics with severe asthma who are implementing the Straighten Up exercises at Life University. Life University sees about 250 patients a day at the clinic. All of the patients at Life University are trained to implement the Straighten Up exercises. The focus of this study was to target those who have severe asthma.

Sampling and Sampling Procedures

For this study I used secondary data collected from the Life University' clinic. The clinic staff captured information about adult asthmatics' and allowed these individuals to self-report on how the Straighten Up model exercises are effecting their asthma management at each visit. The research question was only concerned with adult asthmatics who have been diagnosed with severe asthma and are implementing the Straighten Up exercises instructed by Life University. Life University includes data from all patients who report using the Straighten Up exercises. The Straighten Up routine is not accessible to all asthmatic adults, therefore, in using the secondary data provided by

Life University, a small representative group of the population of asthmatic patients was captured as a sample. Keeping in mind the research question, all of the units in the sample provided by Life University were used; for, the sample population is 278.

The research question was very specific in regard to the population. In chapter 2, it was noted this study was not for any asthmatic adults but based on the literature severe asthmatics are the target. The data provided by Life University also served as a sampling frame for only adults with severe asthma who are receiving chiropractic care at the Life University clinic are included in this study.

Power analysis was calculated using Raosoft database. To calculate the sample size I did the following: 5% margin of error, 95% confidence interval, 1,000 population size (asthmatic clients at Life University), and 50% response distribution resulting in a needed sample size of 278 participants. The power of analysis noted above shows that at least 278 participants were needed to represent this group to show significance in the study results (Raosoft, 2014).

Archival Data Collection

The Center for Health and Optimum Performance is the clinic at Life University. The clinic is open to the general public and serves a diverse population. The patients of the Life University clinic come in to receive chiropractic care. In order to receive the best care, patients provide information on their overall health including chronic disease prevention. Life University collects data on all patients regarding chronic disease management. The patients are informed the information provided will be used by Life University to provide optimal care and may be used for further research. Life University

has a file room with all the patients' data in files. This research study focused exclusively on the adult asthmatic patients with severe asthma who are implementing the Straigten Up exercises. Life University provided access to all the asthmatic patients they serve. To identify the sample for the study the data set was narrowed down to the adult asthmatic patients who reported being diagnosed with severe asthma. For this research, an adult was anyone who was 18 years of age or older. Only the asthmatic patients who were actively implementing Straigten Up as instructed by the Life University chiropractors were included. Any patients who were not actively implementing Straigten Up during the data analysis period were excluded. Once qualified participants were identified data analysis began.

Hallahan et al. (1996) noted high statistical power gives the researcher more of a chance in identifying effects to treatment or relationships between the independent and dependent variable. Hallahan et al. (1996) argued if there is not a chance of finding treatment relationships then there is no need to conduct the study at all. As Murphy et al., (2012) and Hallahan et al. (1996) discussed the accepted (pre-determined) value of power that a test will identify treatment or relationship is 80%. Thus, the power for this study is set at 80%. The alpha level is a pre-determined value set by the research. Murphy et al., (2012) and Hallahan et al., (1996) discussed how $\alpha = .05$ or $\alpha = .01$ are the standard values for alpha, but larger alpha broaden the rejection region giving the researcher more opportunities to reject the null hypotheses and a 95% chance to conclude correctly. Therefore the alpha level for this dissertation is .05. The effect portion of the statistical analysis was determined using Cohen's equation (Cohen, 1988).

Access to Data

The director of the Life University clinic was contacted and involved in the research study. All the necessary information was provided to ensure the data set was available. The professors at Life confirmed the data was available and explained the process of obtaining IRB approval to access the data. Two professors at Life were assigned to the research study based on interest levels and availability. The research proposal was submitted to Life University's IRB office. A standard application form was used (see appendix A) and a copy of the research prospectus was provided with the application form. Life University requires that the principal investigator, chair, and committee member complete the NIH course called "Protecting Human Research Participants." The certificates of completion from all three (appendix B-D) were submitted to the IRB office at Life University. Access to the data was approved by the IRB.

Operationalization

The key variables in this research study are: the use of quick relief medication, hospitalization (due to asthma), night time awakenings due to asthma and the Straighten Up exercises. Below is the process of operationalization for each.

The used of Quick relieve medication is one of the variables for this study. Its operational definition is any medication prescribed to an asthmatic patient by his or her physician to treat the first symptoms of an asthma episode when the patient is exposed to environmental triggers (Shenolikar et al., 2011). The operational definition for "the use of" is the number of times the asthmatic patient has to take the quick reliever medication

(only due to exposure to environmental triggers) during the three months period of implementing the Straighten Up routine exercises. For this variable, the only thing that measured was the number of times the research participants report having to use the quick reliever medication for controlling exposure to environmental triggers.

Hospitalization(s) due to asthma is another variable. Its operational definition is the number of times the study participants report having to check in at an emergency room (ER) as a result of uncontrollable asthma symptoms during the three months period of implementing the Straighten Up exercises (Shenolikar et al., 2011).

Lastly, night time awakenings due to asthma are another variable for this study. Its operational definition is the number of times an asthmatic patient is awaken during an 8 hour period of sleep due to asthma symptoms during the three months period of implementing the Straighten Up exercises (Shenolikar et al., 2011).

Variables

Categorical variables used for the study are presented in Table 1. In addition, the study tracked ratio scaled variable representing participant's Age and interval scale representing participant's body mass index (BMI).

Table 1

Coding Scheme for Variables in the Study

Variable name	Categories
Improved	0=No 1=Yes
StraightenUp	0=No 1=Yes
Gender	0=Female 1=Male
Race	0=Black

	1=White 2=Hispanics 3=Asians
Sleep Interruptions:	0=Decreased, 1= No change; 2=Increased
Hospitalization changes:	0=Decreased by 2 1= Decreased by 1 2=Did not change 3=Increased by 1 4=Increased by 2 0=Decreased by 2
Medication changes	0= Decreased by 3; 1= Decreased by 2; 2= Decreased by 1; 3=Did not change; 4=Increased by 1; 5=Increased by 2; 6=Increased by 3

Data Analysis Plan

For this study, SPSS version 22 was used to analyze the data. Life University will provide information on clients who meet the qualifications for the study. To ensure all the variables in my study are taken into account, I coded each as a way to screen the data set. The following list states how the data set was coded for all the covariates and independent and dependent variables for my study. Quick relief medication use was documented as a ratio variable; sleep pattern (night time awakens due to asthma) was documented as a yes or no answer, also the Straighten Up exercises was documented as a yes or no answer so it is dichotomous; hospitalization due to asthma was documented as a ratio variable; age was documented as a ratio variable; ethnicity and gender was documented as categorical data (nominal); and weight was documented as a ratio.

The research question for this study is as follows: what is the relationship between implementing the Straighten Up exercises (independent variable) for three months among adults with severe asthma and asthma management (dependent variable) techniques (1. use of their quick relief medications, 2. hospitalization due to asthma during the three months period, and 3. night time sleep patterns (are asthma patients not sleeping through the night due to asthma), after controlling for the asthmatic patients age, ethnicity, weight, and gender? There are three null and alternative hypotheses for this study.

H_1 : There is no relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months,

H_{1a} : There is a relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months.

H_2 : There is no relationship between hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{2a} : There is a relationship between the hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for 3 months.

H₃: There is no relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{3a}: There is a relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

Hierarchical regression was used to test the hypotheses in this study. This was chosen as there was more than one independent variable (including the covariates) with dichotomous data sets (coding) and one dependent variable. The hierarchical regression was used based on the Health Belief Model (HBM) as the theoretical framework for this dissertation. The HBM suggests a particular order in which the variables should be entered into the equation. Keeping this in mind and the goal of the research question, in order to identify how much variance in the dependent variable is accounted for by linear combination of the independent variables; hierarchical regression will be used to test the hypotheses. For this study, a p-value of $> .05$ was used show statistical significance. Multicollinearity and homoscedasticity pre-and post- test will be outlined in chapter 4.

Threats to Validity

External validity:

This study used secondary data from Life University. Life University at the clinic where a patient are already receiving chiropractic care and is one of the few places where

the Straighten Up exercises are implemented. Generalizing the results of this study to another group of asthmatic adults with severe asthma may pose a threat to the external validity. Also, in this study all the participants received chiropractic care; it would pose a threat to generalize the results to asthmatic adults with severe asthma who are not receiving chiropractic care; for the pre-conditions will not be the same. The selection process for the study participants was rooted in the research question and the secondary data provided by Life University. Replicating this study in another study in another setting may require some additional work in the selection process. Also, notably the participants in this study learned how to implement the Straighten Up exercises at the Life Clinic by a chiropractor. So, the conditions were safe (Shenolikar et al., 2011). In replicating this study, providing a safe learning environment for the participants to learn would be needed, and not having that would pose a threat. The characteristic of the asthmatic patients in following doctors' orders and creating an environment free from triggers may cause it to be difficult in discerning how much of the patients wellness is due to the treatment or their other characteristics. In the U.S., lots of research as noted in chapter 2 focuses on asthma management (Shenolikar et al., 2011). Asthmatic patients are saturated with information regarding asthma management and their part in the process (Shenolikar et al., 2011). Replicating this study to a population who does not have access to current up to date information about asthma management would pose a threat to the external validity. With this study using secondary data, reactive effects of the participants will not be a factor.

Internal Validity

In using secondary data for this research, there is no way to note any unanticipated event that occurred during the intervention (three months where the asthmatic patients implemented the Straighten Up model exercises); not having that history poses a threat. Another threat to the internal validity is maturation and changes in the dependent variable (asthma management), which is impacted by so many factors working simultaneously. Lastly, experimental mortality may be present in that all the asthmatics who started the study may not have completed the Straighten Up for the entire three months period. Low statistical power is something that may pose a threat to the validity of this study. Not having a large sample size to draw conclusions resulting in accepting the null hypothesis when it is false. This is addressed by using the power analysis to determine sample size.

Ethical Procedures

An IRB application with Life University is in the appendix section of this dissertation. The IRB application and the study prospectus were used to gain access to the data. Life University has procedures that are used to keep the patients' information confidential. The principal investigator did not receive any additional information about the participants including personal information that was not related to the study. The study participants were not specifically recruited for this study, nor were any data collected simply for this study. There are no issues related to confidentiality of the patients' data. Life University is the sole owner of the data and will continue to work

with patients directly to receive written consent for the use of their information. Life University will continue to keep all patient data confidential. As the principal investigator for this study I only had access to the data that was needed for this study. I did not have access to additional information about the asthmatic patients. I will keep the data for 5 years from the date the research has been completed. The data will not be disseminated to anyone and will be stored at the Life University clinic where I went to access the data for research purposes. This study is not related to my own work environment; there were no issues with incentives or conflict of interest.

Summary

This research used quantitative methods to answer the research question: what is the relationship between implementing the Straighten Up posture modules for three months and adult asthmatics use of their quick relief medications, hospitalization due to asthma during the three months period, and night time sleep patterns (are asthma patients not sleeping through the night due to asthma) (despite the asthmatic patients age, ethnicity, weight, and gender). The data came from Life University and was used as secondary data. SPSS was used to analyze the data. The power of analysis confirmed at least 278 participants were needed for this study and p-value of $> .05$ was used to show statistical significance. Threats to both the internal and external validity are noted. Chapter 4 will include a detailed description of the data and the results of the study.

Chapter 4

Introduction

The purpose of this study was to identify the relationship between asthma management and posture care. Asthma management is different for all asthmatics, as there are different classifications of asthma. Those with severe asthma are known to experience nighttime awakenings due to asthma, hospitalizations (ER visits) due to asthma, and use of their quick reliever medications often. This study specifically tested those three factors within adults with severe asthma as they were implementing the Straighten Up exercise taught by Life University Chiropractors for a three month period.

The research question for this study was as follows: what is the relationship between implementing the Straighten Up exercises (independent variable) for three months among adults with severe asthma and asthma management (dependent variable) techniques (1. use of their quick relief medications, 2. hospitalization due to asthma during the three months period, and 3. night time sleep patterns (are asthma patients not sleeping through the night due to asthma), after controlling for the asthmatic patients age, race, weight, gender, and age of onset. There are three null and alternative hypotheses for this study.

H_1 : There is no relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{1a}: There is a relationship between sleep patterns (night time awakenings due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H₂: There is no relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months,

H_{2a}: There is a relationship between the use of quick reliever medication among adults with severe asthma and implementing Straighten Up routine exercises for three months.

H₃: There is no relationship between hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

H_{3a}: There is a relationship between the hospitalizations (due to asthma) among adult asthmatics with severe asthma and implementing the Straighten Up routine exercises for three months.

In this chapter, I discuss the data collection process of the study. Detailed information about how the original data collection took place. The results of the tests of the 3 hypothesis are provided using SPSS and what those findings mean are noted.

Data Collection

For this research, the information used was secondary data; for, the data was collection by the chiropractors at the Life University clinic. Life University, chiropractic

school; located in Marietta, GA serves local community members. The data collection did not include any recruitment of the participants; for, Life University has a base of consistent community members who receive chiropractic care at the clinic. Data is collected on an ongoing basis, and the timeframe of data collection heavily relies on the patients being active with going to the clinic regularly. For this study, 2013-2014 were the years of data collection covered. Each time the patients go for chiropractic care data is collected, the more visits the more data. The Life University clinic teaches the Straighten Up exercise (the intervention for this study). Chronic diseases of the patients are noted. Before the patients receive chiropractic care, an intake interview takes place where full background information regarding the patients' health is documented. Patients are self-reporting on all chronic diseases, infectious diseases, allergies, and anything else that is imperative to their overall health. The patients' file is created from this information and serves as baseline on where the patient is at regarding their overall health. At each visit, chiropractors ask patients to report specifically on how things are going with their overall health. For example, if patients have asthma listed as a chronic disease, at each visit they are asked questions regarding their asthma management. If they had an asthma episode it's documented, and details surrounding the episode are noted. The key variables linked with asthma management are documented for each asthmatic patient (as needed): if the patient was hospitalized (ER), if the patient was experiencing night time awakenings due to asthma, and if the patient was using their quick reliever medication. All this information is on file for each patient and is used as a follow up for the next visit. Specifically, the chiropractors would use the notes from the previous visit to follow up

and continue documenting the patients' progress. The patients are self-reporting their responses verbally, and the Chiropractors or student interns (who are accompanied by a Chiropractor) are simply inputting the information into the patients' file. All patients of the clinic receive the same training on how to implement the Straighten Up exercise as a way to better their posture. At each visit, all patients are asked how implementing the routine at home is going, how often they are implementing it, and any challenges encountered. Since the patients are self-reporting on their personal health, the chiropractors heavily rely on them to be honest not only about their implementation of the intervention but also on their progress with overall chronic disease prevention; including asthma management.

For this study, only adult (over 18) asthmatics with severe asthma who have implemented the routine exercises for three months were considered. The covariates discussed in chapter 2: age of onset, age, pregnancy status, race, gender, and weight were all considered in the inclusion process. In chapter 3, statistical power was calculated using the Raosoft database. To calculate the sample size and identify correlation at a 5% margin of error, 95% confidence interval, 1,000 population size (asthmatic clients at Life University), and 50% response distribution resulting in a needed sample size of 278 participants. Life university provided an excel document with the data for 304 participants, going over the required number needed.

Sample Characteristics

Descriptive statistics for the sample is presented in the Tables 2 and 3.

Table 2

Descriptive Statistics (n = 304)

	N	%
Race		
Black	128	42.1
White	144	47.4
Hispanic	28	42.1
Asian	4	47.4
Gender		
Male	186	61.2
Female	118	38.8
Straighten Up exercises		
No	87	28.6
Yes	217	71.4

Table 3

Changes in Outcomes Between Pre-test and Post-test (n =304)

	N	%
Change in Sleep Interruptions		
Decreased	170	55.9
No change	123	40.5
Increased	11	3.6
Change in Hospital Readmissions		
Decreased by 2	35	11.5
Decreased by 1	122	40.1
No Change	130	42.8
Increased by 1	14	4.6
Substantially Increased by 2	3	1
Change in Asthma Medications		
Decreased by 3	26	8.6
Decreased by 2	58	19.1
Decreased by 1	126	41.4
No Change	84	27.6
Increased by 1	4	1.3
Increased by 2	5	1.6
Increased by 3	1	0.3

Results

Hallahan et al., (1996) noted high statistical power gives the researcher more of a chance in identifying effects of treatment or relationships between the independent and dependent variables. Hallahan et al., (1996) argued if there is not a chance of finding treatment relationships then there is no need to conduct the study at all. As Murphy et al., (2012) and Hallahan et al., (1996) discussed the accepted (pre-determined) value of power that a test will identify treatment or relationship is 80%. Thus, the power for this study is set at 80%. The alpha level is a pre-determined value set by the research.

Murphy et al., (2012) and Hallahan et al., (1996) discussed how $\alpha = .05$ or $\alpha = .01$ are the standard values for alpha, but larger alpha broadens the rejection region giving the researcher more opportunities to reject the null hypotheses and a 95% chance to conclude correctly. Therefore the alpha level for this dissertation is 0.05. The effect portion of the statistical analysis was determined using Cohen's equation (Cohen, 1988).

Multicollinearity and Relationships among Independent Variables

Generally speaking multicollinearity is not applicable when some variables are categorical, because multicollinearity refers to linear relationships between independent variables. Yet, it is possible to check if independent variables are associated with each other.

For Age and BMI, there is no association between the two because Pearson's correlation coefficient is very small $r = -0.042$, $p = 0.467$.

It was also possible to check if there was any relationship between Race and Sex. Chi-square test suggests that there was no such association $\chi^2(3) = 4.172$, $p = 0.243$, thus association between these two independent variables is unlikely. With the same individuals observed at pre-test and post-test, the data is treated as matched-pairs data. To do so for each outcome, new variables representing difference are computed as difference between post-test values minus pre-test value. These differenced variables represent difference in sleep interruptions (V1), change in number of hospitalizations (V2) and change in number of medications (V3) before and after the program. They are used as dependent variables in the subsequent analysis. The three differenced variables

are ordinal in nature. The best choice to analyze these variables is ordinal regression because linear regression is that it assumes continuous dependent variable (interval or ratio scales). For example, change in sleep interruptions has only three values (0,1,2) which makes linear regression a poor choice.

Analysis for Sleep Interruptions

The analysis for changes in sleep interruptions was conducted in four steps. The first two steps utilized ordinal regression with sleep interruptions as the dependent variable, while the second two steps involved the analysis of collapsed dichotomous Straighten Up variable as the independent variable in the logistic regression.

At first step all collected variables Race, Age, BMI, Sex and Straighten Up were included in the ordinal regression model with the dependent variable representing changes in sleep interruptions (Table 4). The results of fitting the full ordinal regression model are presented in the Table 4. In this table none of the independent variables were statistically significant except for Straighten Up $\chi^2(1) = 6.095, p = 0.01$. Significance suggests that Straighten Up may have been associated with changes in sleep interruptions.

Table 4

Saturated Ordinal Regression Model for Sleep Interruptions as the Dependent Variable.

	Estimate	p-value	95% CI	
<i>Threshold parameter estimates:</i>				
Sleep Interruptions				
Decreased	2.09	0.17	-0.89	5.06

No Change	5.18	0.00	2.14	8.22
<i>Location parameter estimates:</i>				
Age	0.01	0.29	-0.01	0.02
BMI	0.00	0.96	-0.07	0.07
<i>Race</i>				
Black	1.12	0.34	-1.20	3.43
White	1.00	0.40	-1.31	3.31
Hispanic	0.99	0.42	-1.40	3.39
Asian	0(a)	.	.	.
<i>Gender</i>				
Female	0.40	0.10	-0.08	0.88
Male	0(a)	.	.	.
<i>StraightenUp</i>				
No	0.64	0.01	0.13	1.14
Yes	0(a)	.	.	.

At the second step, all variables that were not statistically significant were dropped from the model. The new reduced model contained only one independent variable SU. For this model by itself Straighten Up was statistically significant $\chi^2(1) = 4.81, p = 0.03$ (Table 5). The model was characterized by modest values of pseudo R-square coefficients – Nagelkerke $R^2=0.019$, McFadden $R^2=0.01$ and Cox and Snell $R^2=0.016$. With the values of these coefficients being close to zero, the explanatory power of this model is insufficient. The positive value Straighten Up coefficient $\beta = 0.55$ suggests that for those who did not use Straighten Up exercises, increase (or no change in sleep) was likely. Conversely there is statistically significant evidence that Straighten Up exercises was associated with sleep interruptions.

Table 5

Reduced Ordinal Regression Model for Sleep Interruptions as the Dependent Variable.

	Estimate	p-value	95% CI
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Threshold parameter estimates:

Sleep Interruptions

Decreased	0.39	<0.01	0.12	0.67
No Change	3.47	<0.01	2.84	4.10

Location parameter estimates:

Straighten Up

No	0.55	0.03	0.06	1.04
Yes	0.00	.	.	.

The analysis of the descriptive statistics suggest that only n = 11 participants out of 304 experienced increase in the sleep interruptions. With this category being infrequent, a new dichotomous variable was created to represent sleep interruptions (0=did not/change or increased and 1=decreased).

At the third step, this dichotomous variable was used as the dependent variable in the logistic regression model, while independent variables represented Race, Age, BMI, Sex and Straighten Up. The analysis suggests that no variables were statistically significant other than the dichotomized Straighten Up variable ($p = 0.03$) (Table 6). The model did not fit data very well because Nagelkerke $R^2 = 0.035$ was small. Before a final conclusion can be made about significance of Straighten Up variable, non-statistically significant variables must be dropped from the model.

Table 6

Saturated Logistic Regression Model for Sleep Interruptions as the Dependent Variable.

	Estimate	p-value	Odds ratio
Age	-0.01	0.41	0.99
BMI	0.00	0.93	1.00
Race			
Black		0.73	
White	-1.12	0.34	0.33

Hispanic	-0.96	0.41	0.38
Asian	-0.92	0.45	0.40
Gender			
Female	0.00		
Male	0.41	0.10	1.51
Straighten Up			
No	0.00		
Yes	0.57	0.03	1.78

At the fourth step, all variables that were not statistically significant were dropped from the logistic regression model. The new reduced model contained only Straighten Up variable. For this model see by itself Straighten Up at 0.05 level was not statistically significant $\chi^2(1) = 3.794$, $p = 0.051$ (Table 7). In addition to the lack of significance, the model's fit measured by Nagelkerke $R^2 = 0.034$ was poor.

Table 7

Reduced Logistic Regression Model for Sleep Interruptions as the Dependent Variable.

	Estimate	p-value	Odds ratio
Straighten Up			
No	0.00		
Yes	0.50	0.051	1.65

Therefore the null hypothesis H_{03} must not be rejected if the results of logistic regression are considered, however the conclusion is the opposite if the results of ordinal regression are taken into account.

Analysis for Hospitalization Due to Asthma

Table 8 suggests that neither Straighten Up nor demographic variables were statistically significant. For all variables p-values were greater than 0.05 (under location parameters). Thus neither SU nor demographic variables have any effect on the changes in hospitalization due to asthma (Table 8).

Table 8

Saturated Ordinal Regression Model for Hospitalization as the Dependent Variable.

	Estimate	p-value	95% CI	
<i>Threshold parameter estimates:</i>				
Hospitalizations				
Decreased by 2	-2.93	0.031	-5.59	-0.27
Decreased by 1	-0.78	0.564	-3.43	1.87
Did not change	2.04	0.133	-0.62	4.70
Increased by 1	3.83	0.008	0.98	6.68
<i>Location parameter estimates:</i>				
Age	-0.01	0.146	-0.02	0.00
BMI	0.025	0.437	-0.04	0.09
Race				
Black	-0.964	0.338	-2.94	1.01
White	-1.402	0.163	-3.37	0.57
Hispanic	-1.069	0.31	-3.13	1.00
Asian	.	.	.	.
Gender				
Female	0.303	0.18	-0.14	0.75
Male	.	.	.	.
StraightenUp				
No	-0.151	0.533	-0.63	0.32
Yes	.	.	.	.

The analysis suggests that the null hypothesis H_{02} cannot be rejected because p-values for each location parameter exceed level of significance of 0.05.

Analysis for use of Quick Relief Medications:

The full model with all independent variables included suggests that no variables were statistically significant. We see that neither SU nor demographic variables were statistically significant. For all variables p-values were greater than 0.05 (under location parameters). Thus neither SU nor demographic variables have any effect on the change in the use of quick relief medications (Table 9).

Table 9

Saturated Ordinal Regression Model for Medication Use as the Dependent Variable.

	Estimate	p-value	95% CI	
<i>Threshold parameter estimates:</i>				
Medications Use				
Decreased by 3	-2.93	0.03	-5.50	-0.36
Decreased by 2	-1.52	0.24	-4.07	1.03
Decreased by 1	0.27	0.84	-2.28	2.82
Did not change	2.88	0.03	0.28	5.47
Increased by 1	3.40	0.01	0.76	6.04
Increased by 2	5.21	0.00	2.02	8.40
<i>Location parameter estimates:</i>				
Age	0.00	0.63	-0.01	0.02
BMI	0.03	0.29	-0.03	0.10
Race				
Black	-1.31	0.17	-3.20	0.58
White	-1.35	0.16	-3.24	0.54
Hispanic	-1.25	0.21	-3.23	0.73
Asian	0.00	.	.	.
Gender				
Female	-0.16	0.46	-0.59	0.27

Male	0.00	.	.	.
Straighten Up				
No	-0.32	0.17	-0.78	0.14
Yes	0.00	.	.	.

The analysis suggests that the null hypothesis H_{03} cannot be rejected because p-values for each location parameter exceed level of significance of 0.05.

Contingency Table Analysis:

Another way to analyses the effect of SU on sleep interruptions, hospitalizations and use of medications is by using contingency tables. This analysis shows if there is an association between a particular pair of variance. In general, the disadvantage of this approach is that contingency table does not allow control for covariate. However, the above analysis suggests that the analyzed covariates have not effect on outcomes. For this reason, contingency table analysis may be executed.

Chi-square suggests there was only a statistically significant effect for sleep interruptions $\chi^2(2) = 6.22, p = 0.045$. For example, Table 11

suggests that 59.4% of those who exercised showed a decrease in sleep interruptions as compared to only 47.1% those who did not do exercises. To estimate the magnitude of the effect associated SU exercises a Gamma score was computed at $\gamma = -0.256$. Absolute values of gamma between 0.25 and 0.49 represent weak relationship (Howell, 2012). Thus, it can be conclude that even for sleep interruptions the effect of SU exercises was weak.

Table 10

Contingency Table for Actual Counts of Straighten Up and Sleep Interruption Variables

Sleep interruptions	Straighten Up Exercises		Total
	No	Yes	
Decreased	41	129	170
No Change	40	83	123
Increased	6	5	11
Total	87	217	304

Table 11

Contingency Table for Column Percentages of Straighten Up and Sleep Interruption Variables

Sleep interruptions	Straighten Up Exercises		Total
	No	Yes	
Decreased	47.1%	59.4%	55.9%
No Change	46.0%	38.2%	40.5%
Increased	6.9%	2.3%	3.6%
Total	100.0%	100.0%	100.0%

As noted above, there were no statistically significant association between use of quick relief medications and Straighten Up exercises $\chi^2(6) = 4.812, p = 0.568$. (Table 11) Similarly changes in frequencies of hospitalization due to asthma did not change, $\chi^2(4) = 3.678 p = 0.451$. This contingency table analysis validates the conclusions reached in the regression analysis.

Summary

Only hypothesis H_1 was rejected, as there was no statistically significant evidence to reject hypotheses H_2 and H_3 . Covariates such as Age, Sex, BMI, and Race did not demonstrate statistically significant associations with any of the outcomes.

When adult asthmatics with severe asthma implemented the Straighten Up exercise there were changes in sleep interruptions. Despite being statistically significant, the effect of exercises was weak. No association was identified with the use of quick relief medications and hospitalizations (ER visits) due to asthma. In chapter 5, I will discuss the implications of the findings, things to keep in mind if the study were to be replicated, and study limitations.

Chapter 5

Introduction

This study was focused on discovering the relationship between implementing the Straighten Up model exercises as instructed by the chiropractors at Life University among adult asthmatics with severe asthma and asthma management. The results of this study contributed to the growing body of information regarding asthma management in older adults and how posture care as a lifestyle variable comes into play. As noted earlier, many elements and variables are involved with asthma management. Posture is one of many lifestyle changes that have an impact (Shaw, 2011). Since asthma cannot be cured but managed, any and all effort towards managing asthma needs to be ongoing (King et al., 2010). One of the innovative strategies about this study is that it captures a specific group of asthmatics who at one point were committed to implementing a posture care routine taught by chiropractors. Asthma management is characterized by three variables: use of quick relief medications, hospitalization due to asthma, and night time awakenings due to asthma. Of the 304 participants; the intervention (the Straighten Up model) had effect with night time awakenings due to asthma, but its effect on hospitalization due to asthma and the use of quick relief medications was not clear. Also, amongst all of the co-variants noted in chapter 2 and 4 none had any effect on the outcome.

Interpretation of the Findings

Hart et al., (2010) reported how the Baylor University Medical Center at Dallas developed the Rules of Two. A simple way to identify if asthma is well managed by applying a simple rule of two to the following four questions: Have asthma symptoms or

take your quick-relief inhaler more than Two times a week? Awaken at night with asthma symptoms more than Two times a month? Refill your quick-relief inhaler more than Two times a year? Measure your peak flow at less than Two times 10 (20%) with asthma symptoms? Keeping in mind the consistent themes in the literature, this dissertation focused on quick relief medication use, night time awakenings, and hospitalization due to asthma as variables in the relationship between asthma management and posture care when Straighten Up is applied.

Annakkaya et al., (2013) noted how sleep comes into play with asthma management, showing when asthma is poorly managed we see interruptions with sleep. Adult asthmatics with severe asthma who implemented the Straighten Up exercise and contributed to my study reported fewer sleep interruptions. However, although the literature described a strong connection between hospitalizations due to asthma and the use of quick relief medications as variables to measure asthma management, when it was tested for statistical significant there were none as it relates to the Straighten Up exercises., These findings show the intervention had impact on one out of the three dependent variables. The co-variants noted in chapter two were: age, sex, age of onset, pregnancy status, race, and weight. All these co-variants were tested and none had any statistically significant relationship with the three key variables.

Shaw (2011) discussed how asthmatic patients are often times observed to have a posture that involves slumping in the upper back area which can have an effect on lung function. Also, respiratory muscles are impacted by bad posture (Shaw, 2011). Peer reviewed studies like the one presented by Shaw (2011) describe the link with asthma and

posture care, this study focused specifically on the Straighten Up exercises and how it fits into the exiting literature associated with asthma management and posture care within adults with severe asthma. The findings show how chiropractic care did impact one of the key variables related to asthma management, night time awakenings due to asthma. This study leaves a gap for other researchers to explore how this intervention or others like it can impact asthma management as it relates to hospitalization due to asthma (ER visits) and use of quick relief medications. With these findings, asthmatics can learn another resource to help with asthma management, allowing them to engage with their team of providers. The findings, did not allow us to discover how the co-variance impacted asthma management, further study is needed to learn about their effects. Having more time to observe the participants may allow for more understanding of the intervention's impact.

This study allowed us to see and confirms the gap in the literature related to adults with asthma, and how asthma is a problem in the adult population. Further study is needed to learn more about adults as a venerable population related to asthma. Within this population, the focus of adults with severe asthma is one that opens the door for future research; where now, the current focus is on children with severe asthma. The findings of this study are in agreement with the exciting literature presented by Shaw (2011); however, further study is needed to learn more about the Straighten Up exercise's impact. Health care professionals who serve adult asthmatic patients may want to explore posture care and invite chiropractors to the table as a member of the team; realizing asthma management is a team effort. In public health practice, the following

professionals could use these findings: ER doctors, asthma educators, policy analyst working on asthma friendly worksites, and chiropractors.

The theoretical framework for this study was embedded in the Health Belief Model (HBM). In chapter 2 it was noted how the health belief model is where an individual will take a health related action (in this case the Straighten Up exercises) if that individual perceives that a negative health condition (in this case an asthma episode) can be avoided. In this case, Life University provided results of 304 adult participants with severe asthma who implemented the Straighten Up model exercises for three months. Baseline data was collected on the participants prior to the intervention and three months later data was collected on the same group of participants. The results of the study confirmed the HBM, in that the participants were implementing the Straighten Up exercises believing it would have some positive impact on their health. It's good to note, the participants were not implementing the intervention only for this study but their overall health. Using this theory in future studies will continue to ensure the participants are changing (lifestyle) behavior based on the belief of gaining the benefits associated with the intervention at hand.

Limitations of the Study

This study used secondary data from Life University. Life University collected the data at the clinic where patients are already receiving chiropractic care and is one of the few places where the Straighten Up exercises is implemented. Generalizing the results of this study to another group of asthmatic adults with severe asthma poses a

threat to the external validity; for, the study participants were trained by chiropractors or student interns where a chiropractor was in the room. Also, in this study all the participants are receiving chiropractic care; it poses a threat to generalize the results to asthmatic adults with severe asthma who are not receiving chiropractic care; for the pre-conditions will not be the same.

The sample size of 304 met the criteria of the power of analysis for this study, but a larger sample may potential have yielded different results. Also, only observing the participants for 3 months limited the study results; for, a longer time frame of implementing the intervention could have provided participants more opportunities to not only implement the intervention but see results.

In using secondary data for this dissertation, there is no way to note any unanticipated event that occurred during the intervention (three months where the asthmatic patients implemented the Straighten Up model exercises); not having that history poses a threat. Another threat to the internal validity is maturation and changes in the dependent variable (asthma management), which is impacted by so many factors working simultaneously. Lastly, experimental mortality may be present in that all the asthmatics who started the study may not have completed the Straighten Up for the entire three months period. Low statistical power is something that poses a threat to the validity of this study. Not having a large sample size (only 304) to draw conclusions resulting in accepting the null hypothesis when it is false. This was addressed by using the power analysis to determine sample size.

In this study, participants were simply sharing yes/no answers related to implementing the intervention and related behavior. Researchers recorded the answers provided; this does pose a threat to the reliability of the study, not having a way to measure if the participants are providing accurate responses. Also, human error with recording the participants' results is a threat to the reliability of the study.

Lastly, the asthmatics were self-reporting, leaving room for so many contributing factors to their responses. Also, all of the study participants were not trained by a chiropractor; some were trained by student interns at the Life University Clinic. It's imperative to note, outside factors may influence better asthma management other than the intervention that will not be reported by the participants and was not asked of them to report. All of these factors are limitations to note and consider.

Recommendations

The focus of this section is to provide recommendations for future research. One of the main factors is the number of participants in the study. As noted about 304 satisfied the requirements for power of analysis but for this study a larger sample size might have produced different results. A larger sample size may have also allowed for more findings related to the co-variants. The timeframe of the intervention was only three month, for future research it's recommended to collect data longer, allowing for greater potential impact. The selection process for the study participants was rooted in the research question and the secondary data provided by Life University. Replicating this study in another setting may require some additional work in the selection process. Also, notably the participants in this study learned how to implement the Straighten Up

exercises at the Life Clinic by a chiropractor or student under the supervision of a chiropractor. So, the conditions were safe (Shenolikar et al., 2011).

In replicating this study, providing a safe learning environment for the participants to learn would be needed, and not having that would pose a threat. The characteristic of the asthmatic patients in following doctors' orders and creating an environment free from triggers may cause it to be difficult in discerning how much of the patients wellness is due to the treatment or their other characteristics.

Positive Social Change Implications

The study findings do have positive social change implications. On an individual level for persons with asthma it provides them an additional tool to manage their asthma. For organizations who serve asthmatics, the finding allows them an additional resource to share with the population they serve. Lastly, asthma management involves Policy, Systems, and Environmental changes. The study findings, will allow public health professionals to create policies and system changes that could provide sustainability in the work of asthma management. For example, as public health professionals are working towards asthma friendly school policies, this study will be another resource to share with asthmatics and members of the community at large.

The findings of this study, reveals how the Straighten Up exercises does help night time awakenings due to asthma. This key finding not only opens the door for future research but allows for positive social change with people who suffer from asthma. Having this information will allow asthmatic and loved ones to have a lifestyle change in behavior that could impact their overall health. Asthmatics not experiencing night time

awakenings due to asthma could have improved quality of life associated with asthma, and open the door for decreasing overall asthma related morbidity and mortality.

Conclusion

Public health is ever growing and changing. The need for sustainability in regards to public health research and practice is growing. Asthma is a public health issue that impacts not only the lives of the asthmatics but the community at large. It takes a team work approach to manage asthma as so many variables contribute to asthma management. Posture, is one such variable that although may at first glance seem so small, is in fact a powerful tool related to asthma management. The findings of this study could allow asthmatics to be consumers towards their health and communicate effectively with their health care providers about options for management. Policy, Systems, and Environmental changes related to asthma management will play a key role in the sustainability of asthma management work, and this study is a tool to help guide future research towards positive social change. Asthmatics being able to sleep through the night with no interruptions related to asthma would impact all the other chronic diseases associated with lack of sleep. Lack of sleep impacts overall wellbeing, having adequate sleep is imperative to one's health. This study, introduces an intervention that may allow asthmatics to take an active role in managing asthma, have an improved quality of life, and reduced morbidity and mortality related to asthma.

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